Government Publications Registration Number
11-B410001-000084-01

Knowledge Sharing Program

2022/23 KSP Policy Consultation Report

Laos

Carbon Emissions Trading System Masterplan

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Project Title	Master Plan for Implementing Carbon Trading System in Lao PDR
Prepared for	Government of Lao

Supported by	Ministry of Economy and Finance (MOEF), Republic of Korea
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Government Publications Registration Number 11-B410001-000084-01

ISBN 979-11-402-0941-5(93320)

979-11-402-0942-2(95320)(PDF)

Document Number - KOTRA자료 24-032

2022/23 KSP Policy Consultation Report

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List of Acronyms

Acronyms (Full Title)
• AFOLU (Agriculture, Forestry and Other Land Use)
• AIDC (Asia Investment Development and Construction Sole.Co.Ltd)
• BUR (Biennial Update Report)
• CIBT(Global Capacity Building Initiative for Transparency)
• CCO (Climate Change Office)
• CDM (Clean Development Mechanism)
• CDM DOE (Designated Operational Entity)
• CERs (Certified Emission Reductions)
• COP 27 (Conference of the Parties of the UNFCCC)
• DCC (Department of Climate Change)
• DDMCC (Department of Disaster Management and Climate Change)
• DFRM (Department of Forest Resource Management)
• DLM (Department of Land Management)
• DNA (Designated National Authority)
• DOE (Department of Environment)
• DOF (Department of Forestry)
• DOFI (Department of Forestry Inspection)
• EDL (Electricite du Laos)
• ERPA (Emission Reductions Payment Agreement)
• ESIA (Environmental and Social Impact Assessment)
• FCPF (Forest Carbon Partnership Facility)
• GCF (Green Climate Fund)
• GEF (Global Environment Facility)
• GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit)
• G2G (Government to Government)
• IEE (Initial Environment Examination)
• IPCC (Intergovernmental Panel on Climate Change)

Acronyms (Full Title)
• JCM (Joint Crediting Mechanism)
• LEED (Lao PDR Energy Efficiency Datacenter)
• LoA (Letter of Approval)
• LTMS-PIP (Lao PDR-Thailand-Malaysia-Singapore Power Integration Project)
• MAF (Ministry of Agriculture and Forestry)
• MEM (Ministry of Energy and Mines)
• MOIC (Ministry of Industry and Commerce)
• MONRE (Ministry of Natural Resources and Environment)
• MOU (Memorandum of Understanding)
• MPWT (Ministry of Public Works and Transport)
• MRV (Measurement, Reporting and Verification)
• NAFRI (National Agriculture and Forestry Research Institute)
• NEC (National Environment Committee)
• NRTF (National REDD+ Task Force)
• PDD (Project Design Document)
• REDD+ (Reducing Emissions from Deforestation and Forest Degradation Plus)
• REL (Reference Emission Levels)
• SDM (Sustainable Develpment Mechanism)
• STEA (Science, Technology and Environment Agency)
• TWG (Technical Working Group)
• TWGCC (Technical Working Group for Climate Change)
• UNEP (UN Environment Programme)
• WB (World Bank)

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CHAPTER

Project Overview

1. Project Background and Objectives
2. Project Progress and Methods
3. Expected Effects

Project Overview

1. Project Background and Objectives

1.1 Project Background

Changes in International Carbon Market Mechanism

○ There was a discussion on the implementation of the Paris Agreement and the Glasgow Climate Pact in the 27th Conference of the Parties of the UNFCCC, hereinafter referred to as 'COP27', held in 2022.

- After discussing the issue of compensation for losses and damages caused by climate change in developing countries, COP27 adopted the 'Sharm-El-Sheikh Implementation Plan' as the final agreement.
- To establish a global carbon market, some aspects of voluntary reduction cooperation projects between countries have been finalized, and the project duration of the Clean Development Mechanism, hereinafter referred to as 'CDM', is limited to up to the end of 2025.

○ With the change from CDM to SDM (Sustainable Development Mechanism), it is anticipated that not only developing countries but also greenhouse gas reduction projects in developed countries will expand, leading to the revitalization of the Certified Emission Reductions (CERs) market.

- Under Paris Agreement Article 6.2 (Cooperative Approach), it is increasing possibility that international trading of emission reduction achievements will be sought through bilateral agreements, such as Joint Crediting Mechanism, hereinafter referred to as 'JCM' of Japan, or that a small number of interested countries will come together to form a certain group to link carbon markets or schemes.

○ Article 6.4 requires the CMA (Conference of Parties serving as the meeting of the Parties to the Paris Agreement) to designate a Supervisory Board (SB) for the new mechanism.

- Parties can voluntarily utilize the mechanism under Article 6.4, which results in credits called Article 6.4 Emissions Reductions (A6.4ER).
- Paris Agreement Article 6.4 specifies the participation of the private sectors. However, under the implementation rules agreed at the Conference of the Parties in Glasgow (COP26), if the private sector acquires ownership of an ITMO (Internationally Transferred Mitigation Outcome) in exchange for an investment and uses it for other international mitigation purposes, it is likely to be difficult in principle to use it to achieve a country's NDCs.
- Nevertheless, with the detailed implementation of Paris Agreement Article 6 finalized at COP26, 87% of the countries submitting NDCs (previously 44%) have identified business plans that utilize Article 6, demonstrating that international carbon markets are recognized as both a means of mitigation and an opportunity to generate economic benefits.

The Need for the Introduction of Emissions Trading System (ETS) in Laos

○ Meanwhile, Laos, the least developed country designated by UN, is the first ASEAN country to join the Paris Agreement in 2016 and set greenhouse gas reduction targets.

- With the support of various international organizations (UNDP, GGGI etc.), Laos established the '2030 National Green Growth Strategy' in 2018 and the Nationally Determined Contributions, hereinafter referred to as 'NDC', in 2021.
- However, there is a lack of comprehensive detailed implementation plans and organizational and human capacity within the Laos government ministries to achieve the actual goals.

○ Laos faces challenges in linking to its NDCs due to a lack of detailed regulations for carbon reduction implementation and particularly, incentives for the private sector to participate in greenhouse gas reduction.

- Laos has not established market-based policies for economic actors to engage in low-carbon economic activities to reduce greenhouse gas emissions from national industrial and economic activities.
- There is a need to consider how to leverage Paris Agreement Article 6.2 to

receive support from developed countries for mitigation, adaptation, finance aid, technology transfer and capacity building to achieve NDCs through international reduction projects.

○ Laos recognizes the need to introduce an emissions trading system within Laos in order to naturally establish and settle a carbon market with international linkages in the future.

* Recently, countries in the Asian region such as Japan, Indonesia, Malaysia and Thailand have begun full-scale operation of emissions trading systems, likely due to future exports to the EU (Carbon Border Adjustment Mechanism (CBAM) implementation etc.), and the potential expansion of the global carbon market.

1.2 Project Objectives

○ There is an increasing need for the Laos government to review relevant laws and improvements, improve institutions, and establish an operational system to achieve the 2030 NDC and explore ways to utilize the carbon market.

- Hoping to share empirical knowledge of mechanism and system establishment gained from the development of Korea's carbon emissions trading system (K-ETS) and strengthen internal human capacity.

○ Therefore, the 'Knowledge Sharing Program' is being promoted to contribute to the economic and social development of Laos by utilizing Korea's experience and knowledge in the field of carbon emission management and to create a foundation for friendly cooperation with Korea at the same time.

○ The purpose of this project is to identify limitations and improvement directions based on the current status analysis of laws, policies, operational systems and projects promoted so far in the field of local climate change response and greenhouse gas reduction in Laos.

- To develop mid-to-long term masterplan for the introduction of an emissions trading system meeting the needs of the Laos government as well as being locally applicable.

○ In addition, as Laos is a priority partner country[1] for Korea's climate change cooperation and is currently preparing to sign a bilateral cooperation agreement[2], it is necessary to identify international mitigation business models between the two countries in advance.

- Therefore, we are planning to discover new projects that can be used as international reduction projects through Paris Agreement Article 6 between Korea and Laos targeting domestic companies that wish to establish or expand their presence in Laos.

1) Of the 18 countries prioritized for bilateral cooperation on climate change by the Ministry of Foreign Affairs, Vietnam signed a MOU (Memorandum of Understanding) on climate change in 2021. The others are 10 countries in Asia (Indonesia, India, Thailand, Mongolia, Laos, Uzbekistan, Bangladesh, Myanmar, Sri Lanka, and the Philippines), 4 countries in Latin America (Chile, Brazil, Peru, and Colombia), and 3 countries in the Middle East and Africa (Saudi Arabia, Morocco, and the UAE). (As of Dec. 2022)

2) The Ministry of Trade, Industry and Energy hosted the 'Global Net Zero Connection in Asia' in Vietnam (May. 18~19, 2023), organized by KOTRA, and initiated discussions with six Southeast Asian countries (Vietnam, Thailand, Malaysia, Bangladesh, Laos, and Cambodia) to commence bilateral negotiations with the aim of transferring GHG emission reduction outcomes abroad.

2. Project Progress and Methods

(Project Progress) Establishing Mid-to-Long Term Strategy

○ To establish short-term and mid-to-long term strategies to propose the introduction of an emissions trading system suitable for local conditions in Laos.

- (Short-term : 2024~2030) ①Establishing a national GHG inventory, ②Building up a government management system and proposing its operational plans, and ③Suggesting plans to strengthen Korea-Laos bilateral cooperation by utilizing Paris Agreement Article 6.
- (Mid-term : 2031~2040) ①Preparing for the introduction of the greenhouse gas target management system and the emissions trading system(ETS), ② Presenting the project design document (PDD) of demonstration cooperation utilizing Article 6.2 and 6.4 of the Paris Agreement.
- (Long-term : 2041~2050) ①Introducing the emissions trading system in a full scale and managing it for sustainable operations.

○ In the short term, as a foundation-building stage, link to the inventory-related program currently being implemented by the Laos government in cooperation with the United Nations Environment Programme (UNEP) using the Global Capacity Building Initiative for Transparency (CBIT) of the Global Environment Facility (GEF).

- Finally, presenting detailed activities in the areas of legislation, policy-making, research and education for the establishment of the 'Laos National GHG Inventory'.
- At the same time, presenting sectoral preparations to lay the foundation for bilateral international reduction projects under Paris Agreement Article 6, which will be further expanded after COP28, the 28th Conference of the Parties to the UNFCCC, held later this year.

○ In the mid-to-long term, we would like to specifically present the case of Korea, which has the longest experience in operating an emissions trading system (ETS) in Asia, for the actual implementation of an emissions trading system in Laos.

(Research Method ①) Establishing an international trading mechanism for carbon emissions

○ (Laos Status) Periodic meetings were held with the Department of Climate Change (DCC) of the Ministry of Natural Resources and Environment (MONRE) using local consultants to understand the current status of laws, operating systems, and policies related to climate change and carbon neutrality.

○ (Laos-Related Projects) Cases of JCM (bilateral project type) and CDM (international mechanism type) projects were analyzed.

(Research Method ②) Establishing an Emissions Trading System (ETS)

○ (Domestic) Exploring short-term measures to strengthen government controls and internal capabilities and long-term measures to introduce an emissions trading system.

- In the short term, prioritizing the establishment of the 'Laos National GHG Inventory and Research Center'.
- In the long term, after piloting Korea's target management system, Laos will eventually introduce an Emissions Trading System (ETS) suitable for local conditions and link it to its NDC.

○ (Overseas) Presenting respective models based on Article 6.2 and 6.4 of the Paris Agreement.

- Proposing a plan to revitalize the G2G project based on bilateral cooperation under Paris Agreement Article 6.2 in the short term so that the government can manage external projects.
- Aiming to present a model for the implementation of the Paris Agreement 6.4ER(SDM) projects based on Paris Agreement Article 6.4, but in controllable manner.

(Research Method ③) Discovering Linkage Project

○ (Paris Agreement Article 6 Project) Proposing demonstration projects between the two governments and identifying items for linkage projects at the corporate level.

- Proposing a Korea-Laos G2G demonstration project in the form of a bilateral

agreement that can be controlled and monitored by the Laos government, and identifying feasible items through a demand survey among Korean companies in Laos that are interested in carbon reduction projects.

○ (By Sector) Organizing around the renewable energy sectors that the Laos government is focusing on, such as small hydropower, biomass, and solar power, and identifying the needs of Korean companies interested in entering Laos in these sectors.

(Research Method ④) Human Resource Development

○ As it is essential to cultivate human resources capable of carrying out carbon emission-related projects in Laos and strengthen internal capabilities, Laos officials in charge will be invited to Korea to visit relevant governments and organizations in Korea for training and facility tours.

○ Various programs such as short-term training and master's programs utilizing Korean ODA will be introduced so that the Laos government can request those programs to the Korean government even after the project ends.

3. Expected Effects

○ This project will contribute to the building of a preliminary infrastructure for the introduction of the system by providing the necessary contents and steps to reorganize the law and operation system required for the establishment of an emissions trading system(ETS), and to enable government agencies and industries in Laos to have their own capabilities.

○ By enhancing the image of Korea, which has the longest experience of operating an emissions trading system in Asia, and providing policy suggestions that faithfully reflect the local conditions and needs of Laos through the knowledge sharing project, it is expected to secure the credibility of the knowledge sharing project and contribute to the future development of bilateral cooperation between Korea and Laos.

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CHAPTER

Understanding on Economic and Social Development in Laos

1. General Information
2. Economic Status
3. Industrial Status
4. Energy Area Status
5. GHG Reduction Activity Status

Understanding on Economic and Social Development in Laos

1. General Information

※Ref:: KTV

[Figure 1] 5 Countries in Mekong River Region

[Table 1] General Overview of Laos

Country	• Lao People's Democratic Republic (Established on December 2, 1975)
Capital	• Vientiane - Population: approximately 969,000 (2021, Laos Statistics Office)
Population	• Approximately 7.26 million people (2021, IMF)
Language	• Lao (With tones, similar to Thai) - Lao 6 tones, Thai 5 tones
Location	• A landlocked country located between 14.1-22.3 degrees north latitude and 100-108 degrees east longitude - Borders with five countries: Vietnam (2,069km) to the east, Thailand (1,835km) to the west, Cambodia (435km) to the south, China (505km) to the north, and Myanmar (236km) to the northwest
Area	• 236,800㎢ (about 1.1 times the size of the Korean Peninsula)
Climate	• The average annual temperature is 28 degrees (Highest 39 degrees (April), lowest 10 degrees (December)) • May to October is the rainy season, and the average annual rainfall is about 2,045mm • Dry season from November to April (Little rain in December and January)

Religion	• Buddhism (69.4%), folk religion (28.4%), Christianity (1.5%), etc. • Freedom of religion is recognized under the constitution, but missionary work is • not permitted
Government type	• People's Democratic Republic
Currency	• The currency unit is LAK, called as "Kip" • 1 USD is 13,222 kip (Laos Central Bank as of May 13, 2022)
GNI per capita	• USD 2,514 (as of 2021)

※Ref: Ministry of Foreign Affairs. 2022. Laos overview

2. Economic Status

General Economic Status

○ Laos is actively pursuing hydroelectric power projects based on its abundant water resources, resulting in a substantial amount of electricity exports to neighboring countries.

- While the tourism sector, centered around Luang Prabang and Vang Vieng, has a significant contribution to the economy, the country has a weak manufacturing base and relies on imports for most of its industrial products and processed foods.

○ Laos is currently one of the world's least developed countries (LDCs), and is pursuing the 9th National Socio-Economic Development Plan (2021-2025) with the goal of graduating from LDCs by 2024 and entering a middle-income country by 2030.

○ Laos maintained a growth rate in the range of 6-7% from 2014 to 2018. However, in 2022, despite some expectation of slightly higher growth compared to 2021 (3.48%), the growth rate actually declined due to stagnant production and consumption activities and a sharp drop in currency value starting in early 2022.

- The economic growth rate has declined since early 2022 due to rising prices, fuel shortages, and sluggish domestic and foreign investment.
- The Laos government proposed an economic growth rate target of 4.5% for 2023, and the IMF and World Bank predict economic growth rates of 4% and 3.1-3.8%, respectively.

• While the resumption of economic activities in China is expected to benefit the tourism sector, the high inflation rate, which is forecasted to be 40.8% this year is likely to have a negative impact on economic growth of Laos.

[Table 2] Trend of Major Macroeconomic Indicators of Laos (2017~2022)

Category	Unit	2017	2018	2019	2020	2021	2022 (Estimated)
GDP	Billion USD	16.85	18.04	18.74	19.08	19.21	15.92
GDP Growth Rate	%	6.89	6.25	5.46	3.28	3.48	2.5

[Table 2] Trend of Major Macroeconomic Indicators of Laos (2017~2022)

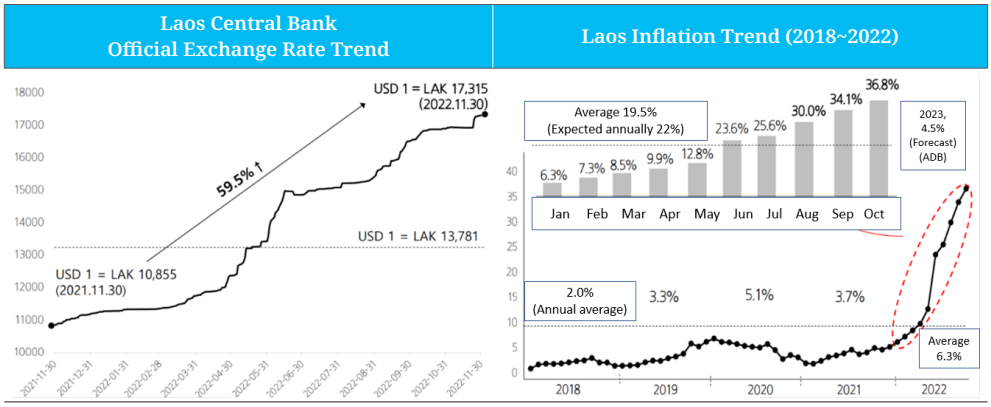
Category	Unit	2017	2018	2019	2020	2021	2022 (Estimated)
GDP per Capita	USD	2,407	2,539	2,598	2,607	2,587	2,114
Consumer Price Inflation Rate	%	0.83	2.04	3.32	5.1	3.76	16.9
Export	Billion USD	5.79	6.1	6.33	6.49	6.96	7
Import	Billion USD	6.99	8.13	8.02	8.23	8.85	9.47
Current Balance	Billion USD	-1.26	-1.65	-1.32	-0.23	0.47	n.a
Currency (Average)	Kip/USD	8,351.50	8,450.40	8,679.50	9,045.50	9,696.50	13,672.10
Population	Million People	7	7.11	7.21	7.32	7.43	7.53

※Ref: Korea Institute for International Economic Policy. 2023 Diagnosis and implications of Laos economic crisis possibility

○ From the second half of 2021, when the country was recovering from COVID-19, economic uncertainty increased due to a sharp rise in consumer prices, a sharp decline in the value of the domestic currency, the kip, and an increase in external debt.

- Laos, which has a persistent foreign exchange shortage and an increasing public debt, is facing challenges related to its ability to repay external debts. The ongoing global high inflation rates, high-interest rates, exchange rate fluctuations, and other unfavorable conditions have even raised concerns about the possibility of a default.

• Laos, whose GDP size is $18.55 billion in 2021, has a relatively high government debt-to-GDP ratio at 95.24% compared to its economic size.



※Ref: KOTRA. Overseas Market News, 'Laos, promulgation of amendments to the Foreign Exchange Management Act amid exchange rate and price instability' (Dec. 9, 2022)

[Figure 2] Trend of Major Economic Indicators of Laos (Exchange rate & Inflation)

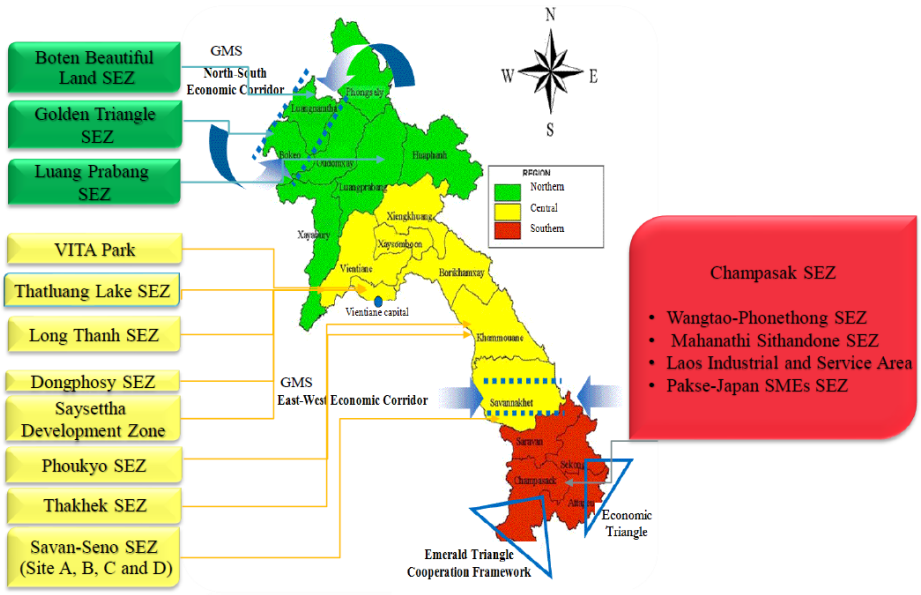
Investment Environment

○ Laos, a landlocked country with a vulnerable manufacturing sector, is actively working on infrastructure development to attract foreign direct investment (FDI). China has become the largest investor in Laos, with its investments steadily increasing over time.

- Laos is heavily dependent on large foreign investment and foreign aid funds in the hydroelectric power generation and mining sectors using natural resources. For continued economic growth, it is necessary to improve the foreign investment environment by strengthening capabilities in each sector, increasing transparency, and securing financial soundness.

○ Laos has been supporting special economic zones (SEZs) as a way to encourage foreign investment since 2000.

- The Laos Special Economic Zone Promotion Office (SEZO) and the Ministry of Planning and Investment are responsible for overall supervision of SEZs. The Special Economic Zone Management Agency (SEZA) of each province where SEZ is located is responsible for approving and promoting business operations in the special economic zone.
- As of 2022, there are 12 SEZs approved by the Laos government, and a total of 1,008 companies have moved in by February 2021.



※Ref: LAO PDR. SPECIAL ECONOMIC ZONES IN LAO PDR

[Figure 3] Map of 12 SEZs in Laos

○ The total investment in Laos as of March 2022 is USD 53 billion, of which the Laos government's investment is USD 3.4 billion, foreign investment is USD 27.6 billion, and Laos investment is USD 22 billion.

- Foreign investment in Laos is mainly from China (USD 13.46 billion), Thailand (USD 4.73 billion), and Vietnam (USD 4.32 billion).

[Table 3] Top 5 Countries for Total Investment

Rank	Country	No. of Projects	Total investment amount (USD); As of March 2022
1	Laos	2,819	15,370,944,737
2	China	920	13,465,892,261
3	Thailand	762	4,728,253,493
4	Vietnam	426	4,323,594,190
5	Korea	312	758,848,151

※Ref: KOTRA. 2023. Laos Entry Strategy

○ Investment in Laos is concentrated in the mining sector (37%) and energy (electric power generation) sector (31%), followed by services, agriculture, and manufacturing/crafts in that order.

- Foreign investment in power generation amounted to $9.5 billion as of March

2022, accounting for 34% of foreign investment, making it the sector with the highest foreign investment.

○ Unlike the countries of the Indochina Peninsula, Laos has low investment in manufacturing.

– The population of Laos is 7.48 million, so not only is the domestic market small, but there is also a shortage of working-age population, making it particularly difficult to expand the skilled workforce.

[Table 4] Investment Status by Sector & Actor

No	Sector	No. of Projects	Laos Investment		Foreign Investment		Total (USD)
			Private	Govt.	USD	Share	
1	Mining	414	12,509,968,267	62,143,954	6,839,589,217	35%	19,411,701,438
2	Power Generation	60	4,689,421,069	2,048,155,148	9,508,924,743	59%	16,246,500,960
3	Service	761	1,455,723,520	863,547,614	4,022,308,505	63%	6,341,579,639
4	Agriculture	994	329,816,632	17,483,387	2,795,604,343	89%	3,142,904,362
5	Manufacturing/ Handcrafts	938	718,595,251	76,838,749	1,451,960,518	65%	2,247,394,517

※Ref: KOTRA. 2023. Laos Entry Strategy
※Foreign investment share is the proportion of the foreign investment amount in the total amount(USD)
Foreign Investment Share = Foreign Investment Amount (USD) / Total Amount(USD)

○ Korea is the 5th largest investment country in Laos and is actively investing in the financial industry in addition to power generation (Xepian-Xe Namnoy hydroelectric power generation). Since the first investment in 1992, the total cumulative investment until 2021 is USD 600 million.

[Table 5] Korea's Annual Investment to Laos

(Unit: Thousand dollars, Investment criteria)

Category		2016	2017	2018	2019	2020	2021	Total
Investment in Laos	No	43	30	24	30	18	29	484
	Amt.	58,549	58,103	37,323	69,373	1,868	36,765	595,243
No. of Local Corp.		15	6	3	9	3	4	156

※Ref: Ministry of Foreign Affairs. 2022. Laos overview

○ Foreign direct investment (FDI) steadily increased until 2017, then decreased until 2019, but is increasing again after COVID-19 with recent active Chinese

investment.

- As of 2021, investments from neighboring countries such as China, Thailand, and Vietnam account for 93.7% of total investments in Laos, marking an expansion compared to 77.7% in 2011. Notably, there is a clear upward trend in investments from China and Thailand.
- Over the past 12 years (2010-2021), total approved FDI in Laos amounted to USD 20,540 million with energy (39.3%), mining (26.7%), agriculture (13.9%), and services (11.2%). These figures reflect a shift in the key investment sectors in Laos.

[Table 6] Composition of FDI by Industry in Laos (2010~2021, Permission Criteria, Top 5 Industries)

Sector	2010~2015		2016~2021		Total (2010~2021)	
	Amount	Share	Amount	Share	Amount	Share
Power	1,844	23.3	6,224	49.3	8,068	39.3
Mining	2,878	36.4	2,598	20.6	5,476	26.7
Agriculture	1,320	16.7	1,536	12.2	2,856	13.9
Service	456	5.8	1,847	14.6	2,303	11.2
Tourism (Hotel and Restaurant)	170	2.2	152	1.2	322	1.6

※Ref: Korea Institute for International Economic Policy, 2023 Diagnosis and implications of Laos economic crisis possibility

○ On January 28, 2021, Laos announced the implementation of the PPP law to revitalize Public-Private Partnership projects.

- Recently, Laos has announced various policies with a strong commitment to graduation from LDC status and improvement of its public infrastructure. PPP is a common investment model for overseas projects. However, enacting specific regulations through legislation in Laos indicates the significance of PPP in their policy framework.

○ Laos is pursuing the expansion of PPP projects focusing on improving public infrastructure to break away from its status as an LDC.

- The law clearly defines eight areas* to which PPP will be applied.

* ① Transportation and logistics ② Service ③ Government service, ④ Energy development, ⑤ Tourism industry development, ⑥ Industrial complex development, ⑦ Social network establishment ⑧ Agriculture

ODA Cooperation Status

○ Laos is receiving an average of USD 557.8 million in ODA support between 2017 and 2021, and Korea is providing an average of USD 59 million in ODA support (about 10.6% of the total support amount).

– Korea's proportion of ODA support to Laos exceeds 10% on average, excluding 2020, and ranks second as a single country.

• Korea's top priority is to contribute to Laos' graduation from LDC through ▲sustainable rural development ▲improvement of health environment ▲ support for education and transportation.

○ While non-repayable assistance to Laos, a traditional priority partner, has steadily increased since 2012, repayable aid mostly supports the energy sector.

– Repayable aid shows significant year-to-year variations but is primarily directed towards the energy sector (44.9%), which includes hydroelectric power generation and electricity transmission and distribution. This is followed by support for water supply and sanitation (29.7%), government and civil society (8.1%), and transport and storage (6.5%).

3. Industrial Status

○ Prior to the COVID-19 pandemic, Laos had maintained a high-speed growth rate in the range of 7% annually. The country's economic profile is better described by the term 'natural' rather than 'industrial.'

- When looking at Laos's industrial GDP composition in 2021, the primary sector accounted for a relatively low 16% compared to the secondary and tertiary sectors. However, on closer examination, crop cultivation held the third-highest share (10.4%) after electricity generation and retail/vehicle repair services.
- In addition, the combined share of Laos' manufacturing sector GDP is 8.5%, which indirectly shows that the manufacturing sector was not the main driver of annual growth of 7%.

○ Nevertheless, Laos is promoting a national vision of graduating from the UN-designated LDC and leaping into a middle and high-income country through sustainable and eco-friendly methods.

- To date, Laos' industrial competitiveness is based on agriculture, and handicrafts, and industries that utilize natural resources and hydroelectric power generation.

[Table 7] Composition of Laos' GDP by Industry (2021)

Main	Subcategories	Comp.(%)		Main	Subcategories	Comp.(%)	
1st Industry	**Crop cultivation**	**10.4**	16	3rd Industry	**Wholesale / Retail trade, Vehicle repair**	**11.5**	38.1
	Livestock	2.3			Transportation, warehousing	1.2	
	Forestry	1.1			Food, accommodation	0.9	
	Fisheries	2.2			ICT	1.6	
2nd Industry	Mining	4.4	34		Finance, insurance	2.9	
	Food manufacturing	1.6			Real estate	5.4	
	Drinks / Tobacco	1.3			Tech science	1.3	
	Apparel / Garment	1.1			Defense, Admin, social insurance	9	
	Other manufacturing	4.5			Education	2.1	
	Power generation	**11.8**			Health, social welfare	0.6	
	Water&Waste treatment / Environmental beauty	0.2			Other services Other services	1.6	
	Construction	9.1					

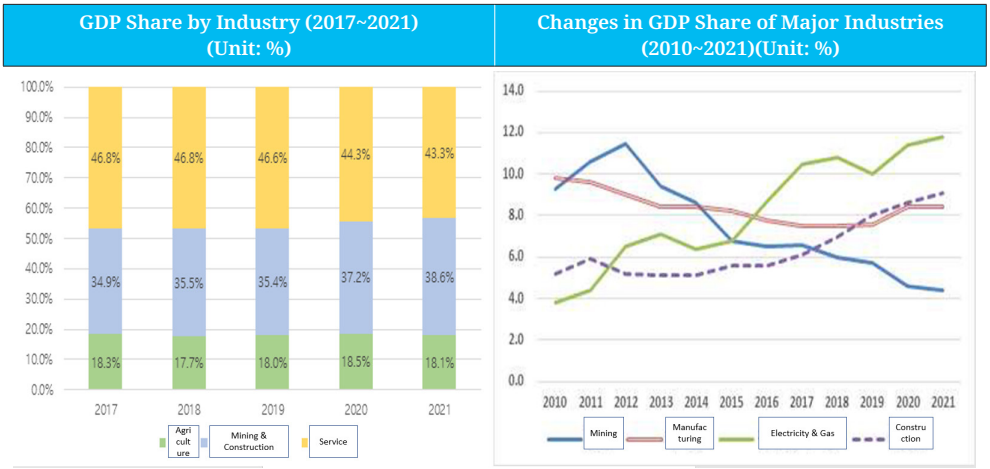
[Table 7] Composition of Laos' GDP by Industry (2021)

Main	Subcategories	Comp.(%)	Main	Subcategories	Comp.(%)
Net Income		12			
Total		100			

※Ref:: KOTRA overseas market news. "What is the potential for green business in Laos?"

○ (Industrial Structure) Based on GDP, the proportion of agriculture, forestry and fisheries has decreased sharply since the 2000s, while the proportion of mining and construction industries has recently increased and the proportion of service industries has tended to decrease.

- It is analyzed that the background of active FDI is the expansion of electricity production and export through the construction of hydroelectric power plants, expansion of infrastructure construction including dams, and decline in international raw material prices.
- The electric power and mining, along with the tourism, are the largest foreign exchange attracting sectors in Laos.



※Ref: Korea Institute for International Economic Policy. 2023 Diagnosis and implications of Laos economic crisis possibility

[Figure 4] Share and Change of Laos' GDP by Industry

4. Energy Area Status

Energy Policy

○ Laos has designated the supply of stable, affordable and sustainable electricity as a top priority in its energy policy for economic growth and poverty reduction.

- The main focus areas are improving access to electricity and hydropower generation, and in 2015, the Laos government approved Laos' sustainable hydropower development policy.

○ Laos' new and renewable energy development strategy (2011) sets a goal of 30% of the proportion of new and renewable energy in the national energy mix by 2025.

- This plan includes a short-term strategy (2010-2015) to strengthen necessary research and capacity, a medium-term strategy (2016-2020) to establish a clear renewable energy framework, and a long-term strategy (2021-2025) to develop a fully competitive renewable energy market.

• New and renewable energy target: 7% in 2015 and 20% in 2020

Status of Power Generation Facilities

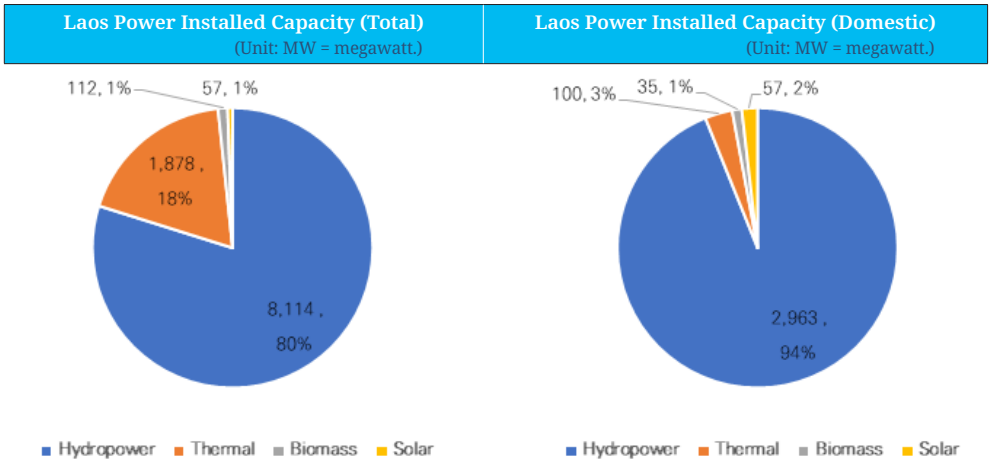
○ As of 2020, the total installed capacity of power generation facilities in Laos is 10,161MW, of which 31%, or 3,155MW, is for domestic use.

- For domestic purposes, the installed capacity of hydroelectric power accounts for 94%, so most of the installed capacity for domestic uses relies on hydroelectric power.

• The installed capacity of other power generation types, such as biomass and solar power, is still very low.

- Laos is a country with a very large proportion of hydroelectric power generation, with the installed capacity of hydroelectric power accounting for 80% of the total, with thermal power generation accounting for 18%.

• Since 2015 with the introduction of thermal power generation, about 1.9GW installed capacity has been built.



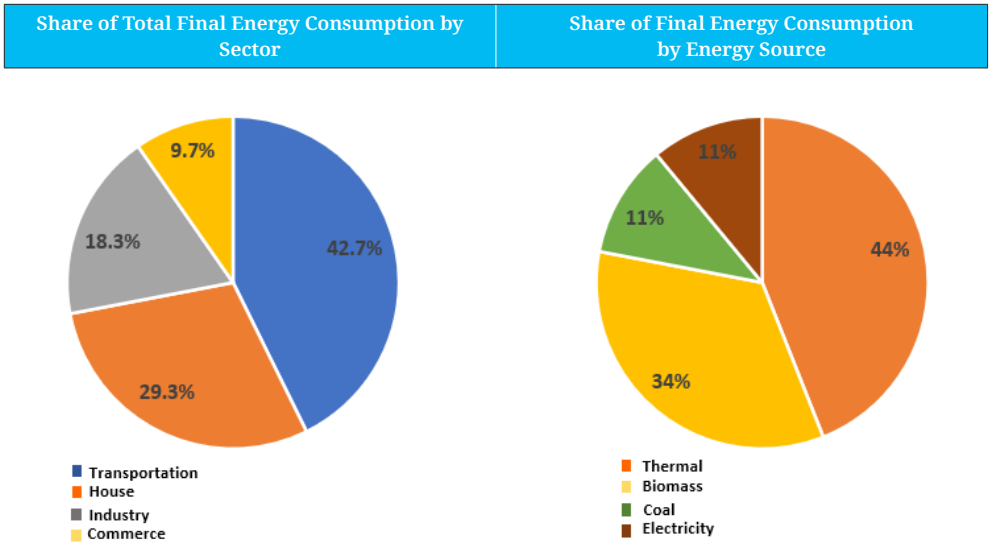
※Ref:: ERIA. 2022. Analysis on Impacts to the Power Sector

[Figure 5] Power Facilities Status (2020)

Energy Consumption Status

○ Total final energy consumption (TFEC) in 2019 was 4,449 ktoe, with most demand coming from the transportation sector (42.7%), followed by the residential sector (29.3%), industrial sector (18.3%), and commercial sector (9.7%).

○ Oil was the main energy source for TFEC, accounting for a 44% share, followed by biomass (34%), electricity (11%), and coal (11%).



※Ref:: ESCAP. 2022. SDG 7 Roadmap for the Lao PDR

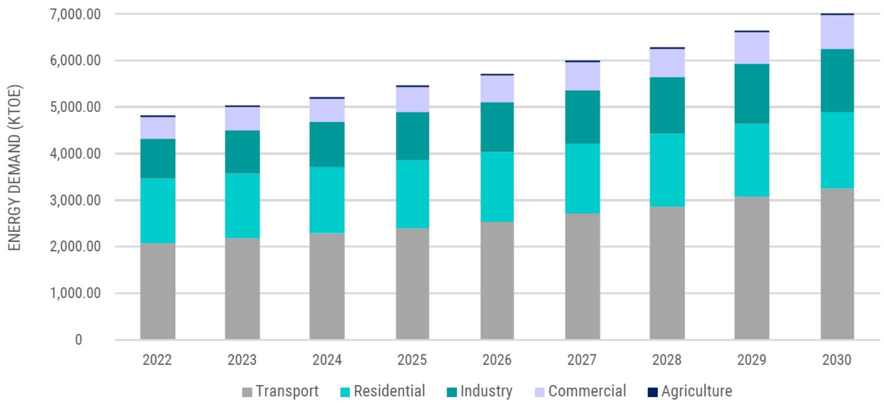
[Figure 6] Laos Power Supply and Power Generation by Energy Source(2019)

Energy Demand Outlook

○ According to the BAU scenario, total energy demand is expected to increase from 4,423 ktoe in 2019 to 6,976 ktoe in 2030 at an average annual growth rate of about 5%.

– This represents an estimated 40% growth in energy demand in 2030 from around 5,000 ktoe in 2023.

– In 2030, the transportation sector is expected to account for the largest share of consumption at 47.5%, followed by the residential sector at 24%, the industrial sector at 19%, and the commercial sector at 10.4%.

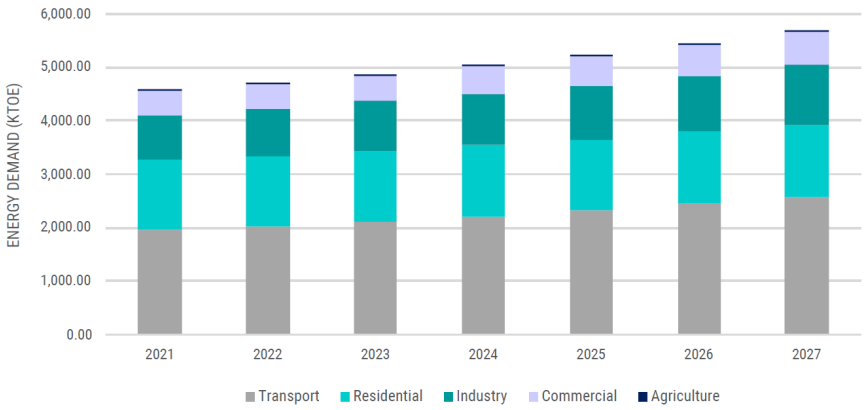


※Ref: ESCAP. 2022. SDG 7 Roadmap for the Lao PDR

[Figure 7] Final Energy Demand by Sector - BAU Scenario (2022-2030)

○ The second demand scenario, the Current Policy (CP) Scenario, is based on the current initiatives that are being implemented. According to this scenario, it is estimated that energy demand will grow at a rate of approximately 4.3% from 4.4 Mtoe in 2019 to 6.5 Mtoe by 2030.

– In 2030, the transportation sector is expected to remain the main consumption sector with 3.05 Mtoe (46.7%), followed by the residential sector with 1.42 Mtoe (21.7%), the industrial sector with 1.35 Mtoe (20.6%) and the commercial sector with 0.72 Mtoe (11%).



※Ref: ESCAP. 2022. SDG 7 Roadmap for the Lao PDR

[Figure 8] Final Energy Demand - CP Scenario (2022-2027)

Status of New and Renewable Energy Use

○ According to the proportion of each energy source in the national primary energy supply, the proportion of new and renewable energy has been slightly decreasing since the introduction of thermal power generation in 2015, but recorded 48% as of 2019.

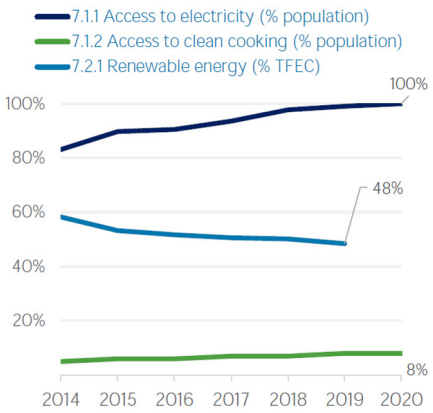
– Energy production increased by approximately 25% from 2016 to 2019, so even considering the about 10% decrease in the proportion of new and renewable energy production during the period, the actual amount of new and renewable energy production is increasing.

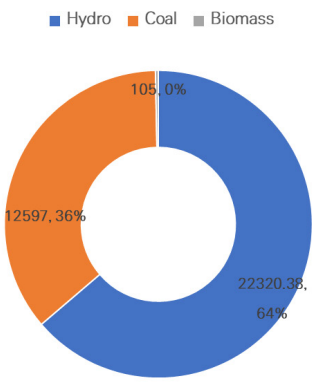
– Biomass and hydropower are the main renewable resources in Laos. Biomass is generally used to produce heat energy, but hydropower is almost the exclusive source of electricity generation.

• As of 2019, renewable energy supply consists of 65% hydroelectric power and 34% bioenergy, with solar, wind, and geothermal energy accounting for less than 1%.

• The first lignite-fired power plant went into operation in 2015, and it contributed to producing 12,597GWh (35.97%) in 2017, as shown in the figure below.

Share of New and Renewable Energy in Laos (7.2.1)	Electricity Generation by Energy Source in Laos





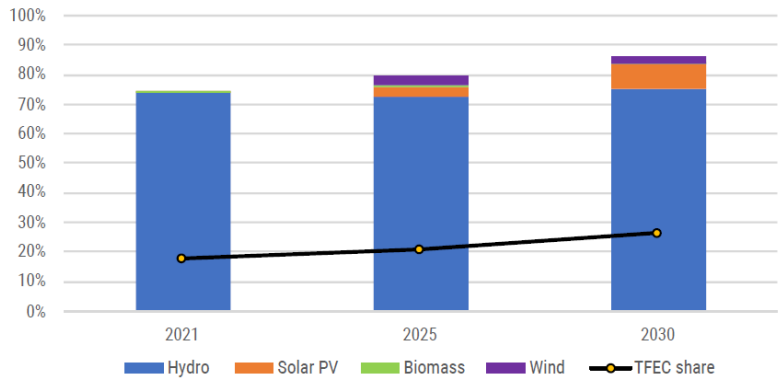
※Ref: (L)IRENA. ENERGY PROFILE, (R) AGEP. 2018. Country-Profile_Lao-PDR

[Figure 9] Electricity Generation by Energy Source and Renewable Energy

Prospect for Expansion of New and Renewable Energy

○ The share of renewable energy in Laos' total final energy consumption (TFEC) is expected to increase to 26.5% in 2030, and the share of new and renewable energy in the power generation mix is expected to increase from 65.5% in 2018 to 86% in 2030.

- (Estimation basis) Based on the NPDP (National Population and Development Policy) goal of Laos by UNESCAP (Economic and Social Commission for Asia and the Pacific).
- The use of solar and wind energy is expected to increase after 2025, and the proportion of solar energy use is expected to increase until 2030, while the proportion of biomass is expected to decrease.



※Ref: ESCAP. 2022. SDG 7 Roadmap for the Lao PDR

[Figure 10] TFEC and Renewable Energy Share in Power Generation

○ By 2030, the electricity capacity composition is estimated to be 23GW of hydropower, 11.5GW of solar power, and 0.9GW of biomass. Currently, hydroelectric power accounts for the absolute share (79% by 2021), but the share of solar power is expected to increase to about 30% by 2030.

– (Estimation basis: Coal phase-out scenario) It was assumed that the current proportion of coal-based electricity production would be fixed rather than expanded.

• To keep global warming below 1.5°C, coal power generation use must be reduced by 80% by 2030. At the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change(COP26), major coal-consuming countries declared to stop using coal for electricity production.

• In addition, while this estimate considers the potential for wind power generation in Laos to be low, there is growing concern that during the dry season, hydropower generation might decrease. To mitigate this risk, investments and development in wind power generation are ongoing.

– In the case of solar power, the power generation capacity using idle land is estimated to be 8GW, and it is expected that about 3.5GW power generation will be possible through floating solar power generation linked to a hydroelectric power plant.

[Table 8] Power Capacity Mix in the Coal Phase-out Scenario (GW), 2021-2030

Mix	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Hydro	7.2	8	10.7	13.3	16	17.4	18.8	20.2	21.6	23
Coal steam	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Biomass	0	0.1	0.2	0.3	0.5	0.5	0.6	0.7	0.8	0.9
Solar	0	1	3.3	5.6	7.9	8.6	9.3	10	10.8	11.5
Wind	-	-	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Total	9.1	11	16.6	21.7	26.8	29	31.2	33.4	35.7	37.9

※Ref: ESCAP. 2022. SDG 7 Roadmap for the Lao PDR

5. GHG Reduction Activity Status

Laos GHG Emissions Status (2011~2019)

○ Since 2011, Laos' GHG emissions (excluding LUCF[3]) have continued to increase, and GHG emissions in 2019 increased by 2.4 times compared to 2011.

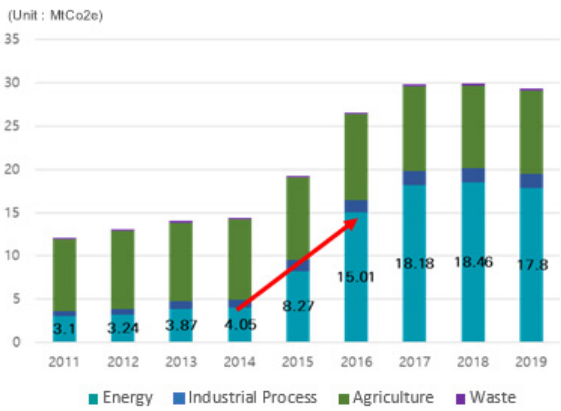
- Looking at the change trend by sector, emissions from the energy sector, which accounted for about 25% in 2011, increased more than six times, accounting for more than 60% in 2019, becoming the most key factor.
- The industrial process sector also increased by more than three times, and the agriculture and waste sector increased slightly by more than 10%.

• Even in global standards, the proportion of emissions is high in that order: energy at 74.7%, agriculture at 12.4%, industrial processes at 6.6%, and waste at 3.5%.

[Table 9] GHG Emission Status in Laos(2011~2019)

(Unit: $MtCO_2e$)

Sector	2011	2012	2013	2014	2015	2016	2017	2018	2019
Energy	3.10	3.24	3.87	4.05	**8.27**	**15.01**	**18.18**	**18.46**	**17.80**
Industrial Process	0.54	0.62	0.88	0.91	1.25	1.39	1.61	1.65	1.67
Agriculture	8.3	9.05	9.1	9.24	9.53	9.94	9.81	9.58	9.6
Waste	0.19	0.19	0.19	0.2	0.2	0.21	0.21	0.21	0.22
Sub Total	12.13	13.10	14.05	14.40	19.26	26.55	29.81	29.90	29.28



※Ref: Climate Watch, Global historical emissions, https://www.climatewatchdata.org/ghg-emissions (Search date: Jun. 9, 2023)

3) LUCF : Land Use Change and Forestry

○ CO2 emissions also continue to increase. CO2 emissions in 2019 increased more than six times compared to 2011.

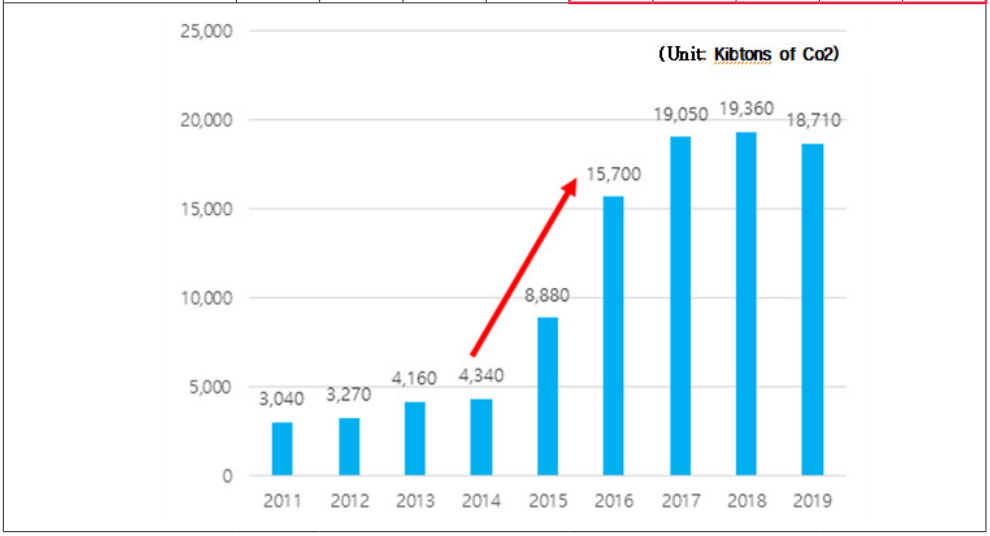
- Compared to the three-fold increase in GHG emissions over the same period, CO2 emissions are increasing at a more faster rate. In addition, there is a similarity of two factors in that the largest increase occurred between 2015 and 2016.

