SOCIALIST REPUBLIC OF VIET NAM

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT

VIET NAM

THIRD BIENNIAL UPDATED REPORT

To the United Nations Framework Convention on Climate Change

HA NOI, 2020

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INTERNATIONAL SUPPORTS

Global Environment Facility (GEF)

United Nations Environment Programme (UNEP)

SilvaCarbon Programme

Colorado State University

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** Recalculative result*

ABBREVIATIONS

AFD	Agence Française de Développement
AFOLU	Agriculture, forestry and other land use
AUD	Australian dollar
AusAID	Australian Agency for International Development
BAU	Business as usual
BUR	Biennial Updated Report
BUR1	The Initial Biennial Updated Report
BUR2	The Second Biennial Updated Report
CER	Certified Emission Reduction
CDM	Clean Development Mechanism
CIDA	Canadian International Development Agency
CO_2e	Carbon dioxide equivalent
DTU	Danish Technical University
EB	Executive Board of CDM
EUR	Euro
FAO	Food and Agriculture Organization of the United Nations
FNC	The Fourth National Communication
GEF	Global Environment Facility
GDP	Gross domestic product
GHG	Greenhouse gas
GNI	Gross national income
GSO	General Statistic Office
GWP	Global warming potential
HDI	Human development index
IE	Included elsewhere
IIP	Index of industrial production
INC	The Initial National Communication
IPCC	Intergovernmental Panel on Climate Change
ISPONRE	Institute of Strategy, Policy on Natural Resources and Environment

JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
KP	Kyoto Protocol
LEAP	Long-range Energy Alternatives Planning
LPG	Liquefied petroleum gas
LULUCF	Land use, land use change and forestry
MARD	Ministry of Agriculture and Rural Development
MOC	Ministry of Construction
MOF	Ministry of Finance
MOFA	Ministry of Foreign Affairs
MOIT	Ministry of Industry and Trade
MOST	Ministry of Science and Technology
MOT	Ministry of Transport
MPI	Ministry of Planning and Investment
MRV	Measurement, Reporting and Verification
NA	Not applicable
NAMA	Nationally appropriate mitigation action
NC	National Communication
NDC	Nationally determined contribution
NE	Not estimated
NO	Not occurring
ODA	Official development assistance
PA	Paris Agreement
PoA	Programme of activity
QA	Quality assurance
QC	Quality control
REC	Renewable energy certificate
REDD+	Reducing emissions from deforestation and forest degradation as well as conservation, sustainable management of forests and enhancement of forest carbon stocks
SNC	The Second National Communication
SP-RCC	Support programme to respond to climate change

TNC	The Third National Communication
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar
VCS	Verified carbon standard
VND	Viet Nam dong
WB	World Bank

CHEMICAL FOMULAR

CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
HFCs	Hydrofluorocarbons
NMVOCs	Non-methane volatile organic compounds
NO_x	Oxides of nitrogen
N_2O	Nitrous oxide
NH_3	Ammonia
PFC_s	Perfluorocarbons
SF_6	Sulfur hexafluoride

UNIT

^0C	Degree Celsius
kg	Kilogramme
cm	Centimetre
m	Metre
km	Kilometre
m^2	Square metre
km^2	Square kilometre
m^3	Cubic meter
ha	Hectare
t	Tonne
kt	Thousand tonnes
Mt	Million tonnes

tCO_2	Tonne of carbon dioxide
tCO_2e	Tonne of carbon dioxide equivalent
TOE	Tonne of oil equivalent
KTOE	Thousand tonnes of oil equivalent
kW	Kilowatt
MW	Megawatt
kWh	Kilowatt per hour
MWh	Megawatt per hour
TJ	Tera-joule
GJ	Giga-joule

FOREWORD

In pursuance of Decision No.2/CP.17 dated March 15, 2017 of the 17th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), the Ministry of Natural Resources and Environment (MONRE), as the Viet Nam national focal point to implement the UNFCCC, the Kyoto Protocol (KP) and the Paris Agreement, prepared the Third Biennial Updated Report (BUR3) to the UNFCCC in coordination with relevant ministries and agencies.

BUR3 of Viet Nam, prepared in accordance with the UNFCCC guidance, includes five chapters presenting updates on the national context; greenhouse gases (GHG) inventory; mitigation actions and their effects; measurement, reporting and verification (MRV) for mitigation; difficulties, gaps and needs for financial, technical, technology supports in implementing mitigation actions and other information to achieve the UNFCCC objectives. In addition, the 2016 national GHG inventory technical report; the report on GHG emission reductions from deforestation and forest degradation, carbon removals from enhanced forest carbon stocks in Viet Nam during the period of 2014-2018 were also prepared and will be submitted to the UNFCCC together with BUR3.

The completion of BUR3 to the UNFCCC Secretariat has affirmed that Viet Nam has always fulfilled its commitments as a Party to the UNFCCC despite being one of the developing countries severly affected by climate change and having limited resources. It has also demonstrated the determination of the Government of Viet Nam to respond to climate change and to actively join hand with the international community to achieve objectives of the UNFCCC and the Paris Agreement, especially in the challenging context of the COVID-19 pandemic.

I would like to express my appreciations to relevant ministries, sectors, localities, organisations for their effective cooperation; Vietnamese and international experts and scientists for the valuable contributions; international organisations, particularly the Global Environment Facility (GEF), United Nations Environment Programme (UNEP) for their financial support in the preparation of the Report.

I hope that BUR3 will provide a supporting tool for the policy-making and state management on climate change responses, as well as an useful reference for research and information dissemination./.

Dr. Tran Hong Ha
Minister of Natural Resources and Environment
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EXECUTIVE SUMMARY

The Viet Nam BUR3 was developed in 2020 using the 2016 inventory year. Making the highest efforts, Viet Nam has completed its BUR3 with significant improvements in comparison to its previous reports. In BUR3, the 2006 and 2019 refinements to the 2006 IPCC Guidelines for national GHG inventories were applied. This is the preparation for carrying out the requirement on developing and submitting the Biennial Transparency Reports (BTR) from 2024.

The Report, prepared in accordance with the UNFCCC guidelines for the non-Annex I Parties to the Convention, includes five chapters:

1. National circumstances;
2. National GHG inventory for 2016;
3. Information on mitigation actions and their effects;
4. MRV for mitigation; and
5. Other information.

Information in each chapter summarised below highlights the national circumstances and efforts to respond to climate change with updates since Viet Nam submitted its BUR2 and TNC to the UNFCCC.

ES 1. National circumstances

Viet Nam is a country in Southeast Asia, bounded by the waters of the Pacific ocean, with a total land area of 331,235.97 km^2 and a coastline of 3,260km, including internal waters, territorial waters, exclusive economic zone and continental shelf defined under the 1982 United Nations Convention on the Law of the Sea (UNCLOS), and two archipelagoes namely Hoang Sa (Paracel) of Da Nang city and Truong Sa (Spratly) of Khanh Hoa province as well as thousands of large and small, onshore and offshore alike islands.

Viet Nam has a tropical monsoon climate. Due to its long territorial stretch in latitudes and diverse topography, Viet Nam witnesses significant climatic differences among the regions across the country.

Over the past years, Viet Nam has carried out socio-economic development tasks under both favourable and unfavourable, challenging context, internationally and domestically. Climate change, extreme weather and natural disasters have become increasingly complicated, unpredictable, have providing negative impacts on production and social life. Particularly, since the beginning of 2020 the Covid-19 pandemic has broken out globally, having seriously affected the world and the Vietnamese economy. Natural resources management, environmental protection and climate change responses have been strengthened with significant changes. Laws and policies on environmental protection and climate change responses continue to be revised and updated. Since the submission of its BUR2 to the UNFCCC, Viet Nam has developed and issued important policies on climate change responses at the national level, such as the Conclusion of the Politburo of the Communist Party of Viet Nam on the further implementation of the Resolution on proactively responding to climate change, enhancing natural resource management and environmental protection approved by the 11th Central Party Committee at its seventh session (2019); the Resolution of the Politburo of the Communist Party of Viet Nam on the direction of Viet Nam's energy development strategy to 2030 with a vision to 2045 (2020); the National action plan on climate change adaptation for the period of 2021-2030 with vision to 2050 (2020); the 2020 Law on Environmental Protection with a Chapter on climate change responses. In terms of the sustainable development index, Viet Nam moved to 49th among 166 countries and territories in 2020, up by 39 ranks compared to 2016.

Regarding population, Viet Nam had the average annual population growth rate of about 1.12% in the period of 2014-2018 and the male-to-female ratio of 1/1.01. Rural areas had the distribution of population nearly twice as high as urban areas.

In the period of 2014-2018, the economy continued to grow steadily and evenly for all economic sectors. GDP growth rate in the period of 2016-2019 was relatively high, at about 6.8% per year. The scale of GDP continued expanding and reached VND 5,542,332 billion (about USD 266.5 billion) in 2018, to which the service sector contributed the most. Viet Nam has gradually renewed its growth model as well as improved growth quality in the direction of increasing efficient use of resources. Quality-based growth has become one of the Party and State's major policies.

Regarding industrial manufacturing, the proportion of processing and manufacturing industries in the industrial structure increased sharply. Agriculture remains one of the key economic sectors, contributing 18% to GDP. The development of hi-tech, clean and organic agriculture has been focused; many hi-tech agricultural product and food processing factories have come into operation. Agricultural cooperative economy and enterprises have witnessed a strong development. Paddy rice still plays a key role among food crops and had an output of 44,046 thousand tonnes in 2018. Forest cover reached 41.7% in 2018 and 41.9% in 2019.

Regarding energy consumption, Viet Nam's total energy consumption increased from 52,248 kTOE in 2016 to 62,206 kTOE in 2018, of which a large increase went to the coal and electricity consumption.

MONRE is assigned by the Government to as the Viet Nam national focal point for the implementation of the UNFCCC, the Kyoto Protocol, the Paris Agreement and other climate-related international commitments, including the preparation of periodical national reports to the UNFCCC.

ES 2. National GHG inventory for 2016

The national GHG inventory for 2016 has marked an important step toward in enhancing transparency and gradually met the requirements of the enhanced transparency framework (ETF). It was conducted with the national GHG inventory system specified under the Prime Minister's Decision No.2359/2015/QD-TTg dated December 22, 2015.

The national GHG inventory for 2016 applied such IPCC guidelines as the 2006 Guidelines for national GHG inventories and the 2019 refinement to the 2006 Guidelines for national GHG inventories. Potential for global warming for 100 years according to the AR5 of the IPCC was also used. The national GHG inventories was implemented in the following sectors: energy; industrial processes and product use (IPPU); agriculture, forestry and other land use (AFOLU) and waste. In order to meet the criteria of transparency, accuracy, consistency, comparability and completeness of national GHG inventories, the emissions and removals for the years of 2010 and 2014 were recalculated in accordance with the 2006 Guidelines and the 2019 Refinements to the 2006 Guidelines.

Total net GHG emissions in 2016 were 316,734.96 $ktCO_2e$. Of which, 205,832.20 $ktCO_2e$ came from the energy sector, accounting for the largest proportion of 65%. It was followed by the IPPU sector, 46,094.64 $ktCO_2e$, or 14.6%. The AFOLU sector had net emissions of 44,069.74 $ktCO_2e$, after removing -39,491.24 $ktCO_2e$ by soil absorption, becoming the third largest emitting sector, accounting for 13.9%. The smallest share went to the waste sector, 20,738.38 $ktCO_2e$, accounting for only 6.5%.

The key category analysis for 2016 showed 42 sources contributed up to 95% of total national net emissions. Among 158 emission sources/sinks calculated, fuel combustion for electricity generation (1A1ai) was rated as the largest source, accounting for 20.6%. CO_2 emissions accounted for the largest proportion, about 60.5%, followed by CH_4, 33.7%.

Table A. GHG emissions/removals in 2016

IPCC code	Sector	CO_2	CH_4	N_2O	HFCs	Total	Percentage
		$ktCO_2e$					%
Total net emissions		**191,651.08**	**106,838.29**	**18,222.26**	**23.32**	**316,734.96**	**100**
1	Energy	182,291.22	22,345.35	1,195.63		205,832.20	65.0
2	IPPU	46,047.20		24.12	23.32	46,094.64	14.6
3	AFOLU	-37,489.34	66,544.64	15,014.44		44,069.74	13.9
4	Waste	802.00	17,948.30	1,988.07		20,738.38	6.5

Note: *Negative value (-) shows GHG absorption of sink.*

The uncertainty of the national GHG inventory was 5.6% in the energy sector, 26.9% in the IPPU sector, 100.2% in the AFOLU sector and 20.3% in the waste sector, respectively.

The recalculation of GHG emissions/removals for the years of 2010 and 2014 has also been made consistently according to the 2006 Guidelines and 2019 Refinements to ensure five principles of transparency, accuracy, consistency, comparability and completeness for national GHG inventories. The total net emissions recalculated for the years of 2010 and 2014 were 264,210.67 $ktCO_2e$, 7% up and 278,659.70 $ktCO_2e$, 1.9% down, respectively, compared to the previous calculations.

Comparing the results of the national GHG inventory for 2016 and the recalculated results for the 2010 and 2014 national GHG inventories shows that net emissions of 2016 up by 13.7%, equivalent to 38,075.26 $ktCO_2e$, against 2014 and 19.9%, equivalent to 52,524.29 $ktCO_2e$, against 2010.

ES 3. Information of mitigation actions and their effects

During the past period, Viet Nam has promulgated and implemented many important policies related to climate change responses at all levels. Viet Nam has completed and submitted its updated nationally determined contribution (NDC) to the UNFCCC Secretariat on September 11, 2020. The completion of the updated NDC has been highly appreciated by the UNFCCC Secretariat in such complicated and challenging context of the COVID-19 pandemic. In particular, Viet Nam has increased its climate change response contributions. Accordingly, by 2030, Viet Nam, with its domestic resources, will have reduced its total GHG emissions by 9% compared to the business as usual (BAU) scenario. This contribution can be increased to 27% when the nation can receive international support through bilateral and multilateral cooperation, and implementation of the new mechanisms under the Paris Agreement.

This Chapter is intended to update outcomes of the implementation of GHG emission reduction policies and activities in BUR2, as well as provide information on recently-promulgated policies at the national, sectoral, and local levels; new GHG emission reduction activities; overall assessments of the co-beneficial impacts of GHG emission reduction activities; and updates on market mechanisms.

Prominent outcomes can be seen from the major policies reported in BUR2. Many objectives of the National strategy on climate change have been achieved, spanning in such important sectors as energy, construction, transport, industrial production, agriculture and waste management. In the framework of the National green growth strategy, many important policies have been promulgated to promote the development of renewable energy (RE), improve energy efficiency, and reduce GHG emissions intensity in the key sectors of energy, construction, transport and industrial production. In addition, two major national programmes, namely the Target programme for climate change response and green growth for the period of 2016-2020, and the 2030 Sustainable development agenda, have also been implemented synchronously in most of the provinces and centrally-run cities.

Along with national policies, sectoral policies have also been actively and effectively implemented, specifically in the following sectors:

In the energy sector, the implementation of the Viet Nam RE development strategy by 2030 with a vision to 2050 has reached and exceeded the development targets for RE with solar power (4,696MW), wind power (377MW), biomass power (325MW) and small-sized hydropower (3,647MW).

In the construction sector, the Action plan on GHG emission reduction in the cement industry by 2020 with a vision to 2030 was approved and 24 of 59 urban areas have promulgated documents to direct and implement the development of green growth urban areas.

In the transport sector, E5 gasoline consumption has increased and accounted for about 40% of the total gasoline consumption. Viet Nam has also applied a tax policy based on engine capacity and fuel use, and incentives of lowering tax on electric vehicles.

In the agriculture sector, three important laws, including the Law on Irrigation, Law on Fisheries, and Law on Forestry, have been enacted within the framework of the Green growth action plan of the agriculture and rural development sector by 2020; the system of rice intensification (SRI) has been implemented in 29 provinces with a total cultivated area of 394,894 ha.

At the local level, mitigation actions have been implemented in several main forms such as participating in regional/national GHG emission reduction projects, implementing small-scale local pilots and performing investments for public and private projects.

The implementation of GHG emission reduction actions and projects also creates co-benefits and brings certain benefits to the process of climate change adaptation and the achievement of the sustainable development goals (SDGs).

Regarding market mechanisms, by December 2020, Viet Nam has achieved: (i) 271 successfully registered Clean Development Mechanism (CDM) projects; ranked fourth in the world in the number of registered projects with a total of 25,485,098 CERs issued; (ii) 14 successfully registered Joint Crediting Mechanism (JCM) projects, eight of which have been issued with 4,415 CERs; (iii) 24 successfully registered gold standard projects, 11 of which have been issued with 4,909,354 CERs; (iv) 22 projects registered under the Voluntary Carbon Standard (VCS) with a total of 629,934 CERs issued; (v) 51 successfully registered projects under the RE certificate mechanisms with a total of 2,199,751 CERs issued.