• **It shows a similar growth (6 times) as the increase in GHG emissions in the energy sector,** suggesting that the increase in CO2 emissions was particularly high in the energy sector.

[Table 10] CO2 Emission Status in Laos(2011~2019)

(Unit: Kilotons of Co_2)

Category	2011	2012	2013	2014	2015	2016	2017	2018	2019
Carbon $(CO)_2$ Emissions	3,040	3,270	4,160	4,340	**8,880**	**15,700**	**19,050**	**19,360**	**18,710**



※Ref: Macrotrends, Lao PDR Carbon (CO2) Emissions https://www.macrotrends.net/countries/LAO/lao-pdr/carbon-co2-emissions (Search date: Jun. 9, 2023)

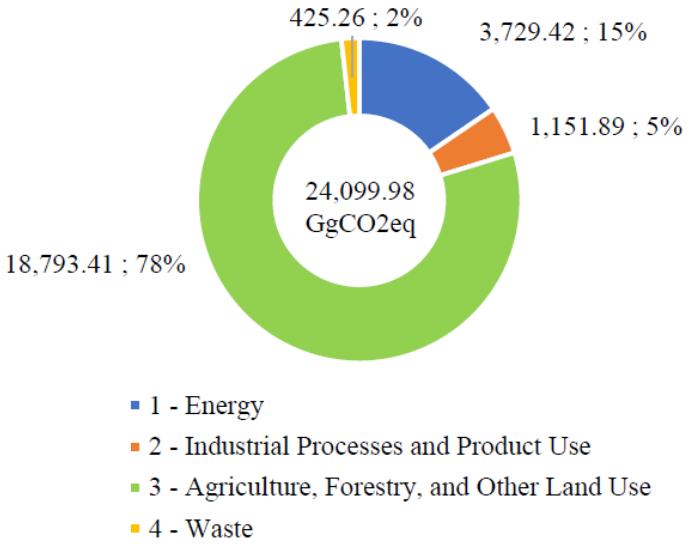
Factors Affecting GHG Emissions

○ CO2 emissions in Laos are closely related to industrial scale, forest size, and agriculture. However, the collection of reliable data is challenging due to its limited availability and its dispersion across various agencies in the country.

- In 2014, "Agriculture, Forestry, and Other Land Use" accounted for the highest proportion of Laos' GHG emissions at 78%, followed by the energy sector at 15% and the industrial sector at 5%.

• Since then, agricultural GDP is experiencing slight increases. Even in the

period of sharp emissions increase during 2014-2015, emissions from the agricultural sector remained at similar levels. With the decreasing trend in agricultural land area, it is challenging to attribute significant contributions of this sector to GHG emissions.



※Ref: LAO. 2020. PEACE INDEPENDENCE DEMOCRACY UNITY AND PROSPERITY

[Figure 11] GHG Emission Status in Laos (2014)

[Table 11] Trend of Agriculture GDP and Change of Agricultural Land Size

Category	2013	2014	2015	2016	2017	2018	2019
Agricultural GDP (Billion kip)	15,568	16,214	16,791	17,254	17,750	17,975	18,194
Farmland area (Thousand ha)	-	-	2494	2494	2444	2394	1870

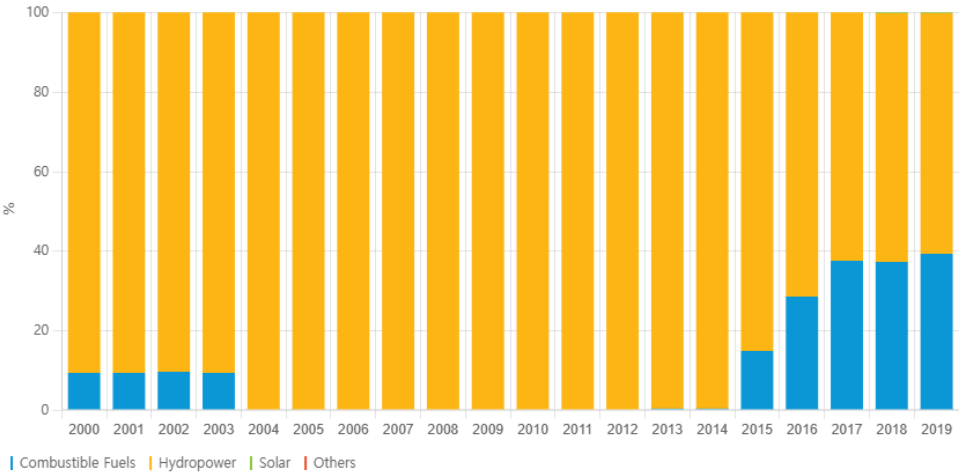
※Ref:(Agriculture GDP): https://ko.tradingeconomics.com/laos/gdp-from-agriculture (Search date: Jun. 21, 2023)
※Ref: (Farmland Area): Korea Agro-Fisheries and Food Trade Corporation. 2021
2021 Agricultural and Food Export National Survey Report

○ As a result of reviewing the factors of change based on related data, GHG emissions showed a noticeable increase after 2014, and it was presumed that the expansion of the 'electricity and gas industry' and the 'construction industry' had an impact.

- Looking at changes in the share of GDP in Laos, the sectors showing an increasing trend since 2010 are 'electricity and gas industry' and 'construction industry'.
- In particular, there is a notable shift in electricity production methods. Unlike in 2014 when hydropower accounted for nearly 100% of electricity

production, since 2015, there has been a sharp increase in the use of combustible fuels. This is considered a key contributing factor.

- Share of combustible fuel : 0.036%(2014), 14.8%(2015), 28.402%(2016), 37.442% (2017), 37.275%(2018), 39.167%(2019)



※Ref: ADB. Key Indicators Database. https://kidb.adb.org/economies/lao-peoples-democratic-republic

[Figure 12] Year-by-year Changes in Laos' Power Supply Sources (% of the total)

- In the construction sector, the Laos government has been promoting expansion through increased fiscal expenditure for infrastructure development and activation of foreign investments to strengthen the vulnerable industrial base. This expansion in the construction sector is expected to lead to increased carbon emissions.
  - In Laos, the infrastructure construction market continues to grow due to a lack of roads, railways, transmission lines, shopping malls, hospitals, etc. However, the Laos government suffers from a continuous fiscal deficit and has limitations in covering infrastructure development costs, so it continues to promote infrastructure development through PPP.
  - Main types of transportation and logistics infrastructure construction projects: road construction, bridge construction, border checkpoint and customs clearance facility construction, inland port construction, railroad construction projects, etc.
  - In Korea, steel, petroleum/chemicals, cement, and oil refining are defined as the four major carbon-emitting industries. The construction industry is a high-carbon industry, so it is highly likely to contribute to changes in emissions.

03

CHAPTER

Carbon Neutrality Control, System and Project Status in Laos

1. Climate Change and GHG Emission Reduction Strategy
2. Climate Change and Carbon Control related Legislations
3. GHG Emission Reduction and Climate Change Adaptation Policy Status
4. Operational System Status of GHG Emission Reduction
5. International Reduction Project Status

Carbon Neutrality Control, System and Project Status in Laos

1. Climate Change and GHG Emission Reduction

1.1. National Strategy

※Ref: KMAC

[Figure 13] Laos Climate Change and GHG Emission Reduction National Strategy

National Strategy on Climate Change (NSCC. 2010)

○ In 2010, the Lao National Assembly approved the NSCC with the vision of "securing a future for Laos capable of mitigating and adapting to climate change for sustainable economic development, poverty reduction,

improvement of public health, improvement of natural resources, and quality of life in Laos."

- NSCC proposed 7 adaptation sectors by expanding the 4 climate change vulnerable sectors identified in the previous National Adaptation Program of Action (NAPA).
  - 7 adaptation sectors: 1) Agriculture and food security, 2) Forests and land use, 3) Water resources, 4) Energy and transportation, 5) Industry, 6) City development, 7) Public health

○ NSCC serves as the basis for integrating climate change adaptation policies into the National Socio-Economic Development Plan through the mainstreaming of climate change in the 7th National Socio-Economic Development Plan (NSEDP).

2030 National Green Growth Strategy (NGGS, November 2018)

○ Laos is pursuing social and economic development through long-term 10-year development plans and mid-term 5-year development plans with the national goal of achieving 'entry into the upper middle-income country through sustainable economic growth.'

- In 'Vision 2030,' Laos has established a long-term strategy with the goals of achieving 'entry into the upper middle-income country through innovative, environmentally friendly, and sustainable economic growth' and 'expanding per capita income fourfold compared to 2015.'
  - As of 2015, Laos had a per capita GNI of USD 1,980, which increased to USD 2,520 as of 2021.
- To accomplish the objectives of 'Vision 2030,' Laos has presented seven medium-to-long-term tasks through the '10-Year Socio-Economic Development Strategy (2016-2025)' and, in more detail, has released five-year plans called 'National Socio-Economic Development Plan (NSEDP)', emphasizing the graduation from the LDC status, as well as the development of emerging trade sectors such as climate change and the digital sectors.

[Table 12] 2030 National Green Growth Strategy

구분	Economic	Social	Environmental
Goal	• Economic growth • Increase in employment rate and income • Minimization of global economic impact	• Inclusivity and equality • Reduction of regional disparities • Promotion of social equity for vulnerable populations	• Effective and efficient resource utilization • Reduction of environmental pollution • Minimization of vulnerability to disasters
Task	**Budget**	**Finance**	**Education**
	• Introduction of environmental taxes • Economic utilization policies for energy and resources • Supportive policies for the production and consumption of socially and environmentally friendly products • Priority procurement policies for eco-friendly products and businesses	• Long-term low-interest loans for high-efficiency, eco-friendly production facilities import • Low-interest loans for small and medium-sized enterprises in the green growth sector • Activation of small loan institutions	• Incorporation of the concept of green growth into primary and secondary school curricula • Development of academic-industry collaborative programs in the field of green growth and sustainable development • Advancement of scientific and policy research related to green growth
	Labor/Social Welfare		**Health**
	• Development of short-term vocational training programs in the green growth sector • Establishment of employment and job information centers • Streamlining and expanding the social welfare system • Enhancement of the efficiency of emergency support systems for disaster victims		• Minimization of malnutrition and food insecurity • Improvement of access to clean water and sanitation • Reduction of maternal and child mortality rates • Enhancement of healthcare service accessibility

※Ref: KOTRA. Overseas Market News.'Carbon Reduction as a Business Opportunity in Laos'

Laos' GHG Reduction Targets (2nd NDC, 1st Revision in March 2021)

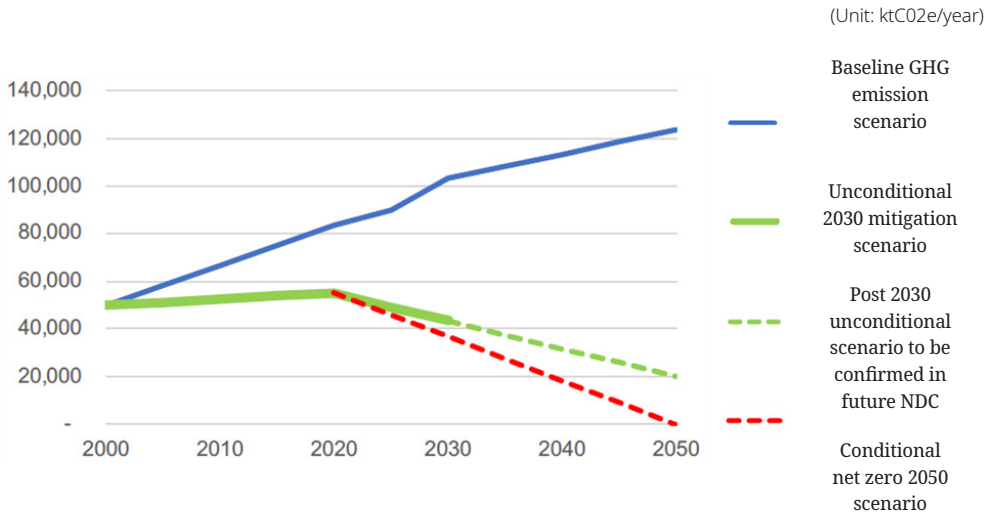
○ In 2015, Laos initiated its first plan, followed by the formulation of the 2nd NDC in 2021.

- Despite being a least developed country, Laos signed the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) in April 2016, making it the first ASEAN nation to do so, showing progress in the execution of climate finance for low-carbon investments by developed countries.

• Laos promised to reduce GHG emissions by 60% by 2030 compared to the

2000 BAU scenario by revising the National Greenhouse Gas Reduction Target (NDC)[4] (May. 2021).

○ Laos has established criteria for its 2nd NDC and has three scenarios: unconditional mitigation until 2030, followed by conditional mitigation beyond 2030.



※Ref: ASEAN Green Future report. 2021. Decarbonization in Lao PDR – the options and challenges

[Figure 14] Simulation Results of the GHG Emissions Scenarios

○ (Unconditional Mitigation Scenario) This indicates the situation where support from developed countries for emissions reduction is not provided smoothly, and reflects the efforts to reduce GHG that Laos can promise, considering Laos' own resources and the existing level of support from developed countries.

- One of the main goals is to achieve an annual average reduction of 1,100kt CO2e in Land Use Change and Forestry (LUCF) emissions from 2020 to 2030.
- In the energy sector, the focus is on hydropower generation, energy efficiency, and transportation.

4) Laos established NDC from Jan. 2018 to Oct. 2021 with the support of UNDP.

[Table 13] Sectoral Level 2030 Unconditional Mitigation Targets

Sector	Activities (2020-2030)	Average Abatement between 2020 and 2030 (ktCO2e\Yr)	Share (%)
Land use change and forestry	Reduced emissions from deforestation and forest degradation, fostering of conservation, sustainable management of forests, buffer zones of national parks and other preserves, and enhancement of forest carbon stocks	1,100	27.7%
Hydro-power	13 GW total hydropower capacity (domestic and export use) in the country	2,500	62.9%
Energy efficiency	Introduction of 50,000 energy-efficient cookstoves	50	1.3%
Transport	New rapid transit bus system in the capital, Vientiane, and an associated non-motorized transport component	25	0.6%
	Lao-China railway	300	7.5%
Total		3,975	100%

※Ref: ASEAN Green Future report. 2021. Decarbonization in Lao PDR – the options and challenges

○ (Conditional Mitigation Scenario) It is a feasible reduction goal on the condition that developed countries provide adequate support in terms of emissions reduction technologies and financial assistance.

- The key goal is in the Land Use Change and Forestry (LUCF) sector, where Laos aims to increase its forest area to 70% of the total land area, in alignment with the National Forestry Strategy (GoL, 2021). This sector accounts for 98.5% of the overall reduction target.
- In contrast to the unconditional mitigation targets, the hydropower generation sector is excluded, while the targets for transportation and energy efficiency are adjusted. New targets are introduced in the agriculture and waste management sectors.

[Table 14] Sectoral Level 2030 Conditional Mitigation Targets

Sector	Activities (2020-2030)	Average Abatement between 2020 and 2030 (ktCO2e\Yr)	Share (%)
Land use change and forestry	Increase forest cover to 70% of land area (i.e., to 16.58 million hectares) through reduced emissions from deforestation and forest degradation, fostering conservation, sustainable management of forests, buffer zones of national parks and other preserves, and enhancement of forest carbon stocks.	45,000	**98.5**
Renewable energy	Solar and wind: 1 GW total installed capacity in the country	100	0.2
	Biomass: 300 MW total installed capacity in the country	84	0.2
Transport	30% electric vehicle penetration for two-wheelers and passenger cars in the national vehicles mix	30	**0.1**
	Biofuels to meet 10% of transport fuel needs	29	**0.1**
Energy efficiency	10% reduction of final energy consumption compared to baseline scenario	280	0.6
Agriculture	Adjusted water management practices in 50,000 hectares of lowland rice cultivation	128	0.3
Waste	Implementation of 500 tons/day sustainable municipal solid waste management project	40	**.01**
Total		45,691	100%

※Ref: ASEAN Green Future report. 2021. Decarbonization in Lao PDR – the options and challenges

○ (Progress on 1st NDC Implementation) National GHG emissions in 2020 are estimated at approximately 53,000ktCO2e, taking into account reduction measures implemented across all sectors since 2000, primarily in LUCF and the power sectors.

– From 2000 to 2020, Laos achieved a 34% reduction in emissions compared to the baseline scenario. During this period, the growth rate of GHG emissions is estimated to be around 0.3% annually.

– Notably, the country's GDP per capita grew at an average rate of 5.3% (World Bank standard) from 2000 to 2019, indicating a separation between emission growth and economic growth.

• In 2000, the total LUCF emissions were 44,805ktCO2e, with an absorption of 2,244ktCO2e, resulting in net emissions of 42,758ktCO2e. However, from 2005 to 2015, the annual average emissions were 41,013ktCO2e, with an absorption of 7,533ktCO2e, achieving net emissions of 33,479ktCO2e.

– (Challenges) Financial constraints are observed in the implementation of M1, M2, and M4 tasks. Data uncertainties, inconsistencies, transparency, accessibility issues, data scarcity, and limited inter-sector coordination serve as major impediments to the implementation of M1 task.

[Table 15] Status of 2015 NDC Measures

No	2015 NDC Measures	Horizon	Progress
M1	Increase forest cover to 70% of land area	2020	Not achieved
M2	30% renewable energy excluding large-scale hydropower	2025	Not on track
	Share of biofuels to meet 10% of transport fuel needs	2020	Not on track
M3	90% of households electrified	2020	Achieved
M4	Transport NAMA	2025	Not achieved
M5	Expansion of large-scale hydropower to 5,500 MW (2020)	2020	Achieved
	20,000 MW (2030)	2030	On track
M6	Climate change action plan	Not Use	On track

*Ref: Laos. 2021. Nationally Determined Contribution (NDC)
*M stands for Mitigation Activities

National Strategy on Climate Change of Laos (April 2021)

○ The NDC implemented in 2010 had various issues, including the activities that were inappropriate or costly and difficult to execute.

– Furthermore, it lacked relevance and effective supports for existing and future national and regional policies and plans, such as SDGs, green growth strategies, and climate change legislation.

• Obstacles to the implementation of the 1st NDC: (i) insufficient time frames for vision, goals, and programs, (ii) a lack of monitoring and evaluation (M&E) systems, (iii) inclusion of climate adaptation in only seven sectors, (iv) ambiguity in climate funding mechanisms, including financial access and resource mobilization, (v) emissions such as methane from coal mining, rice fields, and enteric fermentation.

○ As a major strategy to respond to climate change, the Laos climate change strategy implemented since 2010 is improved and the national vision for climate change by 2050 is defined.

– It outlines national strategy and action plans for climate change management

by 2030, with focus on risk prevention and reduction of key drivers of climate change, resilience, adaptation, recovery, reconstruction from impacts, and GHG emissions mitigation.

- It contains measures for climate action for sustainable development, strengthening institutional coordination and cooperation, strengthening multi-stakeholder participation, and managing domestic, regional, and international climate change.

[Table 16] Goal of National Strategy on Climate Change of Laos

	Content
Goal	• To fulfil the vision, by 2030, Lao PDR aims at (i) strengthening its capacity in all areas, dimensions and aspects including legal framework, institutions, technologies, human and financial resources, economics, cooperation and coordination, research, exchange of information, education, and awareness to be able to cope with climate 19 change, fulfil responsibilities to the national and UNFCCC including COP's requirements, and (ii) fulfil the following targets.

※Ref: Vientiane. 2021. National Strategy on Climate Change of the Lao PDR

○ It has nine major programs to support the implementation of the three strategies, and presents plans for projects and actions for each program.

- Program 3, such as 'GHG Inventory and MRV Capacity Enhancement,' primarily supports Strategy 2 and aims to enhance the capacity of public and private sectors, organizations, and projects to improve the completeness, accuracy, and transparency of GHG inventory and MRV, which are essential for mitigation plans.

[Table 17] National Strategy on Climate Change of Laos-Implementation Program

No	Strategy Implementation Program
Program 1	Develop and Strengthen Capacity for Climate Change Data and Information, Monitoring and Advisory, and Early Warning Systems
Program 2	Enhance Adaptation, Resilience and Building Back Capacity of Infrastructure, Production Systems and Value Chains, Enterprises, Services, Communities, Ecosystems and Sectors at Risk and Impacted by Climate Change.
Program 3	Strengthen Capacity for GHG Inventory and MRV
Program 4	Enhance Capacity for Climate Change Mitigation
Program 5	Strengthen Capacity and Enhance Climate Change Education and Awareness
Program 6	Strengthen Capacity and Promote Climate Change Adaption and Mitigation Technology Development, Deployment and Transfer
Program 7	Strengthen Capacity and Promote Climate Finance
Program 8	Improve Climate Change Mainstreaming, Enabling Environment and Readiness
Program 9	Strengthen Capacity on Climate Change Management and Governance

※Ref: Vientiane. 2021. National Strategy on Climate Change of the Lao PDR

9th Five-Year National Socio-Economic Development Plan (NSEDP, October 2021)

○ The 9th Socio-Economic Development Plan incorporates strong policy reforms aimed at promoting even more environmentally friendly growth, based on the 2030 National Green Growth Strategy.

- It prioritizes the use of renewable natural resources, environmental pollution and waste management, environmental financing mechanisms, and the execution of nature-based tourism that can contribute to green job creation.
- To achieve the goals of the 9th Five-Year Plan, it focuses on six key outputs as shown in [Table 18] and strategically promotes projects. Among these outputs, the output highly related to carbon neutrality is '④ Environmental protection and disaster risks reduced.'

[Table 18] Output of the 9th 5 Year National Socio-Economic Development Plan

6 Main Outputs
① Continuos quality, stable and sustainable economic growth achieved
② Improved quality of human resources to meet development, research capacity, science and technology needs, and create value-added production and services
③ Enhanced well-being of the people
④ Environmental protection and disaster risks reduced
⑤ Engagement in regional and international cooperation and integration is enhanced with robust infrastructure and effective utilization of national potential and geographic advantages
⑥ Public governance and administration is improved, and society is equal, fair, and protected by the rule of law

※Ref: LAO(Vientiane Capital). 9TH FIVE-YEAR NATIONAL SOCIO-ECONOMIC DEVELOPMENT PLAN(2021-2025)

- 'As outputs of '④ Environmental protection and disaster risks reduced', the targets of 'Green Growth Promoted and Actions Taken towards Climate Mitigation' are presented as follows.

[Table 19] Targets of Green Growth Promoted and Actions Taken towards Climate Mitigation

Targets of 'Green Growth Promoted and Actions Taken towards Climate Mitigation'
• Study the feasibility of developing a plan to reduce greenhouse gas emissions to a level that is in balance with absorption capacity, moving towards net-zero greenhouse gas emissions (Net Zero Emission Plan 2050)
• Reduce greenhouse gas emissions from deforestation to about 30 million tons of carbon dioxide equivalent (tC02e) and sell forest carbon credits worth at least USD 95 million

[Table 19] Targets of Green Growth Promoted and Actions Taken towards Climate Mitigation

Targets of 'Green Growth Promoted and Actions Taken towards Climate Mitigation'
• Develop a new Nationally Determined Contribution (NDC) and the National Adaptation Programme of Action (NAPA)
• Energy efficiency standards and codes for electrical equipment are established
• Implement strategies to promote the use of clean energy in the transportation sector to reach 14% of the use of vehicles nationwide
• Build more than 100 charging stations/bio-fuel stations nationwide (20 stations in the northern region, 50 stations in the central region and 30 stations in the southern region)
• Build and improve standardized landfill infrastructure across the country, including at least five locations in major cities

※Ref: LAO(Vientiane Capital). 9TH FIVE-YEAR NATIONAL SOCIO-ECONOMIC DEVELOPMENT PLAN(2021-2025)

• (Climate Change Mitigation) Laos has minimal carbon emissions, but it is significantly affected by carbon emissions from other countries. As a result, Laos is taking measures to adapt and mitigate the impacts of climate change.

[Table 20] Plans of Actions Taken towards Climate Change Mitigation

Plans of Actions Taken towards Climate Mitigation
• Continue the implementation of the Nationally Determined Contributions (NDC) and greenhouse gas emission mechanisms such as the REDD+ project in order to contribute to international greenhouse gas emissions mitigation
• Promote businesses with low greenhouse gas emission to contribute to climate change mitigation; promote the use of modern techniques and technologies that generate less waste, save energy, and use clean and environmentally friendly energies; and promote the protection and expansion of greenhouse gas absorption sources such as forest cover, earth, and others
• Mainstream climate change adaptation and community-based adaptation (CBA) into sectoral development plans to protect people from natural disasters

※Ref: LAO(Vientiane Capital). 9TH FIVE-YEAR NATIONAL SOCIO-ECONOMIC DEVELOPMENT PLAN(2021-2025)

○ Long-term Low Greenhouse Gas Emission Development Strategy (LEDS): Unpublished

○ The World Bank's Climate Change Strategy Center(CCS), which is supporting the development of Laos' Long-term Low Emission Development Strategy(LT-LEDS), is working in collaboration with local partners such as Earth Systems and Care Laos.

- The CCS aims to achieve net-zero commitments by 2050 while ensuring sustainable and equitable socio-economic development.
- It will support the Department of Climate Change (DCC) of the Laos Ministry of Natural Resources and Environment (MONRE) in identifying short and

medium term low emissions development measures across economic sectors and defining implementation roadmaps.

1.2. Implications

○ In the National Strategy on Climate Change of Laos, it appears that Laos aims to enhance the achievability of its national GHG reduction goals through external cooperation with organizations such as GGGI, UNDP, and World Bank.

○ To develop strategies for GHG reduction and climate change adaptation as demanded by the international community, Laos is presenting detailed target outputs and programs in connection with the establishment of a national green growth strategy.

- However, the specific business operation financial plan and actual financing for the promotion of the program seem to rely on global funding support in addition to the government's own resources, which may pose challenges in building Laos' capacity in terms of project planning, operation, and management.

○ To overcome the challenges caused by financial constraints during the process of achieving the 1st NDC in Laos, the government presented a conditional reduction scenario in the 2021 revised 2nd NDC, aiming to attract financial and technological assistances from developed countries.

- In this scenario, emission sources have diversified, and the reduction target has been set at approximately 11.5 times higher compared to the unconditional scenario.
- Furthermore, in the 2030 Green Growth Strategy, Laos plans to actively leverage international organization programs, as well as to utilize grants and loans of developed countries, and climate finance to drive projects.

2. Climate Change and Carbon Control related Legislations

2.1. Legal Framework

GHG Reduction Project Approval Process: Insufficient Legal Framework

○ All project approvals are jointly reviewed by the relevant ministries, and the environmental impact assessment is conducted by the Ministry of Natural Resources and Environment of Laos (MONRE).

- The role of the Designated National Authority (DNA) for GHG reduction projects is under the responsibility of MONRE.

GHG Reduction Project-Related Laws: Absence of Relevant Laws

○ There is no separate legal classification concerning project approvals.

Environmental Impact Assessment (EIA)

○ (Legal Title) Decree on Environment Impact Assessment No. 112/PM ’20

○ (Key Contents) For large-scale projects with significant environmental impacts, an ‘environmental impact assessment’ is required, while smaller projects require ‘initial environmental assessments,’ but in practice, environmental impact assessments are carried out for most construction projects.

- Target Industries·Project List: Prime Minister’s Decree divides the criteria for implementing the EIA into two categories.

[Table 21] Main Items of Environmental Assessment

Category	Main Content
Initial Environmental Assessment(IEA)	• Pre-feasibility study, investigation, and analysis of social and environmental impacts during the initial implementation • Development of alternative measures to minimize social and environmental impacts
Environmental Impact Assessment(EIA)	• Conducting research, investigation, and analysis to assess the positive and negative environmental impacts of the project in both the short and long-term • Developing alternative options to minimize the social and environmental impacts • Establishment of a social and environmental impact management and monitoring plan in accordance with environmental authorities’ guidelines

Ref::KOTRA. 2021. Overseas Carbon Market Entry Guide

2.2. Key Laws

Decree on Climate Change (2019)

○ The legislation on climate change is developed based on four higher-level laws, including the 'Environmental Protection Law (2012),'

* 'Law on Government (2016),' 'Law on Meteorology and Hydrology (2017),' and a 'Proposed Letter from the Ministry of Natural Resources and Environment (2019)'

– The higher-level laws outline goals for adaptation to climate change and sustainable development while aiming to protect the natural environment and industries from the impacts of climate change.

– However, the policy direction for managing GHG emissions, a core factor of climate change, is not explicitly stated. Although the Decree on Climate Change includes provisions related to GHG, they are defined at a conceptual level.

• (Environmental Protection Law) Contains provisions regarding the need to establish policies and strategies for climate change adaptation, investment, technology development, and environmental impact assessment, as well as the necessity of compliance with international agreements related to GHG.

○ The Decree on Climate Change establishes principles, regulations, and measures for the management and monitoring of the climate change adaptation sector (prevention, limitation, and risk reduction) in the direction of sustainable green growth, in order to ensure the people's well-being, health, property, environment, and biodiversity , as well as regional and international infrastructure networking, and contribute to the national socio-economic development.

– It also includes the establishment of (i) a climate change data and information management system to promote national coordination of climate plans and actions, (ii) a vulnerability assessment and mapping process to support national adaptation measures, and (iii) a framework for enhancing carbon sinks and formulating a national GHG strategy.

• It expresses the obligation to monitor climate change for environmentally friendly and sustainable development, and to contribute GHG reduction as well as specifies the 'Mitigation' in Article 19, which aims to reduce greenhouse gas emissions and increase carbon sinks.

• In Articles 20, 21, and 22, policy directions for GHG reduction, increasing carbon sinks, and GHG inventory are provided.

[Table 22] Decrees on Climate Change – Articles on Net Zero

Article	Contents
Article 19 Mitigation	• Mitigation of greenhouse gases is a process on reducing of greenhouse gas emission and increasing of Carbon sink.
Article 20 Reduction of GHG emission	• Reduction of greenhouse gas emission is a determination of appropriate measures or alternatives for greenhouse gas emission reduction from human activities to the atmosphere at a level that does not cause any extreme adverse impacts to global climate condition. • The natural resources and environment sectors, in coordination with other relevant sectors and local authorities, define policies, strategies and plans on greenhouse gas emission reduction. • Relevant sectors, particularly energy and mines, industry and commerce, agriculture and forestry, public work and transport, science and technology, are responsible for developing plans, technical standards, tools and technologies for greenhouse gas emission reduction, based on their respective mandates, in coordination with the natural resources and environment sector.
Article 21 Increase of Carbon sink	• Increase of Carbon sink is a determination of appropriate measures or alternatives for increasing or maintaining of Carbon sink and absorbing of Carbon from atmosphere through photosynthesis, particularly by forest, soil, vegetation and water resources. • Relevant sectors, particularly natural resources and environment, agriculture and forestry, in coordination with local authorities, define policies, strategies and plans on increase of Carbon sink.
Article 22 GHG inventory	• The natural resources and environment sectors, in coordination with relevant sectors, survey and collect data on Carbon sources and sinks, particularly Carbon dioxide (CO2), Methane (CH4), Nitrous oxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF6) as information base for greenhouse gas emission reduction alternatives.

※Ref: LAO PDR. 2019. Decree on Climate Change

Decree on Carbon Management in the Forestry and Energy Sectors (Draft, Unpublished)

○ Legislation on Carbon Asset Management in the Forestry Sector (Draft): The Ministry of Agriculture and Forestry in Laos are in the process of developing a decree that deals with carbon asset management in the forestry sector and collaboration within the carbon market in the forestry sector.

○ The Department of Energy Efficiency and Promotion under the Ministry of Energy and Mines is also working to introduce a decree related to comprehensive cooperation in the energy sector for carbon asset management and the carbon market in Laos.

2.3. Implications

- Laos is in the initial stages of establishing a legal framework for climate and environmental legislation centered on MONRE to implement projects across various sectors such as environmental protection, meteorology, energy, and natural resources (forestry and minerals).

- It aims to implement climate change management for sustainable green growth, presenting a direction in alignment with the National Socio-Economic Development Plan (NESDP).
  - The Decree on Climate Change outlines concepts, scope of application, and the direction for climate change adaptation but lacks specific details on the concrete project implementation plans.
  - While the legal procedures based on local climate and environmental characteristics are outlined for power plant construction and industrialization policies as part of Laos' national development, there is a lack of legal basis for subsequent stages such as GHG reduction and monitoring through decrees and operational organization establishment.

- To achieve Laos' goals of expanding GHG reduction activities for carbon neutrality and sustainable green growth, a capacity-building approach led by MONRE, representing both central and local governments, is necessary.
  - To support this, specific legal frameworks, such as decrees and administrative regulations, need to be established in the GHG reduction sector.

3. GHG Emission Reduction and Climate Change Adaptation Policy Status

3.1. Major GHG Reduction Policies

Nationally Determined Contribution(NDC)

○ (Current Status) Laos submitted its Intended Nationally Determined Contribution (INDC) in September 2015 and revised NDC in 2021 to UNFCCC.

○ (Reduction Target) By 2030, Laos aims to achieve a reduction of approximately 65% relative to the total expected GHG emissions (104,000 ktCO2) from the time when applying a conditional scenario.

[Table 23] NDC 2030 Unconditional Mitigation Targets and Main Content

Target Year	Mitigation Target	Main Contents
2030	LUCF 45,000 ktCO2 per year	• Maintaining forest cover at around 70% of the total land area
	Public transportation 59 ktCO2 per year	• Introducing electric vehicles, including two-wheelers (30% of the total) • Introducing biofuel-powered public transportation vehicles (10% of the total)
	Energy efficiency 280 ktCO2 per year	• Reducing final energy consumption (10% compared to the baseline)
	Renewable energy 184 ktCO2 per year	• Increasing the capacity of solar and wind power generation (1 GW) • Increasing the capacity of biomass power generation (300 MW)
	Agriculture 128 ktCO2 per year	• Implementing water management for lowland rice cultivation (50,000 ha)
	Waste 40 ktCO2 per year	• Implement sustainable solid waste management (500 tons per day)

※Ref: KOTRA 2021. Overseas Carbon Market Entry Guide

○ (Key Content) Identifying and managing key priority areas for climate change response and setting additional conditional reduction targets premised on international aid.

[Table 24] NDC Sectoral Response Plans on Climate Change

Key Sectors	Response Plans
Agriculture	• Encouraging the development of GHG reduction agricultural infrastructure and the adoption of advanced agricultural technologies suitable for climate change adaptation
LUCF	• Enhancing technical capacity for climate change adaptation in forest creation and forest management
Water Resource	• Strengthening the water resource information system, increasing infrastructure for energy production using water resources, and establishing an early warning system
Transportation	• Improving the efficiency of transportation networks to reduce fuel consumption and establishing eco-friendly public transportation systems in major cities
Health	• Improving public health infrastructure and water supply and sewage systems
Energy	• Establishing a climate change response system with hydropower generation, introducing innovative energy management technologies, and securing multi-purpose reservoirs

※Ref: KOTRA 2021. Overseas Carbon Market Entry Guide

3.2. Major Climate Change Adaptation Policies

National Adaptation Program of Action to Climate Change (NAPA) (2009)

○ Laos developed the National Adaptation Program of Action to Climate Change (NAPA), which is the first policy document outlining the basic strategies and responses of major climate change adaptation policies. It was submitted to UNFCCC.

- NAPA provides activities to review the priority of projects that require urgent adaptation, allowing LDCs to reduce socio-economic costs due to climate change. It also provides brief profiles related to each activity and project.

○ In order to implement climate change adaptation projects, Laos proposed 45 priority projects across four vulnerable sectors: agriculture, forestry, water resources, and health.

- 13 programs in the agriculture sector and 14 programs in the forestry sector were proposed as top priority adaptation programs, as well as 10 programs in water and water resources sector and 8 programs in the health sector were proposed as priority adaptation programs.

- However, according to the Mekong River Commission (MRC, 2009), most of Laos' climate change adaptation activities until the establishment of NAPA were carried out in the context of 'disaster management', rather than 'climate change adaptation and mitigation'.

National Strategy on Climate Change of the Lao PDR (NSCC) (2010)

○ In the early 2010s, the Lao National Assembly approved the NSCC with a vision "to secure Laos' sustainable economic development, poverty reduction, public health improvement, quality enhancement of natural resources, and quality of life by mitigating and adapting to climate change".

- NSCC proposed seven adaptation sectors expanding from four vulnerable sectors of climate change in NAPA.
  - 7 adaptation sectors: 1) Agriculture and Food Security, 2) Forestry and Land Use, 3) Water Resources, 4) Energy and Transportation, 5) Industry, 6) City Development, 7) Public Health.

○ NSCC addressed climate change issues prominently in the 7th National Social-Economic Development Plan (NSEDP). This marks the significance of integrating climate change adaptation policies into the national social-economic development plan for the first time.

Second National Communications to the UNFCCC (2013)

○ The Laos government sought to include environmental issues in the process of establishing medium-to-long-term national social and economic development plans.

- The goal of the NSCC is linked to the vision of sustainable development, poverty reduction, improved environmental quality, and enhanced public health, while agencies responsible for public natural resource conservation and environmental protection are gradually being institutionalized and strengthened.
  - The National Environment Committee (NEC), chaired by the Deputy Prime Minister, provides policy guidelines for natural resources and the environment.

○ Among major economic sectors, sustainable transportation systems,

sustainable energy efficiency, sustainable forest management and conservation systems, and national technological capacity development are viewed as the most important mitigation strategies.

- Climate change mitigation strategies focus on agriculture and food security, land use changes and forestry, energy and transportation, industrial processes, and waste management.

○ The GHG inventory investigates emissions by sources and reductions by sinks by designating sectors such as energy, industrial processes, agriculture, land use change and forestry.

Technology Needs Assessment (TNA) (2013-2017)

○ The TNA project started in 2013 and concluded in 2017, and was used as guidelines in the initiative for climate adaptation and disaster resilience from 2018 to 2020, contributing to the Nationally Determined Contributions (NDC).

• Under the United Nations Framework Convention on Climate Change (UNFCCC), the TNA program was operated to enhance the transfer and accessibility of climate change adaptation technologies in identifying and analyzing the technology needs of developing countries. It also assisted to create needs of climate technology of developing countries.

○ As a result of the evaluation of climate technology priorities, 8 adaptation technologies and cases were selected, requiring an estimated budget of about USD 189.91 million to enhance climate adaptation and disaster resilience in the water resources and agriculture sectors.

- In the 8 adaptation technologies, there is a higher emphasis on disaster recovery. Moreover, the technological needs for climate change adaptation are high. The policy objectives for achieving carbon neutrality appear to have been partially applied.

• Some specific technologies related to carbon neutrality include technologies for reducing methane emissions through manure-based biogas and utilizing abattoir waste for biogas supply.

[Table 25] 8 Adaptation Technologies on TNA Program

8 Adaptation Technologies	
Category	**Technology Name**
Water	Early Warning System
	Disaster Impact Reduction Fund
	Watershed or River Basin Management
	Water Supply System
Agriculture	Livestock Disease Prevention and Control
	Agricultural Development Subsidy Mechanism
	Climate Resilient Rural Infrastructure
	Crop Diversification

*Ref: Ministry of Environment. 2019. Climate Change Adaptation Project for Diverse Cooperation and Awareness Expansion: Domestic and International Market Exploration and Expansion

3.3. Implications

○ The current core policy related to carbon neutrality in Laos is the NDC presented in 2021, with a strong focus on the hydropower and forestry and land-use sectors.

- Past climate adaptation strategies in Laos have been rooted in agriculture and forestry development, reflecting the country's characteristics.
- With around 70% of its population engaged in agriculture, Laos' industrial sector growth has been relatively slow.
- In addition, due to the lack of capacity to resolve climate change and environmental issues, Laos has experience in establishing policies and promoting detailed programs through cooperations with various international organizations and developed countries.
- The NDC includes a conditional reduction target that is 11.5 times higher compared to unconditional targets, indicating a high dependence on international financial and technological supports.

○ To achieve its ambitious GHG targets, Laos must integrate specific funding plans into its detailed implementation strategies and enhance internal capabilities for efficient financial management.

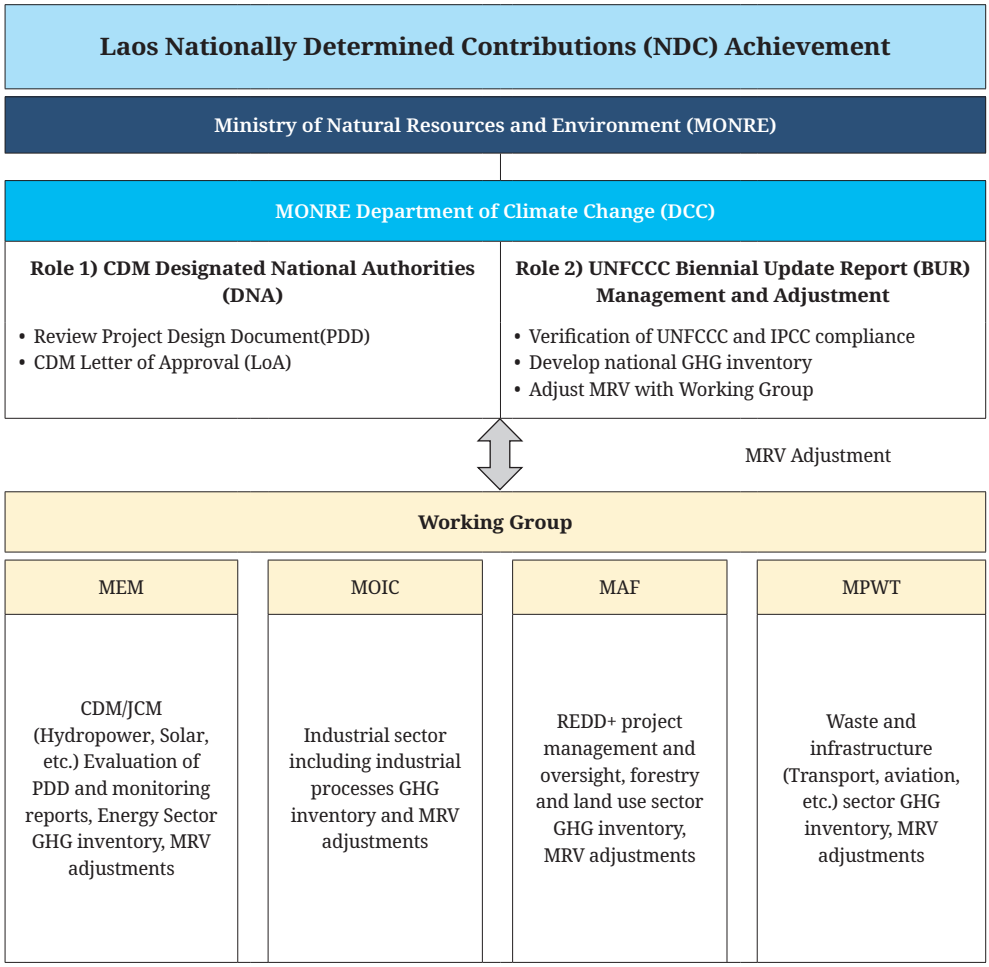
- As Laos is a country that continues to receive development financial support related to climate change, the efficiency of resource allocation must be increased through clear expenditure plans, effective execution monitoring, and mechanisms for evaluating outcomes. And it also needs to enhance tracking and management functions for funds received from various departments.
- According to OECD climate-related development finance data, Laos received about USD 987 million from 2015 to 2019.
  - In 2019, the annual inflow amounted to USD 314 million, marking a 260% increase compared to the previous year and setting a record high during this period.
- The Laos government needs to enhance project planning and proposal capabilities to secure resources from multilateral development banks and other sources.
- Collaboration mechanisms between Laos' MONRE and other relevant ministries are clearly proposed to expand internal capacity on the basic elements of proposal review including climate change technology, financial management capability and project management etc.
  - In the future, Laos should plan to integrate 'climate change and environmental policies' during the detailed implementation program planning stage of its medium-to-long-term national socio-economic development plan.

- To achieve sustainable economic growth and carbon neutrality, it needs to align climate change policies with the introduction of advanced technology of climate change within the economic development process.
- Although Laos currently has a relatively low share of GHG emissions in sectors like manufacturing and industry, there is a potential for increased emissions as the country experiences economic growth and undertakes infrastructure development projects including power station construction.
- The construction sector will be one of the representative industries to generate GHG emissions, and in order to preemptively prevent this, advanced technologies that can minimize climate change should be actively introduced and linked to the achievement of NDC.
- Additionally, Laos has a technological deficit in ICT capabilities. To strengthen carbon emissions monitoring in various industries, it is necessary to introduce advanced technologies.

4. Operational System Status of GHG Emission

4.1. Central Ministries Related to GHG Reduction in Laos

[Table 26] Role of Ministries regarding GHG Reduction in Laos



※Ref: MONRE (2012) Guidelines on Development and Consideration of Proposed Clean Development Mechanism Projects in Lao PDR, MONRE Interview(Jul. 10, 2023)

Laos Ministry of Natural Resources and Environment (MONRE)

○ (Main Role) MONRE is responsible for carbon neutrality, approval of CER trading under the Laos government including CDM Designated National Authority (DNA) and Joint Crediting Mechanism (JCM) Committee managements regarding GHG reduction, and communication with the international community.

○ (Related Policies) MONRE oversees the management of environmental resources, land, forests, water, biodiversity, minerals, and more. It also formulates national-level environmental policies and strategies, including climate change response strategies and the NDC.

[Table 27] MONRE Policy on NDC and Carbon Trading

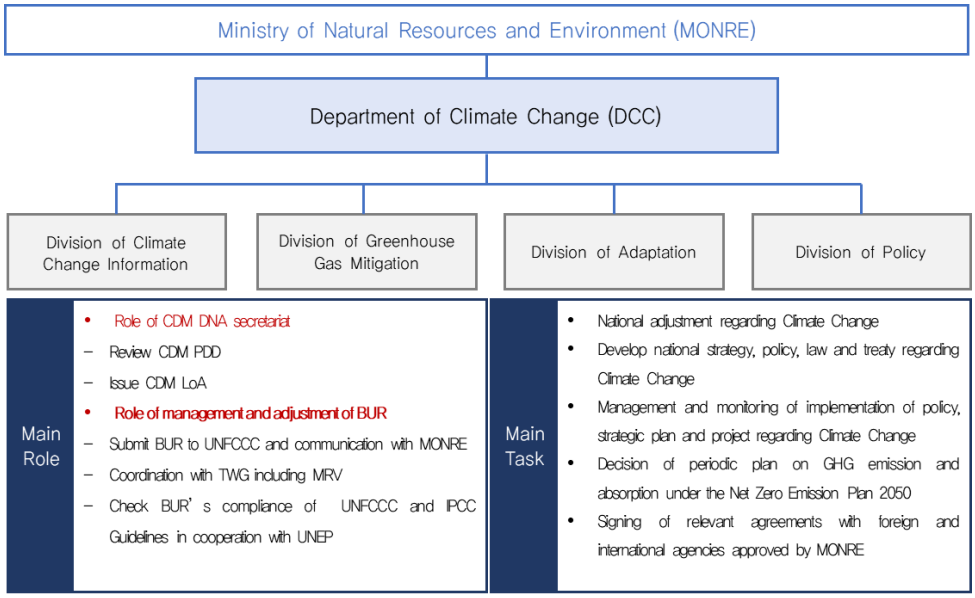
Policy	Main Content
The Strategy on Climate Change of the Lao PDR (2010)	• Setting goals and key strategic priorities for climate change adaptation and response (agriculture/food, forestry/land use, water resources, energy/transportation, industry, city development, public health sectors)
Decree on Climate Change (Decree No. 321/Govt, 2019)	• Determining principles, regulations, and measures related to climate change management and monitoring
Decree on Environment Impact Assessment No. 112/ PM 2020	• Defining principles, regulations, measures, and monitoring for transparent environmental impact assessments
The First Biennial Updated Report* of the Lao PDR (2020)	• Providing information on Lao national situation, GHG inventory, climate change mitigation measures, and MRV (UNEP cooperation and GEF funding aid) • Including essential measures for Laos to respond to climate change and sustainable development
Nationally Determined Contribution (2021)	• Introducing three* national-level GHG emission scenarios and strengthening targets in accordance with Paris Agreement Article 4 * Baseline, unconditional mitigation and conditional mitigation scenarios
National Strategy on Climate Change of Lao PDR – Vision to the year 2050, strategy, and programs of actions of action to the year 2030 (2021)	• Updating the Strategy on Climate Change of the Lao PDR (2010) • Defining a national strategy and action program on climate change management up to 2030 and a national vision up to 2050

*Ref: Based on the Local Consultant Report, and the original policy texts as of Jun. 2023

* As part of the efforts to strengthen MRV systems for mitigation actions in developing countries, during the COP16 to the UNFCCC held in 2010, it was decided that Biennial Update Reports (BURs) should be submitted, which include national GHG inventories, mitigation actions, required support, and received support.

○ (Operating System) There are 12 departments under the MONRE, of which the Department of Climate Change (DCC) serves as the secretariat in charge of climate change policy and management in Laos.

- DCC is the secretariat of MONRE (CDM Designated National Authority) and plays an important role in establishing climate change-related policies, providing technical support for emission reduction, and establishing a GHG inventory system.



※Ref: MONRE DCC Website (http://dcc.monre.gov.la/ Search Date: Jun. 29. 2023)
MONRE (2020) The First Biennial Update Report

[Figure 15] Structure and Main Role of MONRE DCC

○ (Progress) As of June 2023, DCC is in the process of developing Carbon Credit-related policies and GHG inventory guidelines through collaboration with the international community.

- DCC is preparing to enact the "Decree on Carbon Credit Management" with the support of the Australian Embassy and GGGI.
- With support from the World Bank, DCC is planning to formulate a 'Long-Term Low Emission Strategy'. [5)]
- DCC is working in cooperation with the UNEP and receives support from the Global Environment Facility (GEF) to compile biennial update reports (BUR). DCC is in the process of developing GHG inventories and databases following the guidelines of UNFCCC and IPCC.

5) MONRE Interview (Jun. 28. 2023)

- DCC is planning to develop national GHG inventory guidelines and provide training programs related to GHG emissions and MRV for four sectors: agriculture, forestry and other land use (AFOLU), energy, transportation, and waste management.

[Table 28] Priority Projects and Actions on GHG Inventory and MRV

Projects or Actions	Timeframe
1. Strengthen capacity and promote research and the development of data and emission factors in key sectors such as agriculture, forestry and other land use, industries, waste, energy and transport	2022-2030
2. Develop and strengthen capacity for the management of a data and information system for GHG inventory	2022-2030
3. Strengthen capacity and conduct the national GHG inventory and system for measurement, reporting, and verification (MRV)	2021-2030
4. Strengthen capacity and promote GHG inventory and MRV at city, program, project, facility, and organization level	2021-2030
5. Establish and enhance capacity for management of the system for measurement, reporting, and verification (MRV)	2021-2030

※Ref: Vientiane (2021) National Strategy on Climate Change of the Lao PDR

Laos Ministry of Energy and Mines (MEM)

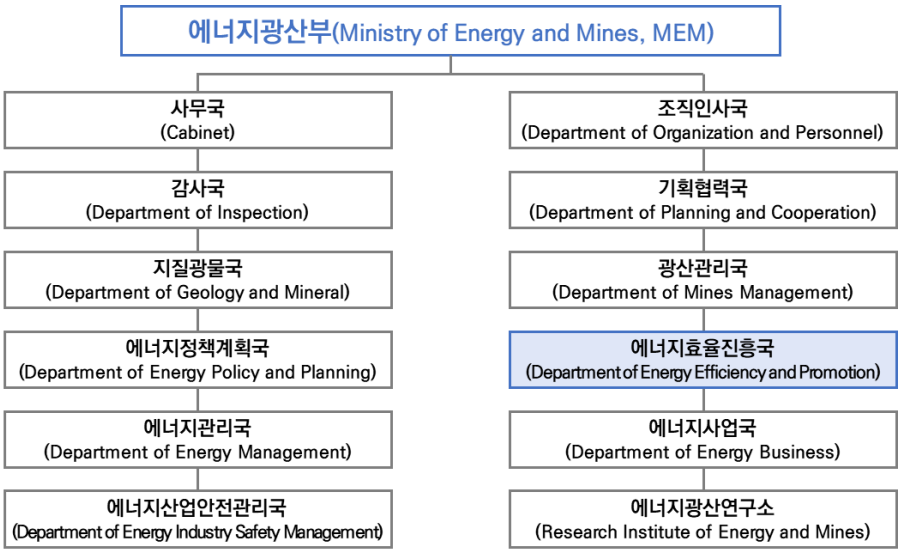
○ (Main Role) It is responsible for managing and overseeing the energy sector in Laos and has the authority over substantial projects related to international emission reduction initiatives such as the JCM.

- Under the Office of the Prime Minister, it is responsible for hydropower generation project for CDM and solar project for JCM.
- It develops energy-related businesses such as fossil energy, renewable energy, and energy conservation.
- It establishes and evaluates sustainable and eco-friendly mid-to-long-term strategies and development plans.
- It manages and supervises various private and state-owned enterprises (EDL, EDL-GEN, etc.)

○ (Operating System) There are 12 departments under the MEM, and the Department of Energy Efficiency and Promotion is in charge of overseas reduction projects.

- (Department of Energy Efficiency and Promotion) It aims to improve awareness of energy efficiency and accelerate Laos' transition to low-carbon

energy, 1) Participating in the evaluation of project design documents (PDD) for emission reduction projects for CDM and JCM, 2) Continuously monitoring GHG emission reductions, and 3) Evaluating monitoring reports based on the duration of CER issuance for CDM projects like hydropower generation.



※Ref: MEM Website (https://www.mem.gov.la/, Search Date: Jun. 29, 2023)

[Figure 16] Structure of MEM

Laos Ministry of Agriculture and Forestry (MAF)

○ (Main Role) It serves as the secretariat of the Laos government for macro-management of agriculture, forestry, forest biodiversity, and rural development in Laos, and oversees the national REDD+ strategy and REDD+ projects.

[Table 29] MAF National REDD+ Strategic Priority Projects

5 Areas (Projects)	24 Priority Projects
Sustainable Agriculture for Forest Protection	1. Legal and policy capacity enhancement 2. Comprehensive land use planning and agricultural land supervision 3. Diversification of farm household livelihoods and increased agricultural production 4. Establishment of real-time agricultural activity monitoring system

[Table 29] MAF National REDD+ Strategic Priority Projects

5 Areas (Projects)	24 Priority Projects
Promotion of Commercial Tree Plantations and Forest Restoration	1. Improvement of existing laws and policies 2. Promotion of tree plantation for commercial and environmental conservation purposes 3. Enforcement of forest restoration laws and public awareness raising 4. Establishment of forest restoration zones and formulation of forest restoration plans 5. Setting and promotion of forest restoration targets by forest category 6. Improvement of forest status information system
Infrastructure Development Linked with Forest Protection	1. Improvement of legislation on land conversion by granting infrastructure development, land leases or concessions 2. Determination of possible areas for infrastructure development with the improvement of forest landscape management 3. Establishment of a centralized land management system and thorough recording of land use histories 4. Minimizing environmental impacts of infrastructure projects through environmental and social impact assessment (ESIA)
Stop Uncontrolled Harvesting of Wood and Forest Products	1. Enhancing capacity of local governments for laws implementation to monitor and inspect on forest conversion 2. Strengthening sharing of annual logging quota allocation information 3. Strengthening capacity for planning and control of logging in concession areas 4. Promoting government regulations related to logging and certification of wood products 5. Establishing a real-time logging monitoring system
Stabilize Uncontrolled Shifting Cultivation and Forest Fires	1. Enhancing the capacity to implement existing laws related to uncontrolled shifting cultivation 2. Enhanced understanding of forest zones by central and local governments and reevaluation of boundaries of forests 3. Development of local livelihood alternative income generating models for shifting cultivation communities 4. Establishment of a real-time monitoring system for mobile cultivation and shifting cultivation activities 5. Public awareness raising on legal aspects for offenses regarding forest fires and fire agriculture

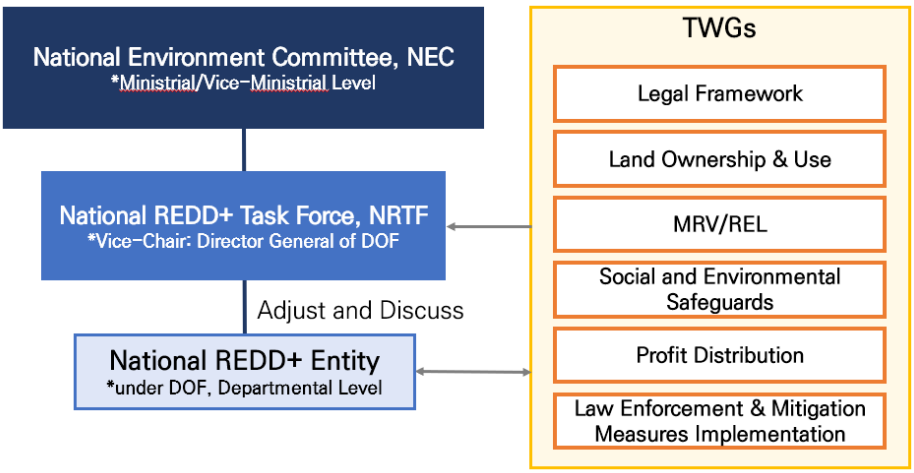
※Ref: MAF (2021) National REDD+ Strategy

○ (Related Policies) As REDD+ related policy, Laos has formulated the “National REDD+ Strategy (2021),” which outlines the development strategy and implementation plans for REDD+ projects.

○ (Operating System) There are 13 departments under the MAF, and the Department of Forestry (DOF) mainly supervises REDD+ projects and promotes policies and projects for efficient management and conservation of forest

resources.[6)]

- The main role of the DOF is to research and monitor the implementation of REDD+ strategies and plans, and to establish short-term and mid and long-term strategies for forest conservation and development across the country.
- The National REDD+ Office is a part of the DOF and is responsible for coordination with Technical Working Groups (TWGs).



※Ref: Local Consultant Report.

[Figure 17] National REDD+ Related Agency's Structure

4.2. Status of GHG Reduction-related Public Institutions in Laos

Laos National Power Corporation (Electricite du Laos, EDL)

○ (Main Role) EDL is a state-owned enterprise responsible for electricity generation, transmission, and distribution in Laos, and manages the import and export of electricity in the national power grid.

- Managed and supervised under the own rules of the MEM.

○ (Related Policies) Laos plans to expand renewable energy sources, such as hydropower and solar power, as part of its NDC implementation and its efforts to achieve carbon neutrality by 2050 and accordingly, stabilization of the power system is necessary.

6) KEIP (2017) Laos' agricultural and rural development status and development demand

[Table 30] Renewable Energy related Mitigation Targets in NDC

Mitigation Measures	GHG Reduction Targets
Unconditional Targets	
13GW total hydropower capacity (domestic and export use) in the country by2030	Annual average 2,500 $ktCO_2e$ (2020~2030)
Conditional Targets	
SOLAR and WIND: 1 GW total installed capacity in the country by 2030	Annual average 100 $ktCO_2e$ (2020~2030)
BIOMASS: 300 MW total installed capacity in the country by 2030	Annual average 84 $ktCO_2e$ (2020~2030)

※Ref: Lao PDR (2021) Nationally Determined Contribution (NDC)

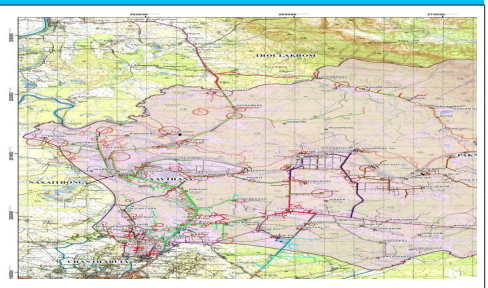
- (9th National Socio-Economic Development Plan (NSEDP)) 9th NSEDP has included main contents related to the power industry including reorganization of the electricity industry.

• Main contents in the power industry include △a restructuring of the national power industry which relies on hydropower generation for over 80% of its energy production, (hydropower 65%, thermal power 30%, and renewable energy 5%), △enhancement of the efficiency of the transmission network to minimize energy losses, △raising the domestic electricity supply rate from 95% to 98%, △ optimizing the power system to make it compatible with neighboring countries.

○ (Related Projects) To address issues like inefficient transmission and distribution networks and power grid shortages, Laos aims to collaborate with international organizations and neighboring countries.

- (World Bank Cooperation Project) In 2015, Laos partnered with WB for the Power Grid Improvement Project to enhance the efficiency of the distribution network in areas supplied with electricity by EDL.

[Table 31] Laos EDL Power Grid Improvement Project

Item	Content	
Project Area	Xaythany District of Vientiane	
Duration	September 2015 to March 2020 (Total 4.5 years)	
Budget	USD 30 million	
Key Project Activities	• Smart metering, distribution improvement, and distribution loss reduction (USD 19 million) • Power information system (USD 6 million) - Supporting advanced metering and distribution automation - Expanding the EDL geographic information system, supporting distribution operation and maintenance - Supplying and installing financial management information system • Institutional capacity building for EDL through consulting, education, and project implementation support (USD 5 million) • Emergency response for immediate recovery and reconstruction in case of natural disasters	

※Ref: EDL, World Bank (2015) Power Grid Improvement Project

- (LTMS Cooperation) In 2022, Laos exported renewable energy (100 MW) from hydroelectric power to Singapore through the Lao PDR-Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP).
  - EDL supplies 30MW during the dry season and 100MW during the rainy season in 2022 and 2023.

5. International Reduction Project Status

5.1. Laos Clean Development Mechanism (CDM) Project

○ (Background) Laos is a country that is vulnerable to climate change, including natural disasters such as floods and droughts, and has the potential to promote climate change mitigation. It ratified the UNFCCC in 1995 and the Kyoto Protocol in 2003.

- After the introduction of CDM project in 2005, Laos recognized the potential of CDM project in renewable energy, energy efficiency, afforestation, and reforestation.

○ (Purpose) While Laos is not obligated to reduce GHG emissions, it actively promotes CDM projects to contribute to sustainable development and climate change mitigation.

○ (Policy) Laos does not have specific national policies related to CDM, but it has established directions on climate change through the '7th National Socio-Economic Development Plan' (NSEDP, 2011-2015) and the 2010-approved 'Strategy on Climate Change of the Lao PDR.'

- (7th NSEDP (2011-2015)) aims to fulfill international obligations, including participating in international efforts to address global warming and reduce GHG emissions.
- (Strategy on Climate Change of the Lao PDR (2010)) prioritizes CDM projects as a strategic approach to climate change mitigation and reducing GHG emissions.

[Table 32] CDM Project Items in Climate Change Strategy of Laos

Sector	Priority Options for Climate Change Mitigation regarding CDM
Energy	Seeking the opportunities under the CDM or other pragmatic mechanisms to develop renewable resources including hydropower (including mini-hydro), biogas, solar etc.
Urban Development	Encouraging the participation of the private sector and international partners in GHG emission reduction from wastes under the CDM and other financing mechanisms

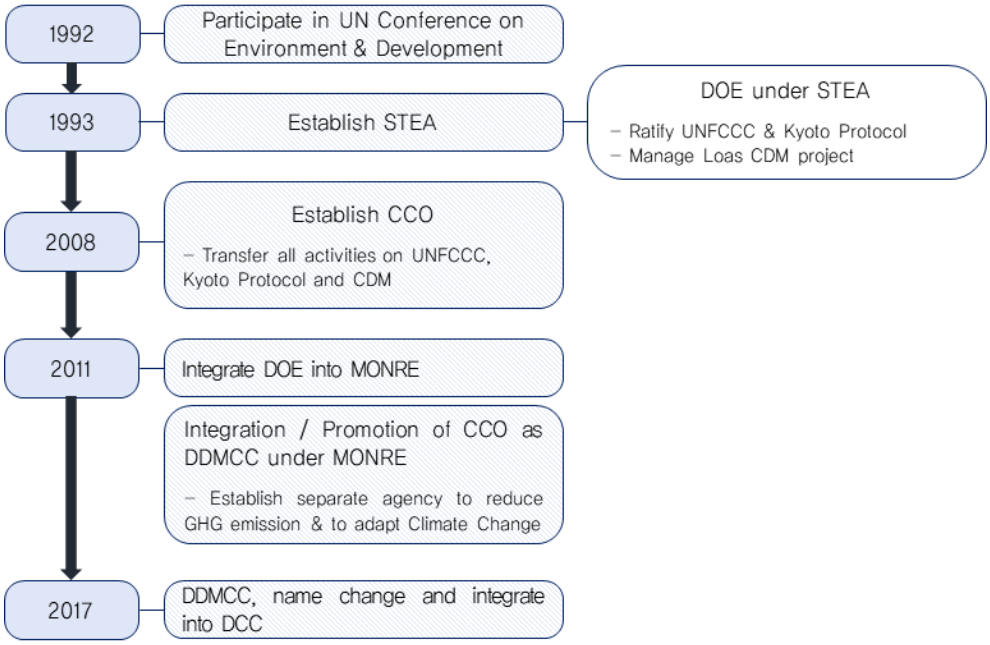
※Ref: UNDP (2010) Strategy on Climate Change of the Lao PDR

○ (Operating System) In the past, the Department of Environment (DOE) under the Science, Technology, and Environment Agency (STEA) and the Climate Change Office (CCO) were responsible for all activities related to UNFCCC, the Kyoto Protocol, and CDM. Later, the Ministry of Natural Resources and Environment (MONRE) and the Department of Climate Change (DCC) took over as DNA for CDM project approvals.

- (1992) Laos signed UNFCCC at the Earth Summit in Rio de Janeiro, which aimed to encourage voluntary greenhouse gas emissions reductions by countries.
- (1993) STEA was established under the Prime Minister's Office to be responsible for the environment, and DOE under STEA is responsible for environmental activities including climate change.

• DOE has played a key role in the country, including ratification of the UNFCCC and the Kyoto Protocol, and is responsible for managing the Laos CDM projects.

- (2008) STEA established CCO as an independent agency responsible for all activities related to UNFCCC, the Kyoto Protocol, and CDM.
- (End of 2011) All environmental responsibilities previously under STEA and DOE were integrated into a new ministry, MONRE. The CCO was promoted to the Department of Disaster Management and Climate Change (DDMCC) under MONRE.
- (2017) DDMCC was renamed and integrated into DCC.



※Ref: MONRE (2012) Guidelines on Development and Consideration of Proposed Clean Development Mechanism Projects in Lao PDR

[Figure 18] History of Agency related CDM in Laos

Laos CDM Project Procedures

○ (Laos CDM Project Guidelines) Laos CDM projects should follow the 'Guidelines on Development and Consideration of Proposed Clean Development Mechanism Projects in Lao PDR, No. 7912/MONRE,' which were announced in November 2012.

– The guidelines include CDM project related development principles and project procedures on the designation and policy of Laos' DNA. The guidelines are based on Laos' relevant laws, along with the guidance provided by the UNFCCC and the Kyoto Protocol.

○ (Roles of Project Entities) Various stakeholders are involved in the development of CDM projects in Laos, including project participants and key entities like the DNA.

[Table 33] Main Role of CDM Project's Entities

Entity	Roles and Responsibility
Project Participants	• Preparation and submission of PDD in English and Lao • Direct contact with the Designated Operational Entity (DOE) for GHG reduction verification of the CDM project • Preparation of monitoring plans and periodic reporting of project progress to MONRE/DCC • Expenditure of project costs, including fees and service charges, according to the Laos presidential decree
DNA (MONRE)	• Review of the proposed PDD in consultation with the Technical Working Group for Climate Change (TWGCC) • Issuance of a Letter of Approval (LoA) for the project based on PDD approval status • Oversight of CDM project implementation in Laos and management of related information

※Ref: MONRE (2012) Guidelines on Development and Consideration of Proposed Clean Development Mechanism Projects in Lao PDR

○ (Process for Project Submission and Approval) Process for Project Submission and Approval consists of a total of 9 steps, as per the guidelines

– Project participants are responsible for identifying and planning CDM projects, while DCC under MONRE acts as DNA for the approval of CDM projects.

[Table 34] Submission and Permission Process for CDM Project in Laos

	Process	Requirement	Entity
Step 1	Project Identification and Planning	Project Design Document (PDD) Summary Report Sustainable Development Criteria Assessment Matrix	Project Participant
Step 2	Submission of PDD and Required Documents	Initial Environmental Examination (IEE) and Environmental and Social Impact Assessment (ESIA) copies submitted to *MONRE DCC (Laos DNA)	Project Participant
Step 3	PDD Completeness Review and Requisition	Document review within 5 working days	DCC
Step 4	PDD Review Request and Environmental Assessment Discussion	Request for document review within 5 working days to TWGCC Assessment discussion with IEE, ESIA related assessment department (DESIA)	DCC
Step 5	Collecting PDD Review Comments	Collection of comments related to PDD within 25 working days	TWGCC, DCC

Step 6	Formation of Additional Discussions and Requests	DCC requests additional discussions with stakeholders	DCC
Step 7	Project Modification Request	Request for modifications and explanations regarding unresolved issues	DCC
Step 8	Compilation of Project Information and Reporting to MONRE Minister	Compilation of additional and modified relevant information Reporting on the proposed project and recommendations	DCC
Step 9	Confirmation of Project Approval Status	If approved, issuance of a Letter of Approval (LoA) for the project If not approved, conveying the reasons to project participants	DCC

※Ref: MONRE (2012) Guidelines on Development and Consideration of Proposed Clean Development Mechanism Projects in Lao PDR

Laos CDM Project Status

○ As of 2023, out of 33 CDM projects, 30 projects have received approval from DNA (MONRE DCC). Among these approved projects, as of 2022, 24 were registered in UNFCCC and the majority of them 20 projects are related to hydropower generation.

- Among the 30 projects approved by DNA, hydroelectric power generation accounts for the most at 25, followed by energy efficiency (2), biogas (1), forestry (1), and cook stoves (1).
- In Laos, it takes at least 1 to 2 or 3 to 4 years from CDM project development to final approval of DNA, and there is a need to solve the problem of long-term delays.

[Table 35] Laos CDM Project Status (Before Permission of CDM EB)

No	Project Title	Registration Date	GHG Reduction (tCO2e)
1	Energy efficiency improvement project of Beer Lao Brewery	2007.04.07	3,338
2	Xekaman 3 Hydropower Project	2011.12.21	499,481
3	Nam Lik 1-2 Hydropower Project	2012.05.04	207,512
4	Xeset II Hydropower Project	2012.05.30	155,983
5	TBEC LIG Biogas Project	2012.11.16	37,120

[Table 35] Laos CDM Project Status (Before Permission of CDM EB)

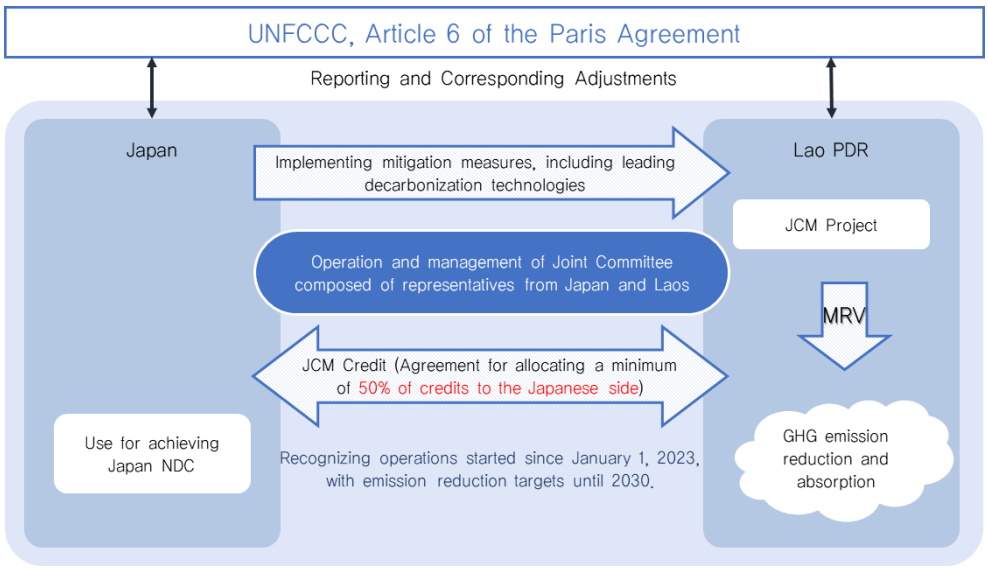
No	Project Title	Registration Date	GHG Reduction (tCO2e)
6	Nam Ngum 5 Hydropower Project	2012.12.22	248,501
7	Nam Sim Hydropower Project, Huapanh Province	2013.01.17	17,995
8	Nam Ngiep 3A Hydropower Project	2014.01.30	85,604
9	Xenamnoy 1 Hydropower Project	2014.02.21	47,558
10	Xe Namnoy 2 - Xe Katam 1 Hydropower Project	2014.03.24	46,438
11	Nam Long Hydropower project	2014.09.30	24,035
12	Nam Lik 1 Hydropower Project	2014.11.20	122,145
13	Nam Sana Hydropower Project	2014.12.31	25,335
14	Rubber Based Agro-forestry System for Sustainable Development and Poverty Reduction	2015.06.18	36,916
15	Nam Samoy Hydropower Project	2015.07.23	15,666
16	Xenamnoy-6 Hydropower project	2015.07.23	15,107
17	Nam Pha Gnai Hydropower Project	2015.12.31	62,184
18	Nam Nga 2 Hydropower Project	2016.05.11	35,019
19	Nam Ngiep II Hydropower Project	2017.02.09	387,174
20	Nam Hinboun Hydropower Project	2017.05.23	86,851
21	Nam Sor Hydropower Project	2017.06.15	10,630
22	Nam Mang 1 Hydropower Project	2017.08.17	125,775
23	Nam Ngao Hydropower Project	2017.12.27	45,375
24	Nam Kap Hydropower Project	2019.05.27	30,252

※Ref: KOTRA Overseas Market News Website (https://dream.KOTRA.or.kr/, Search Date : Jun. 23, 2023)

5.2. Joint Crediting Mechanism (JCM) Between Laos and Japan

○ (Background and Objectives) In 2013, Laos adopted JCM with the aim of promoting sustainable development and the dissemination of decarbonization technologies, products, systems, services, and infrastructure, as well as climate change mitigation measures.

- Through the introduction of JCM, Laos received support from the Japanese government for potential GHG emission reduction projects, including technology transfer, capacity building, and feasibility studies.
  - Japanese Ministry of Environment supported 50% of the investment capital for Laos' JCM projects.
- The JCM seeks to contribute to REDD+ strategies or implementation plans for emission reduction from forest harvesting and forest degradation.



※Ref: JCM Laos Website (Search Date: Jun. 26, 2023)

[Figure 19] Change of Agency related Laos CDM Project

○ (Project Details) Under the Rules of Implementation for the Joint Crediting Mechanism (JCM) between Japan and Laos, the scope and duration of projects are defined.

- (Project Period) Projects that started operation after January 1, 2013, are recognized as JCM projects, with the goal of achieving emission reductions through JCM until 2030.
- (Projet Target) The GHGs covered by JCM are seven gases*, which were more comprehensive than those under CDM (six gases)**.

* JCM scope: CO2, CH4, N2O, HFCs, PFCs, SF6, NF3

** NF3 is excluded from the CDM greenhouse gas scope.

- (Credit Issuance) Credits are issued based on the quantified GHG emission reductions and absorptions achieved considering the contribution of project participants in JCM projects. Laos allocates a minimum 50%* of the credits to the Japanese government based on the bilateral agreement.

* The Lao PDR Energy Efficient Data center Project (LEED, Feb. 2017~Aug. 2018) determined by the Joint Committee (JC) in 2019, resulted in Japan receiving 174 credits (84%) and Laos receiving 33 credits (16%)[7].

○ (Operating System) The Lao side of the JCM Joint Committee is managed by MONRE. The Japanese Embassy and relevant government departments are involved in JCM activities.

[Table 36] JCM Joint Committee from the Lao side (Japan-Laos)

No.	Name	Ministry/Agency
1	Mr. Syamphone SENGCHANDALA	MONRE
2	Mr. Immala INTHABOUALY	MONRE
3	Dr. Bouakham TOUNALOM	MOH
4	Mr. Phetvixay KASERMSOUK	MOIC
5	Mr. Phonesavanh SIPASERT	MEM
6	Mr. Khatiphone CHANPAPASERT	MTC
7	Ms. Vanmany DITTAVONG	Lao Women Union (LWU)
8	Mr. Chanthasak BOTTAPHANITH	MPWT
9	Dr. Thamthone VONGVISOUK	MAF

※Ref: Local Consultant Report, JCM Website (Search Date: Jun. 28, 2023)

[Table 37] JCM Joint Committee from the Japanese side (Japan-Laos)

No.	Name	Ministry/Agency
1	Mr. Junya NAKANO	Embassy of Japan in the Lao PDR
2	Mr. Atsushi KATO	Ministry of Foreign Affairs
3	Mr. Norihiro KIMURA	Ministry of Economy, Trade & Industry
4	Mr. Kazuhisa KOAKUTSU	Ministry of the Environment
5	Mr. Tetsuo TANIMOTO	Forestry Agency
6	Mr. Takuya UO	Embassy of Japan in the Lao PDR

※Ref: Local Consultant Report, JCM Website (Search Date: Jun. 23, 2023)

JCM Project Status in Laos

○ Proposed JCM projects are verified by a third-party organization according to the GHG reduction and absorption verification guidelines developed by the joint committee of both countries. To date, seven projects have received approval.

– (Project Sectors) The Laos Energy Efficiency Data Center Project (LEED)

7) JCM Laos Website (https://www.jcm.go.jp/la-jp/projects/issues, Search Date: Jun. 29, 2023)

received credits in 2019. And solar power generation projects (4), power grid project (1), and REDD+ project (1) received approval for carbon credit trading.

- (Emission Reductions) As of 2023, the cumulative emission reductions amount to 290,217 tons.
- (Largest Reduction Project) The renewable energy sector, with a focus on solar power, accounts for over 45% of the cumulative reduction. The 14MW solar power project in Vientiane, with an annual average reduction of 6,838 tons, contributed a total of 75,218 tons in emissions reduction.

[Table 38] Laos JCM Project Status

No.	Type	Project	Operation/ Approval Period	Responsible Ministry	GHG Reduction (tCO2e)
1	Energy Efficiency	Lao PDR Energy Efficiency Datacenter Project (LEED)	2017~ (5 years)	MTC	207
2	REDD+	Reducing emissions from deforestation and forest degradation in Luang Prabang	2015~2017	MAF	140,000
3	Solar	Introduction of 14 MW floating solar power system project in Vientiane	2020~ (17 years)	MEM	75,218
4	Solar	Introduction of 11 MW solar power project in Savannakhet Province	2021~ (17 years)	MEM	47,950
5	Solar	Introduction of 19 MW solar power project in Xieng Khuang Province	2021	MEM	7,861
6	Solar	Introduction of 14 MW solar power project in Vientiane and Bolikhamxay Province	2020	MEM	TBD
7	Electric Grid	Installation of Amorphous High Efficiency Transformers in power distribution system	2022~ (18 years)	MEM	18,981
	Total				290,217

※Ref: MONRE (2023) Status of Carbon Credit and Carbon Market in Lao PDR (Unpublished)
MONRE Interview (Jun. 28, 2023)

5.3. Laos REDD+(Reducing Emissions from Deforestation and Forest Degradation Plus)

○ (Background) Laos became a member of the REDD+ initiative in 2008, focusing on the restoration, protection, and sustainable development of forests, which make up 70% of the country's total land area.

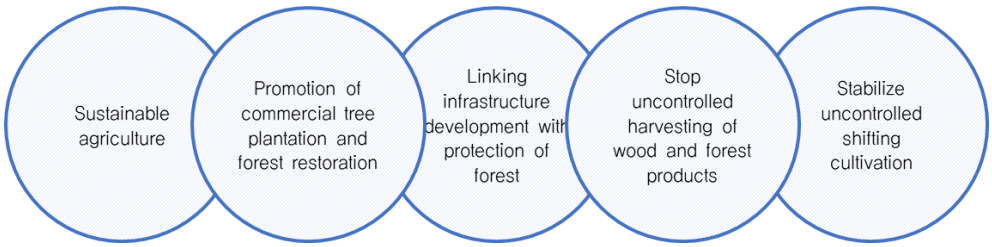
- To promote participation from all stakeholders at the national level, Laos has been actively building REDD+ capacity at the regional level and implementing pilot projects. The country has also developed a National REDD+ Strategy (2021).
- Laos has set 'Promoting Green Growth' as a detailed output through the 9th National Socio-Economic Development Plan (2021), and plans to reduce carbon emissions by 30 million tCO2e and secure forest carbon credits worth more than USD 95 million through REDD+.

○ (National REDD+ Strategy) Laos establish a national strategy to reduce GHG emissions through forests and contribute to achieving NDC by determining the direction of Lao REDD+ development and preparing an action plan.

- The goal is to reduce GHG emissions from the forestry sector by 30 million tCO2e by 2025, and 24 priority tasks in 5 areas have been established.

  * By 2025, approximately 21 million tCO2e emissions are expected to be reduced by reducing forest and tree cover loss, and around 9 million tCO2e will be absorbed through forest restoration and reforestation efforts[8)]

- The national strategy aims to have a real-time forest monitoring system including land conversion and to develop a systematic and transparent mechanism for data management.



※Ref: MAF (2021) National REDD+ Strategy

[Figure 20] Laos National REDD+ 5 Key Strategic Area

○ (Operating System) REDD+ and the national REDD+ strategy are the responsibility of the Lao Ministry of Agriculture and Forestry (MAF), and the REDD+ entity was established to ensure consistency of related sector

8) MAF (2021) National REDD+ Strategy

development policies and plans.

[Table 39] Laos REDD+ related Operational Agency

Agency	Roles
Ministry of Agriculture and Forestry (MAF)	**Overall Supervision of Forestry, Fisheries, and Agriculture**
Department of Forestry (DOF)	• Development of REDD+ mechanisms according to REDD+ policy oversight and support from bilateral and multilateral donor NGOs • Head of DOF is appointed as the Vice Chairman of NRTF (Chairman: Vice-Minister of MAF) • (Forest Development Design Department) playing an important role in setting forest (emission) baseline (REL) and establishing MRV system • REDD+ Secretariat, REDD+ TF Secretariat
Department of Forestry Inspection (DOFI)	• Enforcement and strengthening of forestry and wildlife laws and regulations such as the Forestry Act and Wildlife Act
National Agriculture and Forestry Research Institute (NAFRI)	• Adaptability assessments, methodology tools, information package development, policy feedback provision, research, surveys and management
National REDD+ institution	**REDD+ related Development Policy and Plan Integration**
REDD+ Task Force (NRTF)	• Overseeing all REDD+ activities, including policy and strategy formulation, coordination and implementation of projects at the international level • Organizing meetings at least once a year to review and formulate project plans for each period
REDD+ Task Force Secretariat	• A REDD+ department under DOF serves as a secretariat • Responsibilities and roles related to the coordination, research, management, and implementation of relevant projects following the guidelines of NRTF • Promoting technical sectors and financial activities of projects
Technical Working Groups (TWGs)	• 6 Technical Working Groups (TWGs) offering technical advice across various fields
MONRE	**Restructuring of Protection and Conservation Forest Divisions under DOF into MONRE**
Department of Forest Resource Management (DFRM)	• Responsible for sustainable management of forest resources in protected and conservation forests
Department of Land Management (DLM)	• Responsible for allocation of land boundaries
Department of Climate Change (DCC)	• International communication with UNFCCC

※Ref: Korea Rural Economic Institute (2015) World Agriculture No. 180: Status of Korea's REDD+ Pilot Project
MAF (2021) National REDD+ Strategy

Laos REDD+ Project Status

○ Laos has been engaged in REDD+ activities with support from various development partners since 2008. In 2009, Laos secured USD 200,000 in funding from the Forest Carbon Partnership Facility (FCPF) through World Bank[9].

– In December 2020, the Laos government signed an Emission Reductions Payment Agreement (ERPA) with WB/FCPF for the 'Governance, Forest Landscape and Livelihoods (GFLL)' project in six northern provinces. This agreement is expected to help Laos to reduce 8.4 million tons of GHG emissions by 2025, securing up to $42 million in support.*[10]

* The 1st payment (40%, 2023) and the 2nd payment (60%, 2025) are scheduled to be disbursed.

[Table 40] Laos REDD+ Project Status

No	Project	GHG Reduction (tCO2e)	Progress
1	Governance, Forest Landscapes and Livelihoods – Northern Laos (GFLL) between 2020-2025	8,400,000	ERPA concluded (2020)
2	REDD+ between 2022-2029	1,260,000	Joint implementation with GIZ, drafting of carbon trading agreement
3	Governance, Forest Landscapes and Livelihoods (I-GFLL) between 2020-2024	5,600,000	GCF proposal submitted
4	Laos-Korea REDD+ Joint (Project) between 2018-2022	TBD	Signed MOU with Korea Forest Service (2018)
5	REDD+	TBD	Signed MOU with AIDC for feasibility study
6	REDD+	TBD	Signed MOU with BFSF for feasibility study
7	Livelihood Development for Sustainable Forest Governance in Northern Lao PDR (LFGL)	TBD	Supported by the Korea-Mekong Cooperation Fund (Initiated in Aug. 2022)

※Ref: Local Consultant Report, MAF (2019) GFLL (Governance, Forest Landscapes and Livelihoods–Northern Laos) Process Framework, MAF (2022) Korea–Lao Green Growth Partnership 2022 Presentation Material

South Korea-Laos REDD+ Cooperation Project

○ (Background) In March 2018, the Ministry of Agriculture and Forestry of Laos (MAF) and the Korea Forest Service (KFS) signed an MOU for a REDD+ pilot project. In April 2022, they expanded the project by revising the MOU.

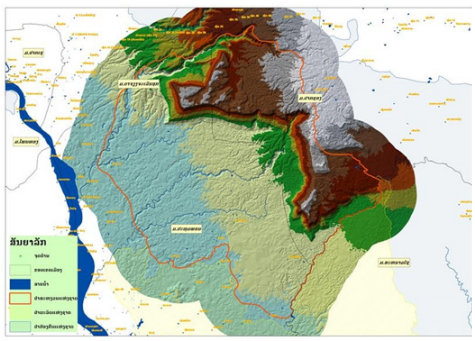
9) MAF (2019) GFLL(Governance, Forest Landscapes and Livelihoods–Northern Laos) Process Framework

10) MAF (2022) Korea–Lao Green Growth Partnership 2022 Presentation Material

- In line with the Paris Agreement guidelines, the CERs secured through the REDD+ project are used to achieve the NDC. Therefore, the project was expanded from a pilot project to the sub-national level.
- Both countries will utilize private financial resources and technology by developing projects from government-led to private-sector participation, and establish public-private cooperation plans such as voluntary carbon reduction by companies.

○ (Objective) The South Korea-Laos REDD+ Cooperation Project aims to △ Establish a forest CER platform , △Improve the quality of life for forest communities in the project target areas, △Enhance the capacity of key stakeholders and △Provide support to the Laos government in formalizing REDD+ policies.

[Table 41] Korea-Laos REDD+ Joint Project Status

Category	Content	
Target Location	Dong Hua Sao Conservation Forest in Champasak Province (3 Areas)	
Size	110,000 ha	
Period	2018 ~ 2022 (for 5 years)	
Budget	USD 1.3 million (MOU Revision)	
Progress Status	• Signing Pilot Project MOU(Mar. 2018) • Contract for Pilot Design Services(Sep. 2020) • Data collection and case re-study to make PD • Revision of the MOU to expand project (Apr. 2022)	
Main Project Activities	• Forest protection activities • Stakeholder capacity building • Installation of boundary marker	• Support for natural forest regeneration • Discovering eco-tourism projects

※Ref: MAF (2022) Korea-Lao Green Growth Partnership 2022 Presentation Material
Korea Forest Service (2021) International Symposium 2021 Presentation Material

REDD+ related International Coalition: LEAF Coalition

○ (Background and Objectives) The LEAF (Lowering Emissions by Accelerating Forest Finance) Coalition is a voluntary international coalition established in April 2021, to jointly mobilize at least USD 1 billion in forest financing from governments and the private sector to prevent deforestation and forest

degradation in tropical and subtropical forest countries.

- Through the LEAF Coalition, forest governments can receive results-based compensation for emission reductions, and sell them to public and private sector buyers, generating real value and benefits from the forest sector.
- As of August 2023, forest governments that have joined in the LEAF Coalition include Vietnam, Ecuador, Costa Rica, Ghana, Nepal, Kenya. Contributing countries include the United States, the United Kingdom, and Norway, with South Korea being the fourth participating country.

○ (Future Plans) By becoming a forest government member of international coalitions like the LEAF Coalition, Laos can receive support from the Korean government and potentially other nations and private sectors for its REDD+ projects.

- To be eligible for participation in the LEAF Coalition, countries must meet certain criteria related to their national-level readiness and policy development. Laos will need to review and prepare to meet these eligibility criteria.

[Table 42] LEAF Coalition Eligibility Criteria for Forest Government

Eligibility Criteria for Forest Government	
Target of at least 500,000 tCO2e emission reductions over 5 years	
ART TREES scale eligibility criteria	Sub-national governments must have a minimum of 2.5 million ha of forest applies. (No scale threshold applies for national governments)
Implement activities eligible to generate TREES credits	i) Removals, ii) Deforestation and degradation, iii) High forest low deforestation (HFLD)
Create related national basis and policy	1) An overall NDC target that includes forests 2) A National Forest Monitoring system that is closely aligned with TREES carbon accounting requirements 3) An existing REDD+ strategy or Action Plan in place at the national level that can be used to develop a TREES Implementation Plan 4) A Safeguards Information System (SIS) or an analogous system 5) A Summary of Information (SoI) (national governments) or report on safeguards at the appropriate scale that is consistent with national reporting to the UNFCC (Sub-national governments)

※Ref: LEAF Coalition Website (Search Date: Aug. 18, 2023)

5.4. Implications

○ Laos' policies and strategies related to carbon neutrality and GHG reduction are operated by MONRE, with an important role in coordinating various sectors and local governments.

○ In Laos, MONRE takes responsibility for managing and overseeing carbon neutrality and GHG reduction. It is in the process of preparing for the establishment of a GHG inventory and MRV system.

– To enhance Laos' capacity for GHG statistics, international programs like a Korea's 'International GHG Expert Training Program' will be required to facilitate knowledge sharing and capacity building among professionals.

• 'The International Greenhouse Gas Expert Training Program' has been running in the National GHG Information Center (NGIS) in Korea since 2011 , to train government officials and experts in GHG inventories from developing countries. It has been operated jointly with the UNFCCC Secretariat through MOU since 2017, offering lectures, practical training, and more.

• This training program, unlike general theoretical courses, focuses on technical aspects of GHG calculations and reduction methods. It covers topics such as △mandatory national reporting and review under the Paris Agreement, △ sectoral estimation and verification to establish national GHG statistics, △ utilization of IPCC guidelines, △emission projections and more.

○ In Laos, sector-specific agencies within central government ministries oversee GHG reduction projects such as JCM and REDD+. However, policy and strategy formulation, international reduction management, and related responsibilities fall under the jurisdiction of MONRE. Therefore Laos has a top-down structure with central ministries taking the lead.

– To develop and execute carbon neutrality and GHG reduction policies that align with regional characteristics at regional and grassroots levels, control towers like Carbon Neutrality Support Centers are essential.

– Through such centers, goals need to be derived by linking regional growth and carbon neutrality through raising awareness and strengthening the capabilities of local governments, analyzing regional characteristics, and analyzing local community demands.

○ Laos focuses on GHG reduction and absorption through forests to meet its unconditional and conditional reduction targets within its NDC. In this regard, cooperation with Korea, particularly through REDD+ initiatives, has the potential for expansion and alignment with the bilateral cooperation envisioned under the Paris Agreement Article 6.2.

○ Laos consists of 70% forested land, making land-use change and forestry (LUCF) a significant portion of its unconditional and conditional GHG reduction targets within its NDC, accounting for 27.7% and 98.5% of the total reduction targets, respectively, which are central goals for Laos.

- The National Strategy on Climate Change of Lao PDR (April 2021) encompasses climate change adaptation and mitigation measures, with a focus on the LUCF sector, including the REDD+ program. Laos regards REDD+ as a key component of its GHG reduction efforts, and there is an expectation for its expansion.
- In particular, REDD+ projects in Laos have been carried out in collaboration with Japan's JCM. There have also been cooperation with various international organizations, international funds, and overseas agencies, including Korea Forest Service. It is a prominent project among Laos' international reduction efforts.

○ The REDD+ project can be used for NDC achievement in alignment with the Paris Agreement guidelines. There is potential to expand the pilot project to a sub-national level and further promote bilateral cooperation between Korea and Laos in this field.

- In April 2022, at the 3rd advisory committee on Korea-Laos REDD+, Korea Forest Service and a Laos delegation agreed to expand the Laos REDD+ project as Korea's first sub-national project in Laos. They aim to enhance the project through private sector involvement.
- In November 2022, Korea Forest Service announced its membership in the LEAF Coalition at COP 27. Consideration is given to Laos joining the LEAF Coalition alongside Korea, which could contribute to supporting REDD+ activities in both governments and private sectors. This collaboration is expected to be in line with the principles of corresponding adjustments for NDC achievement.

• Developing countries eligible to join the LEAF Coalition are REDD+ implementing countries at the sub-national level, similar to ART-TREES. Korea

Forest Service, with its experience and collaborative relationship in the Laos project, can contribute to the sustainability of a sub-national REDD+ project and results-based rewards for implementing countries.

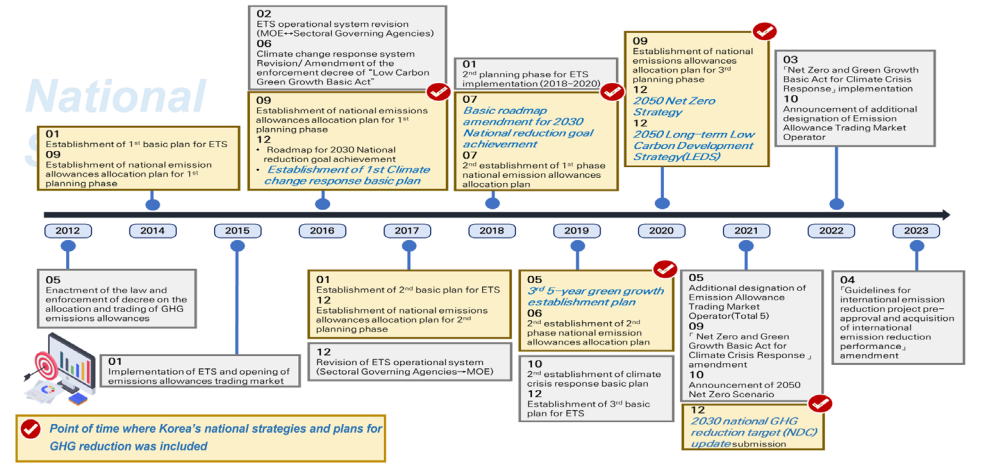
04

CHAPTER

Carbon Neutrality Control, System and Project Status in Korea

Carbon Neutrality Control, System and Project Status in Korea

1. Climate Change and GHG Emission Reduction



※ Ref: National GHG Management System, Korea Net Zero Commission etc.

[Figure 21] History of ETS Progress in Korea

○ Korea ranks fifth in the world among OECD countries in total greenhouse gas emissions as of 2016 and eighth in 2020, prompting calls for aggressive greenhouse gas reduction.

○ Korea has declared its intention to reduce greenhouse gas emissions by 40% from 2018 levels by 2030, with a goal to achieve carbon neutrality by 2050.

- Additionally, despite being a Non-Annex Ⅰ country under the Kyoto Protocol system, Korea has voluntarily committed to reducing emissions by 30% from 2020 BAU 03 in 2009 in order to proactively respond to the international community's demand for GHG reduction and seeks to promote the development of low-carbon technologies for creating new growth engines.

1st Climate Change Response Basic Plan (December 2016)

○ To align with the new climate regime, the Korean government has set up a Climate Change Response Basic Plan and commenced modifying the current energy and climate change response policies, aiming to transition to a new growth paradigm.

– 「The Basic Plan」, established under the 「Framework Act On Low Carbon, Green Growth」, is the first comprehensive plan that encompasses Korea's mid-to-long term climate change strategy and specific implementation action plans to respond to the new climate regime (Post 2020), and covers related measures such as reducing greenhouse gas emissions, adapting to climate change, and collaborating internationally.

[Table 43] 1st Climate Change Response Basic Plan

Main Tasks	Detailed Implementation Tasks
① Transition to a low-carbon energy policy	• Expanding renewable energy supply: Targeting 11% renewable energy penetration by 2035 • Expanding clean fuel generation and improving efficiency • Increasing energy efficiency in the construction, transportation, and industrial sectors
② Cost-effective mitigation by leveraging carbon markets	• Revitalizing Emissions Trading System* * 67.7% of total national greenhouse gas emissions (694.5 million tons) managed by the emissions trading system (2016)
③ Fostering new industries to respond to climate change and increasing investment in new technology research	• Fostering new energy industries as new growth engines • Creating a climate technology base and promoting demonstration and commercialization: Establishing and utilizing an implementation plan* for securing climate change response technologies * CTR (Climate Technology Roadmap): Progress and utilization plans for 3 areas (carbon reduction, carbon capture & utilization, and climate change adaptation) and 10 climate technologies (solar cells, fuel cells, by-product gas conversion, CO2 conversion, etc.)
④ Building a climate-safe society	• Establishing a scientific climate change risk management system • Sustainable natural resource management: species conservation, ecosystem restoration, etc.
⑤ Increasing carbon absorption and circulation	• Enhancing the function of carbon sinks such as forests • Promoting the transition to a resource-circulating society * * Establishing Framework Act On Resources Circulation (Enacted May. 2016, Enforced Jan. 2018)
⑥ Strengthening international cooperation for the new climate regime	
⑦ Building a foundation for citizen action and engagement	• Reducing greenhouse gas emissions in daily lives • Establishing a climate change coordination system (governance) and supporting companies in their climate change response efforts

※Ref: Korea Policy Briefing (www.korea.kr)

Revised Draft of 2030 Greenhouse Gas Reduction Roadmap (July 2018)

○ The "2030 Basic Roadmap for Achieving the National Greenhouse Gas Reduction Target" resets the national greenhouse gas reduction target from 30% in 2020 to 37% in 2030 (compared to BAU*), requiring a systematic implementation plan to achieve the target.

* BAU(Business As Usual) : GHG 'emissions projections' which are expected if no specific actions are taken for the reduction.

- The government presented a plan in 2016 to attain a 37% reduction target, with a 27% reduction target within the country and an 11.3% reduction target achieved through international activities.
- However, the 2016 roadmap was criticized both domestically and internationally for its weak willingness to reduce emissions and lack of clear reduction measures, so in 2018, the domestic reduction target was raised to 32.5% to reflect the policies surrounding fine dust reduction and energy transition.

[Table 44] 2030 GHG Reduction Roadmap (Revision, 2018)

Sector	Reduction Target (Million Tons)	Main Reduction Means
Transition	57.8 MT	• **Reflecting the current government's climate, atmosphere, and energy policies,** including the Comprehensive Plan for Fine Dust Management (Sep. 2017), the 8th Basic Plan for Electricity Supply and Demand (Dec. 2017), and the RE 3020 Implementation Plan etc. **(23.7 million tons)** • **Additional reduction of 34.1 million tons by reforming the energy tax system and strengthening environmental dispatch (confirmed until 2020)**
Industry	98.5 MT	• **Energy efficiency** including the expansion of smart factories, production process improvement including the spread of excellent reduction technologies, and high value-added products, etc.
Building	64.5 MT	• Tightening energy standards for new buildings and encouraging **green remodeling of** existing **buildings, etc.**
Transportation	30.8 MT	• **Expanding the supply of electric vehicles** (from 1 million to 3 million), increasing eco-friendly public transportation, and improving fuel efficiency of vehicles, vessels, and airplanes
Wastes	4.5 MT	• Strengthening **reduction and recycling** in all areas of waste generation, minimizing landfills, and capturing and recycling methane gas, etc.
Public	5.3 MT	• **Strengthening the target management system for public institutions,** expanding the distribution of LED lights and street lamps, and increasing renewable energy facilities
Agro-Livestock	1.6 MT	• Reduction technology of rice field irrigation, and distributing high quality and low methane feeds, etc.