ES 4. Measurement, reporting and verification for mitigation

To meet the UNFCCC requirements for implementing the updated NDC in the 2021-2030 period, it is necessary to promulgate regulations on the national MRV system for mitigation actions to ensure transparency, accuracy, and consistency; apply the latest IPCC guidelines for GHG emission reduction actions, reflecting Viet Nam's effort in response to global climate change.

Viet Nam, so far, has yet to promulgate any legal documents defining responsibilities of ministries, sectors, localities, organisations, and individuals for monitoring GHG emission reduction actions to achieve targets and international commitments set by the Government. The MRV system for GHG emission reduction activities will have positive impacts on the GHG emitters, providing incentives for new investments in both climate change mitigation and adaptation activities.

Implementing the Decision No.2053/QD-TTg dated October 28, 2016 by the Prime Minister, which promulgates the Plan for the implementation of the Paris Agreement, MONRE has taken lead and coordinated with relevant ministries, sectors, and agencies to draft the Prime Minister's Decision on the national MRV system for GHG emission reduction actions. The draft Decision specifies tasks, roles and responsibilities of ministries, sectors, and localities in order to ensure that GHG emission reductions will be recognised internationally; the current lack of consistency, connectivity, integration and alignment in goals and mitigation actions will be addressed; and the accuracy, transparency in responsibilities and overall interests of the country will be ensured. The implementation will enhance the accuracy of the GHG inventory, which serves as the basis to determine GHG emission quotas and create a foundation for the domestic carbon market in accordance with the 2020 Law on Environmental Protection.

At the sectoral and local levels, MONRE has collaborated with ministries, sectors, and localities, especially the Ministry of Industry and Trade (MOIT), the Ministry of Construction (MOC), the Ministry of Transport (MOT) and the Ministry of Agriculture and Rural Development (MARD) to develop and implement a number of projects and programmes related to the MRV system at all levels.

At the entity level, according to the 2020 Law on Environmental Protection, the Prime Minister will issue a list of sectors and entities required to conduct GHG inventories. These entities shall conduct GHG inventories and report results to relevant agencies every two years. This is considered as a strong commitment of Viet Nam towards more effective GHG emission reduction activities.

The operation of the MRV system at all levels will be specified in sub-law documents such as decrees, the Prime Minister's decisions, circulars and technical guidelines issued by relevant state management agencies. After defining the responsibilities and functions of state management agencies, the MRV system will be developed into an online system, applying information technology and digital transformation to ensure its transparency and timeliness. The legal corridor for the MRV system will be completed in the coming time, in line with the socio-economic development strategies and conditions of the country as well as specific sectors and fields.

The MRV system is closely related to the national GHG inventory system, which was issued by the Prime Minister under the Decision No.2359/2015/QD-TTg dated December 22, 2015. According to the plan, the national GHG inventory system will be completed together with the MRV system at all levels in 2021.

ES 5. Other Information

This Chapter presents information on the assessment of difficulties, gaps, and status of rectification in the national GHG inventory, the development and implementation of mitigation actions, the transfer and application of technologies, and the development of BUR3; and the demand for financial, technical, technological and capacity-building support for mitigation actions; received assistance and national efforts to achieve the SDGs.

Difficulties and gaps mentioned in previous reports have been partially addressed. Some of the currently identified difficulties and gaps are related to the application of the 2006 Guidelines, the establishment of continuous data for time series on GHG inventories, impact and quantitative assessments of GHG emission reductions of mitigation actions, impacts of the COVID-19 pandemic... On that basis, a number of solutions have also been proposed to gradually address the difficulties and gaps.

The demand for international financial support to achieve mitigation targets identified in the updated NDC towards 2030 for the five sectors of energy, agriculture, land use, and land-use change and forestry (LULUCF), waste, and industrial processes (IP) is about USD 44,129.9 million with expected emission reductions of about 166.8 $MtCO_2e$.

Regarding the received support, so far, the Green Climate Fund (GGF) has funded Viet Nam over USD 146 million for three projects with USD 20.26 million disbursed. GEF has funded over USD 400 million to implement climate change response projects. Multilateral organisations such as the United Nations Industrial Development Organisation (UNIDO) and financial institutions such as the Asian Development Bank (ADB) and the World Bank (WB) have committed or have disbursed funds, mainly in the form of soft loans.

BUR3 was prepared in the 2019-2020 period with financial support from GEF via UNEP and technical assistance from a number of international organisations.

CHAPTER 1
NATIONAL CIRCUMSTANCES

1.1 National conditions

1.1.1. Geography

Viet Nam is Southeast Asia country, situated between latitudes 8°27′ to 23°23′N and longtitudes 102°08′ to 109°30′E. Viet Nam, seen as an S-shaped strip of land on the map with a total length of 1,650 km from north to south, covers a total area of 331,235.97km^2 [1]; the widest inland part is 500km and the narrowest, about 50km. Three quarters of the country's topography are covered by mountains from 100 to 1000m high and the remaining, by flat deltas. Two largest deltas include the Mekong River Delta with total area of 40,000km^2 in the South and the Red River Delta with an area of 15,000 km^2 in the North.

Viet Nam has a coastline of 3,260 kilometres and a long internal waters, territorial waters, exclusive economic zone and continental shelf defined under the UNCLOS 1982 and two archipelagoes, namely Hoang Sa (Paracel) of Da Nang city and Truong Sa (Spratly) of Khanh Hoa province as well as thousands of large and small islands.

1.1.2. Climate

Viet Nam has a tropical monsoon climate. Due to its long territorial stretch in latitudes and diverse topography, Viet Nam witnesses significant climatic differences among the regions across the country. The lowest temperature fluctuates between 10°C and 16°C in the northern mountainous region and from 20°C to 24°C in the southern regions. In summer, average temperature ranges between 25°C and 30°C. The annual average rainfall varies sharply among regions, ranging around 600mm and 5,000mm and most commonly around 1,400mm and 2,400mm. About 80-90% of total rainfall accumulates in the rainy season. Annual rainy days last from 60 to 200 days and also are different among regions. The annual average relative humidity is about 80-85%. Total average annual sunshine hours are about 1,700-2,500 hours.

The mainland is divided into seven climatic regions, including the Northwest, the Northeast, the Red River Delta, northern Central, southern Central, the Central Highlands and the South. The Northwest has the lowest average temperature, approximately from 16.1°C to 23.2°C while the South has the highest and constantly high all over the year, commonly between 25.2°C and 27.6°C. In the period of 1958-2018, the average temperatures among all climatic regions tended to have increased with the Central Highlands having the sharpest

increase of about 0.18°C per decade. The Northeast, norther Central, southern Central (the most), the Central Highlands and the South regions saw an annual rainfall increase whereas the two remaining regions witnessed a decline. On average, water levels at Viet Nam's coastal stations tended to have increased for 2.74mm/year.

In the period of 1961 to 2018, total number of tropical storms and depressions directly impacting Viet Nam decreased by 0.3 storms per decade. Total of heavy rainy days went up in the Northeast, northern Central, southern Central, and the Central Highlands regions, among which southern Central witness the highest increase of 1.6 days per decade. The number of hot sunny days increased in most regions, except for the Central Highlands, among which northern Central had highest increase of 3,43 days per decade. Over the past years, hails have occurred in many localities, some of which especially caused serious damage. Days of extreme cold weather tends to have declined. However, the exceptional freezing cold days in the beginning of 2016 have been recognised coldest in 100 years with the lowest temperature recorded by meteorological stations, such as: -1°C in Tam Dao (Vinh Phuc); -4.2°C at Sapa, Lao Cai; -5°C at Mau Son, Lao Cai on Jan 24, 2016 and -4.3 °C at Pha Din, Dien Bien on Jan 25, 2016.

1.2. Socio-economic development

1.2.1. Population

The characteristics of Viet Nam's population in the period of 2014-2018 are described in Table 1.1. The population growth rate remained steady; the population structure by gender remained almost unchanged in the period with male population lower than female.

Table 1.1. The population structure of Viet Nam [2]

Year	Population *(thousand)*	Population growth rate *(%)*	Gender *(%)*		Residence *(%)*	
			Male	Female	Urban	Rural
2014	91,203.8	1.12	49.57	50.43	33.19	66.81
2015	92,228.6	1.12	49.61	50.39	33.48	66.52
2016	93,250.7	1.11	49.65	50.35	33.67	66.33
2017	94,286.0	1.11	49.69	50.31	33.86	66.14
2018	95,358.2	1.17	49.72	50.28	34.22	65.78

1.2.2. Economy

Viet Nam witnessed a continuously steady and even economic growth among sectors in the period of 2014-2018. GDP growth for each economic sector from 2014 to 2018 is depicted in Table 1.2.

Table 1.2. GDP at the current price by economic sector [2,7]

Unit: billion VND

Year	Total	Of which			
		Agriculture, forestry and fishing	Industry and construction	Service	Products taxes less product subsidies
2014	3,937.856	696,969	1,307.935	1,537.197	395,755
2015	4,192.862	712,460	1,394.130	1,665.962	420,310
2016	4,502.733	734,830	1,473.071	1,842.729	452,103
2017	5,005.975	768,161	1,671.952	2,065.488	500,374
2018	5,542.332	813,724	1,897.272	2,278.892	552,444

The gross national income (GNI) at the current price for the 2014-2018 period is illustrated in Table 1.3.

Table 1.3. GNI at current prices [2,7]

Unit: billion VND

Year	GDP	GNI	Net income from abroad	GPI over GDP *(%)*
2014	3,937.856	3,750.823	-187,033	95.25
2015	4,192.862	3,977.609	-215,253	94.87
2016	4,502.733	4,314.321	-188,412	95.82
2017	5,005.975	4,651.399	-354,576	92.92
2018	5,542.332	5,198.567	-343,765	93.80

Viet Nam will become more energy-dependent in the context of climate change. The fluctuation of energy sources, especially the primary, will affect the national energy security. Types of primary energy sources and total energy consumption are demonstrated in Table 1.4 and 1.5.

Table 1.4. Number of primary energy sources by type in the period of 2014-2018 [3-7]

Unit: KTOE

Type of energy / Year	Coal	Crude oil	Total oil products	Natural gas	Non-commercial fuel	Electricity	Total
2014	19,957	6,345	9,453	9,124	12,745	4,665	**58,023**
2015	24,608	9,756	9,784	8,223	11,925	4,963	**70,588**
2016	25,595	8,182	11,413	9,351	6,823	5,613	**66,978**
2017	28,368	6,232	13,531	8,901	7,924	7,733	**72,688**
2018	37,791	11,962	9,895	9,009	7,752	7,365	**83,774**

Table 1.5. Total energy consumption in the period of 2016-2018 [3-7]

Unit: KTOE

Type of energy / Year	Coal	Total oil products	Natural gas	Non-commercial fuel	Electricity	Total
2014	11,457	15,592	1,458	12,696	11,045	**52,248**
2015	11,409	16,976	1,491	11,866	12,338	**54,080**
2016	8,613	19,609	1,425	5,300	13,718	**48,665**
2017	14,946	20,941	1,044	7,892	14,859	**59,681**
2018	15,224	21,974	1,056	7,700	16,251	**62,206**

Agriculture remains one of the most important economic sectors, accounting for 18% of total domestic gross production. The area and production of crops in the period of 2014-2018 are presented in Table 1.6.

Table 1.6. Planted area and production of cereals in Viet Nam [2,7]

Year	Area *(thousand ha)*		Production *(kt)*	
	Paddy	Maize	Paddy	Maize
2014	7,816.2	1,179.0	44,974.6	5,202.3
2015	7,828.0	1,178.9	45,091.0	5,287.2
2016	7,737.1	1,152.7	43,165.1	5,246.5
2017	7,705.2	1,099.5	42,738.9	5,109.6
2018	7,570.9	1,032.9	44,046.0	4,874.1

The forest status in Viet Nam in the period of 2014-2018 is shown in Table 1.7.

Table 1.7. Area of forest in Viet Nam [2,7]

Unit: thousand ha

Year	Total area	Forest		Percentage of coverage *(%)*
			Plantation	
2014	13,796.5	10,100.2	3,696.3	40.4
2015	14,061.9	10,175.5	3,886.4	40.8
2016	14,377.7	10,242.1	4,135.5	41.2
2017*	14,415.4	10,236.4	4,179.0	41.5
2018	14,191.3	10,255.5	4,235.8	41.7

1.2.3. Society

In the 2014-2018 period, the unemployment rate of the labor force in rural area tended to have increased whereas in urban regions, it decreased gradually. Labourers in rural areas mostly work in the agriculture sector and have been suffered from extreme weather conditions. Some of the key social indicators are shown in Table 1.8.

Table 1.8. Some key social indicators achieved [2,7]

Indicator	Year				
	2014	2015	2016	2017	2018
Unemployment rate of working-age labour force in urban areas *(%)*	3.40	3.56	3.21	3.17	3.10
Unemployment rate of working-age labour force in rural areas *(%)*	1.49	1.90	1.84	1.77	1.74
Poverty rate *(%)*	-	-	9.2	7.9	6.8
Literacy rate of people aged 15 and above *(%)*	94.7	94.9	95.0	95.1	94.8
Life expectancy at birth *(year)*	73.2	73.3	73.4	73.5	73.5
Percentage of households using safe water *(%)*	93.0	-	93.4	-	95.7
Percentage of households using electricity *(%)*	98.3	-	98.8	-	99.0

1.3. Environmental protection

Over the past years, despite many difficulties, the balance of state budget expenditures for environmental protection has always been prioritised over other expenditures in compliance with the country's regulations and increased annually in absolute numbers. The minimum annual allocation for environmental protection activities is always no less than 1% of total state budget expenditures as stipulated under the Prime Minister's Decision No.34/2005/QD-TTg dated February 22, 2005 on approval of the Government's Action plan to implement the Politburo Resolution No.41-NQ/TW on environmental protection in the period of accelerating national industrialisation and modernisation. Specifically, the allocations (including foreign capital) are as follows: VND 18,392 billion (central budget: 2,100 billion, local budget: 16,292 billion, equivalent to 1.2% of total state budget expenditures) for 2018; VND 20,442 billion (central budget: 2,290 billion, local budget: 18,152 billion or 1.25% of total state budget expenditures) for 2019.

Environmental protection has been strengthened, especially in waste collection and treatment. Specifically, the total amount of solid waste collected and treated meeting appropriate technical requirements increased swiftly in the period of 2014-2018 (see Figure 1.1).

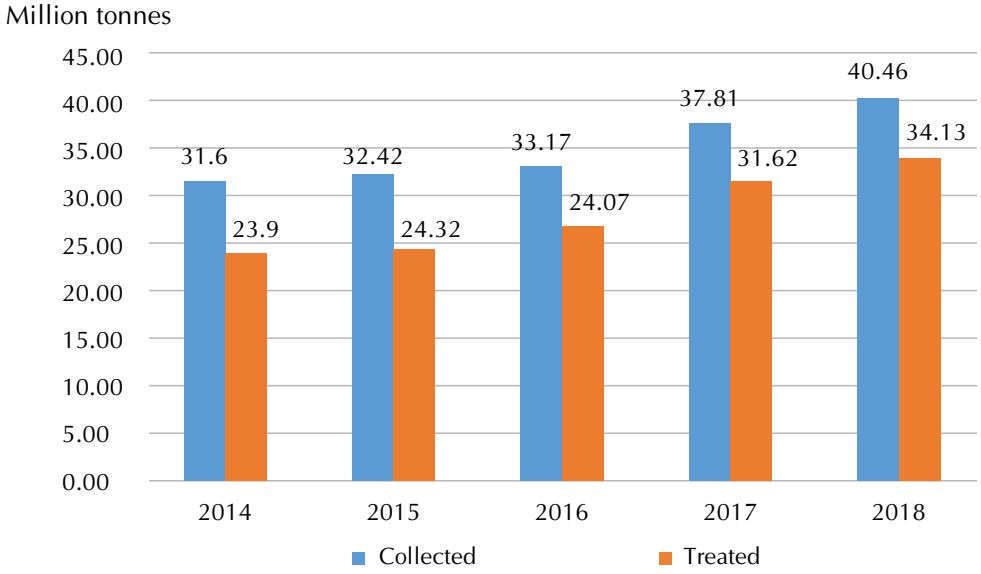

Figure 1.1. Amount of solid waste collected and treated [7].