[Table 44] 2030 GHG Reduction Roadmap (Revision, 2018)

Sector	Reduction Target (Million Tons)	Main Reduction Means
CCUS	10.3 MT	• Reflecting the existing roadmap reduction of 10.3 million tons, but materializing it based on the results of a joint inter-ministry exercise
Others	3.1 MT	• Reflecting reduced emissions from the fugitive emission sector

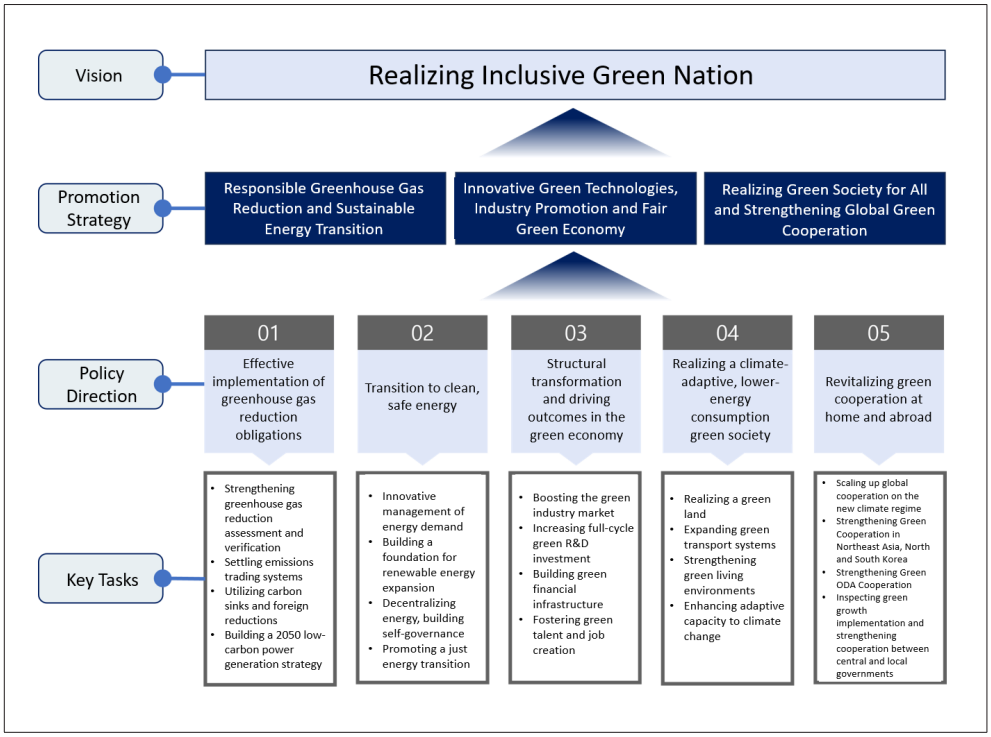
※Ref: Ministry of Environment, Korea (www.me.go.kr)

○ It is noteworthy that the total amount of emission allowances for the 2nd plan period (2018~2020) for 591 companies subjected to the emissions trading system from 2018 to 2020 was finalized at 1777.13 million tons, reflecting the revised roadmap, and the paid allocation system was introduced for the first time.

– It remains true to the polluter-pays principle, whereby countries pay greenhouse gas emitters directly by selling credits to allocate them, and also lays the groundwork for an efficient emissions trading system, where companies can buy as many credits as they need.

Study on the 3rd 5-Year Green Growth Plan (May 2019)

○ After reviewing the direction of the 3rd plan utilizing the analysis results of promotion plans of government departments and major overseas reports, the direction of implementation was derived centered on specific action plans to reinforce the inclusiveness of green growth and responsibly reduce GHG emissions.



※Ref: National Institute of Green Technology, Study on the 3rd 5-Year Green Growth Plan

[Figure 22] Vision and Strategy of 3rd 5-Year Green Growth Plan

- In the case of the emissions trading system in the plan, the expansion of paid allocations and rationalization of criteria, inducing cost-effective reductions through the revitalization of the emissions market and the use of third-party market participation and derivatives were considered, with a focus on improvements and complimentary, in order to settle the system.
- To expand the use of carbon sinks and overseas reduction, securing the reliability of technologies through continuous demonstration, including capture, transport, and storage technologies, and expanding sinks in the domestic forest, agriculture, livestock, and marine sectors, as well as expanding overseas forest resource acquisition foundations and pilot projects* have been planned.

* Technology accumulation and pilot issuance of credits through REDD+ pilot project implementation and VCS (Verified Carbon Standard) registration with four Southeast Asian countries including Laos. (Indonesia (14,000 ha), Cambodia (70,000 ha), Myanmar (69,000 ha), and Laos (110,000 ha)).

※Ref: National Institute of Green Technology, A Study on the 3rd 5-year Green Growth Plan

[Figure 23] Main Tasks of 3rd 5-Year Green Growth Plan

2050 Net Zero Strategy (December 7, 2020)

○ The government announced the promotion of the '3+1 Strategy' aiming to achieve carbon neutrality, economic growth, and quality of life simultaneously through the joint efforts of relevant ministries.

- The '2050 Carbon Neutrality and Green Growth Commission', a public-private partnership under the presidency, was established to coordinate opinions among stakeholders and raise public awareness to achieve the goal, and a dedicated deputy minister for energy was created at the Ministry of Trade, Industry and Energy to strengthen the promotion and management of detailed implementation tasks.

[Table 45] 2050 Net Zero Strategy

Strategy	Detailed Implementation Tasks
Low-carbonization of economy structure	• (Accelerating the energy transition) Actively shifting the main energy source from fossil fuels to new and renewable energy, expanding transmission and distribution networks and spreading decentralized energy systems for local production and local consumption. • (Reforming high-carbon industrial structures) Supporting technology development in high-carbon industries such as steel and petrochemicals, and providing tailored process improvement support for high-carbon small and medium-sized enterprises. • (Switching to future mobility) Expanding production and distribution of hydrogen and electric vehicles through innovation in eco-friendly vehicle pricing, charging, and demand, supplying 20 million electric vehicle chargers to households nationwide, and building hydrogen charging stations by city and hubs. • (Low-carbonization of cities and land) Making zero-energy construction mandatory for new buildings and strengthening the carbon absorption function using ecological resources in national land planning.
Creating an ecosystem of promising low-carbon industries	• (Nurturing new promising industry) Securing core technologies for next-generation batteries, actively promoting green hydrogen to convert more than 80% of hydrogen energy to green hydrogen by 2050, and developing innovative technologies such as carbon capture, utilization and storage (CCUS) technology. • (Building an innovation ecosystem) Discovering and supporting companies with promising technologies in the eco-friendly, low-carbon, and energy industries sectors, actively fostering them as green unicorns, and expanding carbon-neutral regulatory free zones. • (Revitalizing circular economy) Establishing a sustainable production and consumption system, strengthening the target rate of renewable resource utilization by industry, and expanding the provision of eco-friendly product information.
Fair transition to a net-zero society	• (Protecting vulnerable industries and classes) Actively supporting business transformation to alternative and promising sectors through R&D, M&A, etc. for shrinking industries such as internal combustion engine manufacturers and parts makers, and providing tailored reemployment support. • (Realizing carbon neutrality centering on regions) Supporting the implementation of carbon neutrality centering on a region and establishing an institutional foundation for the implementation of strategies tailored to each region. • Raising public awareness of a carbon-neutral society.
Strengthening the institutional framework for carbon neutrality	• (Finance) Establishing a new 'Climate Response Fund' (tentative name), reconstructing carbon pricing systems such as taxes, levies, and emissions trading systems, and reviewing the introduction of a green budgeting system. • (Green finance) Organizing financial market infrastructure by increasing the proportion of the financial support in green sector by policy financial institutions, supporting companies to transition to a low-carbon industrial structure, and gradually expanding companies' environmental-related disclosure obligations. • (R&D) Focusing on supporting the development of core technologies for carbon neutrality, such as CCUS, energy efficiency maximization, and solar cells.

※Ref: Korea Policy Briefing (www.korea.kr)

Long-term Low Carbon Development Strategy (LEDS) (December 2020)

○ The Paris Agreement recommended that Parties develop a long-term low greenhouse gas emission development strategy (LEDS) by 2020 as a long-term vision for their climate change response policies.

- The Korean government decided to establish the LEDS in order to join the international community's climate change efforts, and in order to fully collect the opinions of private experts from the LEDS formulation stage, it established the '2050 Low-carbon Vision Forum', which includes experts from various fields such as academia, industry, and civil society, and reviewed various national GHG reduction targets and visions for 2050.
- Subsequently, in 2020, a cross-departmental consultation* involving 15 ministries developed this strategy by synthesizing the views of various sectors, including industry, civil society and future generations, through societal discussions such as online surveys, expert consultations, national debates and public hearings.

* Office for Government Policy Coordination, Ministry of Environment, Ministry of Economy and Finance, Ministry of Science and ICT, Ministry of Trade, Industry and Energy, Ministry of Foreign Affairs, Ministry of Interior and Safety, Ministry of Agriculture, Food and Rural Affairs, Ministry of Land, Infrastructure and Transport, Ministry of Oceans and Fisheries, Ministry of Employment and Labour, Financial Services Commission, Korea Meteorological Administration, Korea Forest Service, and Rural Development Administration

[Table 46] Long-term Low Carbon Development Strategy

Vision and Basic Directions	Main Content
Korea's 2050 Vision	• Setting the basic principles of 'actively supporting international efforts to respond to climate change', 'laying the foundation for a sustainable, virtuous carbon-neutral society', and 'promoting joint efforts by all citizens'.
The five basic directions to 2050 carbon neutrality	• The LEDS has prepared five basic directions for 2050 carbon neutrality as follows, and provided directions for policy, social, and technological innovation for green transformation across the country. ① Expanding the use of cleanly produced electricity and hydrogen ② Improving energy efficiency to a significant level ③ Commercializing future technologies like a carbon removal ④ Scaling up the circular economy to improve industrial sustainability ⑤ Enhancing carbon sinks

Sectoral Vision	Main Strategy Content
Energy supply sector Fossil fuel centered → renewable energy + green hydrogen+ CCUS	• (Coal·LNG power generations) Further strengthening the existing coal power plant reduction policy (30-year lifespan) to promote drastic reductions, and linking and utilizing LNG power generation with CCUS*. * Actively using carbon capture, storage and utilization technologies in case of using fossil fuel power unavoidably for the stable electricity supply. • (Renewable energy) Requiring the transformation of the existing fossil fuel-centric power supply system to eco-friendly renewable energy such as solar and wind power. • (Utilizing hydrogen) Requiring the establishment of an affordable and reliable green hydrogen* supply system for the transition to a hydrogen economy, which is key to power generation (fuel cells), transport (hydrogen vehicles) and industry (steel and petrochemicals). *Zero carbon dioxide emissions in the production, transport and storage of hydrogen (Electrolyzing renewable energy into water, import, etc.) • (Network connection) Requiring supplementary measures for the Northeast Asian Supergrid to overcome the electrical island system.

[Table 46] Long-term Low Carbon Development Strategy

Vision and Basic Directions	Main Content
Industry sector Building a sustainable, carbon neutral industrial ecosystem with new technologies and circular economy of the future	• (Future technologies) Alternative technologies for steel cokes (→ hydrogen-based reduction ironmaking*) and petrochemical naphtha (→ innovative materials**) are needed to fundamentally reduce GHG emissions in energy-intensive industries (steelmaking and petrochemicals). * Using hydrogen instead of cokes / ** Replacing naphtha with chemical reaction of carbon-hydrogen and bio-based raw materials • (Green transition) Promoting greener industrial processes by improving energy efficiency and utilizing renewable energy, etc. • (Circular economy) Minimizing the use of raw materials through sustainable product production and enhancing the virtuous cycle of resources* ** Steel (→ iron scrap), petrochemicals (→ waste plastics), cement (→ waste concrete, coal ash), electronics (→ product design standardization, battery recycling), food and packaging (→ disposables ↓, packaging ↓).* (Fluorinated gases) Promoting substitution with low Global Warming Potential (GWP) materials and strengthening reduction measures such as recycling of refrigerants and plasma technology in electronics. • (Transition support) Supporting companies that need to shift to low-carbon and eco-friendly products to proactively restructure their business and replace stranded assets (fossil fuel-based).
Transportation sector Internal combustion centered → Eco-friendly transport mode + Intelligence + Green logistics	• (Eco-friendly vehicles) Expansion of eco-friendly vehicles is a key strategy for de-carbonizing in the transport sector and requires the widespread popularization of eco-friendly vehicles and the establishment of related infrastructure such as charging stations. * Requiring the expansion of using bio-fuels for modes of transportation (aviation and shipping) where it is difficult to supply eco-friendly vehicles. • (Fuel conversion) Expanding the use of bio-fuels in sectors where it is difficult to supply eco-friendly vehicles. • (Smart intelligence) Leveraging Korea's strength as an IT powerhouse, optimizing intelligent transportation systems (traffic demand ↓) and accelerating the popularization of autonomous vehicles (traffic accidents ↓, energy efficiency ↑). • (Green logistics) Shifting freight system to lower emissions modes such as railway and marine transport.
Building sector Energy saving (Green buildings) + Energy production (Solar and geothermal) → Realizing energy self-sufficiency	• (Green buildings) Maximizing energy efficiency in buildings by accelerating the conversion of existing buildings to green remodeling and fully applying zero-energy building systems in new buildings. * Self-production of energy (→ solar panels, geothermal and water heat), minimization of energy consumption (Increasing insulation and air-tightness) • (Efficiency improvement) Expanding the application of building energy management systems incorporating 4th industrial technology, supplying the use of LED lighting in a full scale, and improving the energy efficiency of home appliances and office equipment are required. • (Household energy) Requiring widespread electrification (replacing gas stoves) and electric-hydrogen heaters (replacing gas heaters) to reduce dependency on city gas for cooling, heating and cooking.
Waste sector	• Linked to another business

[Table 46] Long-term Low Carbon Development Strategy

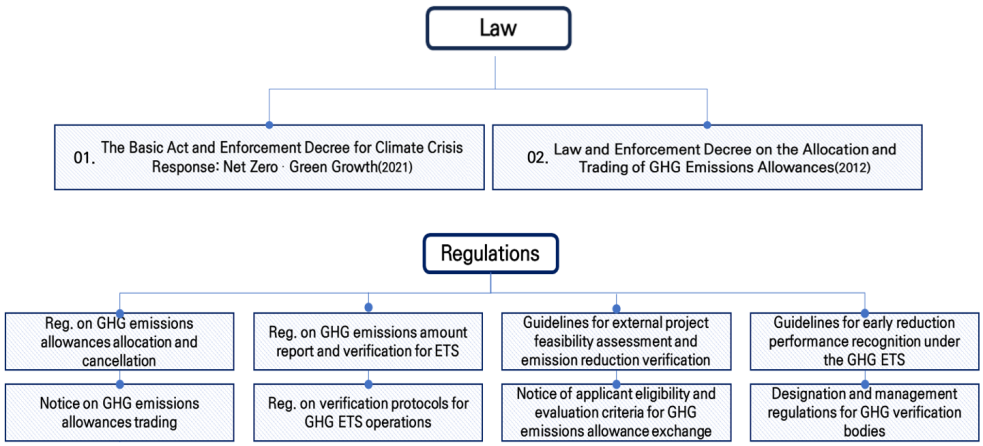
Vision and Basic Directions	Main Content
Agriculture, livestock farming and fisheries sector Promoting eco-friendly farming management and low-carbon distribution	• (Smart farming) Expanding smart farms and smart livestock using 4th industrial technologies. • (Low carbon farming technology) Intermittent irrigation*, shallowly watering the rice paddies, distributing low methane feeds, etc. * Periodic irrigation without keeping fresh water at all times (GHG ↓) • (Eco-friendly energy) Turning manure to energy, deployment of solar power, using geothermal heat pumps, etc.
Carbon sinks Enhancing carbon removal using natural and ecological resources	• (Afforestation) Expanding new afforestation, such as underutilized land, and strengthening reforestation, such as vegetation restoration. • (Forest management) Improving the forest age-class (forest age-class ↓) through forest management, changing tree species, etc. • (Wood supply) Expanding carbon storage and securing continuous renewal demand by utilizing wood products.

※Ref: Korea Policy Briefing (www.korea.kr).

2. Climate Change and Carbon Control related Legislations

○ Korea's emissions trading system has been in effect since January 1, 2015, when the 'Law and Enforcement Decree on the Allocation and Trading of GHG Emissions Allowances' (May 2012) was enacted pursuant to Article 46 of the 'Framework Act On Low Carbon, Green Growth' (Jan 2010).

- In the process, it passed the National Assembly through bipartisan consensus (148 in favor, 3 abstentions) and was fully introduced in 2015 after two years of preparation, including continuous consultations with stakeholders such as industry to build social consensus and conduct preliminary research on detailed system design and risk response measures.



※Ref : Ministry of Environment, Korean Law Information Center

[Figure 24] ETS related Legal System in Korea

○ The legal system of the ETS is divided into the Framework Act On Low Carbon, Green Growth, its Enforcement Decree, and the basic and allocation plans, which serve as detailed guidelines.

- Laws are those enacted by the National Assembly and serve as the framework for sub-systems to follow, and below them are enforcement decrees, also known as presidential decrees, which consist of orders that are promulgated after deliberation by the Cabinet meeting.

Carbon ETS related Legislations

[Table 47] Carbon ETS related Legislations

Act	Article
Low Carbon/Green Growth Basic Act and Enforcement Decree	• A8(Mid-to-long term national GHG reduction target etc.) • A27(GHG target management for management entities)
Law and Enforcement Decree on the Allocation and Trading of GHG Emissions Allowances	• A18(Management of targets and entities) • A19(Designation criteria and planning entities) • A20(Designation procedures for target management) • A21(Methods and procedures for target management) • A22(Establishment of registry for entities) • A23(Monitoring and management of emissions and target achievement entities) • A27(Succession of rights and obligations)
Law and Enforcement Decree on the Allocation and Trading of GHG Emissions Allowances (Emission Trading Law)	
Guideline for the Greenhouse Gas Target Management System	

※Ref : Ministry of Environment, Korean Law Information Center

International Reduction Projects related Legislations

[Table 48] International Reduction Project related Legislations

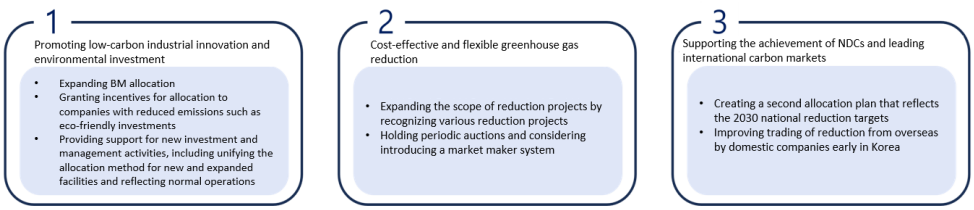
Act	Article
Low Carbon/Green Growth Basic Act and Enforcement Decree	• A35(Implementation of international emission reduction projects)
Law and Enforcement Decree on the Allocation and Trading of GHG Emissions Allowances	• A32(Criteria, Methods, and Procedures for pre-approved) • A33(Review Committee) • A34(Project Reporting) • A35(Registry) • A36(Reporting of acquisition, trading, and cancellation) • A37(Pre-approved) • A38(Dedicated agency)
Guidelines for International Emissions Reduction Project Pre-approval and Acquisition	

※Ref : Ministry of Environment, Korean Law Information Center

3. GHG Emission Reduction and Climate Change Adaptation Policy

Establishing Policy Direction and Planning

○ (Basic Operational Direction) Achieving the 2030 Nationally Determined Contribution (NDC) by providing incentives to eco-friendly investment companies for low-carbon industrial transformation and expanding flexible GHG reduction business operations and market creation.



※Ref : Ministry of Economy and Finance·Ministry of Environment(Sep. 29, 2020)

[Figure 25] Policy Direction for GHG Reduction and Climate Change Adaptation in Korea

Details of ETS Operation by Planning Period

[Table 49] ETS Operation by Planing Period

Classification	1st Phase (2015~2017)	2nd Phase (2018~2020)	3rd Phase (2021~2025)
Applicable Target	Companies emitting more than 125,000 tCO_2-eq annually and businesses emitting more than 25,000 tCO_2-eq annually		
Applicable Sectors	Transition, Business, Buildings, Transport, Waste, Public and 6 other sectors		
GHG	Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride		
ETS Coverage	-	70.1%	73.5%
Operation Purpose	Soft land trading system	Reduce significant amount of GHG emissions	Actively reduce GHG emissions
Allocated Entities	592(2017)	609	684
Allocation	Full free allocation	3% of paid allocation	10% of paid allocation
Free Allocation	GF for the entire amount	BM for 7 businesses	BM for 12 businesses
Participants	Allocated entities	Allocated entities, market maker	Allocated entities, market maker, liquidity provider

[Table 49] ETS Operation by Planing Period

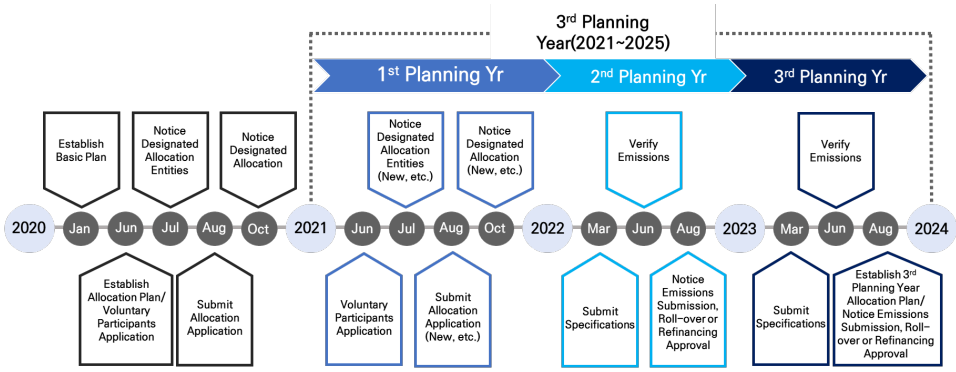
Classification	1st Phase (2015~2017)	2nd Phase (2018~2020)	3rd Phase (2021~2025)
Trading Target	Emission allowances spot	Emission allowances spot	Emission allowance spot, Emission allowance futures(Planned)

Note: GF is a method of determining allowances based on past emissions and allocating them for free, while BM is a method of determining allowances based on emission efficiency and allocating them for free. For more information, see Chapter III, Section 3.

※Ref : Ministry of Economy and Finance·Ministry of Environment(Sep. 29, 2020)etc.

○ Since 2015, when its emissions trading system was introduced, Korea has progressed through three planning periods: the first from 2015 to 2017, the second from 2018 to 2020, and the current one from 2021 to 2125, with a subsequent increase in planning horizon units to five years.

- Korea's ETS brings multiple important strengths from the outset: the scope of GHGs covered by the ETS is broader than in other countries[11], and the coverage of emissions from ETS-covered entities in the country's Nationally Determined Contributions (NDCs) is very high at 73%[12].



4th Planning Year 2024 ~ 2025, 5th Planning Year 2025 ~ 2026

※Ref : National GHG Management System

[Figure 26] Main Schedule in 3rd Planning Year

11) Of the seven GHGs defined by the international community, Korea covers six of them, which is more extensive than other major countries such as the EU ETS (3), RGGI (1), and China (1).

12) As of 2020, the EU ETS is 39%, China 40%, New Zealand 51%, Switzerland 10%, the UK 31%, Germany 40%, New Zealand 51%, and California 75%.

Basic Plan and Allocation Plan

○ (Establishing Plans) Establishing ① basic plan for the emissions trading system (mid-to-long term direction of Korea's emissions trading system), ② the national emissions allocation plan (sectors and industries to be allocated emission allowances, and classification, total emission allowances, sectoral and industry allocations, etc.)

○ (Planning Period) Allocating credits to GHG emitters on a five-year basis and managing their performances.

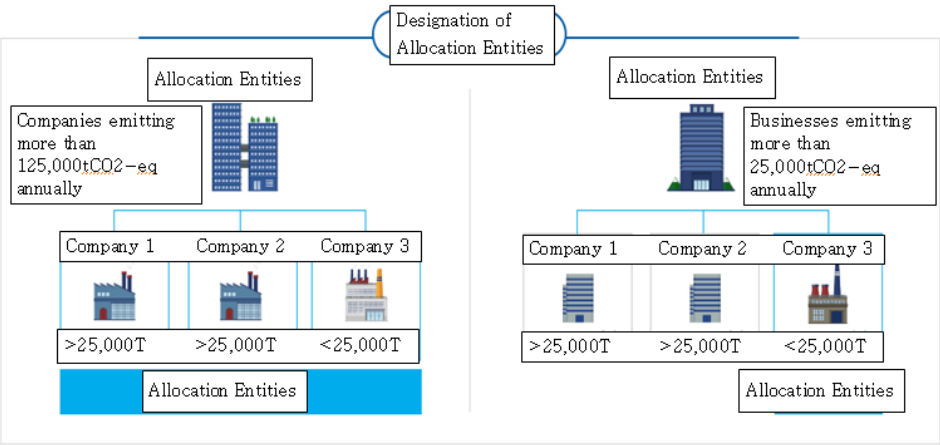
○ (Implementation Year) During each one-year period, the allocated company submits to the government a quantity of GHG credits equivalent to its GHG emissions at the end of each implementation year (Emission statement: Submitting a specification with a verification report verified by a verification company) → The government rechecks the company's emissions and finally certifies them and notifies the company accordingly.

Applicable Targets and Allocation Status

○ (Applicable Targets) Companies(entities) with an annual average GHG emission of 125,000 tons or more for the three years preceding the four-year planning period, or companies with 25,000 tons or more, that have voluntarily applied for designation as an allocation target.

- The allocation method is divided into grandfathering (GF), allocating allowances based on the past emissions performance, and benchmark (BM), allocating allowances based on the past activity data, with 100% of the allocation free of charge in the first plan period, 3% of the emission allowances allocated to companies in the sectors* subject to paid allocation in the second plan period, and 10% of the emission allowances allocated to paid allocation in the third plan period.

* Criteria for free allocation in the second plan period: ① trade intensity of 30% or more, ② additional production cost of 30% or more, ③ trade intensity of 10% or more & additional production cost of 5% or more, ④ criteria for free allocation in the third plan period: companies belonging to industries with a production cost multiplied by trade intensity are 0.002 (0.2%) or more.



※Ref : National GHG Management System

[Figure 27] Designating Allocation Entities of Emission

○ (Total Amount of Allowances) The total number of emission allowances in Korea's ETS is determined based on the 'Basic Roadmap for 2030 National GHG Reduction Goal Achievement', establishing the amount of GHG emissions to be reduced in each sector to achieve the national GHG reduction target in 2030.

- The 'total amount of allowances' that can be emitted by allocated entities in each sector is set utilizing the post-reduction emissions for each sector and industry in the roadmap and the proportion of emissions covered by the ETS compared to total emissions.
- The total amount of allowances includes 'pre-allocation amount', the allowances to be allocated to each sector and industry, as well as a reserve for new entrants and new operations (reserves for other use).

[Table 50] Emission Allocation Status

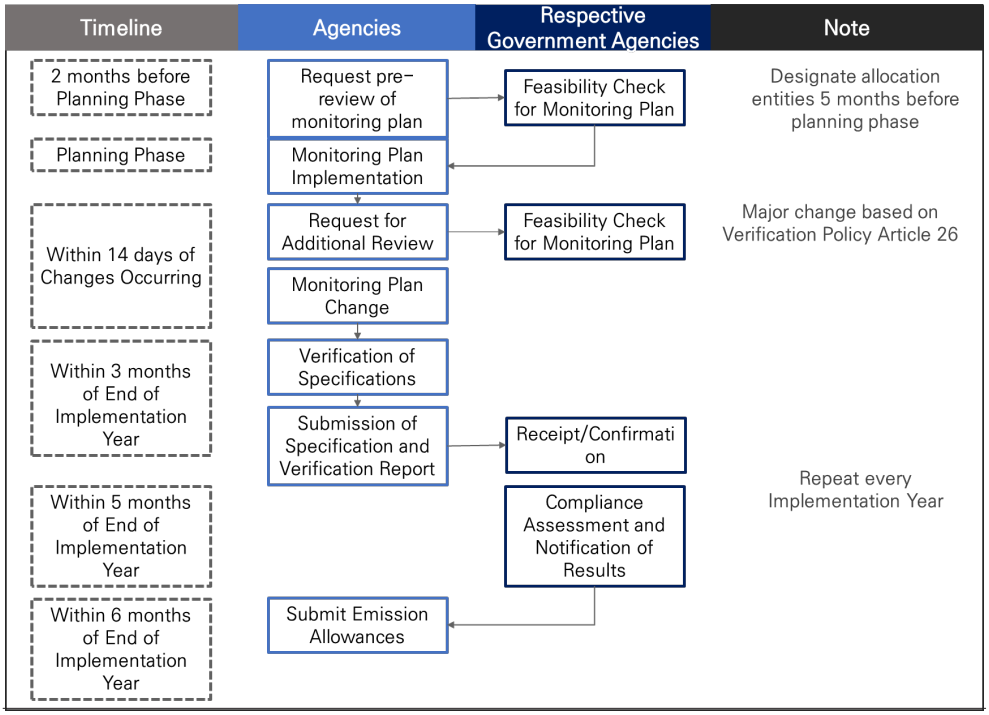
Year	2015	2016	2017	2018~2020	2021~2025
Allocated Entities(ea)	525	564	592	609	684 (As of 2020)

※Ref : National GHG Management System, Korea Exchange (ETS Market) Site

Greenhouse Gas Emissions Adequacy Assessment and Certification System

○ The process of evaluating the adequacy of the GHG emission calculation results by reviewing the statements prepared by the designated company to be allocated to the emission trading system and the report verified by the

verification auditor, and recognizing the evaluation results as the final GHG emissions, and the procedure and schedule are as follows.



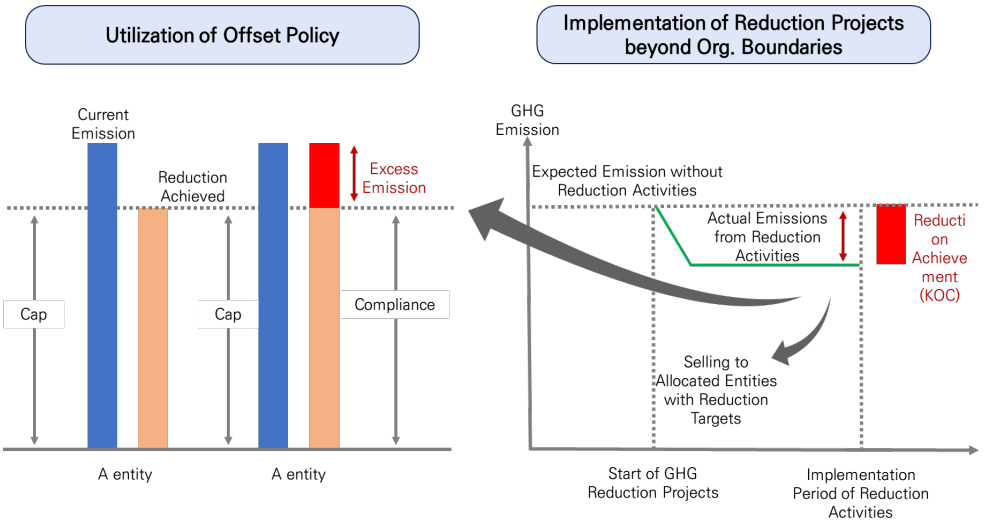
※Ref : National GHG Management System, Environmental Information System of the Environmental Corporation

[Figure 28] ETS Emission Allocation Plan and Adequacy Assessment Process

Operating ETS Offset Policy

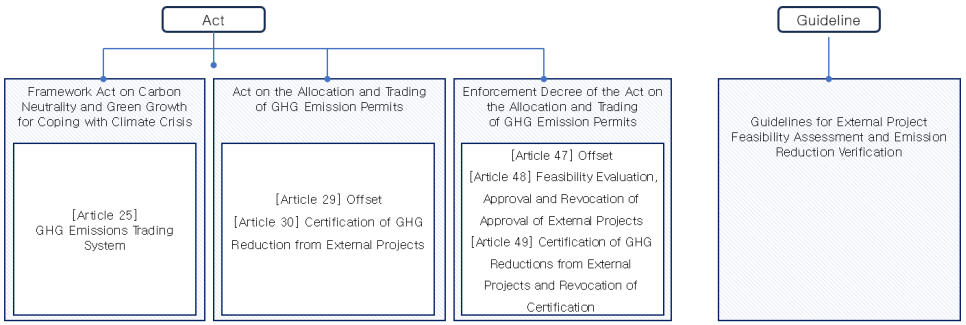
○ This is a policy in which a business (allocated entities) that has been allocated mandatory GHG emission reduction is allowed to recognize the emission credits certified by the Ministry of Environment as the reduction amount of the business by carrying out reduction activities through external projects [13]outside the area (Boundary), providing flexibility in achieving the reduction target.

13) It means a business that reduces, absorbs, or removes greenhouse gases in a manner consistent with international standards at emission facilities or emission activities outside the organizational boundaries of companies subject to emissions trading system allocation. (Guidelines for External Project Feasibility Assessment and Emission Reduction Verification (Ministry of Trade, Industry and Energy Notification No. 2022-232)



※Ref : National GHG Management System, Environmental Information System of the Environmental Corporation

[Figure 29] Principle of Offset Policy

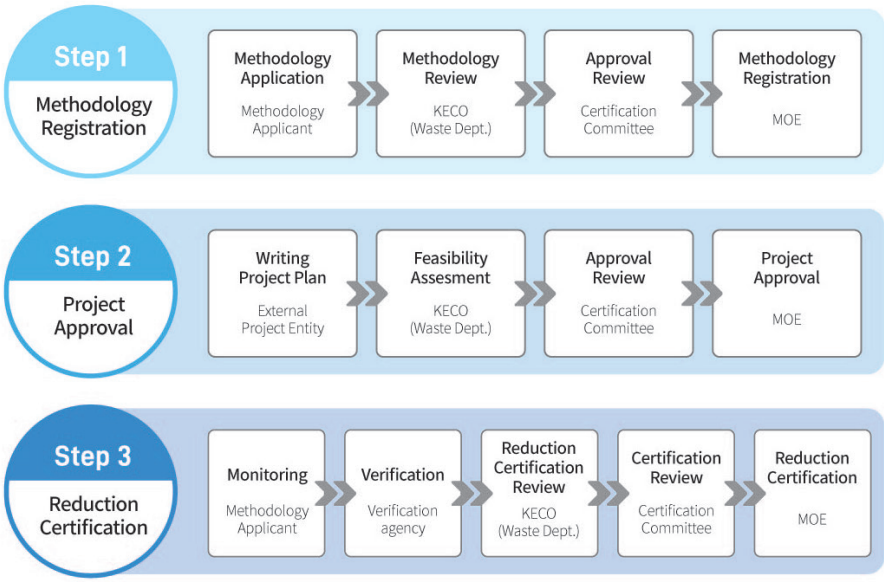


※Ref : Ministry of Environment, Korean Law Information Center

[Figure 30] Legal Grounds of Offset Policy

○ (Operational Process of Offset Policy (External Project)) Step 1 (Methodology Registration) can be skipped for businesses that apply an existing registered methodology.

- Methodology: A document describing the criteria, assumptions, calculation methods and procedures applied to calculate and monitor GHG reductions or absorptions.
- Feasibility assessment: Assessing the project design documents (PDD) prepared by the external business operator to apply for external business approval in accordance with the relevant standards.
- Reduction verification: Verifying after evaluating the GHG reduction and absorption of registered external projects.



※Ref : National GHG Management System, Environmental Information System of the Environmental Corporation

[Figure 31] Operational Process of Offset Policy

National Greenhouse Gas Inventory

○ Gathering and verifying national GHG emissions, emission factors, and GHG-related information and statistics, categorized by energy, industry, agriculture, and waste sectors according to the guidelines of the Intergovernmental Panel on Climate Change (IPCC), and reports the statistics to the UNFCCC.

– For UNFCCC reporting, the Korean government has prepared a Summary of National GHG Inventory Report four times and a Biennial Update Report (BUR) three times.

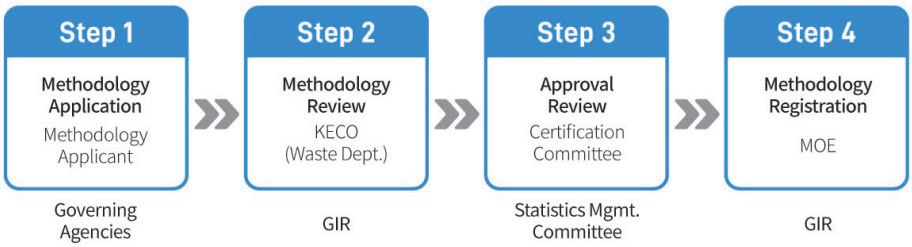
○ (Definition) An inventory of a company's or organization's GHG emissions by source, which refers to a set of GHG management systems that identify, record, manage, measure and report all GHGs emitted by a company's activities.

○ (Purpose) Analyzing GHG inventory characteristics and deriving reduction potential by identifying GHG emission sources and calculating emissions within the organizational boundaries set by the company.

○ (Role) The Greenhouse Gas Inventory and Research Center develops and verifies national GHG emissions and absorptions, country-specific emission

factors, and GHG-related information in accordance with the 'Low Carbon Green Growth Framework Act'.

- Striving to statistical quality at an international level by revising the guidelines for measuring, reporting and verifying (MRV) greenhouse gas emissions and developing an overall management plan.



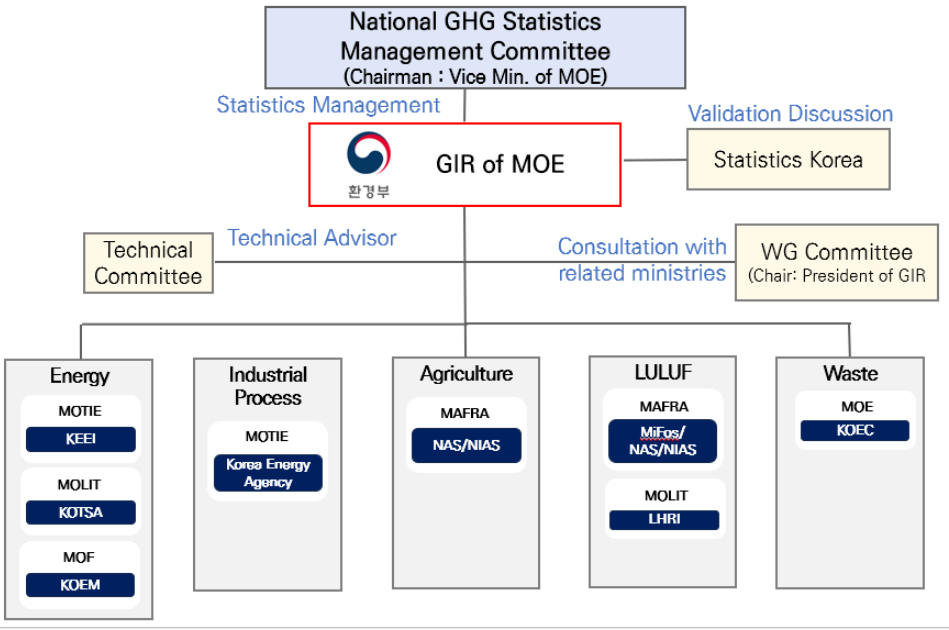
※Ref : National GHG Management System, Environmental Information System of the Environmental Corporation

[Figure 32] Establishment Process of National GHG Inventory

○ (Establishment Process) The National Greenhouse Gas Statistics Management Committee is composed of the Greenhouse Gas Inventory and Research Center of the Ministry of Environment and the technical and practice consultative groups involving government agencies in respective sectors.

- National Greenhouse Gas Statistics Management Committee: Director level
  - Matters regarding international announcements of greenhouse gas statistics and related information.
  - Deliberation and resolution of greenhouse gas statistics, country-specific emission and absorption factors, reports, etc.
- National GHG Statistics Practice Council : Section manager level
  - Consulting on the measurement, reporting and verification of GHG statistics, development and verification of emission and absorption factors, etc.

○ (Participation in Consultative Group) Statistics Korea participated in the consultative group to ensure the fairness and reliability of the national GHG inventory in accordance with the Enforcement Decree and Administrative Regulations of the Framework Act On Carbon Neutrality and Green Growth.



※Ref : Ministry of Environment, Greenhouse Gas Inventory and Research Center

[Figure 33] Korea GHG Total Management System (Establishment · Reporting · Verification Process)

○ Korea is simultaneously establishing and operating a GHG reduction policy at the same time using a regulated market, unlike the emissions trading system, an unregulated market, to achieve its GHG reduction targets.

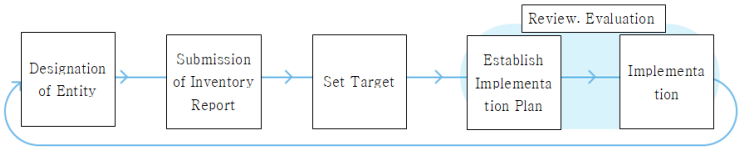
- The ‘GHG Target Management System’ and the ‘GHG and Energy Target Management System in the Public Sector’, which are recognized as the only Korean GHG reduction systems in the world.

GHG Target Management System

○ It is a core tool for achieving Korea's GHG reduction target (40% reduction compared to 2018 by 2030), and sets and manages GHG reduction targets by designating large GHG emitters and businesses as management entities.

– It is a system that sets targets and manages to reduce greenhouse gas emissions by designating companies that emit more than a specific level to be managed every year.

[Table 51] Overview of GHG Target Management System

<table>
<tr><th>Classification</th><th>Content</th></tr>
<tr><td>Background and Rationale</td><td>• A system that manages companies and businesses that emit greenhouse gases above a certain level by designating them as management entities in order to achieve national greenhouse gas reduction targets under the Framework Act On Carbon Neutrality And Green Growth For Coping With Climate Crisis (Framework Act On Carbon Neutrality).</td></tr>
<tr><td>Criteria for Designating Management Entity</td><td>• Management entities subjected to GHG target setting and management are divided into company-level and business-level, and the scope of application is expanded annually.
※ A management entity is a company or business that simultaneously satisfies the publicized criteria for greenhouse gas emissions and energy consumption, averaged over the last three years, based on an annual survey.
<table>
<tr><th rowspan="2">Classification</th><th colspan="2">Since Mar. 25, 2022</th></tr>
<tr><th>Company level</th><th>Business level</th></tr>
<tr><td>GHG (tCO_2-eq)</td><td>50,000</td><td>15,000</td></tr>
</table></td></tr>
<tr><td>Operation System</td><td> 
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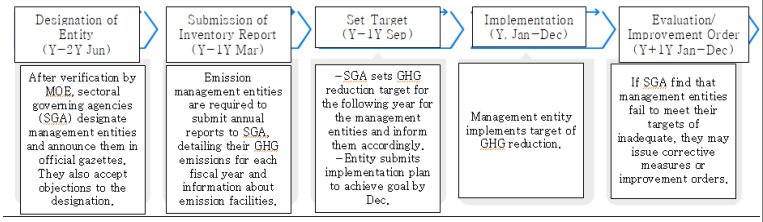
<tr><td>Institutional Procedure</td><td> 
</td></tr>
<tr><td>Penalties for Non-compliance</td><td>• In accordance with Article 83 of the Framework Act on Carbon Neutrality and Article 76(2) of the Enforcement Decree, fines are imposed on companies that violate the law to ensure accurate calculation of greenhouse gas emissions and transparent operation.</td></tr>
</table>

※Ref: National GHG Management System

GHG Target Management System – Public Sector

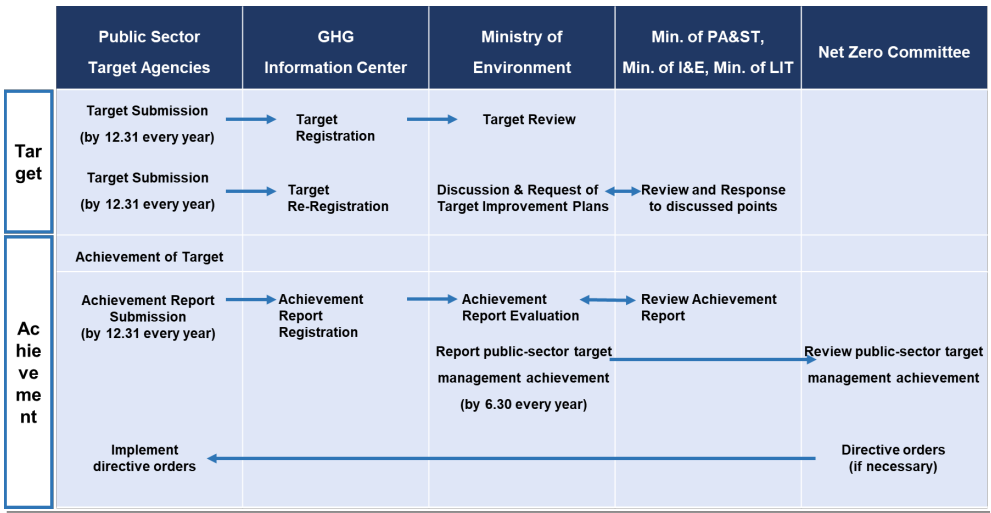
○ Pursuant to Article 26 of the'Framework Act On Carbon Neutrality And Green Growth For Coping With Climate Crisis', it has been in force since 2011 to enable central administrative agencies, local governments, public institutions, etc. to perform a leading role in achieving the national greenhouse gas reduction target.

• (Target Facilities) Buildings under the 'Building Act', motor vehicles under the 'Motor Vehicle Management Act', detached houses, elementary/ middle/ high schools, correctional and immigration institutions, welfare facilities for the elderly, children, and disabled, security and defence facilities, etc.

– Four ministries*, including the Ministry of Environment, annually inspect the performance of 777 institutions** of seven types, such as central government, local governments, and public institutions etc., on their annual reduction targets against their baseline emissions.

* Ministry of Environment, Ministry of Interior and Safety, Ministry of Trade, Industry and Energy, Ministry of Land, Infrastructure and Transport

** Central administration(45), local government(243), city and provincial education office(17), public institution(291), local public corporation(137), national university(34), national university hospital(10)



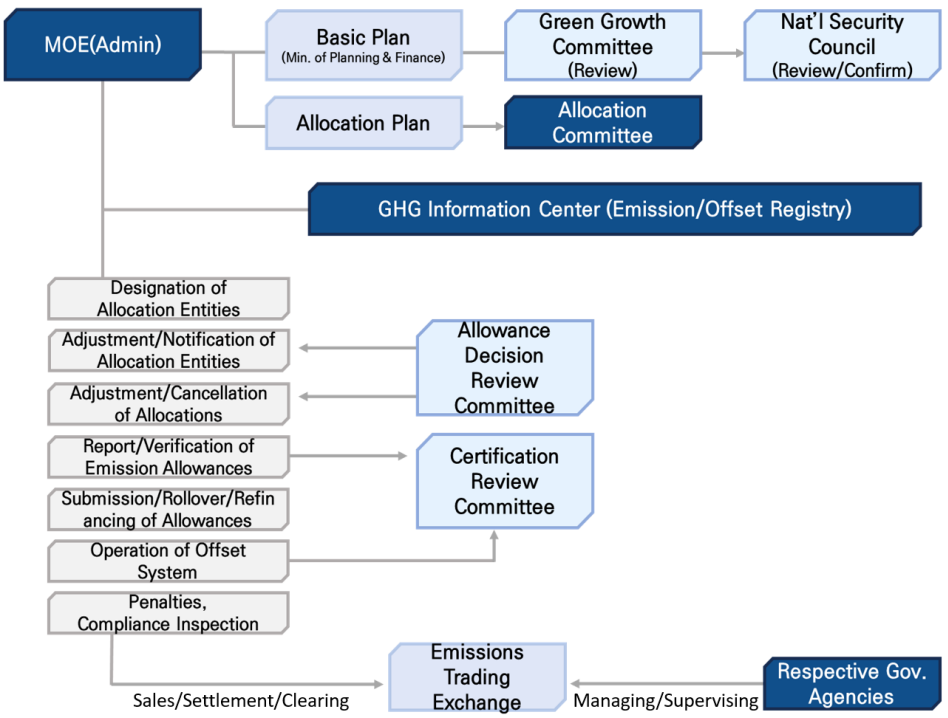
※Ref: National GHG Management System

[Figure 34] Korea GHG Target Management System – Public Sector

4. Operational System Status of GHG Emission

○ The Korean government unified the comprehensive and operational functions of the domestic emissions trading system (ETS) under the Ministry of Environment by 2017, according to the 'Enforcement Decree of The Act on The Allocation and Trading of Greenhouse Gas Emission Permits'.

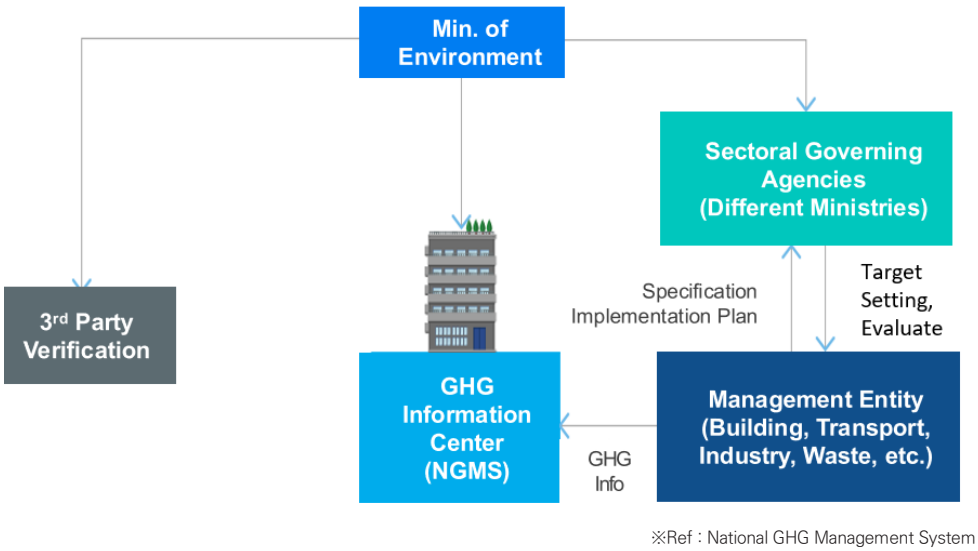
– For external projects for GHG reduction, the relevant system has been improved by maintaining the competent agency by sector and strengthening the effectiveness and project efficiency of the policy.