Viet Nam, currently, has still been facing water pollution and scarcity, especially in industrial production and urban areas. Sources of wastewater have got more complicated and increased in amount, thus having posing significant challenges for management activities.

Viet Nam is now preparing the National Strategy on environmental protection to 2030 with vision to 2050, aiming at preventing the increase of environmental pollution and degradation; further improving the quality of the habitats; stopping biodiversity losses; building capability of responding to climate change; ensuring environment security as well as developing a green, circular and low-carbon economy and lastly striving for the national SDGs in 2030.

1.4. Updated climate change related policies

Since submitting its BUR2, Viet Nam has issued following policies, programmes and plans to respond to climate change:

- The Conclusion No.56-KL/TW dated August 23, 2019 of the Politburo of the Communist Party of Viet Nam on the further implementation of the Resolution on proactively responding to climate change, enhancing natural resource management and environmental protection. Under the Conclusion, specific groups of tasks and solutions have been set to be implemented, including: (i) raising awareness on and responsibility for proactively preventing and combating natural disasters, responding to climate change, and strengthening resource management and environmental protection; (ii) completing the legal system, mechanisms and policies on climate change responses, natural resource management and environment protection; and (iii) building capacity and effectiveness of inspection, examination, and handling of violations as well as proposing urgent tasks.

- The Resolution No.55/NQ-TW dated February 11, 2020 of the Politburo of the Communist Party of Viet Nam on the direction of Viet Nam's energy development strategy to 2030 with

a vision to 2045. The Resolution focused on prioritizing exploitation and complete efficient use of renewable energy sources, new energy and clean energy.

- The Resolution No.64/NQ-CP dated September 4, 2019 of the Government on approving the Kigali Amendment and Supplement under the Montreal Protocol on Ozone Depleting Substances.

- The Law on Environmental Protection No.72/2020/QH14 adopted by the National Assembly on November 17, 2020. The law has 16 chapters with 171 articles and takes effects on January 1, 2022. Climate change response contents are specified in Chapter VII, including regulations on climate change adaptation and mitigation; ozone layer protection; climate change response integration into strategies and projects; national climate change database development; national report preparation on response to climate change as well as implemention of international commitments on climate change and ozone layer protection, among which the updated NDC submitted to the UNFCCC on September 09, 2020.

1.5. Institutional arrangements for development of periodical national reports to UNFCCC

MONRE has been assigned by the Government as the Viet Nam national focal point for the implementation of UNFCCC, the Kyoto Protocol, the Paris Agreement and other climate-related international commitments.

DCC has been appointed by MONRE as the executive agency to take lead, implement the UNFCCC, the KP, the Paris Agreement and other climate-related international commitments, including the preparation of periodical national reports to the UNFCCC.


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CHAPTER 2

NATIONAL GHG INVENTORY FOR 2016

2.1. Institutional arrangements for national GHG inventory

The national GHG inventories for the year of 2016 were implemented through the national GHG inventory system specified under the Prime Minister's Decision No.2359/2015/QD-TTg dated December 22, 2015 [9] (Figure 2.1), as follows:

- The DCC, MONRE is responsible for developing GHG inventory plan; taking lead and cooperating with related agencies in the GHG inventory system as well as compiling the technical report;

- The General Statistics Office (GSO) under MPI is responsible for collecting/controlling the quality of data from other focal points including MOIT, MOT, MARD, MOC and People's Committees (PPCs) of provinces/cities to provide the DCC, MONRE with activity data and related information to implement GHG inventories. Moreover, relevant information and data are collected from agencies and organisations outside of the national GHG inventory system.

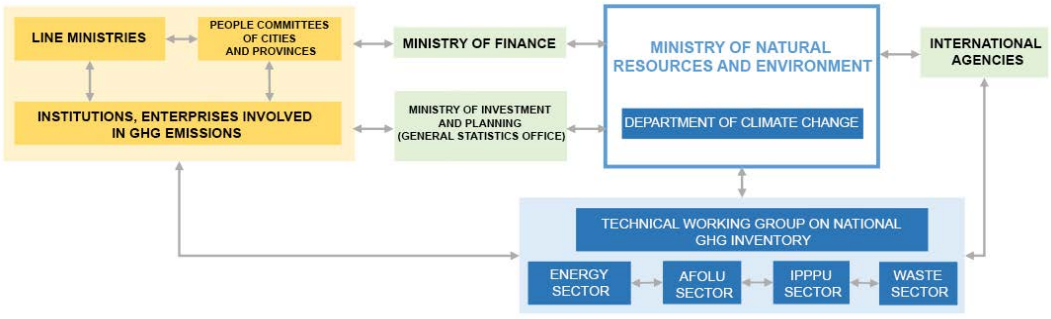

Figure 2.1. Institutional arrangements of national GHG inventory system.

The results of national GHG inventory in Viet Nam are published, updated, archived and administered on the national GHG inventory information system at the website of the DCC, MONRE.

2.2. Methodology for national GHG inventory

2.2.1. Methods for national GHG inventory

The national GHG inventory is carried out in accordance with the guidelines of the IPCC, including:

- The 2006 IPCC Guidelines for national GHG inventories (herein after called IPCC 2006) [10];

- The 2019 refinement to the 2006 IPPC Guidelines for national GHG inventories [11];

- The Revised 1996 IPCC Guidelines for national GHG inventories (hereinafter referred to as the revised 1996 IPCC Guidelines); The IPCC Good practice guidance and uncertainty management in national GHG inventories (hereinafter referred to as the GPG (2000) [12]; The IPCC Good practice guidance for land use, land-use change and forestry (hereinafter referred to as the GPG-LULUCF) are used in case when a number of emission factors (EFs), parameters and conversion factors could not be found in the 2006 IPCC Guidelines and the 2019 refinement to the 2006 IPPC Guidelines [13].

In addition, the emission of land sub-sector under AFOLU is calculated with the agricultural and land use GHG inventory (ALU) software developed by the Colorado State University and based on the 2006 IPCC Guidelines.

Categories considered in the 2016 national GHG inventory include: (i) energy; (ii) IPPU; (iii) AFOLU; and (iv) waste.

2.2.2. Activity data and emission factors

Activity data (AD) and related information are collected and aggregated from national statistics, government agencies, central and local organisations. Also, a part of them are obtained from scientific documents and reports from international cooperation projects.

The top-down approach was applied to collecting, aggregating and processing AD. However, since the national data is not categorised fully enough following the IPCC classification, AD for some sub-sectors in energy and IPPU applied the bottom-up approach.

The majority of EFs, parameters and conversion factors used in national GHG inventories are default values of the 2006 IPCC Guidelines. In addition, some country specific EFs, parameters and conversion factors are also used. A summary of AD, EFs, parameters and conversion factors in national GHG inventories is presented in Table 2.1.

Table 2.1. Methods and data sources used in national GHG inventory for 2016

1. Energy sector	
Tier	Tier 1, Tier 2 (1B1a).
AD	Viet Nam Energy Balance Sheet 2016, Institute of Energy, MOIT, 2020.
EFs	- CH_4 dispersion coefficient in pit coal mining in Viet Nam, MOIT. - IPCC 2006 default values.
Other parameters	- Energy conversion coefficient of coal, oil, gas and biomass, Institute of Energy, MOIT, 2020. - Ratio of surface and underground coal mining according to energy experts. - IPCC 2006 default values.
2. IPPU sector	
Tier	Tier 1
AD	- Statistical Yearbook 2018, GSO, 2019. - Statistical Yearbook 2017 of steel industry, the World Steel Association, 2017. - Report on production and import of urea fertiliser, the Plant Protection Department, MARD, 2020. - Cement Industry Report 2016, the Viet Nam Cement Association, 2016. - Technical report on input data for GHG emission reduction by improving production processes of building materials manufacturing, MOC, 2016. - Report on HFCs consumption in Viet Nam by sectors in the period of 2011-2017, DCC, MONRE, 2018. - Report on updating data for nitric acid production, the Viet Nam Chemical Agency, MOIT, 2020. - Report on assessment and GHG inventory in the production of building materials (cement, glass, tiles, fired bricks, sanitary ware) and proposal on appropriate management solutions, the Viet Nam Institute for Building Materials, MOC, 2019.
EFs	- EFs of SO_2, NOx, CO and NMVOC in steel production based on the revised 1996 IPCC Guidelines. - IPCC 2006 default values.
Other parameters	- The rate of clinker in cement, Final project report of 'the NAMA Readiness programme for Viet Nam's cement sector', MOC, 2016. - IPCC 2006 default values.
3. AFOLU sector	
Tier	Tier 1, Tier 2 (3A2), Tier 3 (3B1).
AD	- Statistical Yearbook 2018, GSO, 2019. - Statistical Yearbook 2018 of the agriculture and rural development sector, MARD, 2019. - Report on production and import of urea fertilisers, the Plant Protection Department, MARD, 2020. - Report on state of forest data 2016, the Forest Protection Department, MARD, 2017. - Surface coating matrix 2006-2016, the National Remote Sensing Department, MONRE, 2020.

EFs	- Country specific CH_4 EFs for continuously flooded rice fields with organic amendments, Project report for development country specific emission factor by GEF/UNEP, MONRE, 2007. - IPCC 2006 default values.
Other parameters	- Percentage of manure management methods in livestock production, the Viet Nam Department of Livestock Production, MARD, 2015. - Percentage of in-field burning of rice straw, Summary report on assessment of current status and proposing solutions for waste management in the field of farming, the Institute of Agricultural Environment, MARD, 2018. - Growth parameters of biomass, aboveground biomass of forest types and the biomass conversion and expansion factors applicable to wood removals (BCEFr) used by forestry experts, the Forest Inventory and Planning Institute, MARD, 2020. - Percentage of residue burnt in-field of some crops (beans, cotton, jute...) using revised 1996 IPCC default value. - Percentage of residue burnt in-field of some crops (maize, sweet potato, cassava...) using agriculture experts assessments. - IPCC 2006 and 2019 default values.
4. Waste sector	
Tier	Tier 1, Tier 2 (4A).
AD	- Statistical Yearbook 2018, GSO, 2019. - National Environment Status Report 2017, MONRE, 2017. - Environment Status Report 2006-2010; 2011-2015, People's Committees of 63 provinces and centrally-run cities.
EFs	- IPCC 2006 default values.
Other parameters	- Average rate of municipal solid waste generation (kg/cap/day) and average rate of solid waste management at landfills, Viet Nam Environmental Monitor 2004 - Solid Waste, MONRE, 2004. - Average rate of rural solid waste generation (kg/cap/day), National Environment Report 2011 - Solid waste, MONRE, 2011. - Rate of wastewater treatment by type of treatment and discharge pathway or system, National Environment Status Report 2017, MONRE, 2017. - Parameters for wastewater treatment for low income areas, septic system and unmanaged system according to waste experts. - IPCC 2006 default values.

2.2.3. Global warming potential

The global warming potential (GWP) value for 100 years was applied for the national GHG inventory for 2016 and recalculated for 2010 and 2014 according to the 5th IPCC Assessment report on climate change (AR5) published in 2014. Details are listed in Table 2.2.

Table 2.2. The GWP values of GHGs are applied to the 2016 GHG national inventory and recalculated for 2010 and 2014 [14]

Gas		GWP
CO_2		1
CH_4		28
N_2O		265
HFCs	HFC-125	3,170
	HFC-227ea	3,350
	HFC-23	12,400

2.3. Results of national GHG inventory for 2016

2.3.1. Summary of national GHG inventory

The total GHG emissions/removals of Viet Nam in 2016 was 316,734.96 $ktCO_2e$. Of which, the energy sector was the biggest contributor, accouting for 65% of emissions, followed by the IPPU sector, 14.6%. The third biggest contributor went to AFOLU, 13.9% and lastly the waste sector, 6.5%, as detailed in Table 2.3. The ratio of GHG emissions by sectors are demonstrated in Figure 2.2.

Table 2.3. GHG emissions/removals in 2016

Unit: $ktCO_2e$

IPCC code	Sector	CO_2	CH_4	N_2O	HFCs	Total
Total net emissions		**191,651.08**	**106,838.29**	**18,222.26**	**23.32**	**316,734.96**
1	Energy	182,291.22	22,345.35	1,195.63		205,832.20
2	IPPU	46,047.20		24.12	23.32	46,094.64
3	AFOLU	-37,489.34	66,544.64	15,014.44		44,069.74
4	Waste	802.00	17,948.30	1,988.07		20,738.38

Note: Negative value (-) shows the GHG absorption of sinks.

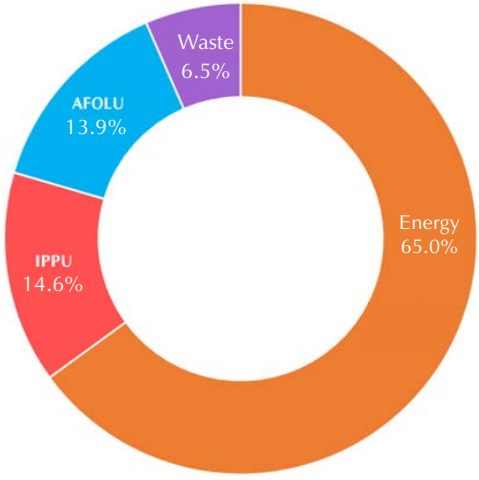

Figure 2.2. Ratio of GHG emissions by sector in 2016.

2.3.2. Results of national GHG inventory by sector

a/ Energy sector

Total GHG emissions of the energy sector in 2016 were 205,832.20 $ktCO_2e$. The largest emission subsector was energy industries with 91,004.80 $ktCO_2e$, tantamount to 42.2% of the sector's total emissions. Details are displayed in the Table 2.4. The ratio of GHG emissions by subsectors in 2016 are demonstrated in Figure 2.3.

Table 2.4. GHG emissions in the energy sector in 2016

Unit: $ktCO_2e$

IPCC code	GHG source categories	CO_2	CH_4	N_2O	Total
1	**Energy**	**182,291.22**	**22,345.35**	**1,195.63**	**205,832.20**
1A	Fuel combustion	180,767.38	1,291.51	1,192.57	183,251.46
1A1	Energy industries	90,554.60	86.56	364.64	91,004.80
1A2	Manufacturing industries and construction	37,701.55	233.95	312.61	38,248.11
1A3	Transport	35,193.17	277.38	424.77	35,845.32
1A4	Other sectors	17,318.05	744.63	90.55	18,153.23
1B	Fugitive emissions from fuels	1,523.84	20,700.46	3.06	22,580.74
1B1	Solid fuels		3,006.72		3,006.72
1B2	Oil and natural gas	1,523.84	18,047.12	3.06	19,574.02

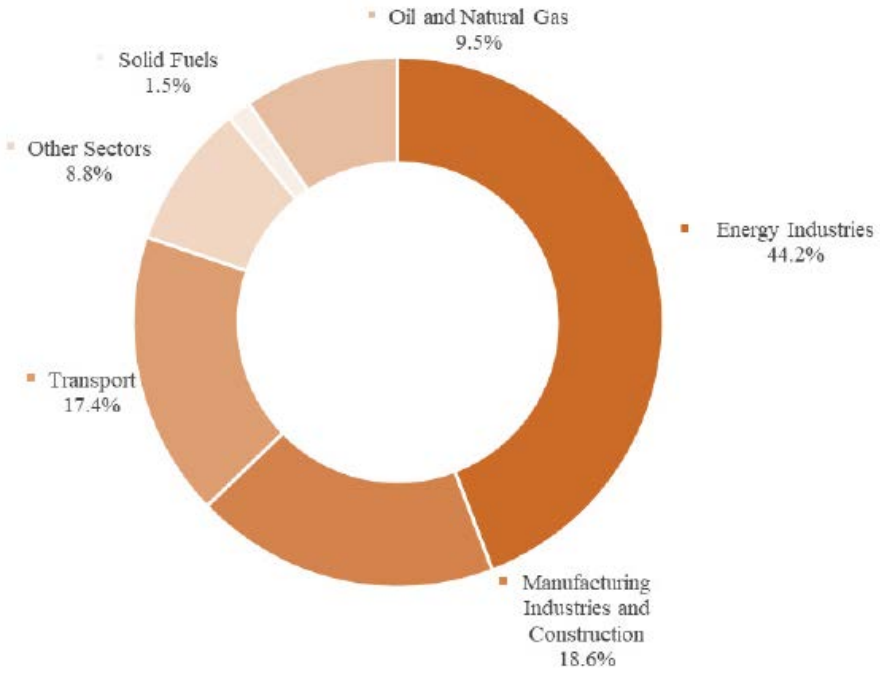

Figure 2.3. Ratio of 2016 GHG emissions of the energy sector.

b/ IPPU sector

Total GHG emissions of the IPPU sector in 2016 were 46,094.64 $ktCO_2e$. The highest emissions went from the Cement production, 36,773.00 $ktCO_2e$, or equal to 79.8% as detailed in Table 2.5. The ratio of GHG emissions by subsectors in 2016 are demonstrated in Figure 2.4.