※Ref : National GHG Management System

[Figure 35] Korea GHG ETS Operational System

Operational Status of GHG Information Management System



※Ref : National GHG Management System

[Figure 36] Korea GHG Target Management System

○ The 'Greenhouse Gas Inventory and Research Center' under the Ministry of Environment operates a DB system for comprehensive information management of national greenhouse gases.

– (1) National GHGs Management System

• A system supporting the establishment of national GHG reduction policies through database for data related to a company's GHG emission activities, such as statements that are the basis of the target management system and emissions trading system, performance reports of implementation plans, allocation applications, and monitoring plans etc.

• The main features are as follows:

  – Building and managing statement data for target management companies and allocated companies
  – Preparing an emission calculation plan and notifying review results
  – Applying for and notifying allocations
  – Evaluating the validity assessment and notifying review results
  – Applying for early reduction results and notifying recognized quantity

※Ref : National GHG Management System

[Figure 37] National GHGs Management System

– (2) Emission Trading Registry System

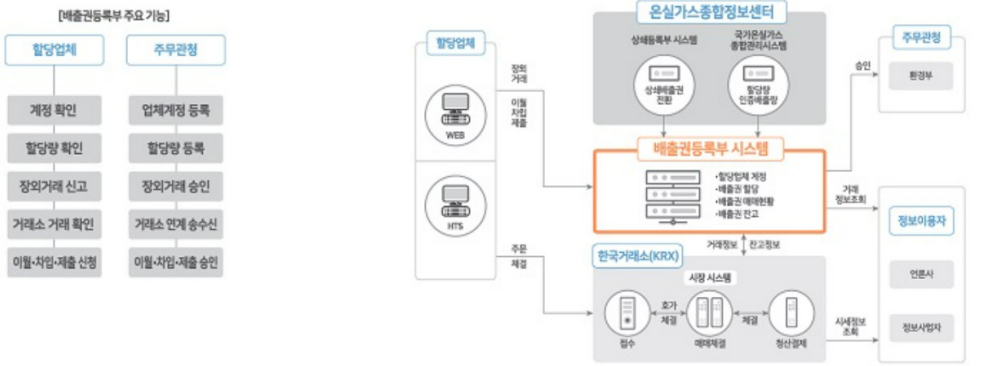
• It is a basis of the emissions trading system that registers and manages the history of emissions trading and fluctuations of allocated companies, including the issuance, deposit, and trading of emissions credits.

• The main features are as follows:

  – Issuing business accounts and registering emission allowances

  – Applying for carry-overs and borrowing, and reporting emissions submissions

  – Tracing emissions trading and reporting over-the-counter trading



※Ref : National GHG Management System

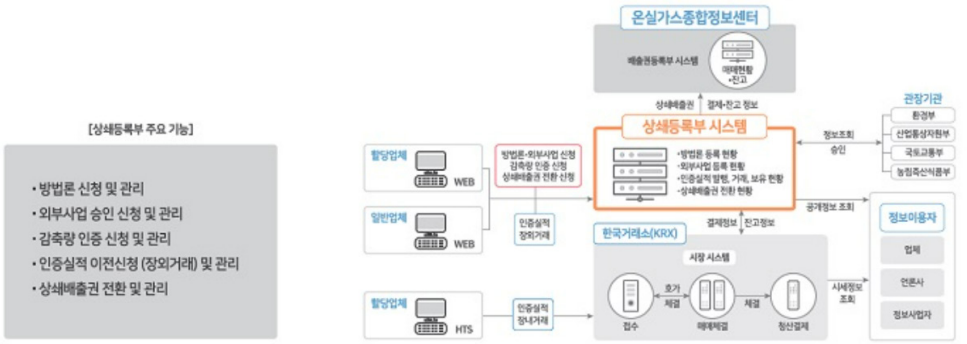
[Figure 38] Emission Trading Registry System

- (3) Offset Registry System

• A system that registers and manages external project methodologies that reduce, absorb or eliminate GHGs and the amount of GHG reductions, and supports the conversion of offset credits and trading of certification records.

• The main features are as follows:

  - Applying and approving an external project methodology
  - Applying and approving external projects
  - Applying and approving external project reduction certification
  - Managing certification performance trading of external project (Linked to Korea Exchange trading system)
  - Applying and approving the conversion of offset emissions allowances



※Ref : National GHG Management System

[Figure 39] Offset Registry System

< Introduction of Korea GHG Inventory and Research Center >

❖ Main Functions

Vision — Global GHG Think-Tank for Low Carbon Development

Goals

- GHG Information Hub
- Accelerating Low-carbon Development
- Expanding Global Networking and Outreach

6 Core Functions

- Operating of a world-class national GHG Management(MRV) system
- Supporting GHG and Energy TMS and ETS
- Supporting setting national and sectoral GHG reduction targets
- Research on national and international GHG reduction actions
- Enhancement of international cooperation for global climate change
- Strengthening linkage with international ETS market

❖ Comprehensive Management of the National GHG Inventory

① Developing a Comprehensive Management Plan of the National GHG Inventory

❖ Under the UNFCCC, member states are obliged to submit relevant reports, including national GHG statistics, to the UN.

(1 Year) Analyzing, verifying and publishing national GHG statistics annually.
(5 years) Establishing an overall management plan for national GHG statistics every five years for efficient and systematic management.

② Preparing the National Inventory Report (NIR)

(1 year) Annually releasing the NIR, which includes emission trends and sectoral status of Korea's GHG statistics in accordance with IPCC guidelines, together with the governing body.

③ Building a regional GHG inventory

(1 year) The Greenhouse Gas Inventory and Research Center calculates and publishes regional GHG statistics with provinces, cities, districts, and municipalities from 2022.

❖ National GHG Inventory Preparation System

1st Phase : Establishment

- a. a. GIR has **developed guidelines for MRV of** national GHG statistics.
- b. **Deliberation and confirmation by Statistical Committee**
- c. GIRs provide guidance to sectoral governing bodies* and calculators
  - * Ministry of Agriculture, Food and Rural Affairs, Ministry of Trade, Industry and Energy, Ministry of Environment, Ministry of Land, Infrastructure, Transport and Tourism, Ministry of Oceans and Fisheries
- d. Sectoral governing **bodies prepare GHG information and statistics** for their sub-sectors.
- e. Submitting to GIR by Mar 31· each year

2nd Phase : Verification

- GIRs compile, validate, correct and supplement sectoral emissions data.
- Submitting completed data to the National GHG Statistics Committee

3rd Phase : Deliberation & Decision

- National GHG Statistics Management Committee deliberates and finalizes statistics by Dec 31
- Publishing finalized statistics at the GHG Information Center

※Ref : GHG Inventory and Research Center (Aug 21, 2023)

5. International Reduction Project Status

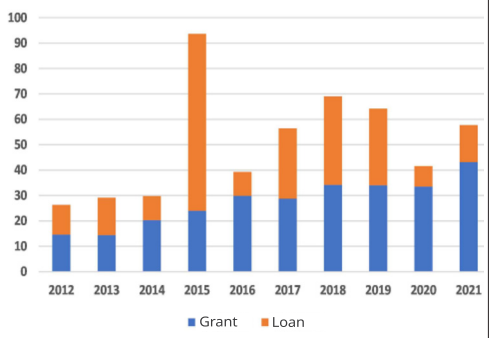
5.1. Project Cooperation Model of the Korea-Laos in Paris Agreement Article 6

○ Laos is a valued, long-standing partner of Korea in the field ODA, and has built bilateral trust with the top priority of contributing to the country's graduation from least developed country status by focusing on sustainable rural development, enhancing the health environment, and supporting the education and transport sectors.

[Table 52] ODA Status (Korea to Laos)

Korea's ODA Trends to Laos

(Unit: USD Million)



※ Splitting into Grants and Loans at Constant Price

Top 5 Sources of South Korea's ODA to Laos

(Unit: USD Million, %)

Rank	Grant	Amount(%)	Loan	Amount(%)
	Total	307.5	Total	267.3
1	Health	75.2 (24.5)	Energy	115.7 (43.3)
2	Agriculture/ Forestry/Fishery	49.0 (15.9)	Water Supply & Sanitation	83.8 (31.4)
3	Education	46.9 (11.5)	Gov.&CSOs	19.2 (7.2)
4	Gov.&CSOs	35.2 (11.5)	Transport & Storge	15.3 (5.7
5	Other sectors	25.3 (8.2)	Agriculture/ forestry/fishery	12.9 (4.8)

※ Based on cumulative amounts from 2012-2022, splitting into grants and loans at Constant Price

※Ref : ODA Korea Website (Aug. 1, 2023)

○ As for a project related to carbon neutrality, the Korea Forest Service and the Ministry of Agriculture and Forestry (MAF) of Lao PDR collaborated in 2018 on a pilot project on forest carbon sinks in the field of REDD+ in Dong Hoi Sao Protected Forest in Champasak Province, Laos, for a total of five years.

○ As such, the Korean government understands Lao society well by carrying out a series of mutual cooperation projects aimed at alleviating urgent problems in Laos.

- The Korean government has selected Laos as a priority country for cooperation in achieving the international reduction target* of its 2030 NDC, and in May 2023, the Ministry of Trade, Industry and Energy launched a bilateral dialogue with the Ministry of Natural Resources and environment of

Laos in Vietnam to jointly respond to climate change.

* 37.5 million tons (12.8% of total reductions of 291 million tons)

○ This chapter, therefore, looks at specific cases where Korea has previously engaged with other countries to explore ways to collaborate with Laos as a joint partner in responding to climate change in the future.

5.2. Paris Agreement Article 6.2 Projects: the Case of Vietnam

○ The 'Korea-Vietnam Basic Agreement on Climate Change' was proposed by the Korean government in May 2017 and was signed in May 2021.

- Unlike the 'Korea-China Climate Change Agreement', the 'Korea-Vietnam Basic Agreement on Climate Change' was discussed and concluded after the adoption of the GHG reduction or Paris Agreement, so the preamble mentions not only the 'UNFCCC', but also the 'Kyoto Protocol' to implement it and the 'Paris Agreement', the new climate regime under the 'UNFCCC'.

○ The 'Korea-Vietnam Basic Agreement on Climate Change' sets out rather specific goals of 'reducing and/or eliminating greenhouse gas emissions' and 'facilitating the Parties' transition to a low-carbon and climate-resilient economy'.

- The agreement also outlines collaboration areas to achieve the objectives of the agreement, including reducing and/or eliminating GHG emissions, improving climate change adaptation capacities, leveraging the market mechanisms of the Paris Agreement, and building capacity on the measurement, reporting and verification (MRV) of national inventory.

○ Regrettably, there is a lack of specific rules on the approval, verification and assessment, transfer certification, corresponding adjustments for GHG reduction activities related to ITMOs,

- Since the signing of the Basic Agreement, no exemplary public-private cooperative projects have been developed due to the passive cooperation of the Vietnam government.

[Table 53] Main Content of Korea-VN Basic Agreement on Climate Change

Classification	Main Content
General Matters	• Date and Place of Signing : May. 31, 2021(Hannoi) • Effective Date : Nov. 27, 2021
Main Content	• Cooperative areas under the agreement cover reducing and eliminating greenhouse gas emissions, improving climate change adaptation capacity, and cooperating on climate-related science and technology. • Both countries are committed to utilizing the market mechanisms of the Paris Agreement, including the use of GHG reduction results. • Allowing international trading of greenhouse gas reductions through voluntary cooperation between countries (Paris Agreement Article 6). • Both countries can strive to use the potential of technology co-operation through bilateral collaborations to enhance technological innovation capabilities and promote relevant industries in both countries. • Two countries establish a joint working group on climate change cooperation to facilitate and coordinate the implementation of the agreement.

※Ref : Ministry of Environment

[Table 54] Composition of Korea-VN Basic Agreement on Climate Change

Articles	Main Content
Preamble	• Reaffirming the 'UN Framework Convention on Climate Change', the 'Kyoto Protocol', and the 'Paris Agreement', which plays a central role in guiding cooperation on climate change issues
Article 1	• Purpose: Reducing and/or eliminating GHG emissions
Article 2	• Cooperation areas: Reducing and/or eliminating GHG emissions, cooperating on climate technology development and transfer, and national inventory measurement, reporting and verification (MRV), etc.
Article 3	• Cooperative activities: capacity building, including verification (MRV), and facilitating projects and programs to achieve Nationally Determined Contributions (NDCs).
Article 4	• Market mechanisms: Striving to utilize the potential of market mechanisms
Article 5	• Science and technology cooperation: Recognizing that NDCs can be implemented through science and technology cooperation
Article 6	• Joint Working Group: Establishing a joint working group to facilitate implementation of the Agreement
Article 7	• Cooperating between and with non-state actors
Article 8	• Supplementary agreements: Encouraging the signing of supplementary agreements between government agencies, companies, investors, research institutes and universities, and social organizations to promote cooperation
Article 9	• Expenses and support
Article 10	• Intellectual property and confidentiality
Article 11	• Relationship to other agreements
Article 12	• Dispute resolution

[Table 54] Composition of Korea-VN Basic Agreement on Climate Change

Articles	Main Content
Article 13	• Effectivation
Article 14	• Revision
Article 15	• Termination

※Ref : Ministry of Environment

[Table 55] (Follow-up project) Climate Change Joint Action Plan for 2050 Net Zero

Classification	Main Content
General Matters	• Date and Place of Signing : Dec. 14, 2021 (Seoul) • Goals: Strengthening bilateral climate change cooperation to realize carbon neutrality by 2050 and achieve the 2030 NDCs
Main Content	• Developing and promoting cooperative projects to reduce GHGs in the environmental sector under the Paris Agreement Article 6, including waste-to-energy, floating solar panel and eco-friendly hydroelectric power, to achieve the 2030 NDCs • Supporting Vietnam's capacity building on national inventory measurement, reporting and verification (MRV) • Sharing climate change response policies in both countries, including carbon pricing • Collaborating to develop green ODA projects • Strengthening biodiversity conservation, as well as cooperation in monitoring marine plastic pollution, which should be carried out in parallel with climate change action, etc.

※Ref : Ministry of Environment

○ (Cooperation Project) Since October 2016, the Korea Institute of Geoscience and Mineral Resources (KIGAM) under the Ministry of Science and ICT has been conducting a bilateral carbon mineral cooperation project with the Ministry of Natural Resources and Environment of Vietnam, aiming to transfer Korea's original technology to Vietnam and expand the Korean CCUS technology cooperation network.

5.3. Paris Agreement Article 6.2 Projects: the Case of Mongolia

○ The Korea Environment Corporation and the Ulaanbaatar City government, Mongolia conducted an Assessment of Feasibility of Power Generation Plant Using Landfill Gas (LFG) at Disposal Site in Ulaanbaatar, Mongolia (2020), leading to the exchange of implementation agreements for the reduction cooperation of the Paris Agreement Article 6 between the Korean and Mongolian Ministries of Environment.

- Under the agreement, ministries of the two countries agreed to strengthen cooperation in GHG reduction projects, capacity building in measurement, reporting and verification (MRV), and sharing of climate change response policies, and to establish a joint committee to supervise and discuss the implementation progress of the agreement.
- The two countries also signed a renewal of the MOU on Environmental Cooperation between Korea and Mongolia, which expired in 2019, aimed at strengthening bilateral cooperation in the environmental field, and agreed to develop various cooperation projects and continue active exchanges over the next five years.

○ Similar to Vietnam's case, the Korean-Mongolian Letter of Intent of Projects for the reduction cooperation on the Paris Agreement Article 6 lacks specific rules on the approval, verification and assessment and transfer certification and corresponding adjustments for GHG reduction activities related to ITMOs.

- However, unlike Vietnam, an implementation agreement has been signed between the two countries on the premise of a GHG reduction pilot project, so it is expected that actual GHG reduction activities can be implemented through concrete projects.

[Table 56] Main Content of Korea-Mongolia Basic Agreement on Climate Change Corporation

Classification	Main Content
General Matters	• Date of Signing : Feb. 7, 2023 • Effective Date : Jun. 11, 2023
Main Content	• Cooperative areas under the agreement cover reducing and eliminating GHG emissions, improving climate change adaptation capacity, and cooperating on climate-related science and technology • Both countries are committed to utilizing the market mechanisms of the Paris Agreement, including the use of GHG reduction results • Allowing international trading of GHG reductions through voluntary cooperation between countries (Paris Agreement Article 6) • Both countries can strive to use the potential of technology co-operation through bilateral collaborations to enhance technological innovation capabilities and promote relevant industries in both countries • Two countries established a joint working group on climate change cooperation to facilitate and coordinate the implementation of the agreement

※Ref : Treaty Information System of the Ministry of Foreign Affairs

[Table 57] Korea-Mongolia MOU on Environment Cooperation

Classification	Main Content
General Matters	• Date and Place of Signing : May. 3, 2022 (Seoul) • Signed by : Ministry of Environment, Korea ⇋ Ministry of Environment and Tourism, Mongolia
Main Content	• Aiming to strengthen bilateral cooperation in the overall environmental field, including biodiversity, soil and water management, two countries agreed to develop various cooperative projects and maintain active exchanges over the next five years

※Ref : Ministry of Environment

[Table 58] Korea-Mongolia Implementation Agreement on Paris Agreement Article 6

Classification	Main Content
General Matters	• Date and Place of Signing : Dec. 14, 2021 (Seoul) • Goals : Strengthening bilateral climate change cooperation to realize carbon neutrality by 2050 and achieve the 2030 NDCs
Main Content	• Developing and promoting GHG reduction cooperation projects in the environmental field • Supporting capacity building in Mongolia on national inventory MRV • Sharing climate change response policies between the two countries • Other cooperation in environmental fields through collaborative approaches

※Ref : Ministry of Environment

[Table 59] Mongolia GHG Reduction Project

Classification	Main Content
Project Purpose	• Capturing and incinerating landfill gas from Narangiin Enger Disposal Site (NEDS) in Ulaanbaatar, Mongolia to reduce GHG emissions and improve air quality in Mongolia
Main Content	• Landfill type : Sanitary landfill • Operation period : 2009~2023(planned), approx, 7 million tons landfilled • Landfill gas amount : After landfill closure, approx. 22.5㎥/min of methan gas is generated with a methane gas concentration of 50% • GHG reduction method : Complete collection and incineration of landfill gas (CH4→CO2 conversion)  
Progress	• Korea Environment Corporation-Ulaanbaatar City signed an agreement on the 'Assessment of Feasibility of Power Generation Plant Using LFG at Disposal Site (NEDS) in Ulaanbaatar, Mongolia (Sep. 2020) • Completion of feasibility assessment (May. 2021) and pre-designing of Mongolia landfill (NEDS) (~May. 2022) • Korea Environment Corporation-Ulaanbaatar City signed an 'Agreement for the Promotion of GHG Reduction Project' (Oct. 2021) • Korea-Mongolia Ministries of Environment exchanged a letter of intent for the reduction cooperation on the Paris Agreement Article 6 (Dec. 2021) • Designating a pilot entity and signed a project agreement (Corporation-Landfill Construction) (Dec. 2021)
GHGs Reduction Estimation	• (Estimated Reduction) 54,550 tons COeq/year* (total reduction of 550,000 tons over 10 years) • (Estimated Project Costs) KRW 5.4 billion (construction costs, site survey costs, design costs, and construction supervision costs) • (Estimated annual operation costs) KRW 240 million (direct labor costs, management and office expenses, facility operation costs)

※Ref : Ministry of Environment, Korea Environment Corporation

5.4. Paris Agreement Article 6.4 Projects: the Case of Overseas CDM

○ There were a total of 273 overseas GHG reduction projects(as of October 2003) with Korean companies registered under the UNFCCC as project participants.

○ Representative projects include Korea Western Power Co. Ltd's natural gas-based power project in India (2015), Korea Water Resources Corporation (K-Water)'s hydropower power project in Pakistan (2012), and Korea Electric Power Corporation (KEPCO)'s wind power project in China (2012).

[Table 60] Main Overseas CDM Registry list of Korean Company

Date Registered	Project Names	Promoted Countries
2012.04.24	(PA) Datang Kazuo Shuangmiao Wind Farm	China
2012.12.07	(PA) Alu Kerqin Qi Balaqirude Wind Farm 45MW Wind Power Project	China
2012.11.24	(PA) Beipiao Xiaotazi Wind Farm Project	China
2012.12.27	(PA) Patrind Hydropower Project	Pakistan
2012.12.23	(PA) Broadlands Hydropower Project	Sri Lanka
2013.12.23	(PA) Biogas Recovery in Siak	Indonesia
2012.09.09	(PoA) Municipal Waste Compost	Sri Lanka
2013.08.06	(PoA) for Small Scale Hydropower CDM	Sri Lanka
2014.05.01	(PoA) Impact Carbon Global Safe Water	Rwanda and 3 other countries
2014.01.30	Semangka Hydro Electric Power Project-CDM	Indonesia
2015.07.31	(PA) Grid connected natural gas based power project in Raigad District, Maharastra	India
2018.08.28	(PoA) Clean energy program supported by Republic of Korea	Myanmar
2018.12.26	Clean Energy Program CPA MM 02	Myanmar
2019.12.13	Santa Rosa PV CDM Project	Chile
2020.01.17	70MW Solar Power Plant Project (Ba Ria - Vung Tau, Vietnam)	Vietnam
2020.02.05	Rinconada PV CDM Project	Chile
2020.02.05	Quinta PV CDM Project	Chile
2021.02.04	GHG Emissions Reduction Project through Cam Lam KN Solar Power Plant Project	Vietnam

※Ref : Overseas CDM projects approved as external projects on Offset Registry

○ Korea allows companies subject to domestic ETS allocations to use offset allowances up to 10% of the total quantity when submitting allowances to the government for CDM projects implemented abroad, and up to 5% of the total quantity can be converted from CDM emission reductions.

○ Overseas CDM projects implemented by Korean companies are divided into the following four types.

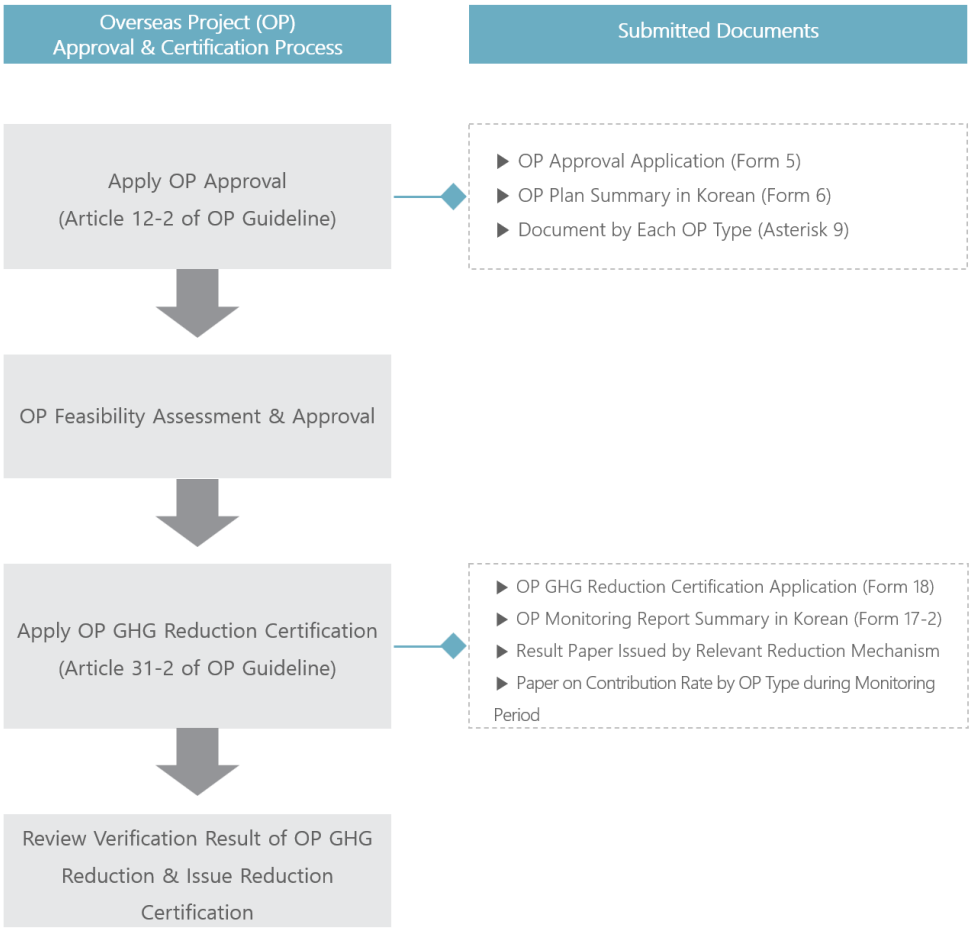
[Table 61] Overseas CDM Project Type of Korean Company

Project Type	Contribution Rate
(A) Direct participation as an eligible entity for the reduction project (20% or more ownership)	• Ownership or operational ratio of share in the facility, such as a domestic company, during the GHG reduction project monitoring period
(B) Participation as a shareholder of eligible entity of reduction project (20% or more ownership)	• Percentage of voting shares (excluding non-voting preferred shares) of domestic companies and etc, during the GHG reduction project monitoring period
(C) Distribution or sale of reduced products, technologies, etc. to end users (more than 20% of cumulative project costs)	• Proportion of distribution or sale's cost of reduced products and technologies that is attributed by domestic companies in the total cumulative project cost during the GHG reduction project monitoring period
(D) Financing GHG reduction projects in least developed and low-income countries	• Proportion of support cost by domestic companies, etc. in the total project cost from the start date of the project to the monitoring period of the GHG reduction project

※Ref : Explanatory material on the recognition criteria of CDM projects that Ministry of Environment, and domestic companies directly implemented in foreign countries

○ To convert Certified Emission Reductions (CERs) issued from overseas CDM projects into Korea Offset Credits (KOCs) in the domestic emissions trading system, it is necessary to take steps of 'external project approval' and 'external project GHG reduction certification'.

- Approval and certification process for external projects is similar to that of domestic CDM projects, with the additional reviews of recognition requirements for each type of project.



※Ref : Explanatory material on the recognition criteria of CDM projects that Ministry of Environment, and domestic companies directly implemented in foreign countries

[Figure 40] Approval and Certification Process of Overseas Project (CERs→KOC Conversion)

5.5. Implications

○ In 2009, the Korean government recognized that policies on climate change, energy, and sustainable development were highly relevant to low-carbon green growth, but were implemented separately and sporadically under different laws and regulations, resulting in a lack of linkages between ministries' policies and projects.

– To integrate multiple laws and regulations for more efficient and systematic operation, the 'Low Carbon Green Growth Basic Act' was enacted, and a 'Green Growth Commission' was established under the president with the

chairpersons of the Prime Minister and a civilian co-chairperson.

- Since then, the process of trial and error and improvement experienced during the implementation of various policies in practice has been the basis for the enactment of the 'Framework Act on Carbon Neutrality' and the establishment of the 'Presidential Commission on Carbon Neutrality and Green Growth' in 2022.

○ It is true that the Korean GHG reduction system is rather regulatory, aiming at visible effectiveness.

- However, a working subcommittee composed of various stakeholders from the private sector, industry, and the environment regularly listens to the opinions of each sector, and faithfully implements the process of collecting opinions on the strategy to be implemented, raising public awareness and building consensus.
- In addition, the overall management of the national greenhouse gas reduction and carbon neutrality strategy and the achievement of detailed implementation targets by each ministry is centralised in the Ministry of Environment, preventing confusion in advance and promoting a consistent plan to achieve the target.

○ Korea's Emissions Trading System (K-ETS) was established in 2015 and is currently in its third planning period (2021-2025), and the scale of transactions has increased annually, expanding the transaction value by more than 20 times compared to the initial period, but the price volatility is high.

- This is attributed to the fact that Korea's ETS allocators are mostly economic sensitive sectors such as power generation and energy, steel, and petrochemicals with high emissions, as well as seasonality issues due to the timing of GHG emissions submissions to the government (June) and the economic slowdown caused by COVID-19.

○ Similar to other countries around the world that have adopted ETS, Korea has introduced an emissions stabilization policy to mitigate the price volatility of emission allowances.

- Various policy studies have recommended implementing a number of market stabilization measures in Korea's ETS, such as limiting carry-over, allowing third-party market participation, and setting a minimum trading price for emission allowances, which the government has positively considered and

partially implemented.

- To increase the liquidity of emission allowances, a carry-over limit was implemented and third parties (securities firms) were allowed to participate in the emission allowance market, of which 20 firms are currently engaged in self-dealing and brokerage transactions.
- Paid allocation auctions were implemented in 2020 to enhance the price discovery function and increase the paid allocation ratio to 10%.
- Ensuring price stability by setting a minimum transaction price as a market stabilization measure when emissions prices plummeted in 2021 due to COVID-19.

○ The next challenge for the Korean carbon ETS is to improve efficiency through linkages with overseas exchanges due to the global convergence of emissions prices from the recent discussion of a carbon border tax, and to gradually reduce direct regulatory intervention through the allocation committee to secure liquidity using market makers and to introduce market stabilization measures such as a minimum price system.

– These measures will gradually lead to the goal of the carbon market, which is to reduce carbon by internalizing the appropriate cost of carbon under the polluter pay's principle, and lay the foundation for bringing low-carbon technologies to the level of developed countries.

○ The 3rd phase of Five-Year Plan for Green Growth is based on a systematic analysis of major achievements and changes in the policy environment compared to the 1st and 2nd phases, and presents the key tasks to reduce GHG emissions in Korea as specifically as possible.

– It is assessed to serve as a clear guideline in that it suggests strategies to improve the settlement of the Emissions Trading System (K-ETS) introduced in 2015 and to implement overseas reductions using carbon sinks and international carbon markets.

05

CHAPTER

Masterplan Direction Proposal to Introduce ETS in Laos

1. Preparation Status to Achieve GHG Reduction Target in Korea-Laos
2. Mid & Long Term Roadmap to Introduce ETS
3. Direction Proposal based on ETS related Legislations
4. Establishing Detailed Organizational Structure and Collaborative System among Different Agencies
5. Implications

Masterplan Direction Proposal to Introduce ETS in Laos

1. Preparation Status to Achieve GHG Reduction Target in Korea-Laos

○ The timing of the submission of its NDC to the United Nations Framework Convention on Climate Change (UNFCCC) shows that Laos has joined in the international trend three years earlier than South Korea.

- This is because Laos, being a least developed country, was proactive in recognizing and getting ready to meet international demands through a range of initiatives backed by international organizations and developed nations.

[Table 62] Comparison of Laos-Korea NDC

Laos (Conditional Scenario Target, 2021)

(Unit : ktCO2e/y)

Category	Mitigation Measures (2020-2030)	2020-2030 Avg. Target
Land Use Change & Forestry	Expanding forest area to 70% (16.6M hectares) of total land area	**45,000 (98.5%)**
Other Renewable Energy	Solar and wind: Total 1GW installed nationwide	**100 (0.2%)**
	Biomass: Total 300MW installed nationwide	**84 (0.2%)**
Transport	30% EV penetration rate, compared to the total no. of vehicles nationwide including motorcycles and passenger cars	**30 (0.1%)**
	Biofuel accounts for 10% of transportation fuel	**29 (0.1%)**
Energy Efficiency	Reduce 10% energy consumption compared to BAU	**280 (0.6%)**
Agriculture	Water management practices adjusted for 50,000 hectares in lowland rice cultivation	**128 (0.3%)**
Waste	Sustainable solid waste management project with a capacity of 500 tons/D	**40 (0.01%)**

Korea (Mar. 2023)

(Unit: 1 M CO2eq

Category	Sector	Base Year ('18)	NDC (Reduction to 2018)	NDC (Update) (Reduction to 2018)
Emissions		727.6	536.1 (△191.5, △26.3%)	**436.6 (△291.0, △40.0%)**
Emissions	Transition	269.6	192.7 (△28.5%)	**149.9[1] (△45.9%)**
	Industry	260.5	243.8 (△6.4%)	**230.7 (△11.4%)**
	Building	52.1	41.9 (△19.5%)	**35.0 (△32.8%)**
	Transport	98.1	70.6 (△28.1%)	**61.0 (△37.8%)**
	Agriculture/ Fishery	24.7	19.4 (△21.6%)	**18.0 (△27.1%)**
	Waste	17.1	11.0 (△35.6%)	**9.1 (△46.8%)**
	Hydrogen	-	-	**8.4[2]**
	Others	5.6	5.2	**3.9**
Absorption & Offset	Source	-41.3	-22.1	**-26.7**
	CCUS	-	-10.3	**-11.2[3]**
	Abroad reduction	-	-16.2	**-37.5[4]**

※ Base year (2018) emissions are gross emissions, 2030 emissions are net emissions (gross − absorption & offset)
1) Reducing additional 4 million tons by expanding clean energy, including solar and hydrogen
2) Updated hydrogen demand (blue hydrogen +10.5k tons), carbon capture related to blue hydrogen is reflected in CCUS (0.8 million tons)
3) Reflected domestic CCS potential (0.8 million tons), expanded in light of CCU demonstration (0.1 million tons)
4) Increase international reductions by 4 million tons by identifying public–private partnerships and increasing investment

※ Ref: Lao PDR NDC, Website of Presidential Commission on 2050 Carbon Neutrality and Green Growth (https://2050cnc.go.kr)

○ When comparing the sector-specific emission reduction goals in the updated NDCs of Laos and Korea, it becomes evident that the industrial composition of these two countries is nearly polar opposites.

- Forest carbon market plays the most important role in reducing GHG emissions in Laos, with the conditional scenario for Lao PDR suggesting that land use change and forestry will achieve 98.5% of the reduction target.
- Korea seems to need to control emissions from sources directly attributable to fossil fuels, such as oil and coal, as 86.3% of the target (draft) is to be achieved by transition and industry.

○ Both countries have to control GHG emission sources in different industrial structures and are making efforts to develop their own national conditions and implementation capabilities related to climate change and GHG reduction in order to achieve the reduction targets promised to the international community.

National Strategies

○ (Korea) Korea, which has led economic growth in the most carbon-intensive sectors, announced 1st Climate Change Response Basic Plan in 2016, incorporating the concept of greenhouse gas reduction into its national strategies and preparing for a comprehensive eco-friendly reorganization of its industrial structure.

- After laying the groundwork for laws and policies in the 1st and 2nd plans, the government announced the 3rd Five-Year Green Growth Establishment Plan, centered on detailed action tasks for each industry sector to achieve carbon neutrality.

○ (Laos) After signing the UNFCCC Paris Agreement in 2016, the country established 2030 National Green Growth Strategy of the Lao PDR (in 2018) with the support of UNDP and enacted laws on climate change in 2019,

forming an organization to manage and monitor climate change.

- The 9th Five-Year National Socio-Economic Development Plan allocates one area (④ Strengthening Environmental Protection and Disaster Risk Reduction) to present a GHG emission reduction plan, but it is analyzed as a program that will be supported by international organizations and not as an action plan led by the Laos government.
- It is disappointing that the national strategies for climate change mitigation and net-zero emissions in Lao PDR are largely organized around capacity building for the UNFCC framework instead of practical tasks linked to targets for readiness to achieve NDCs.

• In the case of Korea, a national balanced development plan is established, but it consists only of balanced development with local governments, so it is excluded from the comparative review in this report.

Legal Framework

○ (Korea) The "Framework Act on Low Carbon, Green Growth" (Jan. 2010) was enacted to maintain national competitiveness through the transformation of profit-making models in the face of intensifying global competition and to proactively address climate change and energy issues.

- In accordance with Article 46 of the same act, the "Act on the Allocation and Trading of GHG Emission Permits (May, 2012)" was enacted, and the emissions trading system (ETS) was fully introduced on January 1, 2015, following social consensus and preliminary research.
- In 2020, the "Framework Act on Carbon Neutrality and Green Growth for Coping With Climate Crisis" was enacted, replacing the law enacted in 2010, while establishing the 2050 Net Zero Strategy.
- The legal framework of the ETS consists of laws based on the 'Framework Act on Low Carbon, Green Growth', enforcement decrees, basic and allocation plans presenting detailed directions, and detailed guidelines.

○ (Laos) Established the 2030 National Green Growth Strategy of the Lao PDR (2018) and enacted an enforcement decree on climate change in 2019.

- The above-mentioned decree only provides the rationale of management, but lacks details such as the designation of institutions, criteria, and procedures necessary for the implementation of Inventory, MRV, CERs, and international emission reduction projects etc.

- Consequently, there is a lack of a well-established legal framework, including the essential enforcement decrees, administrative regulations, and comprehensive guidelines required for practical implementation.
- Therefore, the Ministry of Agriculture and Forestry and the Ministry of Energy and Mines, the two ministries most relevant to the achievement of Laos' NDCs, are currently working on their own administrative rules for securing CERs and utilizing the carbon market.

Policy

○ (Korea) Korea introduced the GHG-Energy Target Management System in 2010, following the announcement at the Cabinet meeting on November 17, 2009, that the country's medium-term GHG reduction target is to reduce its greenhouse gas emissions by 30% by 2020, relative to business-as-usual (BAU) scenario.*

* This reduction plan is on the high end of the range of reductions recommended by the IPCC for developing countries (reduction by 15–30% relative to BAU), with an upward target of 40% reduction in 2021 and a revised NDC in March 2023.

- The Korean government specified the introduction background and system structure in the 'Framework Act on Low Carbon and Green Growth', and established the Guidelines on GHG and Energy Target Management Operations (Ministry of Environment notice) and the Notification of Annual GHG and Energy Target Management Companies for the Building Sector (Ministry of Land, Infrastructure and Transport).
- The following year, in 2011, the Public Sector Target Management System was implemented with the aim of enabling central administrative agencies, local governments, and public institutions to play a leading role in achieving the national GHG reduction target, resulting in a 30.4% reduction from baseline emissions in 2021.
- On the other hand, the emissions trading system(ETS) was introduced in 2015 to cost-effectively achieve the national GHG reduction target, with 636 business entities eligible for allocation in 2020 and 554.4 million tons of greenhouse gas emissions.

○ (Laos) Ranked 42nd in the world's climate change vulnerable countries according to the UNDP survey in 2018, more than 70,000 people were affected by natural disasters in 2021 alone, and damage from droughts, floods, and typhoons is repeated every year.

- The main climate change-related programs and policies in Lao PDR are focused on climate change adaptation. In 2010, the country developed a National Strategy on Climate Change, implemented programs in seven adaptation sectors*, and integrated climate change adaptation policies into the National Socio-Economic Development Plan.

  * 7 Adaptation Sectors: 1) Agriculture and Food Security, 2) Forests and Land Use, 3) Water Resources, 4) Energy and Transport, 5) Industry, 6) City Development, and 7) Public Health

- The most recent Technology Needs Assessment(TNA) cited the need to introduce advanced technologies and increase foreign investment to improve access to clean water.

Operational System

○ (Korea) With the exception of the public sector, Korea's greenhouse gas reduction policies are typically centered around the Ministry of Environment, which serves as the primary agency responsible for offering comprehensive guidelines.

- The GHG-Energy Target Management System is responsible for the inspection and evaluation of the work of the governing bodies. Sectoral governing agencies are responsible for designation of management entities, target setting, implementation management, performance evaluation, and taking related administrative actions.
- In the case of Energy Trading System, the basic plan and allocation plan are established jointly with the Ministry of Strategy and Finance, and the allowance decision review committee and emission certification review committee are formed to systematize the process.
- Under both systems, companies(entities) that are obligated to make reductions by industry sector can send GHG information to a "GHG Information Center" and register their CERs and offsets with the center.

○ (Laos) The Ministry of Natural Resources and Environment (MONRE) is responsible for establishing strategies and overseeing work to achieve the national greenhouse gas reduction target. The Department of Climate Change(DCC) is the nationally approved secretariat of the CDM and plays an important role in providing technical support for emission reductions and establishing GHG inventory.

- As of June 2023, the DCC is working with the Australian Embassy and GGGI to

develop an “Enforcement Decree on Carbon Credit Management”.

- The Ministry of Agriculture and Forestry, which is responsible for the REDD+ sector, the most important sector of the NDC targets, developed a national REDD+ strategy in 2021. The Department of Forestry(DOF) is in charge of checking the detailed implementation status and coordinating with the Technical Working Group.

Reduction Project

○ (Korea) Korea has launched bilateral international emission reduction projects to reduce 33.5 million tons of greenhouse, utilizing the cooperative approach of Paris Agreement Article 6.2.

- After agreeing to a greenhouse gas reduction project with Mongolia through the landfill gas (LFG) electricity generation project, for which a preliminary feasibility study was conducted in advance, a bilateral implementation agreement was signed and a demonstration project is underway.
- With Vietnam, the two countries are working together to secure carbon credits with the goal of utilizing the market mechanisms of the Paris Agreement. Cooperation includes capacity building in the areas of climate technology development and transfer, and national inventory measurement and verification (MRV).
- CDM projects approved in Korea are mainly related to wind, solar, hydropower, biogas, and cookstove distribution in developing countries. For businesses subject to Korea’s emissions trading system, it is possible to convert up to 5% of the total quantity from emission reductions in CDM projects abroad.

○ (Laos) Since 2013, Laos has collaborated with Japan in bilateral cooperation to advance the Joint Crediting Mechanism (JCM). Up to 2023, a total of 7 projects have been implemented, leading to a cumulative reduction of 290,217 tons of emissions. In the LEED pilot project (2017-2018), 174 (84%) credits were issued to Japan, while 33 (16%) were allocated to Laos.

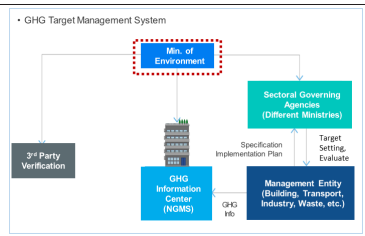
- For the Clean Development Mechanism (CDM), a total of 33 projects are currently in progress. Out of these, 30 have received approval from the Ministry of Natural Resources and Environment as the National Designated Authority (NDA), and 14 have been approved by the CDM Executive Committee. The prolonged duration for obtaining the final approval of CDM

projects in Laos needs to be addressed.

[Table 63] Comparison of Korea-Laos Operation Status on GHG Reduction

	Laos	Korea
National Strategy		• (Dec.2016) The 1st Climate Change Response Basic Plan
	• (Nov.2018) 2030 National Green Growth Strategy of the Lao PDR	• (May.2019) The 3rd Five-Year Green Growth Establishment Plan
	• (Mar.2021) Revised GHG Reduction Scenario * Submitted in 2015	• (Mar.2023) Revised 2030 National GHG Target * Initial submission in 2018, upward target submission in 2021
	• (Apr. 2021) Lao PDR National Strategy on Climate Change	• (Dec. 2020) 2050 Net Zero Strategy
	• (Oct. 2021) 9th Five-Year National Socio-Economic Development Plan ④ Strengthening environmental protection and disaster risk reduction	
	• (Planned) Preparing a long-term GHG emission development strategy	• (Dec. 2020) LEDS
Legal Framework	• (2019) Enforcement Decree on Climate Change - Climate change management and monitoring organizations included * Lack of higher-level laws, notices, administrative rules, and detailed guidelines for detailed implementation	• (Jan. 2010) Framework Act On Low Carbon, Green Growth - Establishment of decrees, administrative rules, and detailed guidelines related to ETS and verification
	• (Planned) Enforcement Decree on CERs is being prepared	• (May. 2012) Enforcement Decree of the Act on the Allocation and Trading of GHG Emission Permits - Forest Carbon Offset Pilot Program Rules
	• (Planned) Decree on Carbon Asset Management and Carbon Market in Forestry Sector is being prepared	• (Aug. 2020) Agriculture and Rural Voluntary GHG Reduction Project Operational Regulations
	• (Planned) Administrative Regulation on Carbon Asset Management and Carbon Market in Energy Sector is being prepared.	• (Sep. 2021) Framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis
		• (Jun. 2021) Act on Management & Improvement of Carbon Sink

[Table 63] Comparison of Korea-Laos Operation Status on GHG Reduction

<table>
<tr><th></th><th>Laos</th><th>Korea</th></tr>
<tr><td rowspan="5">Status of Policies</td><td>• (2009) National Adaptation Program of Action (NAPA)
- 45 Projects in Agriculture, Fishery, Hydro and Public Health</td><td></td></tr>
<tr><td>• (2010) National Strategy on Climate Change (NSCC)
- Suggested 7 adaptation sectors including Forestry, Land Use, Energy, Transportation, Industry and City Development etc.</td><td>• (2010) Implementation of GHG Target Management System</td></tr>
<tr><td></td><td>• (2011) Implementation of GHG Target Management System in Public-sector</td></tr>
<tr><td>• (2013) UNFCCC Communication
- Integrate environmental issues into long-term development plans</td><td></td></tr>
<tr><td>• (2013-2017) Technology Needs Assessment (TNA)
- 8 adaption technology and cases picked in hydro and agriculture sectors</td><td>• (2015) Implementation of ETS</td></tr>
<tr><td rowspan="4">Status of Operational System</td><td>• Operational system to achieve National GHG Reduction Targets</td><td> 
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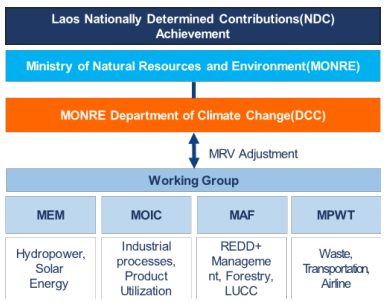
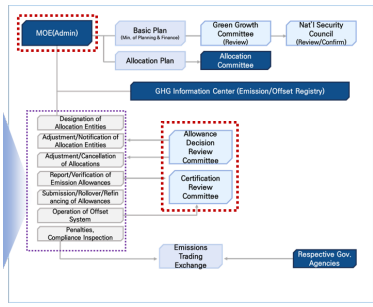
<tr><td> 
</td><td>• GHG Target Management System Operational Framework</td></tr>
<tr><td></td><td>• ETS Operational Framework
 
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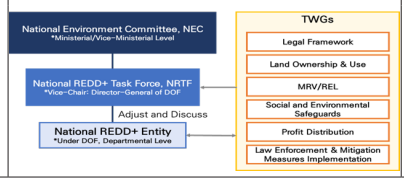
<tr><td>• National REDD+ Operational System
 
</td><td>• Greenhouse Gas Inventory & Research Center
① National GHG Management System,
② Emission Trading Registry System
③ Offset Registry System</td></tr>
</table>

[Table 63] Comparison of Korea-Laos Operation Status on GHG Reduction

	Laos	Korea
Status of Reduction Projects	• JCM cases - 7* projects approved to date * Solar power(4), grid(1), REDD+(1), energy efficiency data project(1)	• (May. 2021) Concluding Korea-Vietnam Basic Agreement on Climate Change * 'reducing and/or eliminating greenhouse gas emissions' and 'facilitating the State Party's transition to a low-carbon and climate-resilient economy' • (Feb. 2023) Concluding Korea-Mongolia Framework Agreement for Cooperation on Climate Change • (Dec. 2021) Korea-Mongolia Agreement on Cooperative Approaches under Paris Agreement Article 6 * Developing and implementing GHG reduction cooperation projects in the environmental sector and supporting Mongolia's national inventory measurement and verification capacity ➡ (2021~2023) GHG reduction and air quality improvement project utilizing LFG from landfill in Ulaanbaatar, Mongolia
	• CDM cases - A total of 33 cases, 30 of which* have been approved by the MONRE * Hydropower(25), energy efficiency(2), biogas(1), forestry(1), cookstove(1)	• Overseas CDM cases - 20 UNFCCC-registered projects, 12 of which were approved for overseas projects

※Ref : KMAC

2. Mid & Long Term Roadmap to Introduce ETS

2.1. Necessity and Direction of the Application of ETS

Necessity of the Application of ETS

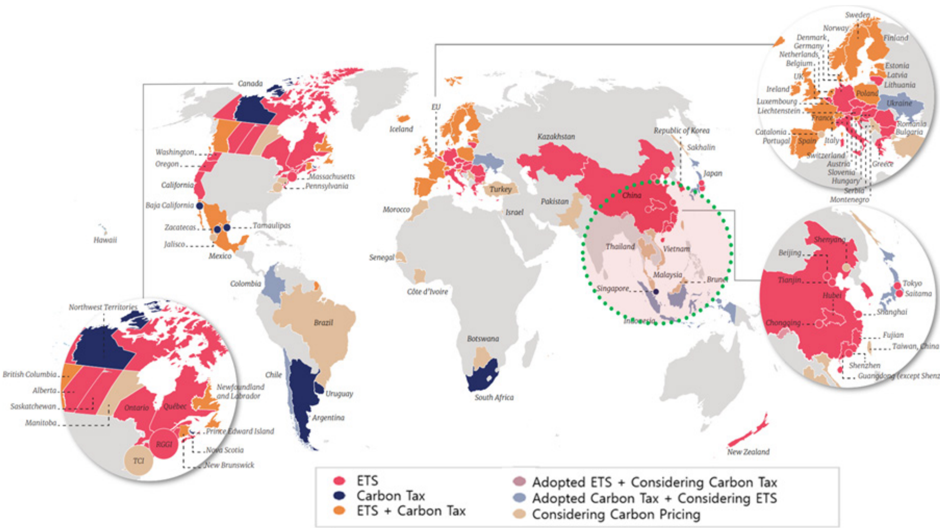
○ The core of climate change policy for carbon neutrality is to reduce greenhouse gas emissions from economic activities.

– To this end, the government's climate change response principle should be to reduce economic actors' dependence on fossil fuels by driving economic actors to low-carbon economic activities through market-based policies.