Table 2.5. GHG emissions of the IPPU sector in 2016

Unit: $ktCO_2e$

IPCC code	GHG source categories	CO_2	CH_4	N_2O	HFCs	Total
2	**IPPU**	**46,047.20**		**24.12**	**23.32**	**46,094.64**
2A	Mineral industry	40,917.20				40,917.20
2A1	Cement production	36,773.00				36,773.00
2A2	Lime production	3,825.00				3,825.00
2A3	Glass production	319.20				319.20
2B	Chemical industry	1,271.78		24.12		1,295.90

IPCC code	GHG source categories	CO_2	CH_4	N_2O	HFCs	Total
2B1	Ammonia production	1,271.78				1,271.78
2B2	Nitric Acid production			24.12		24.12
2C	Metal industry	3,858.22				3,858.22
2C1	Iron and steel production	3,858.22				3,858.22
2F	Product uses as substitutes for ozone depleting substances				23.32	23.32
2F3	Fire protection				23.32	23.32

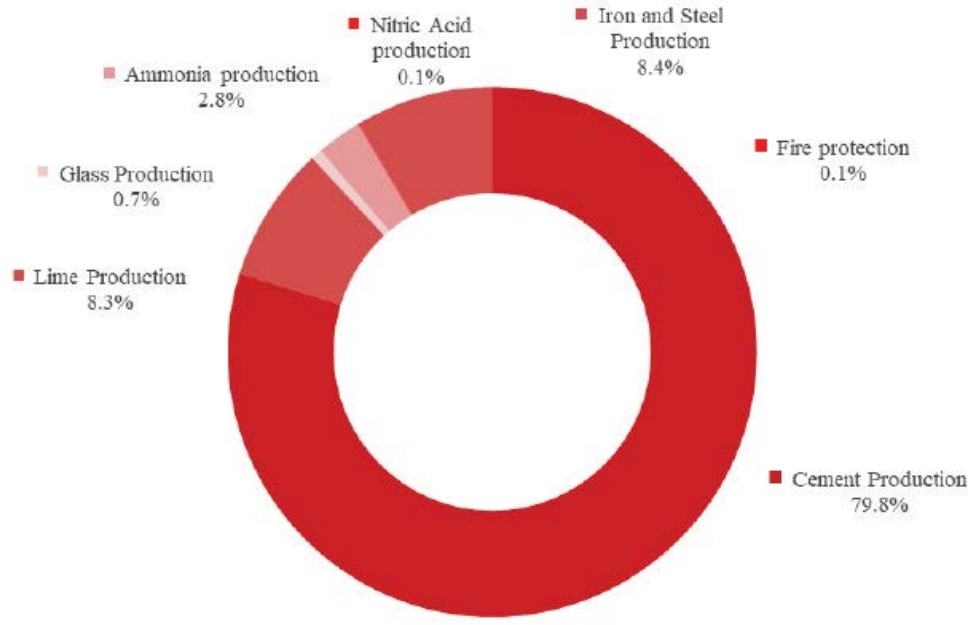

Figure 2.4. Ratio of GHG emissions of the IPPU sector in 2016.

c/ AFOLU sector

Total GHG emissions/removals of the AFOLU sector in 2016 were 44,069.74 $ktCO_2e$. Of which, forest land contributed the highest absorption, -54,657.78 $ktCO_2e$, whereas rice cultivations was the biggest emission source, 49,693.02 $ktCO_2e$. Details are shown in Table 2.6 and Figure 2.5.

Table 2.6. GHG emissions/removals of the AFOLU sector in 2016

Unit: $ktCO_2e$

IPCC code	GHG source/sink categories	CO_2	CH_4	N_2O	Total net emissions
3	**AFOLU**	**-37,489.34**	**66,544.64**	**15,014.44**	**44,069.74**
3A	Livestock		15,553.10	2,960.27	18,513.37
3A1	Enteric fermentation		12,421.74		12,421.74
3A2	Manure management		3,131.36	2,960.27	6,091.63
3B	Land	-39,491.24			-39,491.24
3B1	Forest land	-54,657.78			-54,657.78
3B2	Cropland	3,637.60			3,637.60
3B3	Grassland	1,383.64			1,383.64
3B4	Wetlands	1,046.90			1,046.90
3B5	Settlements	1,919.14			1,919.14
3B6	Other land	7,179.27			7,179.27
3C	Aggregate sources and non-CO_2 emission sources on land	2,001.90	50,991.54	12,054.16	65,047.60
3C1	Emissions from biomass burning		1,298.52	325.61	1,624.13
3C2	Liming	565.79			565.79
3C3	Urea application	1,436.11			1,436.11
3C4	Direct N_2O emissions from managed soils			7,754.11	7,754.11
3C5	Indirect N_2O emissions from managed soils			3,752.55	3,752.55
3C6	Indirect N_2O emissions from manure management			221.90	221.90
3C7	Rice cultivations		49,693.02		49,693.02

Note: *Negative value (-) shows the GHG absorption of sinks*

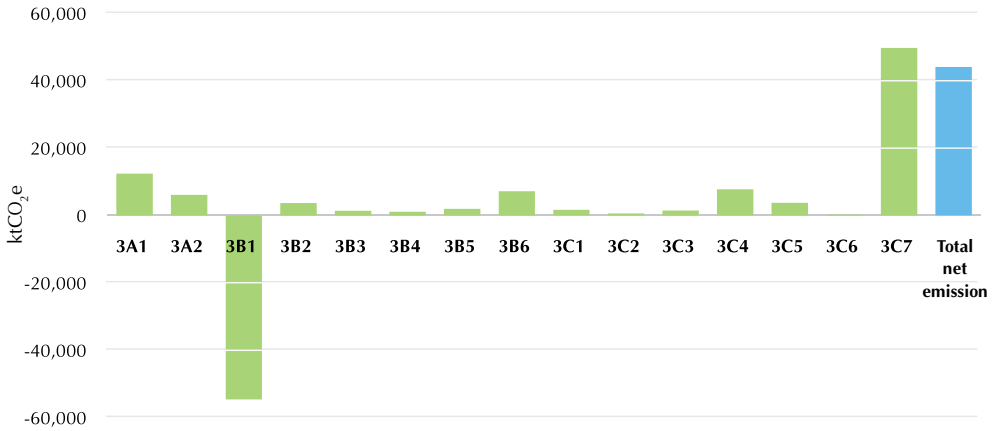

Figure 2.5. GHG emissions/removals of the AFOLU sector in 2016.

d/ Waste sector

Total GHG emissions of the waste sector in 2016 were 20,738.38 $ktCO_2e$. Of which, solid waste disposal emitted the most, 10,438.86 $ktCO_2e$ or 50.3% as detailed in Table 2.7. The ratio of GHG emissions by subsectors in 2016 are demonstrated in Figure 2.6.

Table 2.7. GHG emissions of waste sector in 2016

Unit: $ktCO_2e$

IPCC code	GHG source categories	CO_2	CH_4	N_2O	Total
4	**Waste**	**802.00**	**17,948.30**	**1,988.07**	**20,738.38**
4A	Solid waste disposal		10,438.86		10,438.86
4A1	Managed waste disposal sites		10,438.86		10,438.86
4A2	Unmanaged waste disposal sites		IE		IE
4A3	Uncategorised waste disposal sites		IE		IE
4B	Biological treatment of solid waste		69.45	39.44	108.89
4C	Incineration and open burning of waste	802.00	377.28	62.08	1,241.36
4C1	Waste incineration	528.09	0.13	11.38	539.60
4C2	Open burning of waste	273.91	377.15	50.70	701.76
4D	Wastewater treatment and discharge		7,062.71	1,886.55	8,949.26
4D1	Domestic wastewater treatment and discharge		4,805.66	1,886.55	6,692.21
4D2	Industrial wastewater treatment and discharge		2,257.05		2,257.05

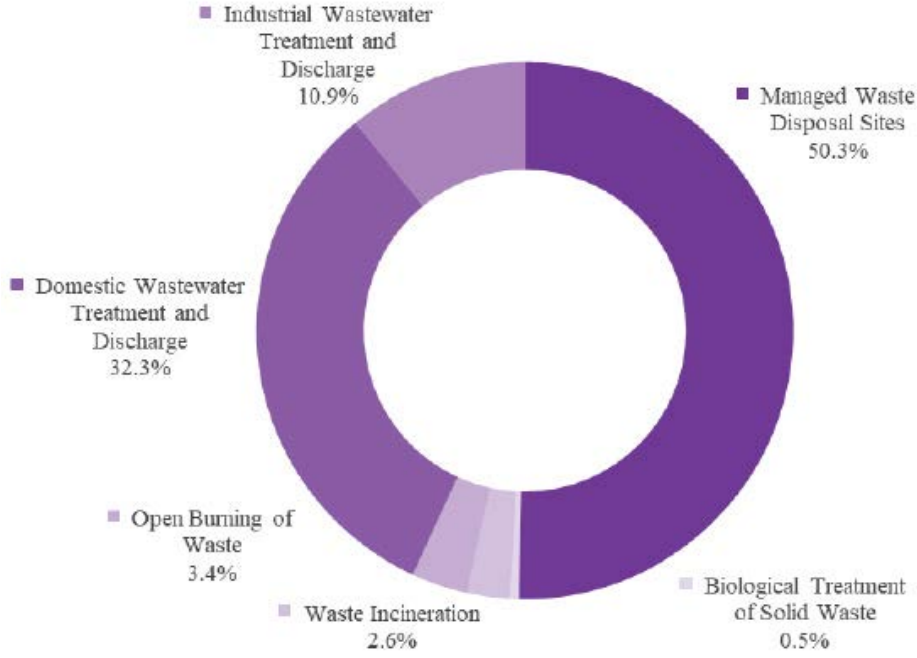

Figure 2.6. Ratio GHG emissions of waste sector in 2016.

2.4. Quality Control and Quality Assurance

2.4.1. Quality Control

Quality control (QC) for the 2016 national GHG inventory includes i) AD and EFs; ii) Results of emission/removal calculation; iii) Key category analysis, uncertainty assessment and other related issues. QC results are synthesised in Table 2.8.

Table 2.8. QC results for 2016 national GHG inventory

Scope	Activities	Results
AD	Check AD sources and criteria for selecting AD	AD are used clearly to ensure reliability. Information and AD published in the national statistical yearbooks have been prioritised, followed by AD obtained from state management, central and local agencies and organizations; some research papers at home and abroad.
	Check the assumptions used due to the lack of AD.	The assumptions based on expert judgments have been found most appropriate for the current data status.
	Check the process of inputting AD and measure units into spreadsheets and inventory tools.	No errors have been found during the process of inputting AD and measure units into spreadsheets and inventory tools.
	Check the consistency of AD among sectors.	AD among sectors has been inspected to ensure consistency.

Scope	Activities	Results
EFs and parameters	Check the parameters, conversion factors and country-specific EFs used.	The selected values have been appropriate and transparent based on reliable sources as well as have ensured consistency across sectors.
	Check the EFs and parameters using IPCC default value.	The selected values have been accurate, consistent and suitable with the IPCC GPG.
Calculated results	Check methodology for calculating emissions/removals.	Fully complied with the methodology of IPCC 2006.
	Check inventory results of sectors for 2016 and recalculated results for year 2010 and 2014.	The applied calculation formulas, GWP values according to the IPCC guidelines have been found correct.
	Check the completeness, accuracy and consistency according to the IPCC categorisation.	The emissions/removals have been calculated correctly. Such notations as NA, NO, IE and NE have been unanimous according to IPCC 2006.
Other contents	Check the results of key category analysis and the uncertainty assessment.	The used method as well as formula for key categories analysis and uncertainty assessment have been precisely applied according to the IPCC guidelines.
	Check the reporting results according to IPCC 2006 guidelines and templates.	The displayed tables and graphs have been accurate, consistent and conformable to the IPCC 2006 templates.

2.4.2. Quality Assurance

Quality assurance (QA) of the national GHG inventory for 2016, including activities in the national GHG inventory system is shown in Figure 2.1 was conducted by agency/experts not directly involved in the inventory compilation. QA activities were conducted from the preparation of GHG inventory until completion of final report.

QA activities include inspecting and assessing the quality of input data as well as the appropriateness of the GHG inventory methodology to make sure that inventory results are the best-estimated emissions/removals under the current scientific background with the existing data. Moreover, QA also supports QC activities.

The process of coordinating and supervising QA activities has seen regular, continuous and close collaboration among related state management agencies, research institutions, NGOs and sectoral experts. Under the consultation procedure for the 2016 inventory in terms of EFs, AD, parameters and conversion factors, applied methods, results, eight workshops, consulting meetings were organised on GHG inventory in the AFOLU and waste sectors; five, in the energy and IPPU sectors together with other technical discussions among GHG inventory compilation groups and sector experts. Comments and inputs from those technical seminars, meetings were well-received, acquired and supplemented in the 2016 National Inventory Report (NIR 2016) as well as sectoral inventory reports.

The NIR 2016 was sent to line ministries and agencies involved in the making of BUR3 for official consultation. Feedbacks and inputs were accommodated in NIR 2016.

2.5. Key emission/removal category analysis and uncertainty assessment

2.5.1. Key emission/removal category analysis

Analysis of key emissions/removals was done based on Tier 1 approach, according to formula 4.1, page 4.14, Chapter 4, Volume 1, IPCC 2006 to identify the largest emissions that accumulate to 95% of total national net emission. Viet Nam had 42 key emissions and removals categories in 2016, which contribute to 95.1% of total 158 GHG emission sources/sinks. In particular, the largest source was fuel combustion for electricity generation (1A1ai), accounting for 20.6%. The detailed analysis of 2016 key emission/removal categories is synthesised in Table 2.9.

Table 2.9. Key emission/removal categories in 2016

No.	IPCC code	Key emission/removal category	Gas	Emissions / Removals	Contribution level	Cumulative total
				$ktCO_2e$	%	
1	1A1ai	Fuel combustion for electricity generation	CO_2	88,482.75	20.6	20.6
2	3C7	Rice cultivations	CH_4	49,693.02	11.6	32.1
3	3B1a	Forest land remaining forest land	CO_2	-42,704.93	9.9	42.1
4	2A1	Cement production	CO_2	36,773.00	8.6	50.6
5	1A3b	Road transportation	CO_2	29,860.73	6.9	57.6
6	1A2f	Non-metallic minerals	CO_2	14,402.77	3.3	60.9
7	1B2a	Oil	CH_4	14,270.02	3.3	64.2
8	3B1bii	Grassland converted to forest land	CO_2	-11,030.95	2.6	66.8
9	4A	Solid waste disposal	CH_4	10,438.86	2.4	69.2
10	1A2a	Iron and steel	CO_2	8,757.59	2.0	71.3
11	1A4c	Agriculture/forestry/fishing/fish farms	CO_2	8,235.91	1.9	73.2
12	3C4	Direct N_2O emissions from managed soils	N_2O	7,754.11	1.8	75.0
13	1A4b	Residential	CO_2	6,994.11	1.6	76.6
14	3A1aii	Dairy cows	CH_4	6,861.05	1.6	78.2
15	3B2bi	Forest land converted to cropland	CO_2	5,623.33	1.3	79.5
16	3B6bi	Forest land converted to other land	CO_2	5,335.51	1.2	80.7

No.	IPCC code	Key emission/removal category	Gas	Emissions / Removals	Contribution level	Cumulative total
				$ktCO_2e$	%	
17	4D1	Domestic wastewater treatment and discharge	CH_4	4,805.66	1.1	81.9
18	3A1b	Buffalo	CH_4	3,879.89	0.9	82.8
19	2C1	Iron and steel production	CO_2	3,858.22	0.9	83.7
20	2A2	Lime production	CO_2	3,825.00	0.9	84.6
21	1B2b	Natural gas	CH_4	3,777.10	0.9	85.4
22	3C5	Indirect N2O emissions from managed soils	N_2O	3,752.55	0.9	86.3
23	1A2l	Textile and leather	CO_2	3,352.31	0.8	87.1
24	1A3d	Water-borne navigation	CO_2	2,963.01	0.7	87.8
25	1B1ai	Underground mines	CH_4	2,652.99	0.6	88.4
26	1A2k	Construction	CO_2	2,571.69	0.6	89.0
27	1A2c	Chemicals	CO_2	2,286.29	0.5	89.5
28	4D2	Industrial wastewater treatment and discharge	CH_4	2,257.05	0.5	90.0
29	1A3a	Civil aviation	CO_2	2,246.01	0.5	90.6
30	1A4a	Commercial/institutional	CO_2	2,088.03	0.5	91.0
31	1A1b	Petroleum refining	CO_2	2,008.90	0.5	91.5
32	4D1	Domestic wastewater treatment and discharge	N_2O	1,886.55	0.4	92.0
33	1A2m	Non-specified industry	CO_2	1,734.14	0.4	92.4
34	1A2i	Mining and quarrying	CO_2	1,683.71	0.4	92.8
35	1A2e	Food processing, beverages and tobacco	CO_2	1,629.60	0.4	93.1
36	3C3	Urea application	CO_2	1,436.11	0.3	93.5
37	3B6bii	Cropland converted to other land	CO_2	1,350.75	0.3	93.8
38	2B1	Ammonia production	CO_2	1,271.78	0.3	94.1
39	3C1b	Biomass nurning in croplands	CH_4	1,244.59	0.3	94.4
40	3B3bi	Forest land converted to grassland	CO_2	1,168.70	0.3	94.6
41	3A2h	Swine	CH_4	1,034.78	0.2	94.9
42	3B2a	Cropland remaining cropland	CO_2	-1,026.04	0.2	95.1

Note: *Negative value (-) shows the GHG absorption of sinks.*

The 42 key categories of GHG emissions/removals included 28 of CO_2; 11 of CH_4 and three of N_2O. The number of key categories are sythesised in Table 2.10.

Table 2.10. Statistics on number of key GHG emission sources/sinks in 2016

IPCC code	Sector	CO_2	CH_4	N_2O	Total
Total key sources		**28**	**11**	**3**	**42**
1	Energy	16	3	0	**19**
2	IPPU	4	0	0	**4**
3	AFOLU	8	5	2	**15**
4	Waste	0	3	1	**4**

In comparison with the results of the key catogory analysis for 2014 with 39 sources including LULUCF, the 2016 inventory results had three more key categories due to an increase of one source in each sector of energy, AFOLU and waste whereas the IPPU sector experienced no changes. Furthermore, the contribution of key categories in 2016 was different from those of 2014 by gases, specifically:

- The energy sector had an increase of one source due to an increase of two CO_2 categories and a loss of one CH_4 category.

- The IPPU sector witnessed no changes.

- The AFOLU sector had increase of three CO_2 categories and reduction of two NO_2 while the CH_4 categories stayed unchanged.

- The waste sector saw an increase of one CH_4 category while others remained unchanged.

2.5.2. Uncertainty assessments

The uncertainty assessments for the 2016 national GHG inventory was conducted using Tier 1 approach, Equations 3.1 and 3.2 page 3.28, Chapter 3, Volume 1, IPCC 2006. The uncertainty value is the combination value of method error, statistical error and standard deviation of used value. The uncertainties of the used AD, EFs, parameters and conversion factors are default values or one value in a default range according to the revised 1996 IPCC Guidelines, GPG 2000, GPG 2003 and IPCC 2006. Some of the uncertainties for AD, parameters and EFs have been applied according to statistical expert judgments. The uncertainty assessments will contribute to next GHG inventory cycle. Results of the uncertainty assessments for 158 GHG emissions/removals of GHGs are combined values of uncertainties of respective AD and EFs. Uncertainty assessment results of the sectors are presented in Table 2.11.

Table 2.11. Results of uncertainty assessments for the 2016 national GHG inventory

IPCC code	Sector	Emission/Removal	Uncertainty
		$ktCO_2e$	%
1	Energy	205,832.20	5.6
2	IPPU	46,094.64	26.9
3	AFOLU	44,069.74	100.2
4	Waste	20,738.38	20.3

Note: *Negative value (-) shows the GHG absorption of sinks.*

2.6. Published national GHG inventory results

Viet Nam has implemented national GHG inventories for five sectors, namely energy, IP, agriculture, LULUCF, waste for the years of 1994, 2000, 2010, 2013 and 2014. All results are prescribed in Table 2.12.

Table 2.12. Published GHG emissions/removals of Viet Nam [15-19]

Unit: $ktCO_2e$

1996 IPCC code	Sector	1994	2000	2010	2013	2014
Total net emissions		**103,839.30**	**150,899.73**	**246,830.65**	**259,024.10**	**283,965.53**
1	Energy	25,637.09	52,773.46	141,170.79	151,402.52	171,621.08
2	IP	3,807.19	10,005.72	21,172.01	31,767.38	38,619.79*
4	Agriculture	52,450.00	65,090.65	88,354.77	89,407.82	89,751.80
5	LULUCF	19,380.00	15,104.72	-19,218.59	-34,239.83	-37,540.18
6	Waste	2,565.02	7,925.18	15,351.67	20,686.21	21,513.04

Note: *Negative value (-) shows the GHG absorption of sinks.*

** Results are calculated by IPPU*

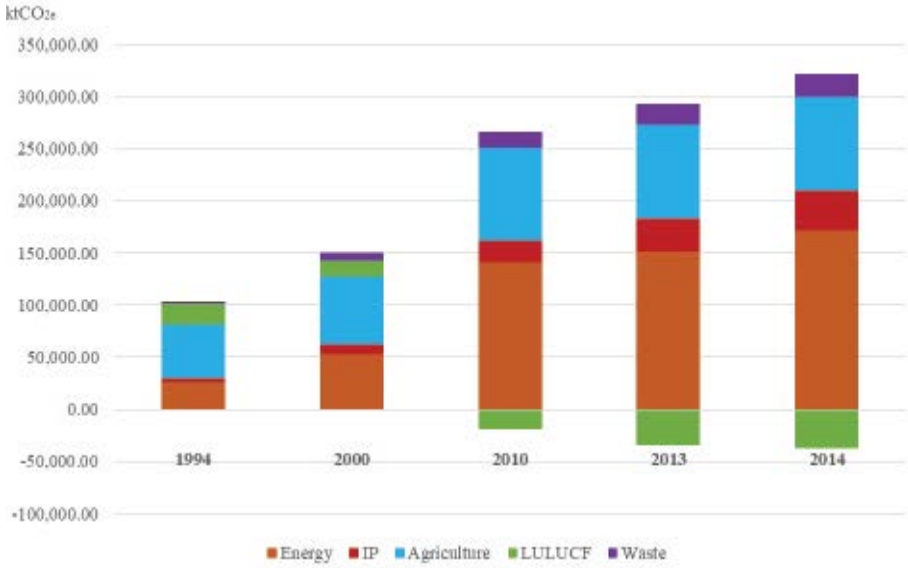

Figure 2.7. Viet Nam's published GHG inventory results.

2.7. Recalculation of national GHG inventories for 2010 and 2014

Under the framework of developing BUR3, recalculation of the national GHG inventories for 2010 and 2014 was conducted, including the update of AD according to national statistics as well as EFs and some parameters, conversion factors applied to the national GHG inventory for 2016 to ensure principles of transparency, accuracy, completeness, comparability and consistency for the national GHG inventories.

Based on the IPCC 2006, EFs and AD, conversion factors, updated parameters and new IPCC GWP values (AR5, 2014), the recalculated results of Viet Nam's net GHG emissions for 2010 increased by 7% compared to those in BUR1 with the biggest difference in the IPPU sector with an increase of 22.1%, followed by the waste sector, 15.8%. The results are presented in Table 2.13.

Table 2.13. The recalculation of GHG emissions/removals for 2010 [15]

2006 IPCC code	Sector	CO_2	CH_4	N_2O	HFCs	Total net emissions	Difference
		$ktCO_2e$					%
Total net emission		**132,641.81**	**115,801.48**	**15,856.10**	**NE**	**264,210.67**	**7,0**
1	Energy	125,514.57	25,075.17	1,289.33		151,879.06	7.6
2	IPPU	25,844.05		NE	NE	25,844.05	22.1
3	AFOLU	-19,499.85	75,258.07	12,952.60		68,710.82	0.6*
4	Waste	694.48	15,468.18	1,614.08		17,776.73	15.8

Note: *Negative value (-) shows the GHG absorption of sinks.*

**: The recalculated results lower than the published results.*

Similarly, the recalculated results of the net GHG emissions for 2014 declined by 1.9% compared to those in TNC, of which the most significant difference was a decrease of 13.8% in the AFOLU sector. In the meantime, values of the IPPU sector did not vary much from the published. Table 2.14 shows the recalculation results for 2014.

Table 2.14. The recalculation of GHG emissions/removals for 2014 [16]

2006 IPCC code	Sector	CO_2	CH_4	N_2O	HFCs	Total net emissions	Difference
		$ktCO_2e$					%
Total net emission		**151,930.72**	**109,842.95**	**16,791.01**	**95.01**	**278,659.70**	**1.9***
1	Energy	148,435.33	25,784.95	1,319.91		175,540.20	2.3
2	IPPU	38,637.70		NE	95.01	38,732.71	0.3
3	AFOLU	-35,936.97	67,304.63	13,630.26		44,997.92	13.8*
4	Waste	794.66	16,753.37	1,840.84		19,388.87	9.9*

Note: *Negative value (-) shows the GHG absorption of sinks.*

**: The recalculated results lower than the published results.*

2.8. Comparing national GHG inventory results for 2010, 2014 and 2016

The comparison of all the re-calculated results of Viet Nam's GHG emissions/removals for 2010 and 2014 and 2016 proves that total net emissions in 2016 increased by 13.7%, equivalent to 38,075.26 $ktCO_2e$ against 2014 and 19.9%, equivalent to 52,524.29 $ktCO_2e$ against 2010, specifically:

- The energy sector: the 2016 emissions increased by 17.3%, equal to 30,292.00 $ktCO_2e$ compared to those of 2014, and 35.5%, equal to 53,953.14 $ktCO_2e$ compared to those of 2010;

- The IPPU sector: the 2016 net emissions rose by 19.0%, equivalent to 7,361.93 $ktCO_2e$ against those of 2014 and 78.4%, equal to 20,250.59 $ktCO_2e$ against those of 2010;

- The AFOLU sector: the 2016 emissions decreased by 2.1%, equalling 928.18 $ktCO_2e$ against those of 2014 and by 35.9%, equal to 24,641.07 $ktCO_2e$ against those of 2010; and

- The waste sector: the total 2016 net emissions increased by 13.7%, equivalent to 1,349.51 $ktCO_2e$ against those of 2014 and by 19.9%, equalling 2,961.64 $ktCO_2e$ against those of 2010.

Calculations are presented in Table 2.15 and Figure 2.8.

Table 2.15. The national GHG inventory results for 2010, 2014 and 2016

Unit: $ktCO_2e$

2006 IPCC code	Sector	2010	2014	2016
Total net emissions		**264,210.67**	**278,659.70**	**316,734.96**
1	Energy	151,879.06	175,540.20	205,832.20
2	IPPU	25,844.05	38,732.71	46,094.64
3	AFOLU	68,710.81	44,997.92	44,069.74
4	Waste	17,776.74	19,388.87	20,738.38

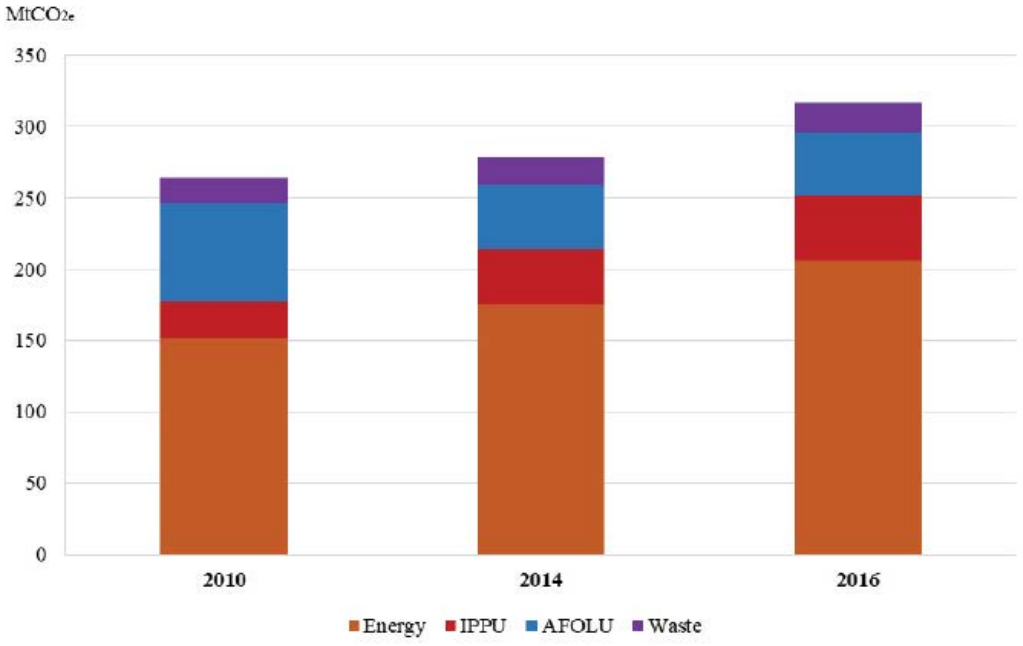

Figure 2.8. Comparing results of national GHG inventories for 2010*, 2014* and 2016.

**: Recalculation results*

CHAPTER 3

INFORMATION ON MITIGATION ACTIONS AND THEIR EFFECTS

3.1. Introduction

In recent years, Viet Nam has continued to promulgate a number of policies and implemented a variety of mitigation actions to implement the Paris Agreement. Viet Nam has completed the review and update of its NDC and submitted to the UNFCCC Secretariat on September 11, 2020. Amid complex developments of the COVID-19 pandemic, Viet Nam's completion of the update of NDC was highly regarded by the UNFCCC Secretariat. Particularly, in the updated NDC, Viet Nam increased its contributions to climate change responses. Accordingly, Viet Nam, by 2030, will reduce its GHG emissions by 9% in comparison with the BAU scenario with domestic resources. The contribution may increase to 27% should Viet Nam receive international support via bilateral/multilateral cooperation and implement new mechanisms as prescribed in the Paris Agreement.

This Chapter provides updates on the implementation results of GHG emission reduction policies and activities reported in its BUR2 as well as information on national, sectoral, and local policies, and newly-implemented GHG emission reduction activities. The report also gives a general assessment of the impacts and benefits of GHG emission reduction actions and provides updates on market mechanisms.

3.2. GHG emission reduction related policies

3.2.1. Updates on implementation outcomes of policies reported in BUR2

Viet Nam has achieved positive results in implementing policies reported in its BUR2, including national, inter-sectoral, and sectoral policies related to GHG emission reduction.

(1). National and inter-sectoral policies

a) The National strategy on climate change, approved under the Decision No.2139/QD-TTg dated December 05, 2011, of the Prime Minister, has so far achieved following important results:

- Energy: by October 2020, Viet Nam had had 11 wind power plants operating with a total capacity of 500 MW, put 106 solar power plants with 6,000 MW of capacity into operation; had 325 MW of biomass power capacity grid-connected and had 10MW of solid waste power capacity; the proportion of renewable energy (RE) had reached about 11.2% of the

total primary commercial energy with total output having reached 4.4%; about 700,000 solar-run water heaters had been installed. The energy conservation were estimated to have reached 5.65% in the 2011-2015 period and will reach 1.0% per year of the total national energy demand in the upcoming years.

- Construction: 24 out of 59 urban areas have issued guiding documents on the development of green growth urban areas; the promotion of energy saving and efficiency in the construction material industry (e.g, the development of an action plan for GHG emission reduction in the cement industry to 2020 with a vision to 2030; the nationwide production of non-fired bricks has reached 7 billion bricks, accounting for 28% of total domestic brick output);

- Transport: tax policies based on engine capacity and fuel type has been applied while taxes have been lowered for electric vehicles (5-15%). In 2018, passenger transportation by bus reached 13.7% and 9.38% in Ha Noi and Ho Chi Minh City, respectively. The consumption proportion of biofuel (E5 gasoline) increased to about 40% of the total gasoline consumption. 100% of newly-manufactured, assembled and imported cars have complied with applicable emission standards;

- Industrial production and construction: national technical regulations on energy efficient construction facilities have been promulgated. More than 9,000 enterprises have implemented cleaner production strategies and 74 projects have been certified as green buildings;

- Agriculture and rural development: A variety of cultivation methods have been applied with the use of fertilisers and animal feeds while 70% of waste from livestock has been processed. The national forest coverage increased from 40.84% in 2015 to 41.89% in 2019. Annually, roughly 230,000 hectares of trees have been planted across the nation (of which, 215,000 hectares were production forest). Since 2016, the logging of natural forests has been halted and its exploitation has been strictly managed. The development of forest reference emission level/forest reference level (FREL/FRL) has been completed and was approved by the UNFCCC Secretariat in April 2017. The national safeguard information system for REDD+ (SIS) has been developed. The development of the national forest monitoring system has also been completed and the development of MRV system has been currently underway. REDD+ pilot projects have been carried out in 24 provinces, of which 19 provinces have approved their provincial level REDD+ action plans; and

- Waste: all 63 provinces and centrally-managed cities have approved solid waste management planning. 71% of bio-solid waste has been landfilled, 16% of waste has been composted and 13%, incinerated without energy recovery. 86.5% of urban domestic solid waste and 63.5% of rural solid waste were collected and treated in 2019. 8-12% of urban domestic solid waste has been recycled. 89% of industrial zones have installed wastewater treatment systems. Investments have made to generate 10 MW of power from solid waste.

b) The National green growth strategy, approved under the Decision No.1393/QD-TTg dated September 25, 2012 by the Prime Minister, has yielded some notable results in institution development, awareness raising, public and private resources mobilisation.