○ Economists consider climate change caused by greenhouse gas emissions to be a market failure and propose carbon pricing as a climate change policy tool to correct it.

– Carbon pricing (carbon tax, ETS etc.), a market-based climate change policy, creates a market for greenhouse gas that causes climate change and requires economic entities to pay for the carbon emitted directly or indirectly from their economic activities.

– Therefore, it is one of the more effective measures to reduce greenhouse gas emissions to mitigate climate change and is being implemented by many countries.

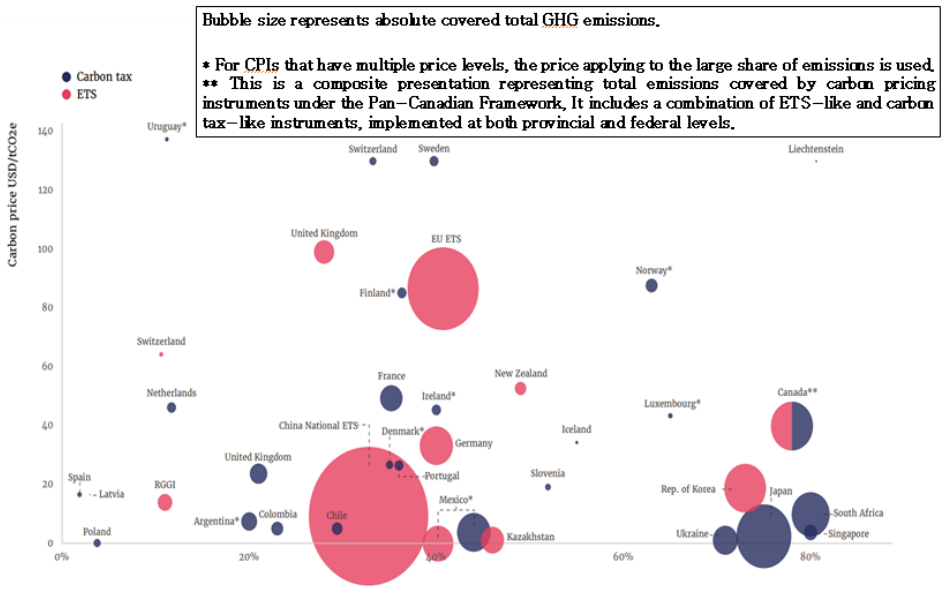


※Ref : World Bank, State and Trends of Carbon Pricing 2022

[Figure 41] Global Carbon Pricing Adoption Status 2022

○ As of April 2022, the 68 regions implementing carbon pricing measures represent 23% of worldwide greenhouse gas (GHG) emissions. The increasing cost of carbon credits, prompted by the European Union's announcement of more ambitious GHG reduction targets, has encouraged major countries to move toward carbon neutrality.

- However, carbon prices in carbon taxation and ETS markets vary significantly from one country and region to another. This has led to situations where countries with relatively lax regulations have gained a competitive advantage, creating discussions about cross-border carbon adjustments between nations.



※Ref : World Bank, State and Trends of Carbon Pricing 2022

[Figure 42] Global Status on Pricing to GHG Emission 2022

○ A key feature that distinguishes ETS from direct regulation and carbon taxes is the existence of a market.

- Direct regulatory approaches like the target management system involve the government imposing fines on companies that exceed emission limits. Under a carbon tax system, companies pay taxes directly to the government based on their greenhouse gas emissions. Therefore, in both of these systems, there is no opportunity for trading.
- In contrast, in emissions trading systems, companies that emit less greenhouse gas than their allocated emission permits can sell surplus carbon credit to other companies, creating an emissions trading market.

○ If Laos wants to introduce an ETS, it is desirable to utilize these various carbon pricing systems efficiently and organically to start building a stable carbon market.

- A comprehensive review of the overall social and economic environment, including the legal system, economic system, and industrial structure, is necessary for the settlement and operation of a stable system in the future.

○ Based on the current situation and issue analysis for carbon mitigation in Laos analyzed in Chapters 2 and 3 of this report, the following considerations should be taken into account when moving forward with the actual implementation of ETS to establish a carbon market based on the new climate regime in Laos.

- We reviewed and discussed the utilization of the carbon tax concept with the Laos government, as Laos enacted a new tax law in 2019 with support from UNDP and promoted the introduction of an environmental tax, but the introduction of a carbon tax is currently considered difficult for the Laos government, which needs foreign direct investment to revitalize the economy after the COVID-19 pandemic.
- Based on our assessment of Laos adoption of an ETS, it is probable that the country can achieve its conditional NDC target with assistance from developed nations. This support could involve the introduction of advanced technologies within the forestry sector and the promotion of renewable energy sources like solar, small hydropower, and biomass.
- Nonetheless, in the context of Laos, the fraction of high-carbon manufacturing industries capable of readily acquiring carbon credits is rather limited. Therefore, it is advisable to pursue the national greenhouse gas reduction target primarily through carbon sinks, while implementing a Target Management System to regulate carbon-emitting industries.
- Laos does not have its own methodology for estimating GHG emissions, its 2021 NDC was supported by international organizations, and 'the preparation of National GHG Inventory' is a prerequisite for the introduction of ETS in the future.

[Table 64] Considerations for the introduction of ETS in Laos

	ETS	Considerations for the introduction of ETS in Laos
Economic Efficiency	• Effective in reducing the total cost of achieving GHG reductions	**Review of carbon market utilization and ETS adoption using Paris Agreement Article 6.4 ER (SDM) through Lao PDR's experience in promoting CDM (33 cases) and JCM (7 cases)**
Promoting Technology Develop- ment	• Promoting the development of mitigation technologies, including the introduction of new technologies related to greenhouse gas reduction	**Foreign Direct Investment (FDI) is essential for incorporating advanced technology from developed countries into the renewable energy expansion sectors, such as solar, hydropower, and biomass, which are being promoted by the Laos government**
Price	• Participant burdens vary based on the allocation method of emission allowances and auction revenue reinvestment method ※ The carbon price is established within the market through the trading of emission allowances by individual entities	**▶ There are only a few high-carbon-intensive manufacturing industries that can readily obtain carbon credits, which means it will take a considerable amount of time to establish a voluntary market and stabilize the system** **▶ Securing carbon sinks through the utilization of REDD+ projects enables participation in the international carbon market**
Emissions	• A cap on overall emissions is set by the government • Each emitting entity determines its allowances and engages in trades based on market prices	**There is currently no methodology for estimating emissions, which is being developed with the support of international organizations, and capacity will need to be gradually built over time**
Characteristics	• The total emissions remain fixed, but the trading prices fluctuate ※ Price formation through marketmechanisms makes it easier to ensure fairness in carbon pricing	**Laos' conditional NDCs primarily focus on forestry and land reuse, accounting for 98.5% of the total, with a high level of confidence in achieving emissions reductions**
Policy Acceptability	• The difficulty in reaching a consensus on the allocation method of emission allowances and the level of overall GHG reduction targets may lead to industry opposition to the policy introduction	**Considering Laos' status as a least developed country, allocating emissions quotas to specific industries can be an efficient approach, even in the face of resistance**
International Connections	• Can be linked to other countries that have adopted ETS	**Given the high likelihood that Laos may face challenges in establishing and sustaining its own carbon market, leveraging international cooperation through bilateral or multilateral partnerships is also a promising approach**

[Table 64] Considerations for the introduction of ETS in Laos

	ETS	Considerations for the introduction of ETS in Laos
Number of Regions in the World Adopted ETS	34	
Major Regions and Countries Adopted ETS	UK (99), EU (87), Switzerland (64), New Zealand (53), Alberta (40), Canada (40), California (31), South Korea (19), Tokyo (4)	

*(Carbon price per ton of carbon dioxide emissions (USD/tCO2e), as of Apr. 2022))
※Ref: 2050 Carbon Neutrality and the Revitalization of the ETS (Song Hongsun), World Bank, State and Trends of Carbon Pricing 2022

[Table 65] Forecast of Global CO2 Price

(Unit: USD)

Price per ton of CO2	Year 2025	2030	2040	2050
Advanced countries	75	130	205	250
Emerging countries*	45	90	160	200
Other developing countries	3	15	35	55

* China, Russia, Brazil, South Africa
※Ref : IEA(2022), Global Energy and Climate Model

○ The International Energy Agency predicts that the price of carbon dioxide will increase significantly in the future due to the implementation of a carbon pricing system.

- Based on this projection, the expected size of the carbon market in Laos based on the carbon dioxide emission scenario is shown in the table below, and is expected to be $\frac{1}{69}$ the size of South Korea and $\frac{1}{124.5}$ the size of Vietnam in 2030.

[Table 66] Expected Carbon Market Size and Comparison in Korea/Vietnam/Laos

(Unit: Mt, Kt/ 100 Million Dollar)

Korea *Applying the price of emerging countries			Vietnam *Applying the price of other developing countries			Laos *Applying the price of other developing countries		
2030	2040	2050	2030	2040	2050	2030	2040	2050
536Mt	320Mt	200Mt	580Mt	590Mt	620Mt	46,591Kt	36,000Kt	20,000Kt
482.4	512	400	870	2,065.00	3,410.00	69.9	126	110

※Ref: NDC scenarios for each country (conditional scenarios for Vietnam and Laos)

○ Laos is a traditional hydropower and natural resource-based agricultural

country with significantly lower carbon emissions than neighboring carbon-intensive manufacturing-based countries.

- However, the share of mining and construction has been increasing rapidly in recent years, and FDI inflows are expected to recover after the COVID-19 pandemic, utilizing special economic zones and PPPs.
- Given Lao PDR's projected future industrial structure changes, GHG emissions are expected to increase compared to the NDC released in 2021.

○ Therefore, it is advisable to introduce an ETS to curb and monitor emissions to meet NDC targets and to secure funds to address climate change.

- However, since Laos does not currently have a GHG inventory system and lacks policies and detailed implementation strategies to incentivize emission reductions, it is necessary to explore ways to apply the experiences of Korea's ETS development process to Laos, but to establish a roadmap for gradually introducing an ETS in the mid- to-long-term.

Application direction of ETS in Laos

○ Energy production in Laos is predominantly focused on low-carbon fuel sources, with over 80% coming from hydropower and only 18% from thermal sources.

- In addition, Laos has 16.28 million m of forest cover, which is expected to increase by up to 470,000 m by 2030, and its abundant forest and water resources make it a potential carbon market for companies looking to invest in carbon credits.

○ Against this backdrop, the Laos government hopes to introduce an ETS as a way to meet voluntary NDC targets promised its implementation with the international society and revitalize a globally expanding carbon market despite the economic crisis caused by COVID-19.

- The introduction of the ETS is expected to have a positive effect on systematizing the monitoring of GHG reduction projects implemented in Laos and securing government funding.

○ However, only 0.7% of the sector-specific implementation strategies in Lao PDR's conditional NDC is dedicated to controlling emissions from direct sources of carbon pollution, which include transportation fuels (0.6%), waste

management (0.01%), and electric vehicle deployment (0.1%).

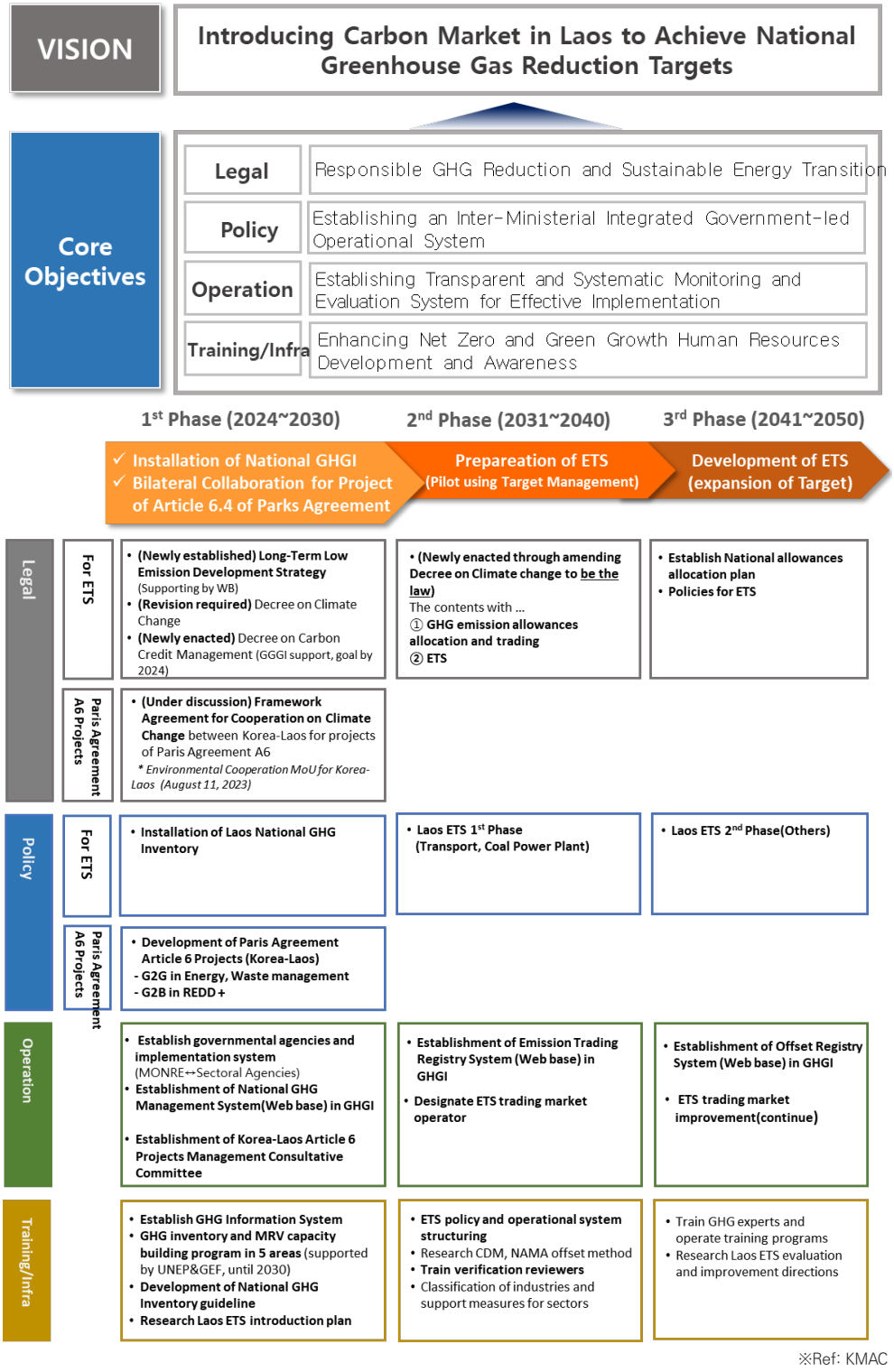
- Creating a market for Emissions Trading Systems (ETS) in Laos under current conditions is expected to be challenging when it comes to GHG reduction allocation and ETS activation. This is due to the fact that Laos does not have a typical high-carbon economic structure like Korea.

○ Hence, considering the factors mentioned above, the introduction of ETS in Laos is anticipated to be time-consuming and costly due to the country's diverse social and economic conditions. Furthermore, it is unlikely that the market will develop spontaneously.

○ In the end, the mid-to- long-term planning direction is to create a domestic ETS environment and revitalize the carbon market in Laos by expanding international support using mechanisms allowed by the international carbon market under the new climate regime and strengthening capacity for carbon market operation.

- (Short-term) Propose a plan to promote international mitigation projects using the Paris Agreement Article 6.4 (SDG mechanism, existing CDM) to secure carbon credits and receive financial resources, technology transfer, and capacity development support from developed countries for climate change response.
- (Mid-to-long-term) Propose a roadmap for the eventual implementation of an Emission Trading System (ETS), beginning with a regulatory framework similar to that of Korea's (Targeted Management System).

2.2. Mid & Long Term Roadmap for ETS Introduction



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[Figure 43] Mid-to-long-term Roadmap to Introduce ETS in Laos

○ Laos wants to establish a roadmap to introduce and operate an ETS to attract foreign investment, increase government revenues, and monitor greenhouse gas emissions.

- Therefore, suggesting the creation of a national GHG inventory and the development of comprehensive legislation that consolidates the administrative regulations pertaining to carbon asset management. Currently, these rules are being haphazardly prepared by various government ministries.
- Proposing a plan for emissions trading in the international carbon market by pursuing projects between Korea and Laos, with a focus on meeting the needs of the Laos government, utilizing the Paris Agreement Article 6 project.
- Presenting a plan for preparing Laos for the future introduction of ETS and strengthening capacity to enter the international carbon market when the ETS stabilizes.

○ The roadmap's phased timelines are aligned with Laos' long-term Low Emission Development Strategies(LEDS) submitted to the United Nations, extending up to the year 2050.

- Specifically, the 1st-phase timeline is set to align with the duration of GHG Inventory and MRV Capacity Building program as a part of the Global Environment Facility(GEF) Capacity Building Initiative for Transparency (CBIT) program, which UNEP is collaborating on, extending until 2030.

○ In terms of specific areas, we propose the necessity of detailed policy introductions categorized into four main domains: laws / regulations, institution / organization (operational system), research / infrastructure, and education / promotion.

○ (Phase 1) Establishment of the National GHG Inventory and Research Center and systematization of the Paris Agreement Article 6 project.

- In terms of operational system, it is necessary to maintain the role of the Ministry of Natural Resources and Environment as the lead agency for national strategies and systems related to GHG reduction, and to establish a cooperation system with related ministries that need to manage actual sectoral reduction targets, clarify roles, and give strong authority to the lead agency.
- The primary focus in Phase 1 is to finalize the construction of the GHG inventory. The successful operation of this inventory depends on the establishment of an information management system, the collection and

analysis of international-level databases, the development of MRV system, and the enhancement of capabilities.

- In addition, the basis for Article 6 projects that are expected to be activated after IPCC COP 28 should be established within the Lao legal framework.
- A 'Framework Agreement on Climate Change Cooperation' should be signed between Korea and Laos for practical implementation, and Korea should discuss and document operational matters related to the corresponding adjustment (ITMO) as a transfer country.

○ (Phase 2) Introducing Target Management System and establishing a legal framework for ETS operations

- It is essential to implement a Target Management System, a precursor to the ETS of Laos. This system will allocate emissions by identifying sectors with high greenhouse gas emissions, such as transportation and thermal power generation. This allocation and verification of statements will enhance the capacity of fossil fuel-intensive industries for the MRV process.
- Furthermore, it is crucial to draft a higher-level legal framework and pass an enforcement decree for the allocation and trading of carbon credits. Additionally, it's essential to specify the responsibilities of task-assigned organizations in detailed administrative rules, including notifications and guidelines. This measure is necessary to prevent confusion in the coordination of tasks among multiple government ministries and agencies.

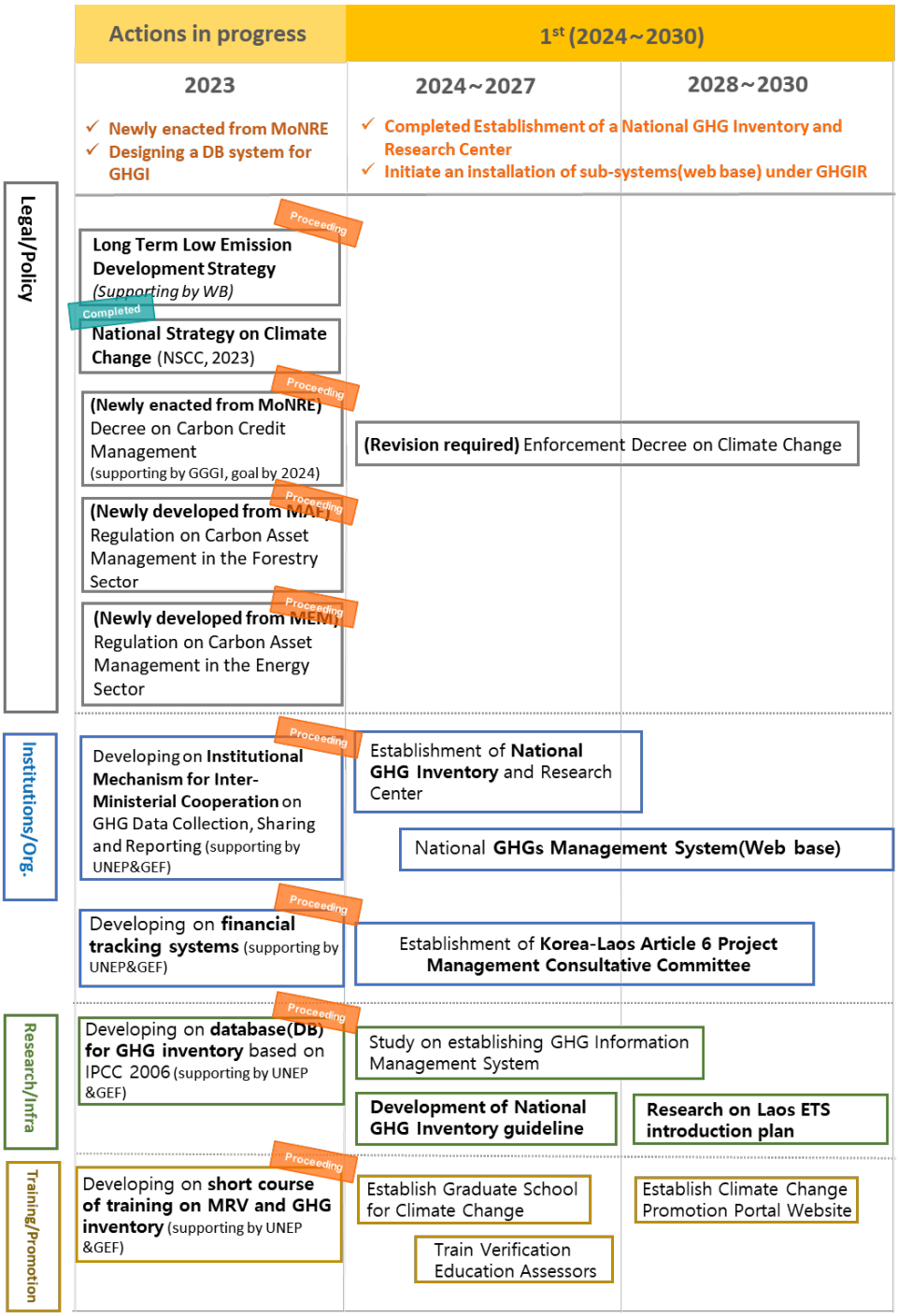
○ (Phase 3) Efforts to enable ETS introduction and operation

- Ultimately, in the phase of introducing a full-fledged ETS, it is imperative to define a "clear baseline for carbon emission levels." This baseline should be founded on the stable database created by national GHG inventory in Phase 1, as well as the operational experience gained from the Target Management System introduced in Phase 2. This step will facilitate the gradual expansion of eligible entities for allocation, thereby fostering emissions trading that significantly contributes to greenhouse gas reduction.
- To ensure that the ETS is well applied and operated in Laos, research on various systems, infrastructure construction and improvement, capacity building of relevant organizations, and training of new personnel should be continuously promoted, and feedback from research should be reflected in the next plan.

Detailed Implementation Plan for the Phase 1 Roadmap

○ (Establishing foundation for GHG Inventory) To be successful in Phase 1 of the roadmap, the GHG inventory will need to be linked to the contents and outcomes of the four capacity building projects currently being implemented with support from UNEP as part of the Global Environment Facility's (GEF) CBIT program as of 2023.

– ① Developing a short training course on MRV and GHG inventory, ② Developing a GHG inventory database based on IPCC 2006, ③ Developing a financial tracking system, and ④ Developing an institutional mechanism for inter-ministerial cooperation on GHG data collection, sharing, and reporting.



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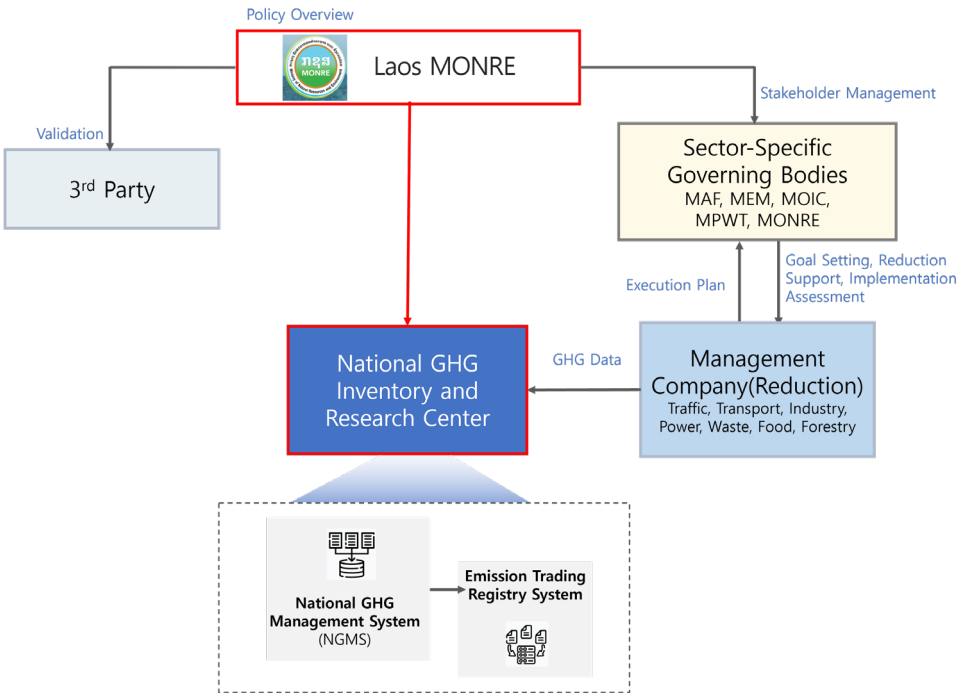
[Figure 44] 1st Phase : Installation of GHG Inventory (Suggestion)



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[Figure 45] 1st Phase : Structure of Laos GHG Inventory & Research Center

○ (National GHG Inventory and Research Center) National GHG Inventory and Research Center in Laos, like the GIR in South Korea, should have the functions of operating the national GHG management system, supporting the setting of national and sectoral GHG reduction targets, and conducting domestic and international GHG reduction surveys and research.

- It should be responsible for international cooperation on climate change, strengthening the global cooperation system and contributing to the achievement of Laos' GHG reduction targets.
- It should also play a role in supporting the GHG Target Management System and ETS introduced in the 2nd and 3rd phases of the roadmap.

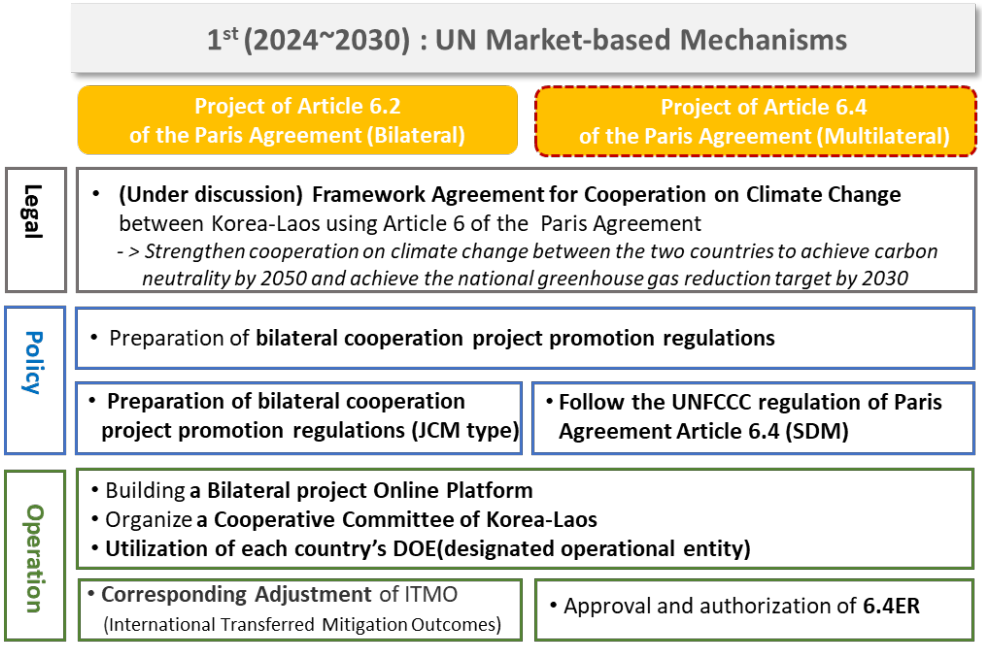
○ (Completed enactment of legislation to utilize the carbon market) The GGGI-supported Decree on Carbon Credit Management, which is being prepared for enactment in 2024, will be the most concrete legal basis for greenhouse gas reductions since Laos signed the UNFCCC Paris Agreement in 2016.

- In order for the Decree to work well, its content needs to be reviewed to ensure that it is relevant to the Decree on Climate Change enacted in 2019.

○ From 2028, after the mid-term of Phase 1, a medium-term plan should be developed to ensure that the GHG Target Management System, which will be introduced in the next phase, is designed and operated according to local conditions in Laos, and studies on the impact of its introduction should be conducted.

○ In addition, Phase 1 should be used as a period to raise public awareness of Laos 2050 carbon neutrality through continuous human resource development in conjunction with university education programs related to GHG reduction, MRV advanced training, and operation of public information sites.

Laying the Groundwork for Leveraging Projects related to the Paris Agreement Article 6



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[Figure 46] 1st Phase: Korea-Laos Cooperation Project Plan under the Paris Agreement Article 6 (Suggestion)

○ In order to build a foundation for the utilization of the international carbon market, which will be further expanded after COP28 in November 2023, it is proposed that Korea and Laos sign a Memorandum of Understanding on Climate Change (currently under consultation) and establish a consultative body to implement projects related to the Paris Agreement Article 6.

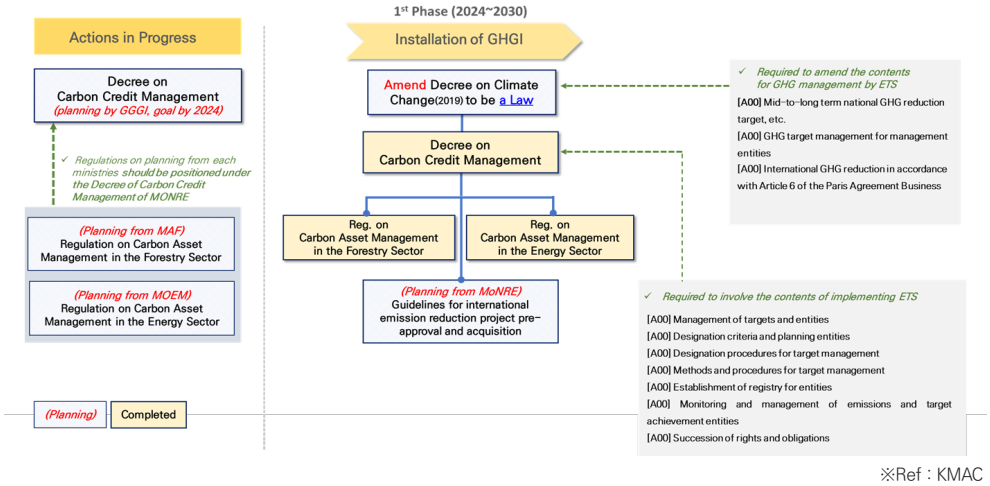
- The REDD+ pilot project that began in 2018 and the upcoming sub-national project set to commence in 2024, involving collaboration between the Korea Forest Service and the Lao Ministry of Agriculture and Forestry, present an opportunity to develop a mutually beneficial framework for utilizing the Cooperative Approach mechanism outlined in the Paris Agreement Article 6.2.

3. Direction Proposal based on ETS related Legislations

The Current Status and the 1st phase : Capacity Building for National GHG Inventory and Establishing National GHG Inventory and Research Center

○ To implement ETS in Laos, it is crucial to first establish the necessity of ETS implementation by building a legal framework.

- Given that Laos is currently classified as a Non-Annex I Party under the Kyoto Protocol and accounted for only 0.08% of global greenhouse gas emissions as of 2019, it is evident that when the justification for ETS introduction is secured, it can lead to both the institutional legalization and garnering the support of stakeholders.



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[Figure 47] Revision of Laos Legal Framework (Suggestion): Status and 1st Phase

○ As of 2023, several government ministries in Laos are working on legislations related to GHG reduction and carbon markets.

- First, the Ministry of Natural Resources and Environment, with GGGI's support, is in the process of enacting the Decree on Carbon Credit Management, which will lay the groundwork for the country's first carbon market in 2024.
- In addition, the Ministry of Agriculture and Forestry is developing the 'Regulation on Carbon Asset Management in the Forestry Sector', and the Ministry of Energy and Mines is developing the 'Regulation on Carbon Asset Management in the Energy Sector.'

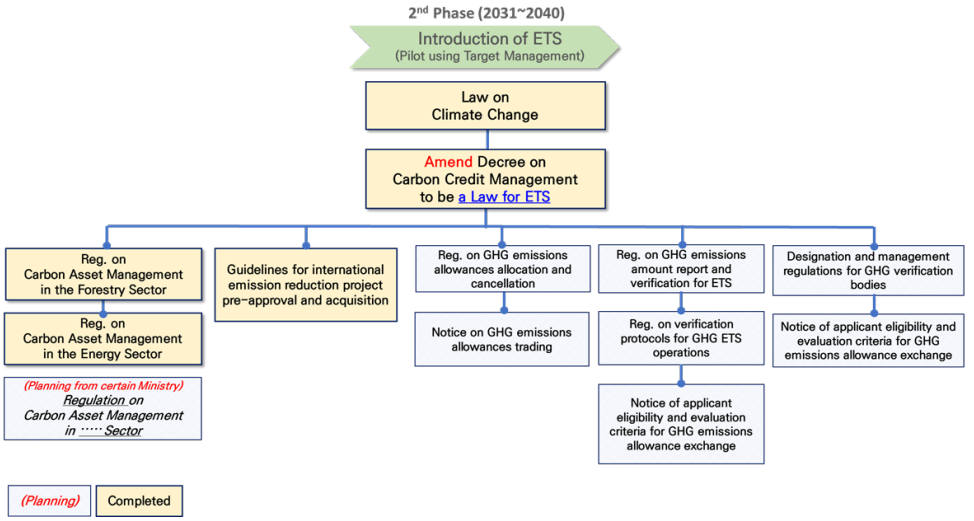
○ However, despite the implementation of these decrees and administrative regulations, they do not have a strong legal foundation. As a solution, it is recommended to amend the Decree on Climate Change (2019) and elevate its status to that of higher law.

- It is recommended that Laos provides a legal basis by adding provisions related to ① the establishment of mid-to-long-term GHG reduction targets, ② the establishment of a GHG inventory and GHG target management system to the law.
- In order to prepare for the full-scale implementation of the GHG Target Management System, detailed information on the designation and management of liable entities should be added to the contents of the sub-enforcement decree.

○ It is also urgent to establish a separate administrative rule for international emission reduction project, setting standards for the designation of a dedicated implementing agency and procedures for Article 6 projects that will be expanded after the end of 2023.

2nd Phase: Introduction of GHG Target Management System to pilot the ETS

○ After the establishment of the National GHG Inventory and Research Center, during the 2nd phase of the roadmap, subordinate legislation should be designed to support the newly enacted ‘Law on Climatic Change’ and the ‘Decree on Carbon Market Operation’ to enable the implementation of the GHG Target Management System.



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[Figure 48] Revision of Laos Legal Framework (Suggestion): 2nd Phase

- In particular, guidelines, administrative rules, and other documentation should be developed for the allocation and trading of emissions allowances, the reporting of emissions allowances, certification and verification processes, and the designation and management of GHG verification bodies. This detailed documentation for each task is essential to proactively address and prevent any potential confusion.

○ In addition, if the industrial structure of Laos changes after 2030 and the number of carbon-emitting industries increases, it is necessary for the ministry in charge of the industrial sector to prepare regulations such as the Regulation on Carbon Asset Management to deal with it flexibly.

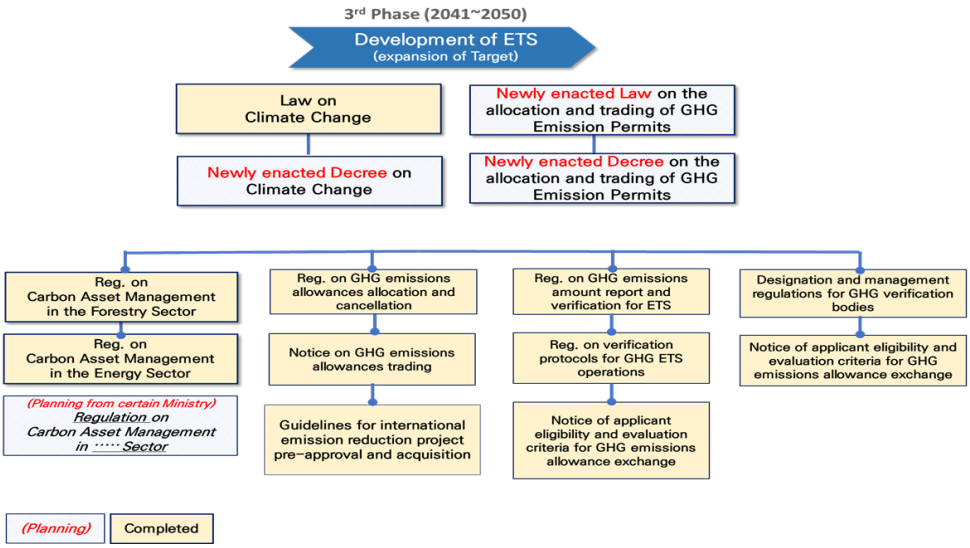
3rd phase: Full-scale Introduction of ETS

○ The 3rd phase marks a significant milestone, as it has been 20 years since the Laos government began considering the development of an inventory and the introduction of ETS for carbon market utilization. At this point, it is anticipated that the Laos government has established its own operational and management system and secured the necessary capacity to implement ETS effectively.

- Hence, it is essential to promulgate a distinct law or enforcement decree for the functioning of ETS in order to provide clarity within the framework where the 'Law on Climate Change' is the sole overarching legislation.

○ Furthermore, following the introduction and pilot implementation of the GHG Target Management System in preceding phases, it is imperative to put into practical use the Act, Enforcement Decree, Notices, Regulations, and Administrative Rules and consistently incorporate and amend any required enhancements.

– For effective improvement work, it is necessary to operate a channel to receive and review opinions from those in charge of ETS-related tasks in ministries, public institutions, and private organizations.



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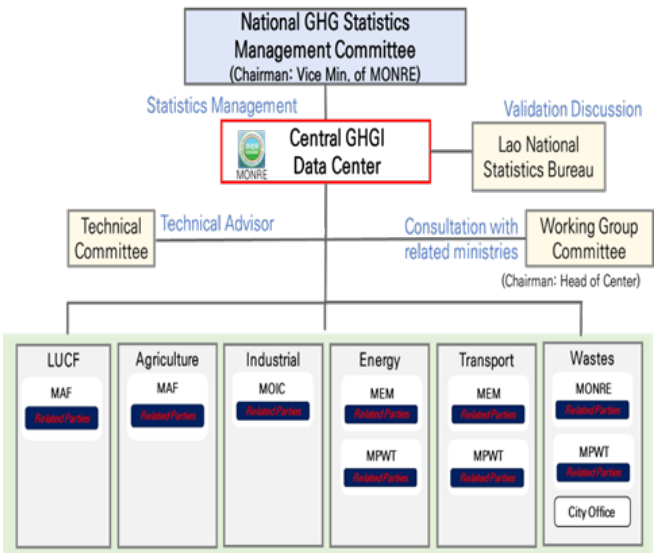
[Figure 49] Revision of Laos Legal Framework (Suggestion): 3rd Phase

4. Establishing Detailed Organizational Structure and Collaborative System among Different Agencies

1st phase: Establishment and Operation of National GHG Inventory and Research Center

○ The Ministry of Natural Resources and Environment is the Laos government's lead ministry for climate change mitigation, while the Ministry of Energy and Mines is responsible for energy management, and these two ministries are responsible for implementing regulatory policies related to greenhouse gas reduction and energy conservation.

- The Ministry of Natural Resources and Environment is tasked with overseeing GHG regulatory policies, including the ETS, while the Ministry of Energy and Mines is responsible for promoting energy efficiency policies to facilitate the effective implementation of GHG reduction initiatives. These two ministries work in tandem, complementing each other's efforts.
- On the other hand, the Ministry of Industry and Commerce, due to its protective and supportive nature of the industry, has a role in representing the industry's interests in the implementation of the ETS, which may lead to conflicting interests with the Ministry of Natural Resources and Environment and the Ministry of Energy and Mines.



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[Figure 50] National GHG Statistics Management Committee

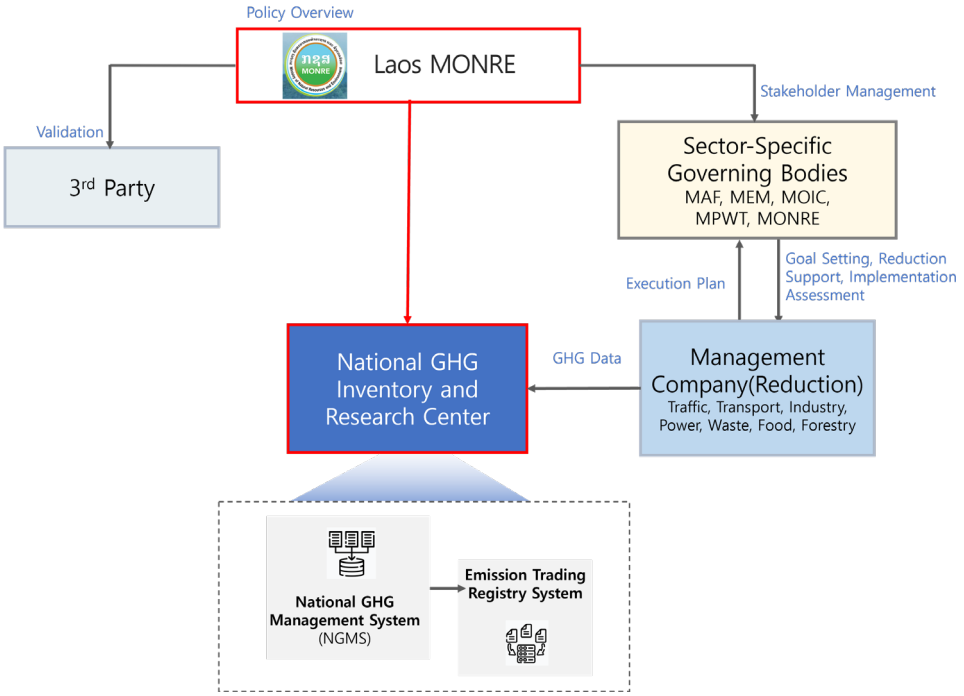
○ To advance greenhouse gas reduction policies, it is important to establish a unified government organizational structure.

- Specifically, for the successful implementation of the ETS, one of the most robust greenhouse gas reduction policies, it is imperative to designate a ministry responsible for the GHG emissions trading system and its associated agencies, and establish an operational framework centered around these entities.
- In the context of Laos, the Department of Forestry within the Ministry of Agriculture and Forestry, which holds the primary responsibility for a significant portion of NDC, should be designated as the primary agency. It is also crucial to establish effective collaboration and coordination between these agencies and its counterparts within the Ministry of Energy and Mines, the Ministry of Public Works and Transport, and the Ministry of Industry and Commerce.

○ At present, the most urgent priority for Laos is the establishment of a national GHG inventory.

- Laos needs to establish a system and build capacity for its responsible ministries and sector-specific agencies in the context of the ETS to maintain consistent data standards, manage and analyze data effectively using standardized formats.
- Fortunately, Laos is currently developing a GHG inventory and database under the UNFCCC and IPCC guidelines for five sectors by 2030 with support from UNEP.
- It is expected that by 2030, when the project is completed, the foundation for the establishment and operation of the National GHG Inventory and Research Center, which is in charge of establishing a national GHG registry and a GHG management system, will be complete.

2nd phase : GHG Target Management System (Suggestion)



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[Figure 51] Laos GHG Target Management Operation System (Suggestion)

○ In Korea, the Target Management System, a precursor to the ETS, is structured with the Ministry of Environment serving as the overarching agency. Each relevant ministry is designated as a sector-specific agency responsible for managing the submission and verification of statements.

- Building upon these experiences, in the ETS implementation phase, the Ministry of Environment has evolved to take a leading role in shaping ETS policies.

○ Similarly to the case in Korea, in Laos, the Ministry of Natural Resources and Environment should be designated as the overarching agency. Roles should be assigned to sector-specific agencies to encourage efforts in greenhouse gas reduction in their respective domains.

- In particular, regarding the lead agency, it is advisable for the same agency designated as the lead for the ETS to also take on the lead role in the pre-ETS system. In the context of Lao PDR, there may be a need to introduce a mandatory reporting system for greenhouse gas emissions, establish a Target

Management System, or initiate a pilot project for a sector-specific ETS as part of the preliminary system.

- For example, in the case of Laos, a limited application of a sector-specific ETS could be considered, targeting the transportation sector, which consumes the most fossil fuels, as a means to assess the effectiveness of the ETS.

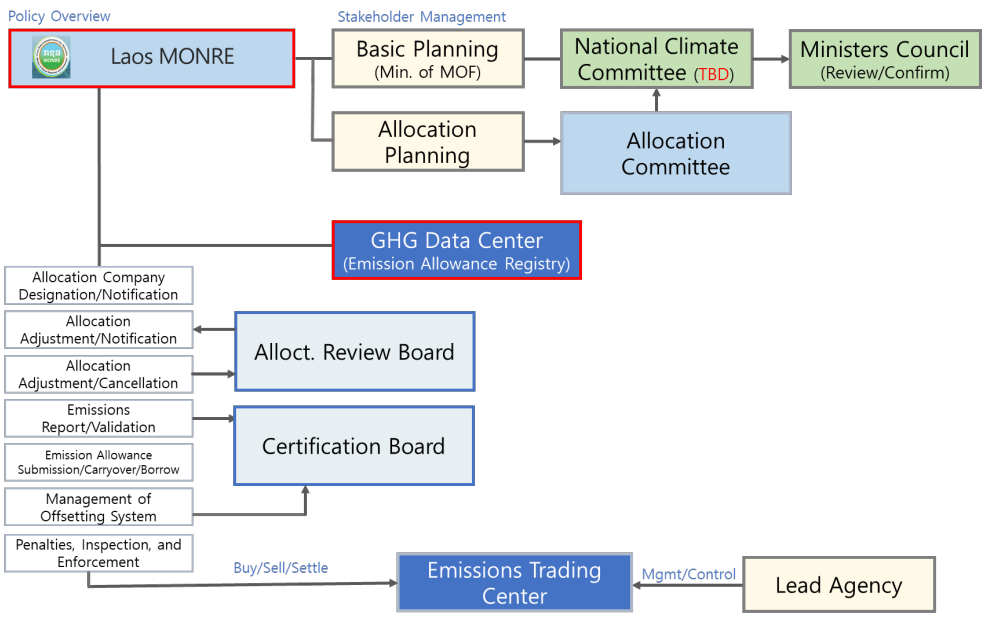
• **In 2019, transportation accounted for 96.7% of the main consumption of petroleum products in Laos.**

- Given the country's geography, Laos will be able to access carbon markets more easily by linking its REDD+ program to an ETS.

○ The implementation of the preliminary system will enhance the learning effect of the relevant organizations by specifying the roles of the overarching organization, the sectoral governing agencies, the inventory and GHG information organization, and the GHG verification organization.

- In addition, the preliminary system should be designed to be linked to the ETS so that trial and error can be reduced and the system can be operated more efficiently during the actual ETS operation.

3rd Phase : Laos ETS Operation System (suggestion)



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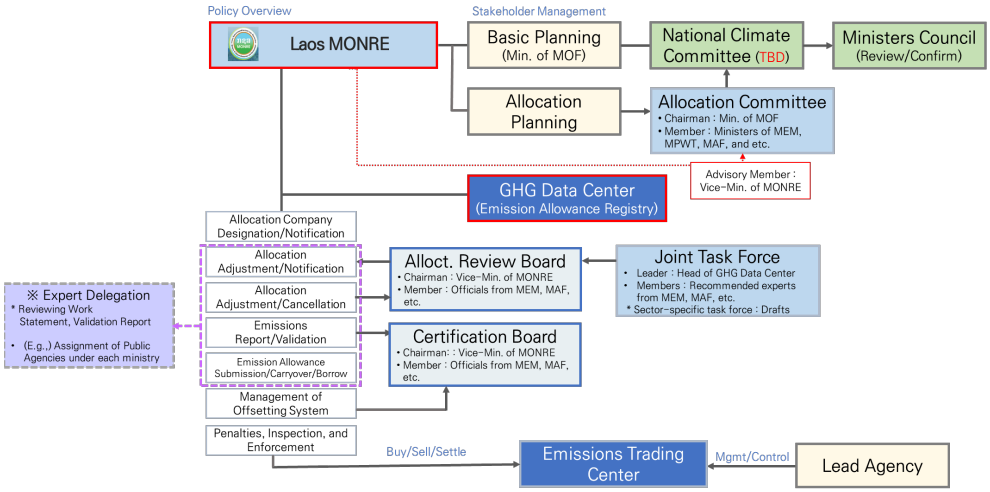
[Figure 52] Laos ETS Operation System (Suggestion)

○ When the ETS is finally introduced, the data reliability of the national GHG inventory already established in the 1st phase will be secured, and the experience gained through the operation of preliminary systems such as the Target Management System in the 2nd phase will lay the foundation for a stable system.



※ Ref : KMAC

[Figure 53] Cooperations among Ministries on ETS in Laos (Suggestion)

○ However, the ETS is designed to encourage voluntary reductions in greenhouse gas emissions by creating and managing a market based on the “polluter pays” principle. Therefore, the establishment of a domestic carbon market in Laos is expected to be challenging due to the country’s economy being primarily agriculture-based, accounting for over 70% of its industrial structure.

– However, Laos holds significant potential in the REDD+ project. Therefore, it is advisable to formulate a policy for implementing ETS with the aim of connecting to the global forest carbon market.

5. Implications

○ The most feasible way to achieve Laos' NDC is to use a conditional scenario with GHG reductions centered on the country's main industries: Agriculture and forestry.