- Regarding the institution development, a system of legal normative documents for the implementation of green growth measures has initially been formed, including Resolutions of the Party and the National Assembly, as well as laws, decrees, and circulars in different sectors. Climate change has been integrated into regulations of the Law on Planning, the Law on Public investment, the Law on Public-private partnership investment, the Decree on the management and use of official development assistance (ODA), technical guidance on the classification of public expenditures on climate change, and the climate change adaptation prioritisation framework.

- On the development of action plans on green growth, the institution development and the implementation of the National green growth strategy have been carried out with the development and issuance of action plans on green growth of ministries and localities. By December 2020, seven ministries and 34 localities had issued their action plans of the kind.

- On the reduction of GHG emission intensity and increase of the use of RE, so far, GHG emission reduction measures have been implemented extensively across all sectors. In the 2011-2015 period, the energy conservation rate of Viet Nam reached 5.65%, equivalent to the total energy saving of 11.3 tonnes of oil equivalent (TOE), of which, the energy intensity of industries that consume a large amount of energy has gradually decreased, e.g. by 8.09% for the steel industry, 6.33% for the cement industry, and 7.32% for the textile industry.

- On greening of production, the percentage of enterprises aware of cleaner production went up from 28% in 2010 to 55% in 2015. Meanwhile, the percentage of enterprises applying cleaner production to reduce the consumption of energy, materials and fuel per product unit increased from 11% in 2010 to 24% in 2015.

- On the greening of lifestyles and sustainable consumption, 24 out of 59 urban areas have issued documents to direct and implement green growth urban measures. In addition, many movements and campaigns have been initiated to change consumer behaviours and develop lifestyles appropriate to green growth and sustainable development principles, including activities on 'green lifestyles' carried out in localities across the country.

- On the mobilisation and distribution of resources for the implementation of the National green growth strategy: The investment demand for implementing the strategy was forecasted to be at a maximum of USD 30 billion, of which 30% comes from the State budget and 70%, from the private sector. The State Bank of Viet Nam (SBV) issued important documents in the 2015-2017 period on green credit; took lead and coordinated with relevant agencies to negotiate and sign 31 programmes and projects for ministries, sectors, and provincial People's Committees to improve the financial capacity for credit institutions to offer green credit through programmes, projects, technical assistance on climate change adaptation including issues of the urban environment, biodiversity conservation, and quality and safety improvement for agriculture products, etc.

c) The Target program on climate change response and green growth for the 2016-2020 period approved under the Decision No.1670/QG-TTg dated October 31, 2017 by the Prime

Minister, has so far, achieved following results:

- Sectors and localities at various levels have been mobilised to synchronously implement policies and investment projects aimed at reducing GHG emissions and developing a low-carbon economy.

- The programme has assisted ministries and sectors to develop their contributions, thus contributing to the completion of the updated NDC.

- By December 2020, three ministries and 35 localities had approved their action plans on climate change response in the 2016-2020 period with a vision to 2050; five ministries and 55 localities had approved their action plans on implementing the Paris Agreement; 25 localities had published their local climate assessments; the National action plan on climate change response for the 2016-2020 period with a vision to 2050 and the national climate assessment had been completed; the Climate change and sea-level rise scenarios had been updated for Viet Nam; the database on climate change in Viet Nam had been developed; communication activities had been conducted to disseminate knowledge in localities and areas heavily affected by climate change.

d) The National action plan to implement the 2030 agenda for sustainable development approved under the Decision No.622/QG-TTg dated May 10, 2017, by the Prime Minister, has, so far, achieved several positive results as follows: In the 2016-2019 period, the percentage of poor households per multidimensional poverty index declined by 1.53% per year; the mortality rate of children under 5 per 1000 live births fell from 22.1 in 2015 to 21 in 2019; the insurance coverage rate increased from 76.4% in 2015 to 90% in 2019, the preschool enrolment rate of 5-year-old children reached 99.9% in 2019; also in 2019, 99.6% of students were certified for their completion of primary education; 95.7% of households had access to safe water and over 99% of households had access to electricity in 2018; 65.9% of the population (equivalent to roughly 64 million people) used the Internet in 2019; annual GDP growth in the 2016-2019 period was relatively high, 6.8%; in the 2016-2018 period, productivity rose by nearly 5.8%; forest coverage increased, reaching 41.9% in 2019; the percentage of female deputies of the 2016-2021 National Assembly reached 26.7%; inequality in the society has been reduced and the access to laws and information has further been improved; the international integration has been promoted more deeply and widel and the national position on the international aren has been enhanced; and Viet Nam has also made important steps in enabling the youth to realise their potentials in achieving SDGs.

(2). Sectoral policies

a) Energy

- The Action plan on green growth of the industry and trade sector for the 2015-2020 period, issued under the Decision No.13443/QD-BCT dated December 08, 2015 by MOIT, has enabled green growth policies for sub-sectors, such as RE development and energy saving and efficiency (details in 3.2.2. (2)). The policies have contributed to the sharp increase of RE

proportion in the power structure in recent years and will promote the RE use to 8-10% of the total energy consumption as well as reduce energy loss to lower than 6% in 2030.

- The Strategy on RE development to 2030 with a vision to 2050 issued under the Decision No.2068/QG-TTg dated November 25, 2015, by the Prime Minister, has enabled several policies on the promotion of solar, wind, and biomass energy development. By 2019, Viet Nam had achieved and surpassed RE development objectives with a total capacity of 4,696 MW for solar power, 377 MW for wind power, 325 MW for biomass power and 3,647 MW for small-sized hydropower.

b) Construction

- The Action plan on climate change response of the construction sector for the 2016-2020 period issued in Decision No.811/QD-BXD dated August 18, 2016, of MOC, has made major achievements, including GHG inventory for some industries such as construction material production and urban solid waste; and the issuance of the Action plan on GHG emission reduction of the cement industry by 2020 with an orientation to 2030 (under the Decision No.802/QD-BXD dated July 26, 2017 by the MOC).

- The Action plan on green growth of the construction sector to 2020 with a vision to 2030 issued under the Decision No.419/QD-BXD dated May 11, 2017 by MOC, has achieved major results including the issuance of the Viet Nam Green growth urban development plan to 2030 (under the Decision No.84/QD-TTg dated January 19, 2018 by the Prime Minister); the issuance of guiding documents, and the implementation of green growth urban measures of 24 out of 59 urban areas; 74 projects certified as green construction facilities.

- The National technical regulations on energy efficient construction facilities (QCVN 09:2013/BXD), issued under the Circular No.15/2013/TT-BXD dated September 26, 2013 by MOC, has played an important role in the design, construction, and renovation of civil construction works, offices, hotels, hospitals, schools, commercial and service buildings, condominiums with a total floor area of 2,500m^2 and above.

c) Transport

- The Action plan on climate change response and green growth for the period of 2016-2020, issued under the Decision No.1456/QD-BGTVT dated May 11, 2016 by MOT, has made major achievements including the construction of urban railway systems in Hanoi and Ho Chi Minh City; the total number of buses nationwide reaching about 12,053 by December 2018; public passenger transport by bus reaching 13.7% in Hanoi and 9.38% in Ho Chi Minh City; the increase in E5 gasoline consumption, accounting for roughly 40% of the total gasoline consumption; the number of CNG-powered buses reaching 453 in Ho Chi Minh City (1.5 times higher than in 2018), 102 in Hanoi (doubling the figure of 2018) and 40 in Binh Duong province in 2019; and the application of tax policies based on engine capacity and fuel type and low taxes for electric vehicles (5-15%).

- The Action plan on CO_2 emission reduction in civil aviation operations issued under the Decision No.4206/QD-BGTVT dated December 28, 2016 by MOT has triggered the issuance of the Regulations on management of fuel consumption and CO_2 emissions of aircrafts in civil aviation operations (under the Circular No.22/2020/TT-BGTVT dated September 28, 2020 by the MOT), including regulations on the collection, monitoring, and reporting methods and procedures for fuel consumption and CO_2 emissions of aircrafts; the management of the database of fuel consumption and CO_2 emissions; and the responsibilities of relevant organisations and individuals.

d) Agriculture and rural development

The Action plan on green growth of the agriculture and rural development sector to 2020 issued under the Decision No.923/QD-BNN-KH dated March 24, 2017 by MARD, has achieved major results including the issuance of such important laws as the Law on irrigation, the Law on fisheries and the Law on forestry, the Law on Crop production and the Law on Animal husbandry; the issuance of several documents directing, guiding and regulating 'green' standards for agricultural production such as Vietnamese good agricultural practices (VietGap), the Biogas programme in the animal husbandry sector, and energey saving and efficiency in the fishery sector; the adoption of SRI on a total area of 394,894 ha in 29 provinces; and the establishment of 26 organic farming facilities and 1,390 VietGAP-certified facilities.

3.2.2. Newly issued policies

(1). National and inter-sectoral policies

- The 2017 Law on Forestry [20] stipulates forest management, conservation, development, and use; forestry goods processing and trade including assessment of GHG emissions reductions by implementing measures to reduce deforestation and forest degradation, promote sustainable forest management, and conserve and enhance forest carbon stocks; regulates payment and management of forest environmental services of organisations and individuals with high GHG emissions from production and business operations.

- The Resolution No.55/NQ-TW dated February 11, 2020 of the Politburo on Orientations of Viet Nam's National energy development strategy by 2030 with a vision to 2045 [21], sets a number of targets such as the rate of RE sources per total primary energy resources of about 15-20% by 2030, and roughly 25-30% by 2045, the rate of energy savings per total final energy consumption compared to BAU of about 7% by 2030 and roughly 14% by 2045; the GHG emission reduction of 20% against BAU from energy activities by 2045, compared to the previously stated reduction of 15%.

- The Law on Environmental Protection No.72/2020/QH14 adopted on November 17, 2020, including 16 chapters and 171 articles, will take effect from January 1, 2022. The legalised regulations on mitigation include the implementation of GHG emission reduction and sequestration activities in accordance with the reduction roadmap and modality aligning

with national conditions and international commitments; GHG inventories and MRV of GHG emission reduction at the national, sectoral and local levels; the examination of compliance with regulations on GHG inventories, emission reduction and implementation of GHG mitigation mechanisms and modalities; the development and implementation of cooperation mechanisms and modalities on GHG emission reduction in accordance with the provisions of laws and international treaties to which Viet Nam is a party; the organisation and development of the domestic carbon market.

(2). Sectoral policies

a) Energy

- The National electricity development planning for the period of 2011-2020 with consideration to 2030 [21] sets specific objectives, including the prioritisation of the development of RE sources for electricity production; the increase of electricity generated from RE sources (excluding large- and medium-sized hydropower, pumped storage hydropower plants) to about 7% by 2020 and over 10% by 2030 with: i) electricity generated from wind power sources accounting for about 0.8% by 2020, around 1% by 2025 and 2.1% by 2030; ii) electricity generated from solar power sources accounting for about 0.5% by 2020, 1.6% by 2025 and about 3.3% by 2030; and iii) electricity generated from biomass sources accounting for about 1% by 2020, 1.2% by 2025 and 2.1% by 2030.

- The support mechanisms for the development of solar power projects in Viet Nam [22] stipulate the electricity purchase price of 2,086 VND/kWh for grid-connected projects at electricity delivery points.

- The support mechanisms for the development of wind power projects in Viet Nam [23] adjust the electricity price of 1,928 VND/kWh for the grid-connected inland projects and 2,223 VND/kWh for offshore projects.

- The regulations on the development of projects and standardised power purchase agreement are applicable to wind power projects [24].

- The support mechanisms for the development of solar power in Viet Nam [25] on the grid-connected solar power and the rooftop solar power system stipulate the price of 1,783 VND/kWh for floating solar power, 1,644 VND/kWh for ground-connected and 1,943 VND/kWh for rooftop.

- The regulations on project development and the standardised power purchase agreement are applied to solar power projects [26].

- The support mechanisms for the development of biomass power projects in Viet Nam [27] stipulate the adjusted price of 1,634 VND/kWh for thermal-power cogeneration projects and 1,968 VND/kWh for projects that are not thermal-power cogeneration.

- The avoidable cost tariff and standardised power purchase agreement are applied to biomass power projects [28].

- The list of vehicles and equipment must be energy-labeled, with minimum energy efficiency standards and the implementation roadmap [29], including regulations on the implementation of voluntary energy labelling until end of December 31, 2019 and mandatory energy labelling from January 1, 2020; prohibitions against importing and producing vehicles and equipment with energy efficiency lower than the minimum energy efficiency standards for certain household appliances, industrial equipment, office and commercial equipment and means of transport.

- The list of and roadmap for energy-consuming vehicles and equipment to be discarded and low-efficient power generators not allowed to be newly built have been issued [30], including the regulations on the list of equipment not allowed to be imported, manufactured and traded from July 10, 2018 and from July 10, 2020 for certain household appliances, office and commercial equipment, and industrial equipment not meeting the minimum energy efficiency standards specified in the Viet Nam national standards (TCVN); the construction of several out-of-date coal-fired and gas-fired generators with first-year operating efficiency lower than the prescribed value was banned from July 10, 2018.

- The list of major energy-consuming facilities in 2016, 2017, 2018, and 2019, required to perform energy-saving tasks has been included in the Prime Minister decisions [31-34].

- The national programme on energy saving and efficiency for the period of 2019-2030 [35] identifies a number of specific objectives: i) energy savings will reach 5%-7% of total national energy consumption, and power loss will be reduced to less than 6.5% by 2025; energy savings will reach 8%-10% and the power loss will be reduced to less than 6% by 2030; and ii) the average energy consumption for all industrial sectors/ sub-sectors will decrease compared to the period of 2015-2018.

b) Construction

- The Viet Nam green growth urban development plan to 2030 [36] set overall objectives of creating and developing green growth urban areas in Viet Nam to promote the transformation of urban economic growth models into green growth, enhance competitiveness, ensure fast, efficient and sustainable regional economic development, contributing to job creation, hunger eradication, poverty reduction and people's material and spiritual life improvement, the resilience enhancement for urban systems against climate change and contribution to GHG emission reduction under the national commitments.

- The regulations stipulate indicators for the development of green growth urban areas and guidance on preparing green growth urban construction reports in compliance with the indicators for centrally-run cities and urban areas of grade I, grade II, grade III, grade IV and grade V [37]. The indicators for the development of green growth urban areas include 24 indicators divided into four groups (economy, environment, society, and institution).

The environment group includes 10 indicators to evaluate the quality of the environment and urban landscape, level of application of energy saving and efficiency solutions, use of RE, environmental protection, and the reduction of pollution, waste discharge, and GHG emissions in urban development.

- The National technical regulations on energy efficiency buildings (QCVN 09:2017/BXD) (the Circular No.15/2017/TT-BXD dated December 28, 2017 by MOC). The regulations include a set of criteria on: (i) building envelopes, (ii) ventilation and air conditioning, (iii) lighting, and (iv) other electrical equipment used in designs, construction, and renovation of office buildings, hotels, hospitals, schools, commercial and residential areas with a floor area of 2,500m^2 or more, and many regulations aimed at reducing the needs for artificial cooling and lighting systems, providing efficient cooling and lighting systems.

- The Action plan of MOC for the implementation of the Paris Agreement for the period of 2020-2030 (the Decision No.967/QD-BXD dated July 24, 2020) sets specific objectives of: (i) reducing GHG emissions in the construction material production sector, developing construction works, municipalities, urban technical infrastructure in compliance with the contributions committed by the Government of Viet Nam in its NDC; (ii) improving institutions, mechanisms and policies to support and encourage construction materials producing enterprises to invest in technological improvement projects, to strengthen production management capacity and to build construction works that reduce GHG emissions; and (iii) improving the management capacity of MOC on GHG emission reduction in its management sectors.

c) Transport

- The roadmap for application of exhaust emission standards for automobiles in use and imported used automobiles (the Decision No.16/2019/QD-TTg dated March 28, 2019 by the Prime Minister) sets the maximum allowable emission limits to automobile pollutants and exhaust fumes with four exhaust emission standard levels.

- Guidelines for energy labelling for 7-9 seater cars (the Circular No.40/2017/TT-BGTVT dated November 9, 2017 by MOT) regulate 7-9 seater cars manufactured, assembled from discrete and brand-new or unused imported components must be tested for their fuel consumption rate and energy-labelled before being sold on the market.

- The regulations on statistical indicators and the statistical reporting system of the transport sector [38] provide guidance on the statistical data reporting system and statistical survey data for the state management of MOT, which includes the regulations on data reporting for GHG inventory and MRV system in the transportation sector.

- The regulations on collecting and reporting fuel consumption data of Vietnamese-flagged ships [39] stipulate that from January 1, 2019, ship owners shall collect and make a report on fuel consumption data of each ship for each calendar year and send it to the Viet Nam Register for the purpose of supporting the protection of marine and air environment, and state management in the transportation sector.

- The guidance on energy labelling for domestically manufactured, assembled, or imported motorcycles and motorbikes [40] stipulates that brand-new motorcycles and motorbikes domestically manufactured, assembled, or imported shall be tested for their fuel consumption rate and energy-labelled before being sold on the market.

- The regulations on the management of fuel use and CO_2 emissions of aircraft in civil aviation operations [41] stipulate the collection, monitoring and reporting data of fuel consumption and CO_2 emissions of international flights; monitoring and reporting data of fuel consumption of domestic flights; management of database on fuel consumption and CO_2 emissions.

d) Agriculture and rural development

- The National programme on GHG emission reduction through the mitigation of deforestation and forest degradation; conservation and enhancement of forest carbon stocks and sustainable management of forest resources until 2030 (REDD+ Programme) [42] sets the overall objectives of contributing to the protection and improvement of the quality of natural forests, area expansion, and quality improvement of planted forests; linking with and integrating into the national targets of GHG emission reduction, forest protection and development, and green growth; attracting international support to approach the carbon credit markets; and improving people life and sustainably developing the the country.

- The Target programme for sustainable forestry development for the period of 2016-2020 [43] sets the overall objectives of improving production output and quality and promoting value of each forest type, increasing value of production forests per area unit; contributing to meeting the requirements of natural disaster mitigation, ecological and environmental protection, response to climate change and rising sea levels; creating jobs, increasing incomes, contributing to hunger eradication, poverty alleviation, improving livelihoods for people working in the forestry sector, closely aligning these activities with the process of building new rural areas, maintaining national defense, security, social order and safety.

- The Decision on the amendment and supplementation of objectives and tasks in implementing the Project to protect and develop coastal forests in response to climate change for the period of 2015-2020 [44] has the objectives of promoting the protection function of coastal forests in response to climate change and rising sea levels, mitigate natural disasters, protecting the sea dyke system, infrastructure, conserving biodiversity, enhancing CO2 absorption, reducting GHG emissions; and contributing to socio-economic development, and strengthening national defense and security.

- The Plan to implement the Paris Agreement of MARD for the period of 2021-2030 [45] has the objective of concretising the implementation of tasks assigned to MARD under the Decision No.2053/QD-TTg dated October 28, 2016 by the Prime Minister, and serving as a basis for mobilising domestic and international resources to respond effectively to climate change in the agriculture and rural development sector.

- The scheme on sustainable forest management and forest certification [46] has objectives of: (i) sustainably managing and exploiting forest resources, conserving biodiversity, protecting the ecological environment and values of forest environmental services; promoting forest certification in Viet Nam to meet the requirements of domestic and international markets for legal timber origin; (ii) creating plantation timber resources in forests performing sustainable forest management and being able to supply at least 80% of raw materials for the wood processing industry; and (iii) improving value of plantation timber, contributing to hunger elimination and poverty reduction and increasing the added value of the forestry sector.

d) Waste

- The amendments to the National strategy on integrated management of solid waste to 2025 with a vision to 2050 have objectives [47] of: i) preventing, controlling and basically limiting the increase in solid waste generation, minimising environmental pollution caused by solid waste; ii) strengthening capacity of integrated management of solid waste, simultaneously implementing solutions to promote solid waste storage, collection, transportation, reuse, recycling and disposal; expanding solid waste collection networks; promoting solid waste separation at source alongside with preventing and minimising solid waste generation in daily life, production, business and services; promoting socialisation and attracting private and foreign investment in domestic solid waste management; and iii) applying advanced and environmentally-friendly treatment technologies; selecting treatment technologies safe and suitable for each locality's socio-economic development conditions in combination with energy recovery and GHG emission reduction; developing the recycling industry, encouraging the use and consumption of products from the solid waste treatment.

(3). Local policies

All localities across the nation have developed and updated their Action plans on climate change responses. By December 2020, 55 localities had developed their plans to implement the Paris Agreement; 35 localities had issued their action plans on climate change response for the 2016-2020 period with a vision to 2050; 34 localities had developed and promulgated their action plans on green growth; 25 localities had issued their local climate change assessments; response solutions in related state management fields had been proposed via specific mechanisms, policies, projects, tasks and measures; research and studies had been proactively conducted to integrate climate change into the sectoral, field, and socioeconomic planning and plans; several provinces and cities have implemented: (i) local GHG inventories; (ii) research, development, and implementation of potential GHG emission reduction activities; and (iii) research and recommendation of relevant procedures for GHG inventory and MRV for local GHG emission reduction activities.

3.3. Mitigation actions

3.3.1. Mitigation component of updated NDC

The mitigation component of the updated NDC 2020 [18] identifies the GHG emission reduction roadmap for the period of 2021-2030 and includes such sectors as energy,

agriculture, waste, LULUCF, and IP. BAU was developed with 2014 as the base year and projected toward 2030.

By 2030, with domestic resources, Viet Nam will have reduced its total GHG emissions by about 9%, equivalent to 83.9 $MtCO_2e$, compared to the BAU scenario. This contribution can be increased to 27%, equivalent to 250.8 $MtCO_2e$ with the international support received through bilateral and multilateral cooperation as well as through the implementation of the new mechanisms under the Paris Agreement. The contribution of GHG emission reduction by sectors is presented in Table 3.1.

Table 3.1. Contributions to GHG emission reduction by sector [18]

Sector	Contribution with domestic resources		Contribution with international support		Total contribution with both domestic resources and	
	Compared to BAU scenario (%)	*Reduced amount ($MtCO_2e$)*	*Compared to BAU scenatrio (%)*	*Reduced amount ($MtCO_2e$)*	*Compared to BAU scenario (%)*	*Reduced amount ($MtCO_2e$)*
Energy	5.5	51.5	11.2	104.3	16.7	155.8
Agriculture	0.7	6.8	2.8	25.8	3.5	32.6
LULUCF*	1.0	9.3	1.3	11.9	2.3	21.2
Waste	1.0	9.1	2.6	24.0	3.6	33.1
IP	0.8	7.2	0.1	0.8	0.9	8.0
Total	**9.0**	**83.9**	**18.0**	**166.8**	**27.0**	**250.8**

Note (*): *GHG absorption increase.*

The mitigation measures in the updated NDC include: (i) improving energy-saving and energy efficiency, and reducing energy consumption; (ii) changing the fuel and energy structure in industry and transportation; (iii) shifting passenger and cargo transportation models; (iv) promoting efficient exploitation of renewable energy sources and increasing their proportion in energy production and consumption; (v) reducing GHG emissions through sustainable agricultural development, and improving the effectiveness and competitiveness of agricultural production; (vi) managing and developing sustainable forests, enhancing carbon sequestration and environmental services; conservation of biodiversity associated with economic development and increasing incomes for forest-dependent communities and people; (vii) managing wastes; and (viii) reducing GHG emissions by replacing construction materials and improving the cement and chemical production processes together with reducing the consumption of HFCs.

3.2.2 Update of outcomes of mitigation actions reported in BUR2

(1). NAMAs reported in BUR2

NAMAs submited to the NAMA Facility since the submission of BUR2 include:

- NAMA in the transport sector 'Low-carbon bus NAMA' submitted for the second time in 2018.

- NAMA in the cement sector 'Supporting up-scaled climate change mitigation action in the Viet Nam cement sector" submitted for the first time in 2019.

(2). GHG emission reduction actions

GHG emission reduction actions and projects reported in BUR2 include: (i) the Viet Nam partnership for market readiness; (ii) Low carbon transition in the energy efficiency sector; (iii) the development and promotion of LED technologies for general lighting in Viet Nam; (iv) energy efficiency in the industry sector; (v) energy efficiency improvement in commercial and high-rise residential buildings in Viet Nam; (vi) the promotion of non-fired brick production and utilisation in Viet Nam; (vii) the low carbon agricultural support programme; (viii) the biogas programme for the livestock sector in Viet Nam in the period of 2016-2020; and (ix) the UN-REDD Viet Nam programme phase II.

The above-mentioned activities and projects have obtained some quantitative achievements on GHG emission reduction and co-benefits such as contributing to sustainable development; encouraging and facilitating investments of the private sector in GHG emission reduction; promoting the use of new energy sources and RE; and raising awareness of climate change response, etc. Updates on the performance of inter-sectoral and sub-sectoral GHG emission reduction actions and projects by sectors reported in BUR2 are presented in Annex 3-1.

3.3.3. Newly implemented activities for reducing GHG emission

Since the submission of BUR2 to the UNFCCC, apart from promulgating policies on responding to climate change, Viet Nam has developed and implemented many GHG emission reduction actions and projects in different fields.

(1). NAMAs

'NAMA in high-rise residential buildings' co-developed by MOC and GIZ was submitted to the NAMA Facility in September 2020 for the first time to promote the transition to low emission in high-rise residential buildings for middle-class residents in Viet Nam with the focus on new buildings. Through the implementation of appropriate emission reduction measures, the project aims at contributing to the achievement of GHG emission reduction targets of Viet Nam. Details on the project can be found in Annex 3-2.

(2). GHG emission reduction actions

a) Inter-sectoral GHG emission reduction activity 'Support to Viet Nam for the implementation of the Paris Agreement' is a project co-implemented by the MONRE, other ministries, sectors, and the People's Committees of Ha Tinh and Quang Binh provinces to strengthen the national legal framework and capacity for supporting the implementation of the Paris Agreement and NDCs. The project plans to develop 05 NAMA proposals in agriculture, transport, construction, and domestic investment. Details on the project can be found in Annex 3-3.

b) GHG emission reduction activities by sector:

- Energy and industry: (i) promotion of the adoption and operation of energy-efficient industrial boilers in Viet Nam; (ii) RE development project; (iii) Viet Nam low emission energy programmme; (iv) promotion of the market of investments in energy saving and effciency in the industrial sector of Viet Nam; (v) the Danish-Vietnamese energy partnership programme; (vi) RE and energy efficiency programme, phase 2; (vii) the ASEAN low carbon energy programme; (viii) climate protection through sustainable bioenergy market in Viet Nam; and (ix) smart grid project for RE and energy efficiency.

- AFOLU: (i) the Viet Nam sustainable agriculture transformation project; (ii) sustainable rice production and GHG emission reduction in Thai Binh province; (iii) the Viet Nam forest and delta programme, phase 3; (iv) the Scheme on emission reduction and transfer of emission reduction rights in the northern Central region; (v) sustainable management of natural resources; (vi) the protection and integrated management of forest ecosystems in Quang Nam, Kon Tum and Gia Lai provinces; (vii) the Project on sustainable forest management and biodiversity to reduce CO_2 emissions; (viii) Supporting the readiness for REDD+ in Viet Nam, phase 2; and (ix) improving the resilience to climate change impacts of vulnerable coastal communities in Viet Nam - mangrove planting component.

Detailed information is presented in Annex 3-4 and 3-5.

(3). Local GHG emission reduction activities

At the local level, GHG emission reduction activities have usually been carried out in the following main forms:

- To participate in national or regional GHG emission reduction projects. The amount of GHG emission reduction from these activities will be included in that of the regional or national projects in which the locality is involved;

- To implement local small-scaled pilot activities such as the pilot of incinerator technology for reduced domestic waste landfill; pilot of the use of 4-wheel electric vehicles to transport tourists; the use of LEDs for fishing, etc.

- To perform investment activities for public and private projects, for example, RE, small-sized hydro power, wind power, solar power, waste-to-energy; forest protection and development projects, etc.

- GHG emission reductions from local small-scaled pilot activities as well as public and private investment projects have not been estimated.

(4) General assessment

The above-mentioned GHG emission reduction activities and projects have mainly been implemented with international support with transparent information on GHG emission reductions during the project life cycle, mainly in the sectors of energy and AFOLU. However, some limitations in estimating GHG emission reduction impacts of the mentioned activities and projects have been found as follows:

- No corresponding assessments and adjustments of GHG emission reductions to generate credits traded on the international carbon market (such as credits from REDP, schemes of emission reduction, and transfer of emission reduction rights in the norther Central region) are available;

- Some projects only estimated GHG emission reductions during the project implementation period, but failed to assess emission reductions from the activities after project completion (life cycle assessment);

- Some projects only estimated GHG emission reductions without actual assessment of achieved GHG emission reductions;

- Some mitigation activities have not been able to quantify GHG emission reductions yet (Annex 3-5);

- The reported activities only focus on internationally funded activities, while no specific reports related to GHG emission reductions from domestic activities, including policy-based activities and others at the local level, are available.

The implementation of GHG emission reduction activities and projects produce co-benefits and certain benefits for climate change adaptation and contribute to Viet Nam's progress in achieving SDGs. Some of the co-benefits include contributing to reducing environmental pollution, reducing the use of fossil fuels, promoting sustainable development, protecting and sustaining ecological services and conserving biodiversity; encouraging and facilitating both community and private sector investments in GHG emission reductions; raising awareness and capacity building; creating jobs and incomes for people from GHG emission reduction activities; enhancing technology transfer and autonomy, improving competitiveness of the industrial sector; and improving consumer health and behaviours.

3.4. Market mechanisms

3.4.1. CDM

By December 2020, Viet Nam had successfully registered 271 CDM projects including 258 projects of activities (PA) and 13 programmes of activities (PoAs). Viet Nam currently ranks fourth in the world in the number of successfully registered CDM projects, accounting for 3.31% of total registered CDM projects.

Among the successfully registered projects, hydropower accounts for a large proportion, 204 projects; waste, 30 projects; biomass, 18 projects; energy efficiency, 07 projects; wind power, 06 projects, solar power, 04 projects; forestry, 01 project; and associated gas, 01 project. The proportion of CDM projects registered by sector is shown in the figure below:

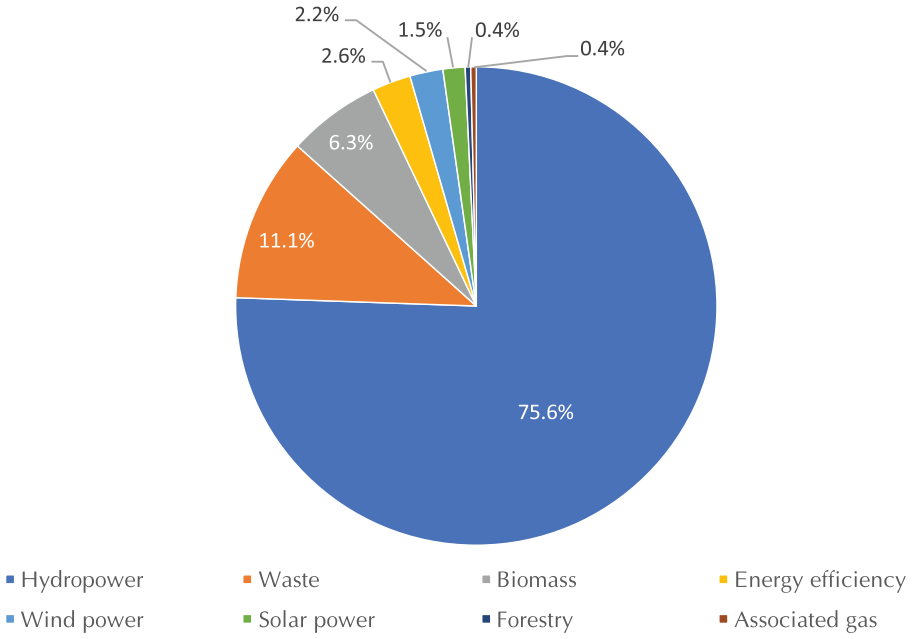

Figure 3.1. CDM project types registered by sectors.