- Laos has great potential in the carbon market utilizing forests, and bilateral cooperation with Korea is expected to expand in the future, especially in forestry initiatives (REDD+).
- However, despite ongoing cooperation from various international organizations in planning and capacity building related to climate change mitigation and GHG emission reductions, Laos has yet to establish a national inventory, which is essential for effective carbon credit trading.

○ Therefore, the establishment of a national GHG inventory is one of the most urgent tasks in the mid-to-long-term to ensure Lao PDR's competitiveness in the international carbon market that will expand under the new climate regime.

- With the goal of implementing the ETS in 2015, Korea first established the GHG Information Center (GIR) in 2010 and formed the National GHG Statistics Management Committee to ensure transparent and systematic data management.
- The data from the GIR was utilized to set national GHG reduction targets by sector, industry, and year in 2011, which were subsequently used as the basis for enacting the Act on the Allocation and Trading of GHG Emission Permits and its implementing decree and establishing basic plans in 2012.

○ The future 'Laos National Inventory' should be organized in collaboration with ongoing programs conducted by various international organizations. The structure should be designed to ensure the efficient operation of the Laos Inventory system.

- It is recommended that Laos takes advantage of the 'International GHG Expert Training Program*', a global GHG reduction cooperation project of the GIR of Korea, to support the planning and design of the inventory for the introduction of ETS.

  * The training has been run by GIR since 2011 and in collaboration with the UNFCCC Secretariat since 2017.

○ At the same time, it is necessary to discuss the implementation of projects

related to the Paris Agreement Article 6 in earnest and identify demonstration projects by concluding the 'Framework Agreement on Climate Change Cooperation' as soon as possible, which is the basis for practical bilateral cooperation in the international carbon market between Korea and Laos.

- In particular, it will be possible to secure carbon credits at a faster pace if the projects are based on the collaborative approach of the Paris Agreement Article 6.2. To this end, it is recommended to start discussions centered on the projects (forest carbon project and LFG project) that Korean companies currently want to promote in Laos.

○ The short-term phase of the mid-to- long-term roadmap involves enhancing the Laos government's and related organizations' internal capabilities to effectively implement ETS in the future. This will be accomplished by establishing pertinent laws and operational systems, conducting research to assess spillover effects, and continuing to train GHG experts before the full-scale introduction of the ETS.

○ To successfully pilot the 'GHG Target Management System' in the medium term and ensure the seamless operation of the ETS in the long term, it is essential to consistently update laws and regulations, enhance the operational framework through the development of new administrative rules (notifications and operating guidelines etc.), and strive to fulfill all requirements through the operation and management of a online-based national inventory.

- Furthermore, following the selection of an emissions exchange (ex, the Lao Stock Exchange), the Laos government will assume the responsibility of continually overseeing the emission trading market and serving as trading coordinator to maintain the stability of market operations.

○ Additionally, the introduction of a national ETS in Laos should be well-planned to allow sufficient time to reach the international target year of 2050 for carbon neutrality. A comprehensive system should be established to ensure that various sectors in Laos, including laws and policies, operational systems, education and infrastructure, and public relations, will be operated harmoniously and seamlessly.

06

CHAPTER

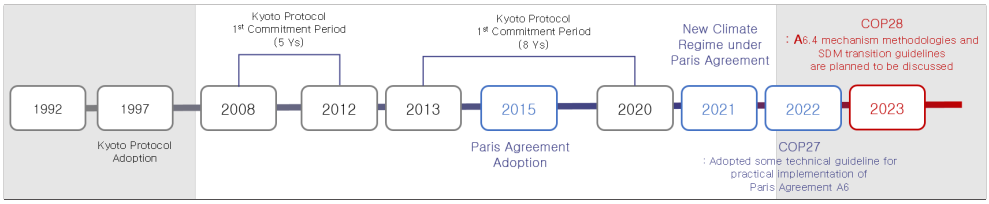
Create Linkage Projects using Paris Agreement Article 6

1. Paris Agreement A6 and Carbon Market Mechanism
2. Paris Agreement A6 Applicable Projects
3. Linkage Project Progress and Result Analysis
4. Review Linkage Project Model under Paris Agreement A6.2 (Cooperative Approach)

Masterplan Direction Proposal to Introduce ETS in Laos

1. Paris Agreement A6 and Carbon Market Mechanism

Paris Agreement : Emergence of a New Climate Regime



※Ref: Ministry of Environment(2022) Read Paris Agreement Together

[Figure 54] Adoption Background of Paris Agreement

○ In May, 1995, the United Nations Framework Convention on Climate Change (UNFCCC) was adopted at the UN headquarters, New York with the aim of stabilizing GHG concentrations in the atmosphere.

- The UNFCCC, which was signed at the United Nations Conference on Environment (UNCED, Rio Earth Summit), has imposed differentiated duties to respond to climate change on Annex 1 (developed countries) and Non-annex 1 countries (developing countries) on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.

○ In December, 1997, the Kyoto Protocol was adopted as a revision of the UNFCCC, and its implementation plans were specified after the Protocol went into effect in 2005.

- (Annex A) Stating a list of GHG (CO2, CH4, N2O, HFCs, PFCs, SF6) subject to reduction and categories of sector/emission source.
- (Annex B) Stating a list of countries that must reduce GHG and caps on their emissions (reduction target).
- (The 1st commitment period) From 2008 to 2012, obligatory to reduce emissions an average of 5.2% (39 nations required to follow it)

• Adopting the Doha Amendment (adopted in 2012, presented in 2020) during the 2nd commitment period △to extend the 2nd period to 8 years (from 2013 to 2020), △add nitrogen trifluoride (NF3) to the GHG list and △amend Annex B (38 nations required to follow it) to reduce an average of 18% emissions.

○ A 2015 new climate regime emerged in line with growing awareness that the new regime encompassing both developed and developing countries is needed to address the worsening climate crisis.

– The UNFCCC clarified compulsory reduction for advanced countries emitting large amounts of GHG in the process of the industrialization. However, denial from some of the countries and a rapid increase in GHG emissions prompted a necessity of the new regime.

○ In December, 2015, the Paris Agreement was adapted as a new climate regime in Paris, France. This new agreement is applied to all the nations including developed countries as a subordinated treaty for the next two decades.

– The Agreement sets a global long-term temperature target as 2°C/1.5°C, makes each country put efforts to reach this goal through their Nationally Determined Contributions (NDC), and will review outcomes through the Biennial Transparent Report (every two years since 2024) and the Global Stocktake (GST, every five years since 2023).

[Table 67] Comparison of Kyoto Protocol and Paris Agreement

Kyoto Protocol	Sector	Paris Agreement
2008 ~ 2020	Applying Date	After the expiration of the Kyoto Protocol in 2020
"Reducing the amount of GHG emissions (1st: average 5.2%, 2nd: average 18%)"	Goal	Limiting the global average temperature increase to well below 2°C above pre-industrial levels and pursuing efforts to limit the increase to 1.5°C
Mostly developed countries	Reduction Committed Nation	All parties
Top-down	Goal Setting Method	Bottom-up
Emissions amount in a reference year and nation's condition	Goal Setting Criteria	"Progress principle (Next NDC should be higher than the current NDC)"
Punitive (Deduct 1.3 times of the excess emissions from the next assigned allowance)	Punishment	Punishment

[Table 67] Comparison of Kyoto Protocol and Paris Agreement

Kyoto Protocol	Sector	Paris Agreement
Punishment	Punishment	Non-punitive
Setting end time of the commitment period	Sustainability (End time)	No end time of the commitment period
Nation	Actor	Encourage various actors to engage in the agreement

※Ref: Ministry of Environment(2022), Read Paris Agreement Together

Paris Agreement Article 6 (A6) Regime

○ To respond to climate change and reach the goals of the agreement, the six key articles* were prepared, and national cooperation articles that utilize A6's market or non-market approaches were included as supplements.

* ①Mitigation (Art.4), ②Adaptation (Art.7), ③Finance (Art.9), ④Technology development and transfer (Art.10), ⑤ Capacity-building (Art.11), ⑥Transparency (Art.13)

- Follow-up negotiations were held to set detailed implementation rules. Article 6 guidelines were adopted at the 26th Conference of the Parties of the UNFCCCs (COP26, December 2021, Glasgow, UK).

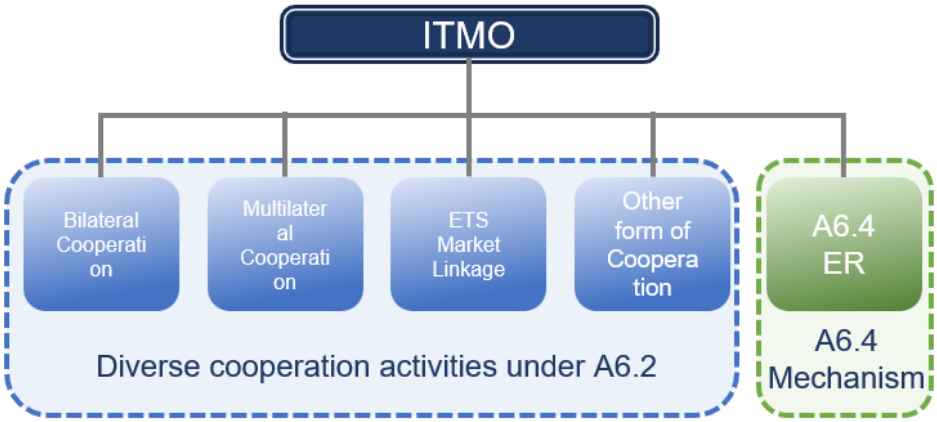
○ The Paris Agreement Article 6 is composed of market (A6.2 and A6.4) and non-market approaches (A6.3).

[Table 68] Paris Agreement Article 6 Market Approaches

Principle	Voluntary Cooperation among parties to enhance ambition in mitigation and adaptation, promote sustainable development and environmental integrity in the NDCs implementation		
Basement	Market Based Approach		Non-market Based Approach
	Collaborative Approach (A6.2)	SDM (A6.4)	Non-market Approach (A6.8)
	• Diverse cooperation projects to ensure the autonomy of participating countries • Obligation to comply with the following guideline when using ITMOs for NDC achievement - Promoting sustainable development - Demonstrating environmental integrity and transparency - Applying rigorous accounting rules, including measures to prevent double counting • Participating country's permission is required when using ITMO	• Reduction projects operated/managed under the supervision of Paris Agreement CMA • Mechanism supporting GHG reduction and sustainable development • Encouraging the participation of public and private sectors through approval of participating countries • Seeking overall global reduction • Prohibition of double-counting of emissions reduction (A64ER) • Distribution of a portion of the proceeds for administrative expenses and support for adaptation in developing countries	• Integrated, comprehensive and balanced non-market approaches • Supporting NDC implementation by adjusting mitigation·adaptation·finance·technology·capacity-building and using effective methods • Establishing a framework for the non-market approaches

※Ref: Ministry of Environment(2022), Read Paris Agreement Together

– The Paris Agreement Article 6.2 refers the reduction outcome resulting from the trading between countries for the NDC commitment as the 'Internationally Transferred Mitigation Outcome (ITMO)'. Article 6.4 Emissions Reductions (A6.4ER) are also seen as ITMO when the emissions are traded for the NDC.



※Ref: Ministry of Environment(2022), Read Paris Agreement Together

[Figure 55] Example of Cooperation Activity to Issue ITMO

Paris Agreement Article 6.2, Bilateral Cooperation Regime

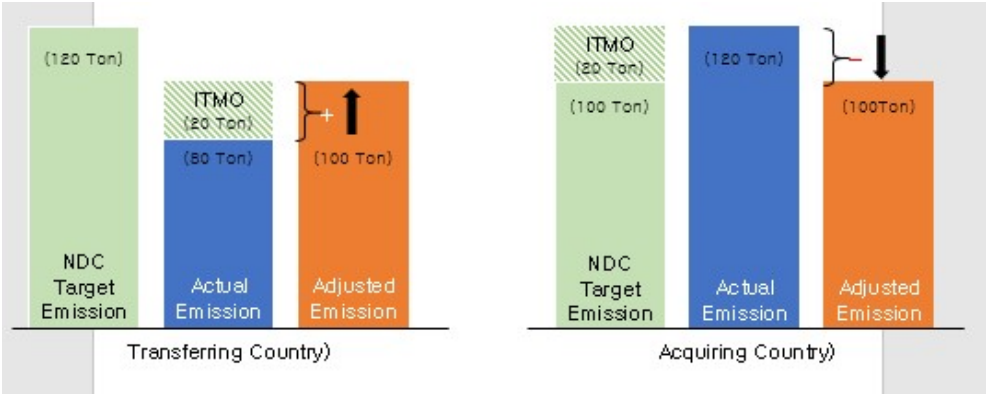
○ Although cooperative approaches can ensure diversity and autonomy of the cooperation among nations, Corresponding Adjustment is prepared to prevent double counting of ITMO traded for the environmental integrity.

– (Environmental integrity) When parties do not join the carbon market (the amount of ITMO transferred) or join (the amount of ITMO used), the total amount of the international GHG emissions does not increase (the amount of ITMO transferred ≥ the amount of ITMO used).

– (Corresponding Adjustment) A methodology for two parties to calculate the same quantity of traded ITMO. A transferring country of ITMO adds but an acquiring country deducts.

• As the host of reduction projects, a transferring country will see issued ITMO added to the registry of the host country once ITMO is approved. If this ITMO is transferred (or sold) to an acquiring country, it is deducted from the registry.

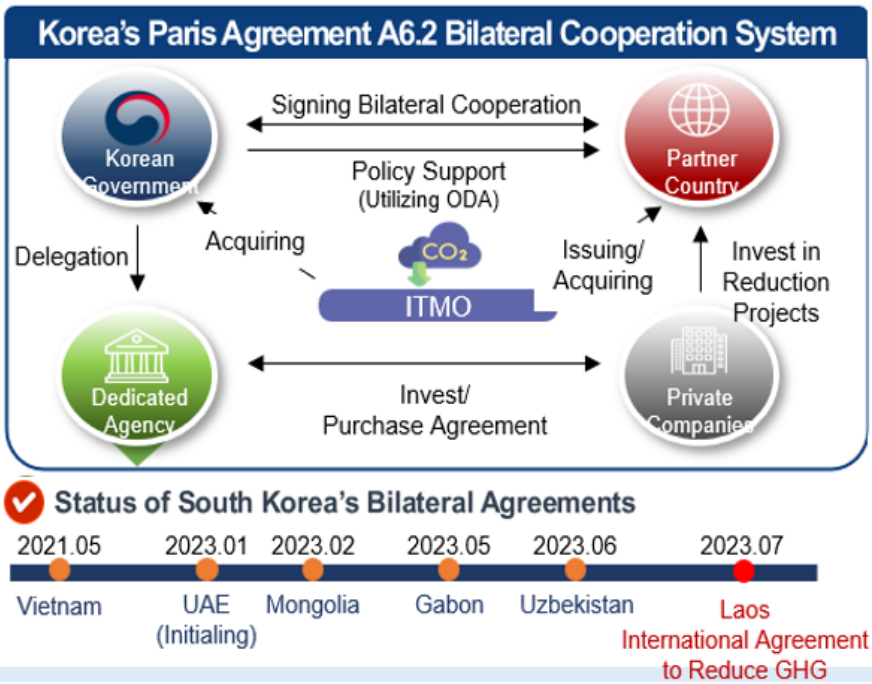
• As an investor of reduction projects, an acquiring country will see transferred ITMO added to the registry of the acquiring country once ITMO is approved and transferred. This acquired ITMO can be used to achieve the NDC.



※Ref: Ministry of Environment(2022), Read Paris Agreement Together

[Figure 56] ITMO Corresponding Adjustment

○ Since Article 6.2 projects can have flexible and speedy criteria and processes under the agreements between parties, GHG reduction projects can be expanded through cooperation channels between parties like a Joint Committee.



Ref: 'International Reduction Project Strategy' (Aug.19, 2022, Ministers' Meeting on External Economy), Korea Environment Corporation Greenhouse Gas Reduction Project Presentation (Sep. 5. 2023).

[Figure 57] Article 6.2, Project Promotion Strategy and Bilateral Cooperation Agreement

○ Korea set the 'International Reduction Project Strategy' from the Ministers' Meeting on External Economy in August, 2022 to expand the global cooperation and achieve the NDC. With designating KOTRA and the Korea Energy Agency as dedicated institutions, Korea shall support the international GHG reduction pilot projects (based on Art.38 of Enforcement Decree of the Framework Act on Carbon Neutrality).

- KOTRA has opened a Carbon Neutrality Support Center in Hanoi, Vietnam in May, 2023. Along with this, it has supported the whole cycle projects like the 'Bilateral Cooperation on GHG Mitigation' through 10 bases for carbon neutrality supports including Laos (designating KOTRA trade center in 2023*).

  * KOTRA opened the first Carbon Neutrality Support Center in Hanoi, Vietnam (May. 2023) and designated 10 supporting bases for carbon neutrality in Laos, the Philippines, India, Sri Lanka, Mongolia, Uzbekistan, Morocco, Peru, Columbia and Chile as of August, 2023.

○ The Ministry of Environment of Korea dispatched a green industry supporting group to Laos in July, 2023 for a bilateral cooperation on the international GHG reduction, and initiated a discussion* to sign an agreement for the two countries to implement the international GHG reduction.

  * 'Framework Agreement for Cooperation on Climate Change' was signed with Vietnam (May. 2021), Mongolia (Feb. 2023), Gabon (May. 2023), Uzbekistan (Jun. 2023) and UAE (initiated in Jan. 2023), and is scheduled to be signed with Laos.

Paris Agreement Article 6.4 Mechanism Regime

○ It is expected to accept operation methods and processes of the existing Clean Development Mechanism (CDM). In addition to this, several rules are intensified including △shortening a reduction outcome issuance period, △strengthening responsibilities of a project-implementing country (host country), △ramping up a reduction outcome methodology.

- As the methodology relevant to Article 6.4 mechanism projects is predicted to be developed and approved in order from the latter half of 2024, registration and approval of new Article 6.4 projects will begin from 2025.

○ Unlike the existing CDM projects, the authority of the host countries is reinforced. These countries should approve activities as follows before asking the Supervisory Body (SB) to register projects.

- Checking information on how mitigation activities encourage the host countries to keep up sustainable development.
- Approving a renewal of the potential credit period if the host countries are

intended to sustain their activities after the 1st credit period.

- Explaining how the reduction activities, NDC implementation and anticipated GHG reduction/removal contribute to the NDC of the host countries.

○ Public organizations or private companies are subject to participants to Article 6.4 mechanism activities, which will be allowed by the host countries. The host countries need to provide a letter of permit that states whether the purpose of the A6.4ERs, which are issued

[Table 69] Comparison of CDM and Article 6.4 Mechanism

CDM	VS	A6.4 Mechanism (SDM)
① Project Development/Planning ▼ ② Approval by the participating country's government ▼ ③ Feasibility Assesment ▼ ④ Project Registration ▼ ⑤ Reduction Activity Monitoring ▼ ⑥ Mitigation Outcome Verification ▼ ⑦ Mitigation Outcome Issuance (CER)	Project Procedure	① Project Development/Planning ▼ ② Approval and authorization by the participating country's government ▼ ③ Feasibility Assesment ▼ ④ Project Registration ▼ ⑤ Reduction Activity Monitoring ▼ ⑥ Mitigation Outcome Verification ▼ ⑦ Mitigation Outcome Issuance (A6.4ER)
CMP	Ultimate Decision-maker	CMA
Executive Board (EB)	Supervisor	Supervisory Body (SB)
CER (Certified Emission Reduction)	Reduction Outcome	A6.4ER (Article 6, paragraph 4, emission reduction)
General – Renewal: Max 21 years in total (Basic up to 7 years + renewal up to twice) General – Fixing: Max 10 years Forestry – Renewal: Max 60 years in total (Basic up to 20 years + renewal up to twice) Forestry – Fixing: Max 30 years	Project Period (outcome issuance period)	General – Renewal: Max 15 years in total (Basic up to 5 years + renewal up to twice) General – Fixing: Max 10 years Forestry – Renewal: Max 45 years in total (Basic up to 15 years + renewal up to twice) Forestry – Fixing: TBD

※Ref: Ministry of Environment(2022), Read Paris Agreement Together

from project activities, is for committing to NDC and/or mitigating the international emissions.[14)]

○ The Paris Agreement Article 6 market mechanism will complement and expand afforestation/reforestation projects, the CDM's representative carbon absorption activity. The Article 5 highlights the importance of the forest and the role of Reducing Emissions from Deforestation (REDD+) in emission and absorption of GHG.

- Based on the Article 6.2, REDD+ enables reduction outcomes after 2021 to be utilized for NDC achievement, international mitigation or other purposes through the voluntary agreements between parties.
- The Paris Agreement Article 5 encourages parties ①to take measures to conserve and improve GHG absorption resources and storage including forest and ②to conduct REDD+ with outcome-based reward in an effort to reduce emissions by preventing deforestation in developing countries.

14) KIEP (2022) Utilizing Paris Agreement Article 6 for Achieving Korea's NDC towards 2030, 59-60p

2. Paris Agreement A6 Applicable Projects

Major Features of Article 6.2 and Article 6.4

○ The Paris Agreement makes reduction mandatory for all the parties, increasing the necessity of bilateral cooperation between countries that have mitigation outcome transfer.

- Korea has signed agreements with five countries for ITMO transfer as of August, 2023. The 'Bilateral Cooperation Agreement on Climate Change' is being promoted with prioritized cooperation countries including Laos.

○ While the Article 6.2 projects have advantages that the projects are proceeded voluntarily according to the contents of bilateral agreements, specific operation regulations, credit acceptance criteria and allocation regulations (Corresponding Adjustment) can be different whenever the agreements are signed.

Sector	Article 6.2	Article 6.4
Objectives	Using cooperative approaches to enhance mitigation ambition under NDCs	
Governance	Under bilateral/multilateral governance	Under the authority and supervision of the CMA and SB
Credit/ Reductions	• Use of **ITMO** requires approval from bilateral/multilateral governance • Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions, - promote sustainable development - ensure environmental integrity and transparency - shall apply robust accounting to ensure, inter alia the avoidance of double counting	• **A6.4ERs** authorized for use towards achievement of NDCs and/or for other international mitigation purposes - For use of CERs towards achievement of their NDCs, using Parties shall apply the guidance on the use of ITMO - Report for each year of the NDC implementation period the amounts of A6.4ERs used for that purpose in the row "Any other information consistent with decisions adopted by the CMA on reporting under Article 6
Pros	• The project is carried out autonomously according to agreement between the parties without separate supervision • Various mechanisms can be designed under bilateral cooperation	• Uncertainty is low because the project is carried out in accordance with the established guidelines of the United Nations (UNFCCC)
Cons	• When each governance agrees, there is variation in specific operating regulations, credit allowance standards (corresponding adjustment), etc.	• There are problems such as uniform and rigid management due to the centralized system • **When using A6.4ERs for NDC, the parties shall apply the guidance of ITMO in Article 6.2, so a corresponding adjustment procedure is necessary in advance**

Market mechanisms under Article 6 are expected to expand, complementing existing CDM activities, with a particular focus on afforestation/reforestation activities (key Carbon absorption projects)

REDD+ is based on Article 6.2, allowing countries to utilize voluntary agreements among themselves to use post-2021 emission reductions for achieving NDCs, international reduction goals, and other purposes

※Ref: UNFCCC (2015) Paris Agreement
KIEP (2022) Utilizing Paris Agreement Article 6 for Achieving Korea's NDC towards 2030, 98p

[Figure 58] Comparison of A 6.2 and A6.4 of Paris Agreement

○ On the other hand, as the Article 6.4 projects are performed under the determined guidelines by UN, there is low uncertainty. But the UN's centralized system could cause problems of the flat and rigid management[15].

15) Junwon Hyun (2022) Study on Rational Utilization of Internationally Transferred Mitigation Outcomes to Achieve 2030 Nationally Determined Contribution Targets

The Paris Agreement A6 Market Mechanism Implementation Regime

○ **(Step 1)** To contribute to the NDC with the reduction outcomes from the Article 6.2 and Article 6.4 projects, the 'Framework Agreement for Cooperation on Climate Change' should be signed. On top of that, credit allocation regulations need to be sophisticated for outcome transfer and usage.

– (Credit allocation regulations) Two governments or project participants should set a credit allocation principle for the mitigation outcome. The participants could adjust the allocation ratio under the agreed project participation contribution rate*.

* The contribution rate can be calculated by finance, technology support, project target, place provision, the number of the participants and the amount of participating time, or agreed after the two governments draft a Project Design Document (PDD).

○ **(Step 2)** Carrying out the Article 6.2 and Article 6.4 projects in line with their guidelines, and applying bilateral basic agreements and detailed regulations (A6.2 project) and UN's methodology and guidelines (A6.4 project).

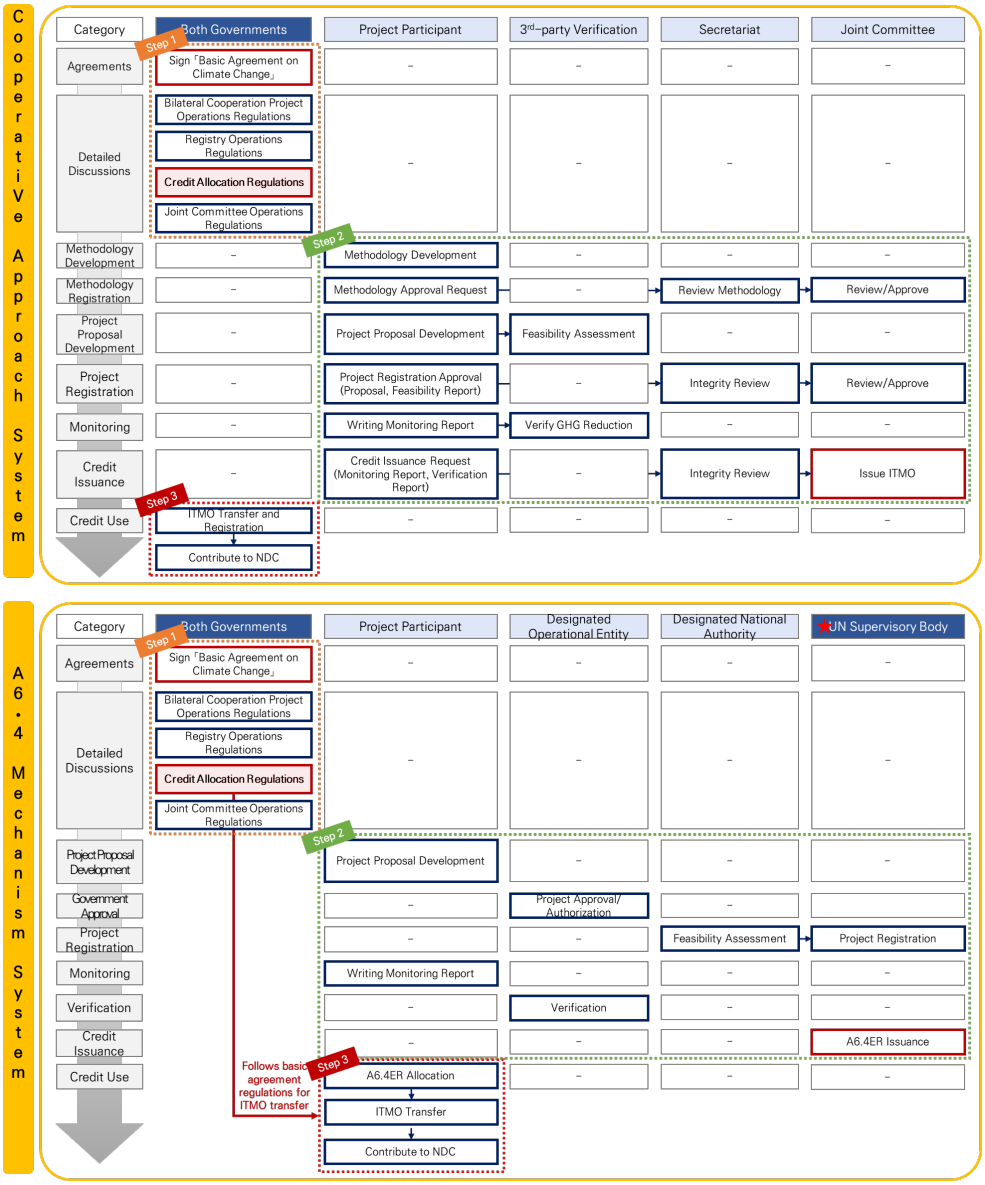
– (A6.2 project) The projects are proceeded with stakeholders (3rd-party verification, Secretariat, Joint Committee) designated from bilateral agreements. The Joint Committee gives a final approval to the methodology, project registration and credit issuance.

– (A6.4 project) Unlike the Article 6.2 project, its processes depend on UN's management, supervision, UN's designated methodology, procedures and regulations, which is expected to be similar to the Clean Development Mechanism. **Moreover, it is a UN Supervisory Body that gives an approval of the registration and the final verification of credit.**

○ **(Step 3)** The credits are registered and used in accordance with projects' results. Each credit can contribute to the NDC of the two countries via transferring.

– (A6.2 project) According to the basic agreements of both countries, credit allocation and transfer contributes to the national NDC.

– (A6.4 project) Credits that are created from the projects can be approved and transferred to ITMO through the basic agreements and Corresponding Adjustment. This ITMO is reflected in the national NDC.



※Ref: KMAC

[Figure 59] Implementation Mechanism of A6.2 and A6.4 of Paris Agreement

Applicable Project in Laos

○ Tried to discover promising GHG reduction projects in accordance with Laos' national strategies and policies, and kept confirming the willingness of the MONRE and other ministries of Laos to join the applicable projects (Actual condition research in Apr. 2023 and the national capacity-building program in Aug. 2023)

– (Ministry of Natural Resources and Environment, MONRE) According to NDC

conditional scenarios, the key is to reduce GHG from the Land Use Change and Forestry (LUCF). Thus, it is required to implement reduction projects utilizing **Reducing Emissions from Deforestation (REDD+).**

- (Ministry of Energy and Mines, MOEM) According to the 2030 renewable energy generation target of 1,688MW or 4,516.31Gwh (solar and wind power)[16], it is necessary to cooperate with **renewable energy project like (small) hydro power, solar power, wind power, biomass and biogas**. In

[Table 70] Paris Agreement Article 6 Applicable Project in Laos

<table>
<tr><th>Applicable Project</th><th colspan="2">Applicable Ground</th></tr>
<tr><td>REDD+</td><td rowspan="2">NDC (2021)</td><td>
<table>
<tr><th>Scenario</th><th>Activity (2020 ~ 2030)</th><th>Average Mitigation (ktCO2e\Yr)</th><th>Ratio (%)</th></tr>
<tr><td>Unconditional</td><td>Decreasing emissions caused by deforestation and forest degradation, encouraging conservation, managing forest in a sustainable way, creating a buffer zone in national parks and reserves, and boosting the amount of carbon absorption in forest</td><td>1,100</td><td>27.7</td></tr>
<tr><td>Conditional</td><td>Increasing the forest area to 70 % of the land (16.58 million ha) from the activities in the unconditional scenarios as above</td><td>45,000</td><td>98.5</td></tr>
</table>
• Increasing forest to 70% of the total land according to Laos' National Forestry Strategy (2021)
• Under the conditional scenarios, allocating 98.5% of the total reduction target to Land Use Change and Forestry (LUCF) (27.7% of the total reduction target under the unconditional scenarios, following the hydro power)
</td></tr>
<tr><td>New Renewable Energy</td><td>
<table>
<tr><th>Scenario</th><th>Activity (2020-2030)</th><th>Average Mitigation (ktCO2e\Yr)</th><th>Ratio (%)</th></tr>
<tr><td>Unconditional</td><td>The total capacity of 13GW from the hydro power (for domestic and export)</td><td>2,500</td><td>2,500</td></tr>
<tr><td rowspan="2">Conditional</td><td>Solar and wind power: the total capacity of 1GW for installation nationwide</td><td>100</td><td>0.2</td></tr>
<tr><td>Biomass: the total capacity of 300MW for installation nationwide</td><td>84</td><td>0.2</td></tr>
</table>
</td></tr>
</table>

16) Aug. 07. 2023~Aug. 11. 2023. According to MOEM officials in the Interim Report and Capacity-building Workshop

[Table 70] Paris Agreement Article 6 Applicable Project in Laos

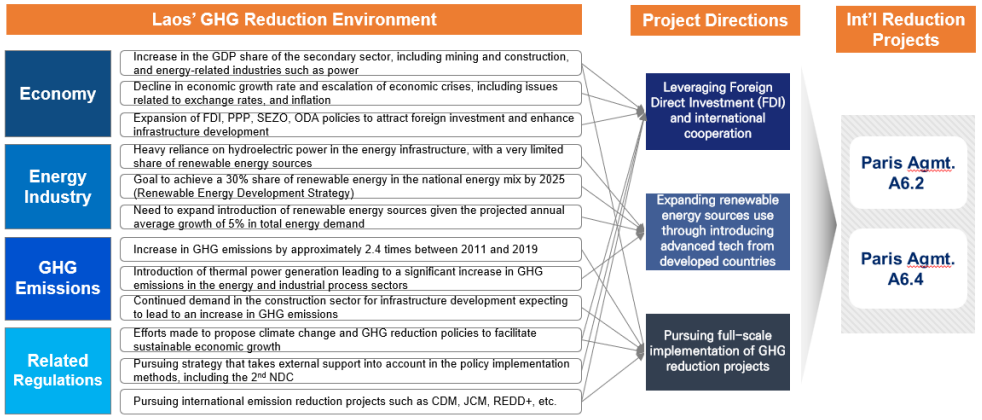
<table>
<tr><th>Applicable Project</th><th colspan="2">Applicable Ground</th></tr>
<tr><td rowspan="2">New Renewable Energy</td><td>NSCC (2021)</td><td>• Setting ‘promotion enhancement of renewable energy development and utilization’ including the solar power, the wind power, bio energy and biomass as priority in a mid-to-long-term 2022-2030 climate change mitigation measures</td></tr>
<tr><td>New Renewable Energy Development Strategy (2011)</td><td>• Setting a goal to increase the share of the renewable energy to 30% in the total energy consumption by 2025
<table>
<tr><th>Sector</th><th>Main Content</th></tr>
<tr><td>Biofuel</td><td>- Replacing 10% of the transportation fuel by 2025</td></tr>
<tr><td></td><td>- Spreading biofuel technologies across the rural areas</td></tr>
<tr><td>Small hydro power</td><td>- Developing small hydro power generation of 650MW by 2025 (2010)</td></tr>
<tr><td rowspan="3">Solar power</td><td>- Providing light by installing a solar power home system in the rural and remote areas</td></tr>
<tr><td>- Installing a large-scale grid-connected solar power energy and hybrid system to provide off-grid area services</td></tr>
<tr><td>- Encouraging to use a solar-power energy for family, commercial and farming facilities</td></tr>
<tr><td>Biogas</td><td>- Increasing the number of households using biogas to 50,000 by 2050</td></tr>
<tr><td>Biomass energy</td><td>- Accepting the farming and the MSW as part of energy mix to ensure the national energy security</td></tr>
<tr><td>Wind power</td><td>- Developing wind power generation of 50MW by 2025</td></tr>
</table></td></tr>
<tr><td>Landfill Waste</td><td>NDC (2021)</td><td>• Along with the NDC, setting renewable energy development including solid-waste-to-energy as priority in the climate change mitigation measures of the NSCC (2021)
<table>
<tr><th>Scenario</th><th>Activity (2020-2030)</th><th>Average Mitigation (ktCO2e\Yr)</th><th>Ratio (%)</th></tr>
<tr><td>Conditional</td><td>Kicking off sustainable MSW management projects with a capacity of 500 t/day</td><td>40</td><td>0.1</td></tr>
</table></td></tr>
</table>

※Ref: Lao PDR (2021) Nationally Determined Contribution (NDC),
Lao PDR (2011) Renewable Energy Development Strategy in Lao PDR 16–23p,
Lao PDR (2021) National Strategy on Climate Change of Lao PDR – Vision to the year 2050, strategy, and programs of actions of action to the year 2030 20–25p

addition, the ministry revealed that it would like to bring an ongoing project of **power generation from wastes** as a linkage project.

3. Linkage Project Progress and Result Analysis

Necessity of Promotion of International Reduction Project



※Ref: KMAC

[Figure 60] Necessity of Int'l Emission Reduction Projects in Laos

○ Taking a look at the GHG reduction environment, Laos has promoted strategies to utilize the external investment to recover from economic recession due to the Covid-19 pandemic.

- However, the rise in the consumption of the fossil fuel introduced in 2015 has increased GHG emissions consistently. This environment can hinder the achievement of the 2050 Carbon Neutrality that the Laos government announced to the international society in 2015.

• Since the fossil fuel power with 1,878MW has been introduced in 2015 to move away from a structure relying on the traditional hydro generation, it has accounted for 35 % of the total power generation in 2017 and the mining industry has been continuously expanding for emissions.

○ Laos conducted comprehensive reviews on the GHG reduction environment in terms of economic environment, the status of energy industry, the GHG status and the GHG-relevant regulations. As a result, it has been turned out that appropriate projects would be △utilizing the Foreign Direct Investment (FDI) and external cooperations, △expanding renewable energy resources by introducing advanced technologies and △promoting the full-scale GHG reduction projects.

- If Laos works on reaching its NDC conditional scenarios by taking these

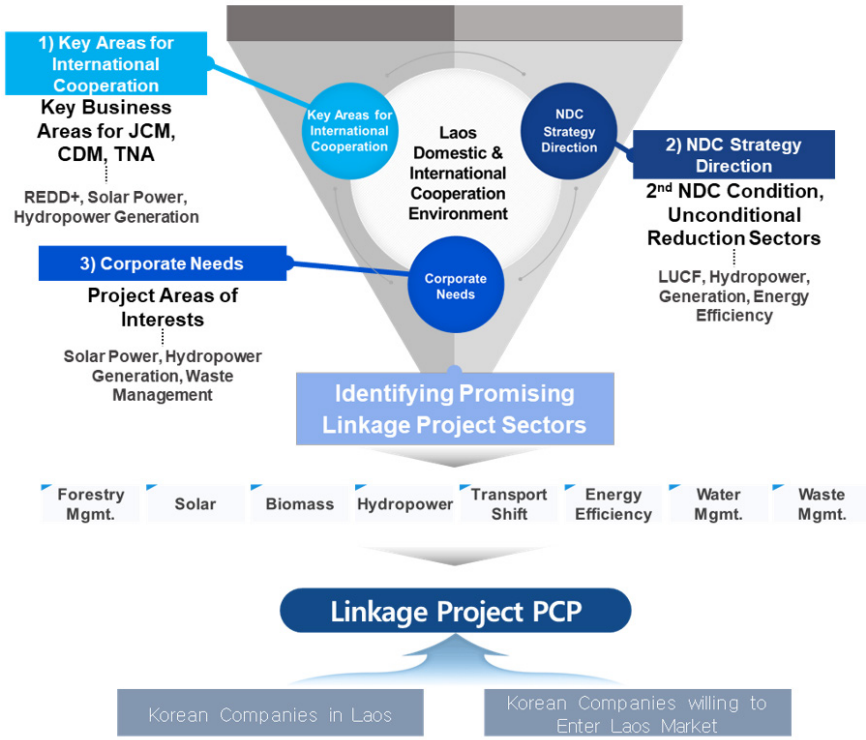
three indications into account, it could bring stimulating carbon market, financial support and technology transfer as subsidiary outcomes under Paris Agreement Article 6.

○ In this regard, in this masterplan, international reduction projects can be suggested as a solution to achieve the eco-friendly economic growth and the GHG reduction that the Laos government seeks. Thus, it is recommended to proactively utilize the projects, which are emerged as an efficient mean under the new climate regime.

Framework to Discover Promising Linkage Project Sector

○ Reviewing three sectors as below to come up with promising sectors of the GHG reduction linkage projects under Article 6. And, implementing a strategic framework to make Project Concept Papers (PCP) of the linkage projects considering Korean companies' advancement to Laos.

- (Main area of overseas cooperation) Reviewing major business sectors that can be seen in Joint Crediting Mechanism (JCM), Clean Development Mechanism (CDM) and Technology Needs Assessment (TNA) projects in Laos.
- (NDC Strategy Direction) Reviewing promising sectors in connection with other industries by referring to conditional and unconditional reduction scenarios in the 2nd NDC report.
- (Needs of Korean companies in Laos) Finding highly promising sectors of the linkage projects from Korean companies that have entered Laos.



※Ref: KMAC

[Figure 61] Korea-Laos GHG Reduction Linkage Project Analysis Framework

○ Discovered eight promising sectors based on the Korea-Laos GHG reduction linkage project framework.

- (Previous industries) Sectors that have been traditionally promoted as an overseas cooperation with Laos include ①forest management and expansion, ②solar power, ③biomass, ④hydro power, ⑥energy efficiency, ⑦water management.
- (New industries) Promising sectors that are newly suggested in the 2nd NDC in 2021 include ⑤transportation conversion like the public transportation, trains, electronic vehicles and biofuel and ⑧waste management.

[Table 71] Identify Promising Areas for Linkage Project with Laos

Sector	1)Key Areas of IC			2)NDC Strategy Direction		3) Corporate Needs	Promising Linkage Project Sectors
	JCM	CDM	TNA	Uncondi-tional NDC	Condi-tional NDC		
Forestry	REDD+	Forestry	-	Forest conservation	Forest expansion	Forest protection & restoration	① Forestry Mgmt.
RE-Energy	Solar	Biomass, Hydropower	-	Hydropower	Solar Biomass	Hydropower, Solar	② Solar ③ Biomass ④ Hydropower
Transport	-	-	-	Public transportation, Railroad	EV, Biomass	-	⑤ Transport shift (EV etc.) ③ Biomass
Energy efficiency	Energy efficiency, Power grid	Energy efficiency, Cookstove	-	Cookstove	Energy saving	-	⑥ Energy efficiency
Water Mgmt.	-	-	Water Mgmt.	-	Water Mgmt.	-	⑦ Water Mgmt.
Waste	-	-	-	-	Solid waste Mgmt.	Waste (recycling)	⑧Waste Mgmt.

※Ref: KMAC

○ To increase the likelihood of realizing the linkage projects aforementioned, needs were confirmed from △Korean companies in Laos and △the ones which are interested in entering into Laos.

- (Demand Survey) Four linkage projects were discovered by conducting an online survey through KOTRA Vientiane office with 17 companies which have worked in Laos as respondents.
- (Demand Discovery) Two linkage projects were discovered in the process of finding one-point promising businesses, which considered projects' purposes and specialty like Laos' circumstances and the GHG reduction, with companies looking to advance into the market in Laos.
- (Additional Suggestion) Researchers proposed a linkage project model by considering promising sectors.

[Table 72] Overview of Promotion of Linkage Project Development of Korean Companies

Sector	Main Content		
Business Purpose	• Contribute to the sustainable growth of Laos and identity follow-up linkage projects of Korean private companies that are promising for bilateral economic cooperation, thereby creating opportunities for Korean technology to enter Laos and strengthening industrial competitiveness.		
Sector	**Track1. Demand Research**	**Track2. Demand Discovery**	**Track3. Additional Suggestions**
Duration	2023. 08.01 ~ 2023. 08. 11	2023. 08.12 ~ 2023. 09.11	-
Investigation	17 Korean companies in Laos	2 Korean companies looking to enter Laos	-
Research Methods	Demand survey through KOTRA Vientiane office	One-point prospecting	Additional suggestion by researchers
Results (Enterprise-Prospects)	4 Linkage projects (3 companies)	2 Linkage projects	1 Linkage project
	• Western Power-②Solar • Western Power-④Hydropower • Goodbye Car-②Solar • Green Goods-②Solar	• SK Forest-①Forestry Mgmt. • Sejin G&E-③Biomass	⑧Waste Mgmt.

※Ref: KMAC

Project Concept Paper (PCP) Preparation

○ Preparing a Project Concept Paper (PCP) with specific business demand for the promising sectors of the linkage projects.

- Various Korean companies like state-owned companies, conglomerates (affiliates) and SMEs are trying to promote the Korea-Laos GHG reduction linkage projects.
- It is anticipated that this project phase will take minimum 2 to maximum 23 years in period and will cost KRW minimum 500 million to maximum 320 billion in expense.
- To mitigate Korea-Laos GHG emissions, appropriate mechanism priority for the international reduction projects were suggested by analyzing the PCP.

[Table 73] Partnership Project Proposal Results

No	Demand Company (Business type)	Revenue in '22년 (KRW M)	Promising Sectors	Project Name	Period	Budget (KRW 100M)
1	Western Power (Public)	8,177,379	Solar	200MW floating solar power project in Xe-Namnoy, Laos	2024~ 2046	3,200
2	Western Power (Public)	8,177,379	Hydropower	Paksong 30MW Hydropower Plant in Laos	2025~ 2053	Not fixed
3	Goodbye Car (SME)	6,214	Solar (Waste Mgmt.)	Developing small-scale (<10kwh) electricity storage using reused EV batteries	2024~ 2046	Not fixed
4	Green Goods (SME)	4	Solar	Smart Hatchery Farming Solar Energy Production to Strengthen the Basic Poultry Industry in Laos	2024~ 2046	5
5	SK Forest (Major)	74,827	Forestry Mgmt.	Carbon Credits through forest protection and restoration in Laos	2025~ 2034	100
6	Sejin G&E (SME)	493	Biomass (Waste Mgmt.)	Landfill gas power generation and carbon credits project in Vientiane, Laos	2025~ 2041	250
7	-	-	Waste Mgmt.	Building an automotive waste recycling center in Laos	2024~ 2025	50

※Ref: KMAC

Project Design Document (PDD) from Companies Entered Laos

○ In 2023, 17 Korean companies in Laos, which were informed from KOTRA, responded to a survey asking their intention to participate in the linkage projects. As a result, four linkage projects (three companies) were found.

- Among these companies, 10 companies working in sales, lease and services areas were determined as less connectivity with the GHG mitigation.
- The remaining sectors include power generation, manufacturing, construction, transportation and farming. Companies who expressed their interest in joining the projects are 'Western Power' for power generation, 'Goodbye Car' for sales and service, and 'Green Goods' for farming.

[Table 74] Intention of Korean Company in Laos for Linkage Project

No	Company Name	Entering Year	Type	Sector	PCP Submission
1	KOWEPO Lao International (Western Power)	2016	Joint corporation	Power	●
2	Paul Golden Lao(Goodbye Car)	2013	Sales corporation	Sales, service	●
3	The Green(Green Goods)	2021	Sole corporation	Farming	●
4	Honghwa Laos	2009	Sole corporation	Sales/lease, service	-
5	Booyoung Lao Bank	2009	Sole venture	Finance, service	-
6	Lao Securities Exchange	2011	Joint corporation	Finance	-
7	CJ Logistics Laos	2012	Representative Office	Transportation	-
8	Xe-Pian Xe-Namnoy Power Company (Major shareholder of SK Ecoplant)	2012	Joint corporation	Power	-
9	Jelacon	2013	Production corporation	Manufacturing	-
10	Samsung Electronics Laos	2013	Sales corporation	Sales/lease	-
11	BNK Capital Lao Leasing	2015	Service corporation	Finance	-
12	T'way Air Lao Office	2015	Representative Office	Service	-
13	DGB Lao Leasing Company	2016	Service corporation	Sales/lease	-
14	Welcome Leasing Lao	2016	Sole corporation	Sales/lease	-
15	KB KOLAO Leasing	2017	Service corporation	Sales/lease, service	-
16	Solutek System Lao	2020	Foreign branch	Other	-
17	KAS Holdings E&C	2021	Construction Corporation	Manufacturing, construction	-

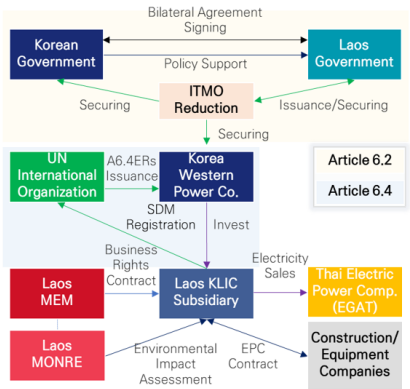
※Ref: KOTRA Laos Trade Office

○ Solar power, hydro power and waste management are confirmed as promising sectors in submitted PCP.

– (① Western Power – (floating) solar power) Western Power is promoting a hydro power project in Xe Namnoy, Laos. It proposes a 'floating solar power' project that will constantly uses abundant sunlight and the reservoir area of hydro power generation.

• This proposal features that negotiation with the Laos government is underway by setting Electricity Generating Authority of Thailand (EGAT) as an off taker.

[Table 75] Linkage Project of Western Power - (Floating) Solar Power

<table>
<tr><th>Company</th><th>Type</th><th colspan="3">Project Name</th></tr>
<tr><td>Western Power</td><td>State-owned</td><td colspan="3">200 MW floating solar power project in Xe-Namnoy, Laos</td></tr>
<tr><th colspan="2">Project Sectors</th><th>Period</th><th colspan="2">Budget</th></tr>
<tr><td colspan="2">Solar (floating solar power)</td><td>2024~2046</td><td colspan="2">3,200</td></tr>
<tr><th>History</th><td>• (Aug. 2022)Electricity sales agreement (EGAT)
• (Sep. 2022)Completion of business feasibility study (F/S) (Yushin)
• (Oct. 2022)Business Development Review Committee approval
• (Currently) Negotiating to revise the MOU between Thailand and Laos for renewable power trading</td><td colspan="3">International Reduction Projects
GHG Type Priority
Article 6.2 – 1st
Article 6.4 – 2nd</td></tr>
<tr><th>Necessity</th><td>• Laos has ample sunshine but lacks the technical capacity and funding to utilize solar power
• The solar power project utilizes the water storage area of the Xe-Namnoy hydropower plant to provide a stable supply of renewable energy regardless of climate change</td><td colspan="3" rowspan="2"> 
</td></tr>
<tr><th>Content</th><td>• (Goal) Stable power generation by introducing floating solar utilizing Xe-Namnoy hydropower facility
• Utilize the Xe-Namnoy hydropower transmission line to sell power to the Electricity Generating Authority of Thailand (EGAT) and secure CERs</td></tr>
</table>

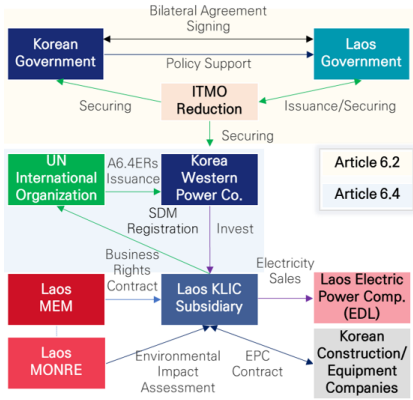
※Ref: KMAC

– (② Western Power – (small) hydro power) With weather characteristics (over 4,000mm of an average annual precipitation) and high altitude of the Blolaven Plateau near Xe-Namnoy, Western Power would like to promote a small hydro

power generation project that can produce a certain amount of power constantly while minimizing damages on the surrounding nature.

[Table 76] Linkage Project of Western Power - (Small) Hydropower

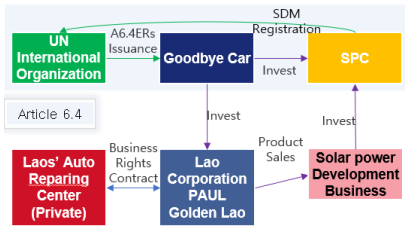
<table>
<tr><th>Company</th><th>Type</th><th colspan="3">Project Name</th></tr>
<tr><td>Western Power</td><td>State-owned</td><td colspan="3">Paksong 30 MW Hydropower Plant in Laos</td></tr>
<tr><th colspan="2">Project Sectors</th><th colspan="2">Period</th><th>Budget</th></tr>
<tr><td colspan="2">(Small) Hydropower</td><td colspan="2">2025~2034</td><td>100</td></tr>
<tr><th>History</th><td>• □ (Mar. 2023) Survey the project site (Western Power Laos Corporation)
• □ (May. 2023) Project participation LOI sent (□ Project developer)
• □ (Currently) Preparing Pre-Feasibility Study (Pre-FS)</td><th colspan="3">International Reduction Projects</th></tr>
<tr><th>Necessity</th><td>• □ There is a need for local balanced power generation and small hydropower utilizing Mekong tributaries
• □ Concerns about the environmental impact of hydropower development on the Mekong River led the Mekong River Commission to adopt the Sustainable Hydropower Guidelines</td><td rowspan="2">GHG Type Priority</td><td>Article 6.2</td><td>1st</td></tr>
<tr><th>Content</th><td>• □ (Goal) Build hydropower plant for sustainable and self-generated electricity utilization (25 years of operation after completion)
• □ Western Power Laos subsidiary (KLIC) to operate and manage the small hydropower and secure CERs</td><td>Article 6.4</td><td>2nd</td></tr>
</table>



※Ref: KMAC

– (③ Goodbye Car – Solar power, waste management) As Laos has increased supply of electrical vehicles (EV), the waste of batteries would be risen. These wastes can be reused to make electrical storage devices and solar power generation systems.

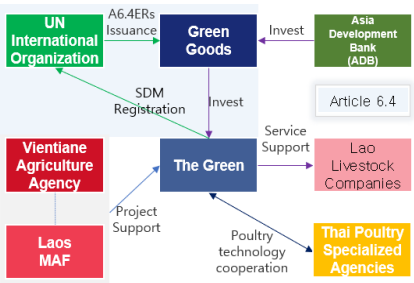
[Table 77] Linkage Project of Goodbye Car – Solar Power, Waste Mgmt.

<table>
<tr><th>Company</th><th colspan="4">Project Name</th></tr>
<tr><td>Goodbye Car</td><td colspan="4">Developing small-scale (<10kwh) electricity storage using reused EV batteries</td></tr>
<tr><th colspan="2">Project Sectors</th><th colspan="2">Period</th><th>Budget(Suggestion), (KRW 100 million)</th></tr>
<tr><td colspan="2">Solar power, Waste management</td><td colspan="2">2024~2026</td><td>TBD</td></tr>
<tr><th>History</th><td>• The small-scale electrical storage reusing waste batteries from EVs were produced for the first time in the world, and has been on the market
• (Oct. 2022) Local demand was confirmed by Vietnam-Laos Green Growth Delegation organized by the Ministry of Trade, Industry and Energy of Korea</td><td colspan="3">International Reduction Projects
GHG Type Priority: Voluntary Market – 1st; Article 6.4 – 2nd</td></tr>
<tr><th>Necessity</th><td>• Laos targets the 30% conversion to EVs by 2030
• Laos implemented zero tariffs to spread EVs
• The capacity of the solar power is expected to be 30% according to ESCAP</td><td colspan="3" rowspan="2"> 
</td></tr>
<tr><th>Content</th><td>• (Goal) Developing solar-power energy storage based on the technology to reuse waste batteries
• Developing products by analyzing demand for electrical storage device and examining the characteristics of BYD EV batteries</td></tr>
</table>

※Ref: KMAC

– (④ Green Goods – Solar power) Green Goods has been expanding its businesses in the poultry farming industry in Laos. To overcome difficulties that Laos depends on Thailand for the poultry supply, this company proposed a project to supply a smart hatchery using the solar power in the poultry farming area.

[Table 78] Linkage Project of Green Goods – Solar Power

<table>
<tr><th>Company</th><th colspan="3">Project Name</th></tr>
<tr><td>Green Goods</td><td colspan="3">Smart Hatchery Farming Solar Energy Generation
to Strengthen the Basic Poultry Industry in Laos</td></tr>
<tr><th colspan="2">Project Sectors</th><th>Period</th><th>Budget(Suggestion)
(KRW 100 million)</th></tr>
<tr><td colspan="2">Solar power</td><td>2024~2025</td><td>5</td></tr>
<tr><th>History</th><td>• The needs for supporting businesses with technologies that can assist independence of livestock companies were confirmed by the Vientiane Agriculture Agency
• Identified demand for installing the farming smart hatchery with considering environmental factors
• Integrating the poultry industry vertically in Laos</td><td colspan="2">International Reduction Projects</td><td></td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">GHG Type Priority</td><td>Voluntary Market</td><td>1st</td></tr>
<tr><td>Article 6.4</td><td>2nd</td></tr>
<tr><th>Necessity</th><td>• 62 % of the workforce are engaging in the agriculture
• Smart agriculture needs to be introduced to overcome the low productivity in the agriculture and livestock industry
• As unstable power supply due to climate instability makes poultry supply difficult, Laos relies on imports from Thailand</td><td colspan="3" rowspan="2"> 
</td></tr>
<tr><th>Content</th><td>• (Goal) Realizing stable power supply by utilizing renewable energy in Vientiane, Laos, and building a stable chick supply chain
• Based on analysis of Laos' agriculture status, figuring out how to establish power supply infrastructure for hatchery and operate it with planning the introduction of solar power energy and promoting solar power project
• Expanding the agriculture areas based on the renewable energy (solar power)</td></tr>
</table>

※Ref: KMAC

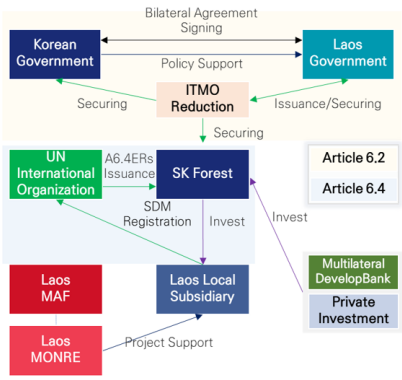
Project Design Document (PDD) for Companies Looking to Enter Laos

○ To figure out diverse demands from Korean companies who would like to enter Laos, KSP business introduction and consults were mobilized. As a result, two PDDs were discovered as a promising sector of the GHG reduction

projects.

- (① SK Forest - Forest) Discovered a promising sector in cooperation with SK Forest, Korean forestry firm, to promote REDD+ (sub-national) in the Land Use, Land-use Change, and Forestry (LULUF) sector, which has the highest ratio in the 2nd NDC conditional scenario in Laos.

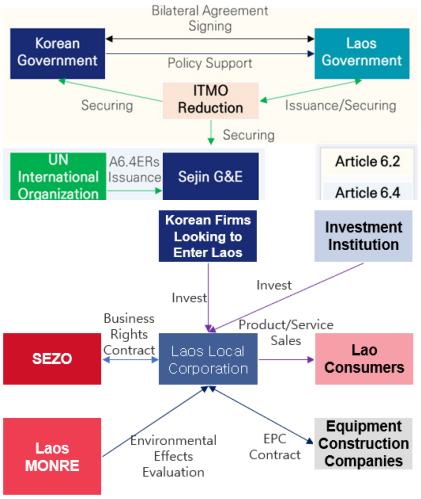
[Table 79] Linkage Project of SK Forest – Forest Mgmt.

<table>
<tr><th>Company</th><th colspan="4">Project Name</th></tr>
<tr><td>SK Forest</td><td colspan="4">Carbon Credits project through forest protection and restoration in Laos</td></tr>
<tr><th colspan="2">Project Sectors</th><th colspan="2">Period (Suggestion)</th><th>Budget(Suggestion) (KRW 100 million)</th></tr>
<tr><td colspan="2">Forestry Management</td><td colspan="2">2024~2025</td><td>100</td></tr>
<tr><th>History</th><td>• Discussed forest restoration projects through PPPs with the Korean Forestry Administration to promote cooperation in Laos
• Discussed business possibilities in the central region of Laos</td><th colspan="3">International Reduction Projects</th></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">GHG Type Priority</td><td>Article 6.2</td><td>1st</td></tr>
<tr><td>Article 6.4</td><td>2nd</td></tr>
<tr><th>Necessity</th><td>• To achieve the forestry sector GHG reduction target in the second NDC, the country plans to finance projects based on external investment
• Forest cover in Lao PDR decreased from 77% in 1990 to 72% in 2020, with a target of maintaining the current level above 70%</td><td colspan="3" rowspan="2"> 
</td></tr>
<tr><th>Content</th><td>• (Goal) Achieve national greenhouse gas emission reduction and absorption through forest protection and restoration projects
• Analyzing the feasibility of possible business sites and acquiring exclusive business rights to promote the business
• Create added value by issuing and selling CERs</td></tr>
</table>

※Ref: KMAC

- (② Sejin G&E – Biomass, waste management) Recently, Laos felt the need to have more landfills to troubleshoot growing wastes and trashes in cities due to population concentration. From this point, Sejin G&E discovered a promising sector to utilize landfill gas (biomass) to generate power, which will contribute to the environmental improvement and the GHG reduction.

[Table 80] Linkage Project of Sejin G&E – Biomass, Waste Mgmt.

<table>
<tr><th>Company</th><th colspan="3">Project Name</th></tr>
<tr><td>Sejin G&E</td><td colspan="3">Landfill gas power generation and carbon credits project in Vientiane, Laos</td></tr>
<tr><th colspan="2">Project Sectors</th><th>Period (Suggestion)</th><th>Budget(Suggestion) (KRW 100 million)</th></tr>
<tr><td colspan="2">Biomass (Waste Management)</td><td>2025~2041</td><td>250</td></tr>
<tr><th>History</th><td>• Completed a report on the feasibility of LFG technology for the Vientiane Landfill for the Laos government
• Support from the Korea Institute of Environmental Technology in progress
• Technical feasibility study completed, legal and financial feasibility study is underway</td><td colspan="2">International Reduction Projects</td></tr>
<tr><td colspan="2" rowspan="2"></td><td rowspan="2">GHG Type Priority</td><td>Article 6.2 : 1st</td></tr>
<tr><td>Article 6.4 : 2nd</td></tr>
<tr><th>Necessity</th><td>• Internal and external demands to improve the overall environment due to increased population and investment in the city of Vientiane
• Increased waste disposal needs in Vientiane
• Need to support growth as a sustainable green city</td><td colspan="2" rowspan="2"> 
</td></tr>
<tr><th>Content</th><td>• (Goal) Efficiently manage/operate landfills in Laos and reduce methane gas, a source of pollution, to improve the surrounding environment and generate and supply electricity
• Promote power generation projects by conducting local waste status surveys and securing business plan feasibility</td></tr>
</table>

※Ref: KMAC

Additional Suggestion

○ In the promising linkage project sector discovery framework, additional needs were analyzed. From this analysis, a waste-managing linkage project was suggested.

– Considering the potential of the automobile market and high demand for replacing auto parts, reusing parts from disassembled cars were suggested as a waste management project.

• Despite a rise in oil price, the scale of auto imports in Laos increased by 54.3% year on year in 2021, showing its solid market growth amid COVID-19.

• In addition, as its policy target is to have automobiles equipped with electric parts (electric or electronic devices of auto parts), the auto-part market is predicted to be emerged. In this light, the market of reusable auto parts and waste management is expected to be larger.

[Table 81] Additional Linkage Project Suggestion – Waste Mgmt.

<table>
<tr><th>Company</th><th colspan="3">Project Name</th></tr>
<tr><td>-</td><td colspan="3">Building an automotive waste recycling center in Laos</td></tr>
<tr><th colspan="2">Project Sectors</th><th>Period
(Suggestion)</th><th>Budget(Suggestion)
(KRW 100 million)</th></tr>
<tr><td colspan="2">⑧Waste management</td><td>2024~2025</td><td>50</td></tr>
<tr><th rowspan="2">History</th><td rowspan="2">• Analyzed the Lao market to promote this project and established BM
• Retaining capability of waste management for the entire process (collection and transport – intermediate treatment (aggregate sale, incineration, recycle, steam sale) – disposal)</td><th colspan="2">International Reduction Projects</th></tr>
<tr><td colspan="2">Need a reduction project model</td></tr>
<tr><th>Necessity</th><td>• A sharp rise in the number of auto registrations but poor traffic infrastructure of Laos lead to high demand for auto part replacement
• Solid wastes have increased steadily because of soaring urban population and industry restructuring</td><td colspan="2" rowspan="2"></td></tr>
<tr><th>Content</th><td>• (Goal) Building a resource circulating system from automotive waste management to recycling and reselling
• Promoting projects near cities promising easy accessibility
• Providing one-stop services regarding automobiles</td></tr>
</table>

※Ref: KMAC

Implication of Linkage Project Discovery Analysis

○ In the wake of the COVID-19 pandemic, Laos, which suffered from serious economic recessions, should focus on both economic recovery and NDC implementation. Accordingly, project models were reviewed to enable to reach these goals through the cooperation with the international society and the Foreign Direct Investment (FDI).

– To promote valid international reduction projects, first of all, finding the

promising linkage projects' sectors by looking into major sectors in the overseas cooperation of Laos, NDC strategies direction and the needs of Korean companies in Laos comprehensively.

- A survey was conducted with Korean companies entered Laos and the ones interested in entering Laos to identify their demand along with an one-point discovery survey. As a result, six linkage projects were found in the management and expansion of forest and renewable energy (solar power, small hydro power, biomass) sectors.

○ To fulfill these linkage projects, suggestions to utilize the Paris Agreement Article 6 were reviewed and the business modeling was formed in order to promote the projects with foreign investments while contributing to the national GHG reduction target.

○ In particular, Korea-Laos bilateral cooperation raises a possibility to achieve the reduction target in the Laos' 2nd NDC conditional scenario. To retain the bilateral cooperation, it is important to promote the linkage projects that can secure carbon credits in the forest carbon market.

4. Review Linkage Project Model under Paris Agreement A6.2 (Cooperative Approach)

○ When the 'Framework Agreement for Cooperation on Climate Change', which is under discussion between Korea and Laos, is signed, bilateral linkage projects using Paris Agreement Article 6.2 cooperative approaches will be promoted actively.

– In this regard, the Project Design Document (PDD) on the forest carbon, one of the linkage projects discovered from this work, was reviewed for detail cooperation ranges of Korea and Laos respectively, which was required to promote Article 6.2 project.

Example: REDD+ Linkage Project

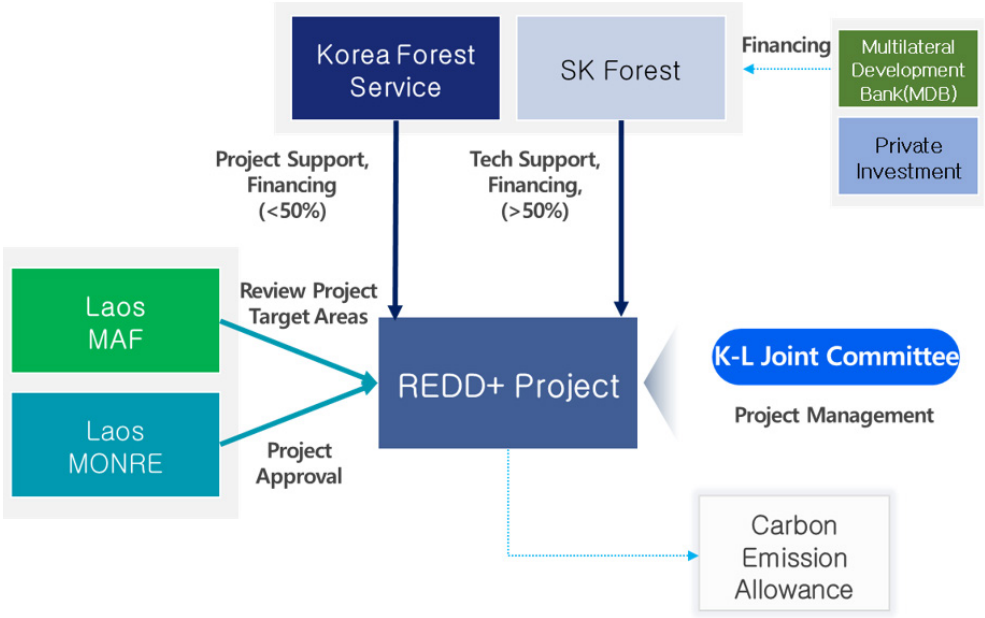
○ 'REDD+ Project' based on the cooperative approaches should be planned with a structure composed of project support from the Laos government, project support and financing from the Korean government (Korea Forest Service, KFS) and technology support and financing from a private firm (SK Forest).

– The cooperative approaches don't necessarily have the government as an agent of the project. The KFS can consider private investments positively to promote rapid and large-scale REDD+ projects to help achieve the NDC of both countries.

[Table 82] Agent and Characteristics of Cooperative Approach Project

Category	Private-led	Government-led
Purpose	Private businesses earn revenues from the GHG reduction projects, committing to reaching GHG mitigation target	Large-scale GHG reduction projects can secure plenty of credits in an cost-effective way and support participating firms in entering the overseas market
Project Range	Centered on Project	Centered on Project/policy
CER Utilization	Private firms own the CERs based on their stakes, generating revenues by using them at the ETS projects or selling them	Both countries own the CERs, which can be directly used in the NDC based on the agreed allocation rate

※Ref: Government Policy Coordination. 2018
A study on a Korean Implementation System to Use Cooperative Approach

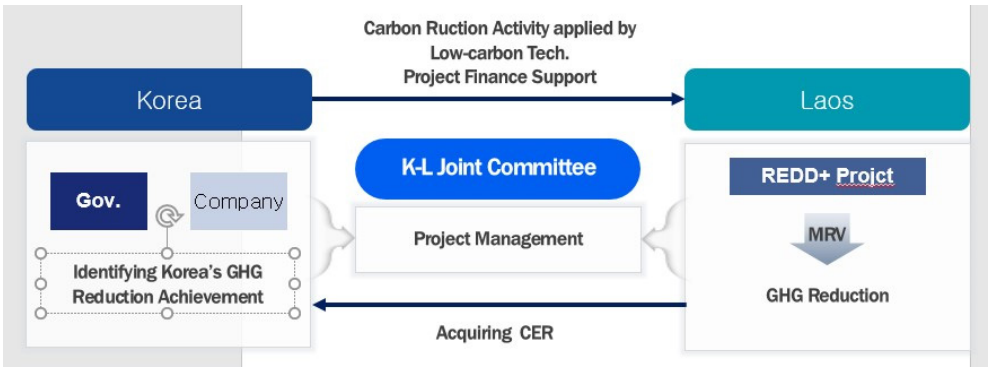


※Ref: KMAC

[Figure 62] REDD+ Linkage Project Structure

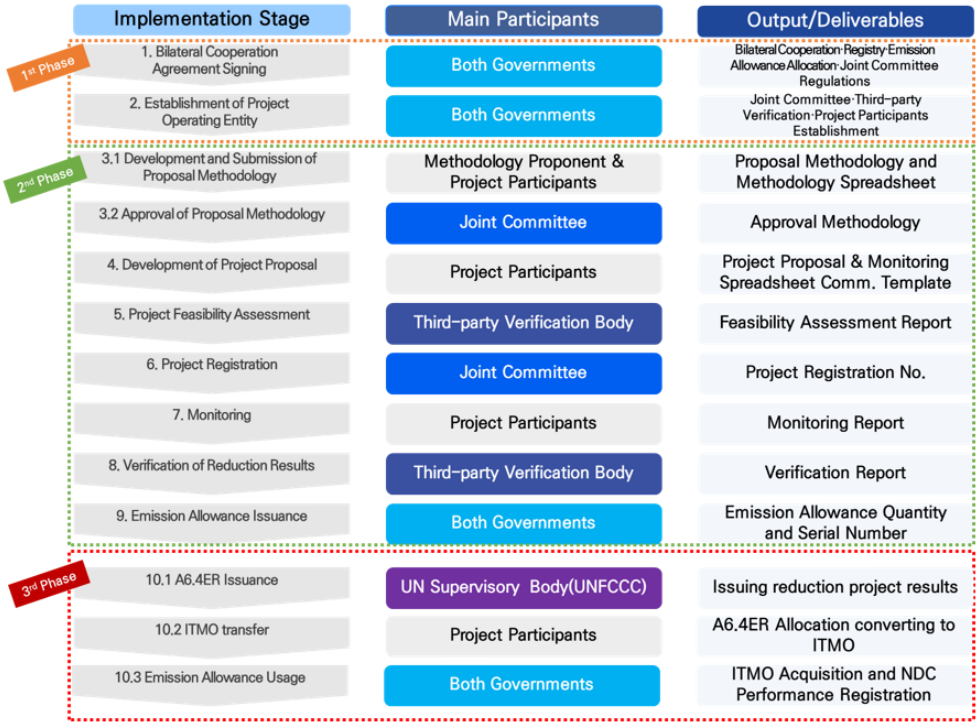
○ To promote Korea-Laos REDD+ project under the Article 6.2 cooperative approaches, composing the Korea-Laos Joint Committee should be prioritized, which will manage and operate the whole processes of the projects.

- The projects should follow procedures that the Joint Committee defines, and clarify roles of each government and multiple stakeholders at every single step like a carbon credit certification through the 3rd party verification body.



※Ref: Government of Japan. 'Recent Developments of the Joint Crediting Mechanism'

[Figure 63] Korea-Laos GHG Reduction Linkage Project Concept Map



※Ref: National Institute of Green Technology. 'Response to Cooperative Approach under New Climate Regime'

[Figure 64] Steps for Cooperative Approach Project

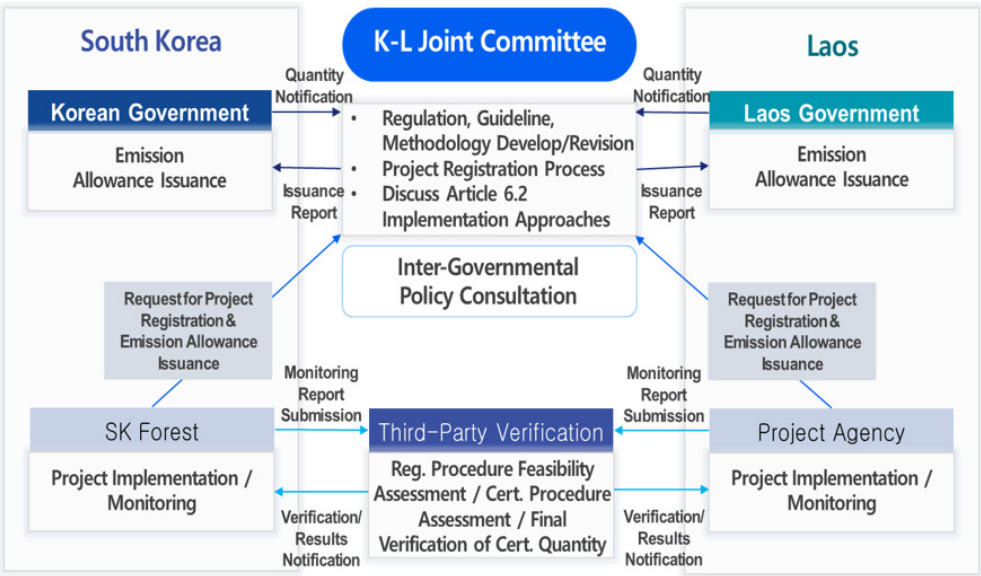
○ The Korea-Laos GHG reduction linkage projects are organized as seen in a 'Figure 64'. It consists of three main phases with 10 detailed implementation steps.

- **(1st Phase)** Both countries should review multiple operation regulations together when they sign a project agreement to promote 'REDD+ Demonstration Project' based on the 'Framework Agreement for Cooperation on Climate Change.'
  - Establishing the Joint Committee to elaborate on the projects as per the agreement, and selecting the main agent who will manage the whole processes by contracting with participants and the 3rd party verification body.
- **(2nd Phase)** In the process of promoting 'REDD+ Project' in detail, the Joint Committee leads developing and approving methodology, preparing Project Design Documents (PDD) and evaluating project feasibility assessment together with private participants and the 3rd party verification body. After going through these steps, a project registration is progressed.
  - And then, participants prepare a verification report after monitoring, get a certification for the amount of reduction from the 3rd party verification body

and request the two governments to issue emission allowance.

– **(3rd Phase)** At the final phase of the project, the Internationally Transferred Mitigation Outcomes (ITMO) issued by an initial allocation agreement between the two governments are ensured for the use of issued emission allowance.

• To secure the accurate ITMO, the establishment of the national inventory and an IT system to manage national emission allowance and reduction quantities are required.



※Ref: KOTRA. 'Guide for Foreign Carbon Market Entry'

[Figure 65] Insurance Process of Emission Allowance from REDD+ Linkage Project

• The Corresponding Adjustment of the ITMO should allocate the carbon credits based on the contribution rate established by the 'Bilateral Cooperation Project Agreement' in the 1st phase. Since the two country's activity ranges are various depend on the characteristics of the project, Korea and Laos need to develop a reasonable methodology in calculating the contribution rate under the negotiation of the two governments.

• Under the assumption of the activities of the bilateral cooperation project, the contribution rate can be calculated as follows.

[Table 83] Calculation of CERs Distribution Contribution Rate (Ex)

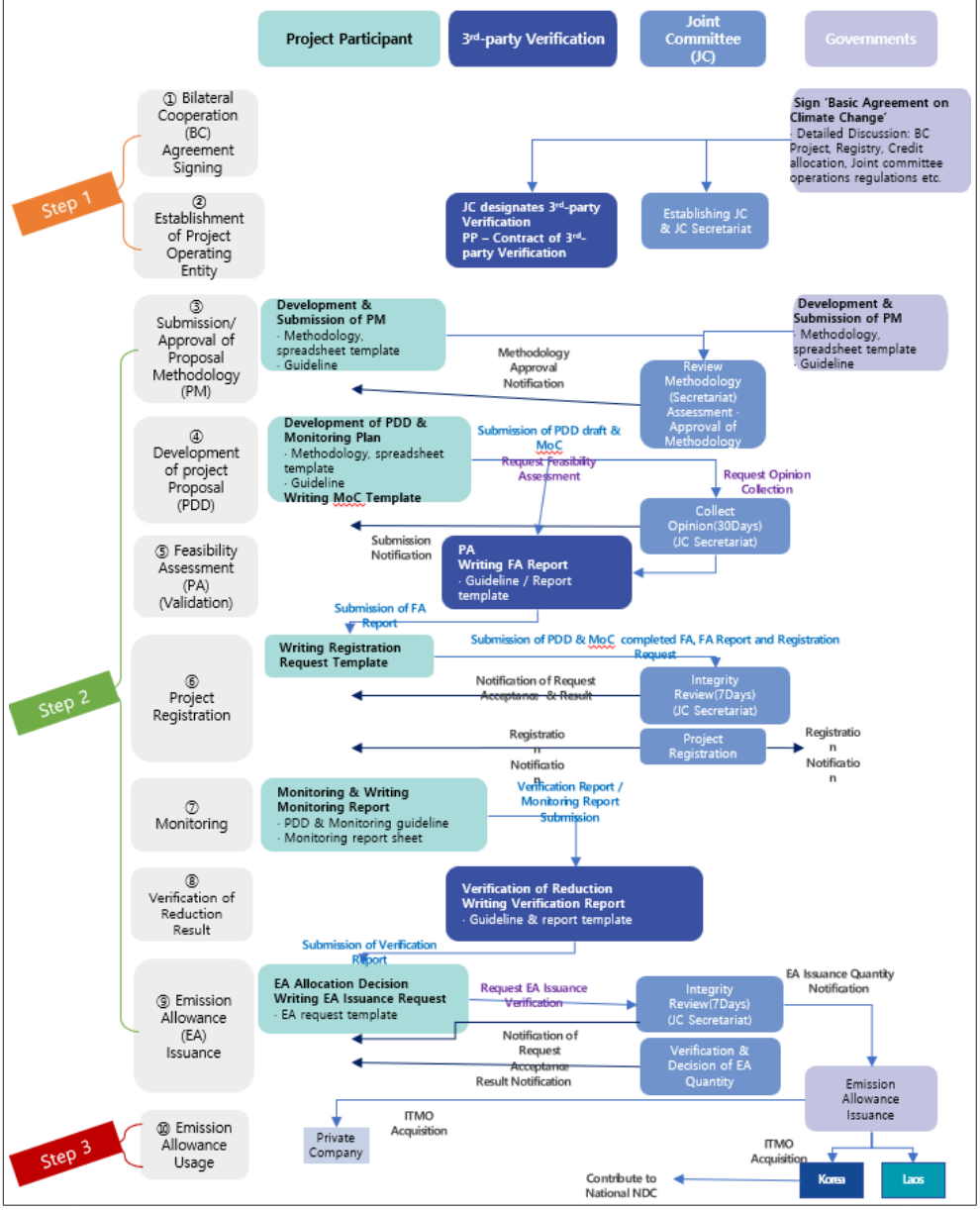
Topics	Ratio (%)	Country	Score									
			10	20	30	40	50	60	70	80	90	100
Funding	30	Korea										◎
		Laos										
Technical Support	30	Korea									◎	
		Laos	○									
Business Venue	10	Korea										
		Laos										○
Number of Participants	15	Korea							◎			
		Laos			○							
Hours of Participation	15	Korea				◎						
		Laos						○				
Total	100	-										

<Contribution rate calculation results>

- Korea : (100 × 0.3) + (90 × 0.3) + (0 × 0.1) + (70 × 0.15) + (40 × 0.15) = 73.5
- Laos : (0 × 0.3) + (10 × 0.3) + (100 × 0.1) + (30 × 0.15) + (60 × 0.15) = 26.5
- Contribution rate: Korea (73.5%) and Laos (26.5%)

※Ref: Greenhouse Gas Inventory and Research Center of Korea. 2021
'A Study on Securing Greenhouse Gas Reduction under Korea-Vietnam Cooperation'

〈Detailed Procedures of Korea-Laos GHG Reduction Linkage Project〉



※Ref: Green Technology Center. 'Response to Cooperative Approach under New Climate Regime

References

Korean References

- Climate Change Center, 'Research on Global Carbon Market Mechanism Utility Strategy under Post-2020 New Climate Regime' (2016.05)
- 2050 Carbon Neutrality & Green Growth Commission, '2050 Carbon Neutrality Scenario' (2021.10)
- 2050 Carbon Neutrality & Green Growth Commission, 'Establishing Guideline on GHG Overseas Reduction Project' (2022.12.30)
- 2050 Carbon Neutrality & Green Growth Commission, 'Korean Government Releases Vision and Promotion Strategy of Carbon Neutrality·Green Growth' (2022.10.26)
- BOK Issue Note, Park Kyung-hun and 6, 'Impact of Climate Change Response on Macroeconomy' (2021.09.17)
- IMPACT ON, Editor Hong Young-pye, 'FKI, Strengthening International Cooperation Based on JCM Model for Carbon Reduction' (2023.03.23)
- KOTRA, 'Singapore's Efforts and Issues for Carbon Neutrality' (2021.10.07)
- Kang Sang-in, 'Research on Negotiation Response under New Climate Regime and Climate Service Industry Development' (2016.07)
- Kye In-hyuk, 'Research on Laos Agriculture Sector ODA Status and Analysis of SDGs Linkage' (2022)
- Ministries & Agencies, 'Laos National Cooperation Strategy' (2023.01)
- Ministries & Agencies, 'GHG Global Reduction Project Promotion Strategy' (2022.08.19)
- Ministries & Agencies, 'Carbon Neutrality / Green Growth Promotion Strategy' (2022.10.26)
- Press Release by Office for Government Policy Coordination / Prime Minister's Secretariat (OPC/PMS), 'Decision of National Strategy and 1st National Basic Plan for 2050 Carbon Neutrality Achievement and Green Growth Implementation' (2023.04.10)
- OPC/PMS, 'Basic Research to Establish Mid&Long Term GHG Reduction Strategy Using Global Carbon Market and Ways for Domestic Implementation' (2022.12.10)
- OPC/PMS, 'Research to Establish Korean Implementation System to Use Cooperative Approach' (2018.02.12)
- Climate Change Center, 'Direction of ETS Paid Allocation for Carbon Neutrality and

Green Growth' (2023.06.07)
- Good Bye Car, 'Evaluation of EV Used Parts and Introduction of Recycling Project' (2022.10)
- Roh Dong-un, 'Recent Paris Agreement Trend in UN Climate Change Negotiation' (2020)
- National Institute of Green Technology(NIGT), 'Technology Related System Analysis under UNFCCC and Research to Revitalize Technology Mechanism' (2019.12)
- NIGT, 'Research on Basic Method to Support Waste Management System Development Strategy of Developing Countries' (2018.12)
- NIGT, 'Research to Revitalize Green/Climate Technology Network, Research to Develop an Assessment System of Developing Country's Climate Technology Needs' (2019.12)
- NIGT, 'Response to Cooperative Approach under New Climate Regime: Centered on Japanese Case' (2017.11)
- NIGT, 'MRV System to Achieve NDC under New Climate Regime' (2018.07)
- Carbon Neutrality & Green Growth Commission, 'Green Growth National Strategy and 5-Year Plan' (2009.07)
- Korea Institute for International Economic Policy(KIEP), Park Young-suk and 4, 'Policy Direction and Implications of Carbon Neutrality in the International Community' (2021.02.04)
- KIEP, Jung Jae-hwan, Kim So-eun, 'Possible Economic Crisis in Laos and Implications', (2023.05.15)
- KIEP, Jung Ji-won and 4, 'NDC Implementation Method using Overseas' Reduction and Main Policy Agenda' (2022.12.30)
- KIEP, Han Hyung-min and 4, 'India's New · Renewable Energy market & Policy Analysis and Ways of Cooperation between Korea and India' (2022.12.30)
- KIEP, 'Diagnosis and Implications of Laos Economic Crisis Possibility' (2023)
- KIEP, 'Agricultural Development Status and Development Needs in Laos' (2017)
- Deloitte Insight Publisher, 'Forecast of Korea's Carbon Neutrality Roadmap and NDC Enhancement' (2021)
- Myung So-young, 'Strategy to Join in CDM Market in Overseas Waste Area' (2009.10.14.)
- Park Jung-muk, Seo Hwan-su, Lee Jung-su, 'National Strategy of Japan's REDD+ and Implications' (2016)
- Park Jung-hee, 'Introduction of Carbon Pricing and Operation Status in Major Countries' (2022.06.13)

- Law Firm Sejong, ‘Main Contents of COP27 and ESG Issue’ (2022.12.02)
- KOTRA Vientiane Office, ‘Report of Support Result for 2022/23 Laos KSP Preliminary Discussion Team’ (2022.12.26.)
- KOTRA Vientiane Office, ‘Preparation Status for Laos KSP Kick-off Meeting’ (2023.04.14)
- Korea Forest Service Press Release, ‘Realizing Global Leading Country, Acquiring GHG Emission Allowances and Expanding Forestry Products Exports by Strengthening International Forest Cooperation’ (2023.03.23.)
- Korea Forest Service Press Release, ‘Upgrading Laos GHG Reduction Project as a Sub-National Level’ (2022.04.22)
- Korea Forest Service Press Release, ‘Encouraging Private Participation in Overseas GHG Reduction Project (REDD+)’ (2021.05.03)
- MOTIE Press Release. ‘Promotion of GHG Overseas Reduction with SEA Countries’ (2023.05.18.)
- MOTIE Press Release. ‘Promotion of Private-led GHG Overseas Reduction’ (2022. 9. 16)
- MOTIE Press Release. ‘Launching Consultative Committee for Industry · Energy Sectors GHG Overseas Reduction Projects for GHG Reduction through Overseas Investment’ (2022.02.09)
- KPMG Economic Institute, Business Focus, ‘COP28 Review, Implementation Plan of Sharm El-Sheikh’ (2022.11)
- KPMG Economic Institute, Business Focus, ‘Battery Circular Economy, Emerging EV Used Battery Market and Company’s Response Strategy’ (2022.03)
- Son Hong-sun, ‘2050 Carbon Neutrality and Revitalization of ETS’ (2021)
- An Chang-nam, ‘Research on Carbon Tax Introduction in Korea’ (2010.08.25)
- GHG Inventory and Research Center, ‘Evaluation of 2021 GHG Reduction Achievement’ (2022.12)
- GHG Inventory and Research Center, ‘Research on the Establishment Support for GHG Inventory System Creation Masterplan in Developing Countries’ (2018.03.30)
- GHG Inventory and Research Center, ‘Study on Securing GHG Mitigation under Korea-Vietnam Cooperation’ (2021.12)
- Ministry of Foreign Affairs (MOFA), Press Release, ‘Korean Government Releases Vision and Promotion Strategy of Carbon Neutrality·Green Growth’ (2022.10.26.)
- Ministry of Foreign Affairs (MOFA), Press Release, ‘Korea’s NDC and LEDS, Submission to UNFCCC Secretariat’ (2020.12.31)
- Ministry of Foreign Affairs (MOFA), ‘Laos Overview’ (2022)

- Ministry of Foreign Affairs (MOFA), 'Vietnam Overview' (2022.08)
- Ministry of Foreign Affairs (MOFA), 'Indonesia Overview' (2022.06)
- Yun Yae-chang, 'Research on Introduction Ways of Carbon Tax' (2021.08)
- Jo Bu-im, 'Agreement Method and Main Content for Inter-government Cooperation to Achieve NDCs' (2022.05.09)
- Jo Hae-kyung, 'Necessity and Basic Direction to Introduce Carbon Tax linked with Carbon Dividend' (2020.11.10)
- KOTRA, '2023, Laos Entry Strategy' (2022)
- KOTRA, 'Carbon Reduction as a Business Opportunity in Laos' (2022.08.04)
- KOTRA, 'Guide for Foreign Carbon Market Entry' (2021)
- Statistics Research Institute, 'Baseline Study to Develop SDGs Indicator regarding 2050 Carbon Neutrality' (2023.04)
- Korea Agro-Fisheries and Food Trade Corporation, '2021 Agricultural and Food Export National Survey Report' (2021)
- Korea Rural Economic Institute, World Agriculture No. 180, 'Status of Korea's REDD+ Pilot Project' (2015)
- Korea Legislation Research Institute, 'Research on Rational Usage Ways of Overseas Reduction Outcome to Achieve 2030 GHG NDC' (2022)
- Korea Energy Agency, 'CDM Project Guideline' (2018.10.18)
- National Research Foundation of Korea, 'Final Report of Climate Change Response Technology Development Project' (2017.12.31)
- Korea Environment Corporation, 'Establishing Implementation Basis for International Corporation under New Climate Regime' (2020.10.14)
- Korea Economy Business Institute, KEMRI Electricity Economy REVIEW, (2016.12.26)
- Ministry of Oceans and Fisheries Press Release, 'MOF Conducts Carbon Neutrality Global Training Program for 15 Countries' (2022.01.21)
- Ministry of Environment (MOE) Press Release, 'Publishing 2020 ETS Operation Outcome Report' (2022.03.10.)
- MOE Press Release, 'Amendment of 2030 GHG Reduction Roadmap and Decision of 2018-2020 Reduction Allowance Allocation Plan' (2018.07.24.)
- MOE Press Release, 'Promoting Korea-Mongolia Reduction Cooperation on Paris Agreement Article 6' (2022.05.03)
- MOE Press Release, 'MOE Agreed with Vietnam on Climate Change Joint Action Plan' (2021.12.14)
- GHG Inventory and Research Center, '2022 ETS Operation Outcome Report' (2023.03)

- GHG Inventory and Research Center, ‘Climate Change and Carbon Neutrality’ (2022.12.30)
- MOE, ‘Overseas CDM Projects Directly Conducted by Korean Companies’ (2018.07)
- MOE, ‘Multilateral Cooperation and Awareness Raising, Creation and Expansion of Domestic & Foreign Markets for Climate Change Adaptation Projects’ (2019)
- MOE, ‘ETS Statement Writing Guideline’ (2022.02)
- MOE, ‘Adequacy Assessment and Certification Guidelines of ETS GHG Emissions’ (2022.02)
- MOE, ‘Guideline to Write Emission Calculation Plan’ (2022.02)
- MOE, ‘Guideline to Develop Company Specific Emission Factor ’ (2022.02)
- MOE, ‘National Emission Allowances Allocation Plan (Draft) in GHG ETS 3rd Planning Year (2021-2025)’ (2020.09)
- MOE, ‘Guideline for Report and Certification of GHG ETS Emission Allowances’ (2022.01)
- MOE, ‘Study Analysis and Research on Improvement Method of GHG Emission Allowances Calculation Methodology’ (2023.06.28)
- MOE, ‘Read Paris Agreement Together’ (2022.03.31.)

News Articles

- ESG Economy, Reporter Lee Shin-hyung, '[COP27] Global CERs' Market Remains as Unfinished Status' (2022.11.21.)
- Seoul Daily, Reporter Kim Dong-ho, 'MOLIT Approves Hooxi Partners as the 1st EV Carbon Credit Reduction Project Operator in Korea' (2023.01.04.)
- Korea Economy Daily, 'Cooperation with Laos Optimized for Green Growth' (2023.03.20.)
- Environment Daily, Reporter Choi Young-gu, 'Problems after COP27, Unclear CDM Project Conversion' (2022.12.04)

Overseas References

- 27GROUP, Carbon Pricing and Taxes in ASEAN(2022.11.17)
- AGEP, Country-Profile_Lao-PDR(2018)
- Amro, Carbon Pricing in ASEAN+3 Economies: Progress and Challenges(2022)
- ASEAN Green Future report, Decarbonization in Lao PDR: the options and challenges(2021)
- ASEAN GREEN FUTURE, Decarbonization in Lao PDR: the options and challenges(2021.09)
- ASIAN DEVELOPMENT BANK, ARTICLE 6 OF THE PARIS AGREEMENT DRAWING LESSONS FROM THE JOINT CREDITING MECHANISM VERSION II(2021.11)
- Case Study Report, for the Project on "2022/2023 Knowledge Sharing Program with Lao PDR : Establishing master plan for implementing carbon trading system in Lao PDR"(2023.05)
- DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS, Developing the strategic guidelines for climate financing, considering possible linkages between climate financing and post COVID-19 agricultural development in Lao PDR(2021.10)
- ERIA, Analysis on Impacts to the Power Sector(2022)
- ERIA, Establishment of Energy Statistics Regulation in Lao PDR(2021.06)
- ESCAP, SDG 7 Roadmap for the Lao PDR(2022)
- FCCC, Record of the facilitative sharing of views at the fifty-second to fifty-fifth session of the Subsidiary Body for Implementation: Lao People's Democratic Republic(2022.01.21)
- GGGI, Carbon Emission Reduction Projects and Markets in Lao PDR(2022.12.01)
- GOODBYCAR, GOODBYECAR CORP. COMPANY & PRODUCT(2022.11)

- Government of Japan, Recent Developments of the Joint Crediting Mechanism(JCM)(2023.04)
- HKTDC Research, Laos: Market Profile(2022.11.01)
- INTERNATIONAL MONETARY FUND, Lao People's Democratic Republic 2019 Article IV Consultation-Press Release; Staff Report; Statement by the Executive Director for Lao People's Democratic Republic(2019.08)
- IRENA, ENERGY PROFILE(2022)
- JICA, Laos Outlook(2019.07)
- Korea-Lao Green Growth Partnership Forum 2022, Renewable Energy and Clean Energy Transition Forwards(2022.12.01)
- Korea-Lao Green Growth Partnership 2022, Accelerating carbon neutrality through greenhouse gas project development(2022.12.01)
- KOREA-LAOS Green Growth Partnership Forum 2022, Green Energy Development in Lao PDR(2022.12.01)
- Korean-Lao Green Growth Partnership 2022, Experience and Lesson Learnt on REDD+ Implementation in Lao PDR(2022.12.01)
- LAO PDR, Decree on Climate Change(2019)
- LAO PDR, National Green Growth Strategy of the Lao PDR till 2030(2018)
- LAO PDR, National Strategy on Climate Change of the Lao PDR(2021)
- Lao PDR, National Strategy on Climate Change of the Lao PDR(2021)
- LAO PDR, Nationally Determined Contribution(2021)
- Lao PDR, Nationally Determined Contribution(2021)
- LAO PDR, TECHNOLOGY NEEDS ASSESSMENTS REPORT CLIMATE CHANGE ADAPTATION(2013)
- Lao PDR, The First Biennial Updated Report of the Lao PDR (2020)
- LAO PDR. 9TH FIVE-YEAR NATIONAL SOCIO-ECONOMIC DEVELOPMENT PLAN(2021-2025)
- Lao People's Democratic Republic , National Green Growth Strategy of the Lao PDR till 2030(2018.12)
- Lao People's Democratic Republic, 9TH FIVE-YEAR NATIONAL SOCIOECONOMIC DEVELOPMENT PLAN (2021-2025)(2021.03.22)
- Lao People's Democratic Republic, Nationally Determined Contribution (NDC)(2021.03.09)
- Lao People's Democratic Republic, Renewable Energy Development Strategy in Lao PDR(2011.10)
- LAO PEOPLE'S DEMOCRATIC REPUBLIC, THE FIRST BIENNIAL UPDATE REPORT OF

THE LAO PDR(2020.07.24)
- LAO PEOPLE'S DEMOCRATIC REPUBLIC, THE FIRST BIENNIAL UPDATE REPORT(2020.07.24)
- MAF, GFLL(Governance, Forest Landscapes and Livelihoods-Northern Laos) Process Framework(2019)
- MAF, National REDD+ Strategy(2021)
- McKinsey & Company, Charting a path for Vietnam to achieve its net-zero goals(2022.10)
- Ministry of Trade, industry and Energy, Policy direction for international mitigation projects in industry and energy sectors(2022.12.01)
- MONRE, Guidelines on Development and Consideration of Proposed Clean Development Mechanism Projects in Lao PDR(2012)
- MONRE, Status of Carbon Credit and Carbon Market in Lao PDR (Unpublished)(2023)
- The Institute of Energy Economics, Japan, Research on International Trends on Market Mechanism Negotiations Report(2020.03)
- THE INTERNATIONAL REC STANDARD, THE INTERNATIONAL REC STANDARD(2018)
- THE WORLD BANK, State and Trends of Carbon Pricing, 2022
- UNDP, Circular GHG mitigation opportunities Lao PDR(2021.11)
- UNDP, The Strategy on Climate Change of the Lao PDR (2010)
- UNIDO, LAO PDR COUNTRY AND INDUSTRY PROFILE(2020.06)
- Vientiane Times, Laos to earn revenue from sale of carbon credit next year(2021.01.29)
- Viraphonh Viravong, Laos: A Unique Perspective on Hydropower and Carbon Credits(2016.10)
- World Bank Group, CLIMATE RISK COUNTRY PROFILE(2021)
- World Bank, Power Grid Improvement Project(2015)

Web-pages

- National GHG Management System, https://ngms.gir.go.kr/ (2023.05.10)
- Korea Policy Briefing, www.korea.kr (2023.05.12)
- Laos MONRE Department of Climate Change ‘Opening Ceremony on Climate Change Adaptation Capacity Building Project’, http://dcc.monre.gov.la, (2023.05.29)
- Laos MEM, https://www.mem.gov.la (2023.05.17)
- ETRS, https://etrs.gir.go.kr/etrs/ (2023.05.8)
- GHG Inventory and Research Center of Korea, https://www.gir.go.kr/, (2023.05.8)
- KTV, ‘1st Mekong-ROK Summit with 5 Countries in Mekong River’ https://blog.naver.com/ktv520/221711291446
- Ministry of Environment in Korea, www.me.go.kr
- Korea Environment Corporation, https://www.keco.or.kr/
- Climatewatch ‘Global GHG Emissions’, www.climatewatchdata.org/ghg-emissions (2023.06.09)
- ADB, http://kidb.adb.org/economies/lao-peoples-democratic-republic
- JCM ‘Laos-Japan Mechanism’, https://www.jcm.go.jp/la-jp (2023.06.26)
- KOTRA Overseas Market News ‘Laos, Promulgation of Amendments to the Foreign Exchange Management Act amid Exchange Rate and Price Instability’, https://dream.kotra.or.kr (2023.06)
- KOTRA Overseas Market News, ‘What is the Potential for Green Business in Laos?’, https://dream.kotra.or.kr (2023.06)
- KOTRA Overseas Market News ‘Carbon Reduction as Business Opportunity in Laos’, https://dream.kotra.or.kr (2023.06.23)
- Macrotrends, www.macrotrends.net (2023.06.09)
- Trading Economics, ko.tradingeconomics.com (2023.06.21)
- ODA Web-page, https://www.odakorea.go.kr/

2022/23년 KSP 정책자문보고서

사업명	2022/23년 KSP 라오스 탄소배출권 거래제도 마스터플랜 수립
협력기관	라오스 천연자원환경부(Ministry of Natural Resources and Environment)
사업주관	대한민국 기획재정부
사업총괄기관	KOTRA(Korea Trade-Investment Agency)
사업수행기관	한국능률협회컨설팅 KMAC(KMA Consultants Inc.)
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