Sources: https://cdm.unfccc.int/

A total of 78 projects have received certified emission reductions (CERs) in Viet Nam, including 60 hydropower projects, 12 waste projects, 02 wind power projects, 01 biomass project, 01 energy efficiency project, 01 solar power project and 01 associated gas project. The total number of CERs issued for these projects is 25,485,098.

The proportion of CERs issued by sector is shown in the figure below:

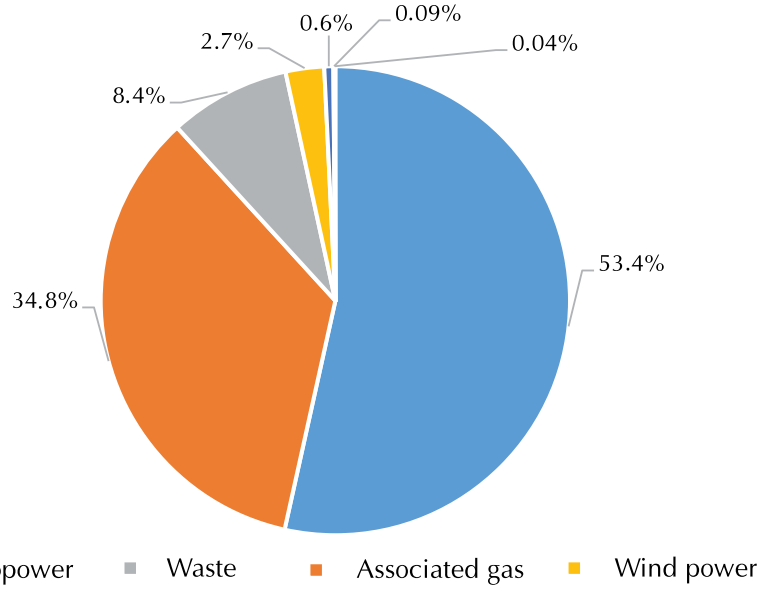

Figure 3.2. CERs issued by sector.

Sources: https://cdm.unfccc.int/

Since the submission of its BUR2, Viet Nam has reached an additional 7,692,066 CERs issued, 06 CDM newly-registered projects, including 03 PAs and 03 PoAs with expected annual GHG emission reductions of 553,053 tCO_2e/year.

3.4.2 JCM

By December 2020, Viet Nam had 14 successfully registered JCM projects, accounting for 21.9% of the total number of registered JCM projects in the world, ranking second in terms of the number of projects successfully registered. The total emission reduction potential of 14 projects by 2020 had been 17,618 tCO_2e. Of which, eight projects have been issued with a total of 4,415 JCM credits, representing 5.1% of the total credits issued in the world, ranking fourth in the number of credits issued, of which 1,724 credits belong to Viet Nam.

Since the submission of BUR2, Viet Nam has had 10 more newly-registered projects and a reduction of 4,415 tCO_2e achieved through JCM.

3.4.3. Gold Standard

By December 2020, Viet Nam had had 24 projects successfully registered with the Gold Standard (GS), including 22 PAs and 02 PoAs, including 15 hydropower projects; 02 solar power projects, 03 wind power projects, 03 waste projects and 01 project in the energy efficiency sector. The proportion of projects registered under the GS is shown in the figure below:

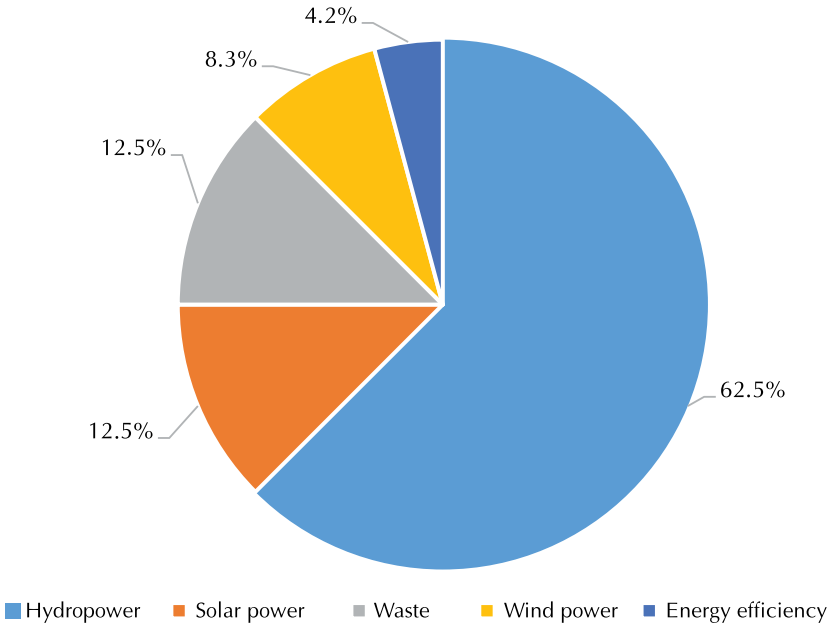

Figure 3.3. Projects successfully registered under GS in Viet Nam by sector.

Sources: https://registry.goldstandard.org

Among the 24 successfully registered projects, 11 projects include 10 PAs and 01 PoAs projects were issued is 4,909,354 GS credits.

Since the submission of BUR2, Viet Nam has had 06 more successfully registered projects (Nam Ngan hydropower, BIM solar power, AMI Khanh Hoa solar power, Nam Gion hydropower, BMI solar power and accelerating clean cooking solutions in the Mekong region - Viet Nam VPA03 - Viet Nam VPA03) and a reduction of 3,588,180 tCO_2e in emissions has been achieved through the GS mechanism.

3.4.4. VCS

By December 2020, 22 projects in Viet Nam had been registered under VCS, accounting for 1.3% of a total of 1,676 certified VCS projects globally. 18 projects have been issued with CERs with a total of 629,934 credits.

Since the BUR2 submission, Viet Nam has registered 07 more VCS projects (Song Lo 4 hydropower plant and 06 solar power projects) and issued 26,517 more VCUs.

3.4.5. International RE certificate (I-REC) schemes

I-REC is a transaction mechanism used to achieve voluntary RE consumption objectives or to comply with policy requirements on RE utilisation rates.

By December 2020, a total of 51 RE projects in Viet Nam had been successfully registered with a total capacity of 1,357.26 MW.

A total of 2,199,751 I-RECs were issued to Viet Nam from 2015 to 2019. The annual number of I-RECs that Viet Nam has received is shown in Table 3.2.

Table 3.2. Number of I-RECs achieved by Viet Nam year after year

Year	I-RECs received
2015	59,522
2016	196,193
2017	315,854
2018	869,578
2019	758,604
Total	**2,199,751**

Sources: I-REC System Management Board.

(https://irecstandard.org).

CHAPTER 4
MRV FOR MITIGATION

4.1. Requirements for the establishment of MRV system

The Paris Agreement, adopted at COP21 in Paris, France in 2015, is the first global legally binding framework on responsibilities for GHG emission reduction of all Parties to the UNFCCC. After three years of negotiations, from 2015 to 2018, the Parties agreed upon the guidance on the implementation of the Paris Agreement, named the Katowice climate package, at COP24 in Poland [48].

An important content of the Katowice climate package is the guidance on the enhanced transparency framework (ETF) for action and support referred to in Article 13 of the Paris Agreement and Decision 1/CP.21, including the modalities, procedures and guidelines for the transparency framework for action and support. This is mandatory for Parties to the Paris Agreement.

According to the Katowice climate package, mitigation actions that are parts of the national efforts will be monitored in each specific activities during the commitment period, including GHG inventory and MRV system as per the UNFCCC guidance.

4.2. General principles for establishment of MRV systems

The updated NDC of Viet Nam was submitted to the UNFCCC, with an increase in climate change response contributions [18]. To meet the UNFCCC requirements for implementing the updated NDC in the 2021-2030 period, the regulations on the national MRV system for mitigation actions must ensure transparency, accuracy and consistency; apply the latest IPCC guidelines for mitigation actions, reflecting Viet Nam's efforts to respond to global climate change.

So far, Viet Nam has not had a legal binding document defining in detail responsibilities of ministries, sectors, localities, organisations, and individuals for monitoring mitigation actions to achieve the Government's targets and international commitments. The MRV system for mitigation actions will have positive impacts on the GHG emitters, providing incentives for new investments in both climate change mitigation and response.

The MRV system for mitigation actions will provide an effective tool for the governance of ministries, sectors and localities, and ensure that the GHG emission reductions will be

recognised. Additionally, the sectoral MRV systems will address the lack of consistency, connectivity, integration and alignment in the GHG emission reduction targets, as well as ensuring accuracy and transparency for the country's responsibilities and overall interests. The MRV system will also serve as a legal basis for the establishment and development of the carbon market, piloting the carbon credit and quota trading system, applying carbon pricing tools in line with national conditions and international practices.

The establishment of MRV systems at all levels requires the participation of minisitries, sectors and localities [49]. The MRV system should be established based on the following principles:

1. To be established based on the orientations and direction of national legal documents;

2. To ensure consistency for management agencies of specific functions and tasks at different scales and levels to strive for a common goal and mission;

3. To ensuring the effectiveness on a basis of reviewing functions and tasks of each level in the state management on climate change mitigation; and

4. To ensuring the suitability with capabilities of state management agencies and objective factors of the practice.

4.3. Establishment of MRV system

4.3.1. National MRV system

Implementing the Decision No.2053/QD-TTg [49], MONRE has taken lead and worked with relevant ministries, sectors and agencies to draft the Prime Minister decision promulgating the regulations on the national MRV system for mitigation activities.

The draft decision is prepared with a vision to establish the national MRV system, unify the regulations on content, roles and responsibilities of relevant agencies and organisations taking part in mitigation activities; ensure the accuracy, transparency, continuity and consistency of GHG emission reduction results as per current Vietnamese regulations and UNFCCC guidelines; ensure sufficient capacity to manage and monitor GHG emission reduction activities for domestic management and oversee the implementation of GHG emission reduction targets in the updated NDC of Viet Nam.

The MRV system is established to identify the emission levels, mitigation potentials to facilitate the development of national reports on mitigation, GHG emission reduction plans, domestic carbon credit trading and international contributions; evaluate the effectiveness of domestic GHG emission reduction activities and international commitments; and enhance the transparency of domestic mitigation activities and contributions to global effort.

Roles and responsibilities of relevant agencies and organisations:

a) MONRE is the national focal point of the national MRV system.

b) MOIT, MOT, MOC, MARD, and MONRE are in charge of developing and implementing the sectoral MRV system under their management.

c) Relevant ministries and the People's Committees of provinces and centrally-run cities are coordinating agencies for the implementation of the national MRV system.

d) Listed entities are required to conduct GHG inventory as prescribed by the law and relevant organisations are required to conduct MRV as per the guidelines of related ministries.

Contents and tasks in MRV for mitigation activities:

a) Issuing MRV procedures

MONRE is the leading agency that coordinates with relevant ministries, namely MOIT, MOT, MOC, and MARD to issue:

(i) methodologies to measure GHG emission reductions in accordance with UNFCCC guidelines; and

(ii) the MRV procedure for national GHG emission reductions.

MOIT, MOT, MOC, MARD, and MONRE are responsible for organising and guiding the MRV procedure for GHG emission reductions under their management.

b) Measuring GHG emission reduction performance

Listed entities required to conduct GHG inventory and relevant organisations are responsible for measuring the GHG emission reductions, following the methodologies and procedures provided by MOIT, MOT, MOC, MARD and MONRE.

MOIT, MOT, MOC, MARD, and MONRE are responsible for:

(i) Synthesising the measurements of GHG emission reductions; inspecting and monitoring the mitigation activities of sectors and fields under their management; and

(ii) Cooperating with MPI to collect relevant data and information to measure mitigation activities.

c) Reporting results of mitigation activities

MOIT, MOT, MOC, and MARD are responsible for working with MONRE to develop, review and evaluate the sectoral GHG emission reduction results from reports of fields and entities under their management, and submit results to MONRE for synthesising and reporting to the Prime Minister.

Listed entities required to conduct GHG inventory and relevant organisations have to report mitigation results as per the guidance of MONRE, MOIT, MOT, MOC, and MARD.

MONRE is responsible for:

(i) Developing the report on GHG emission reductions under its management;

(ii) Reviewing and synthesising the GHG emission reductions at the sectoral and local levels to report to the Prime Minister; and

(iii) Developing national reports on GHG emission reduction, reporting to the Prime Minister, and submitting the reports to the UNFCCC as per the regulations, meeting requirements and obligations of a Party to the UNFCCC.

d) Verifying results of GHG emission reduction

Listed entities required to conduct GHG inventory and relevant organisations conduct assessments on mitigation activities as per regulations and guidance on MRV implementation provided by relevant ministries, namely MOIT, MOT, MOC, MARD and MONRE.

MOIT, MOT, MOC, MARD and MONRE organise inspection and supervision of mitigation activities of listed entities required to conduct GHG inventory under their management.

e) Developing and operating MRV information website and database

MONRE takes lead and works with ministries and sectors to develop and operate an MRV information website and database for the purposes of monitoring and updating.

The MRV system for national and sectoral mitigation activities is specifically proposed in Figure 4.1.

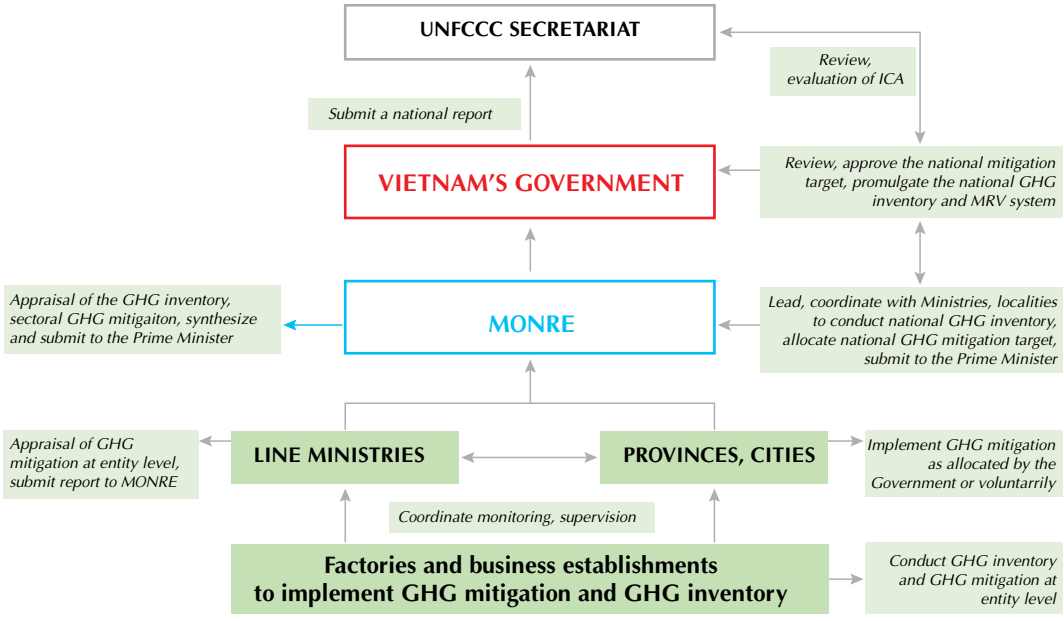

Figure 4.1. Proposed organisational chart of the MRV system.

4.3.2. Sectoral MRV system

Since 2017, MONRE has worked with ministries, sectors and localities, especially MOIT, MOT, MOC and MARD to develop and implement a number of projects and programmes related to the MRV system at all levels.

The above ministries are the leading agencies in the development and implementation of the MRV system for mitigation under their management, guiding the MRV of mitigation results, synthesising the measurement of GHG emission reductions; overseeing and supervising the implementation of sectoral mitigation activities under their management to submit the results to MONRE for synthesising and reporting to the Prime Minister.

In order to support the development of MRV systems, several projects and programmes have been implemented to support ministries and sectors in developing legal documents on the MRV system, as shown in the following table.

Table 4. 1. Projects and programmes related to MRV systems at the sectoral/local level

No.	Name of the project/ program	Funding Agency	MRV-related objectives	(Expected) Outcomes
1	**Energy sector**			
1.1	Low carbon energy development programme (2020-2022) by MOIT	The UK Government	Developing an MRV system for energy saving and efficiency for the seafood processing and beverage production industries	Proposing the MRV system for beer and beverage production activities
1.2	Promoting energy saving and efficiency for industries in Viet Nam (2019-2024) by MOIT	GCF/WB	Develop guidelines for the implementation of energy consumption standards and an MRV system for energy saving and efficiency for some sub-industries	Guidelines for the implementation of energy consumption standards and MRV system for emission reduction for the chemical, steel, paper, and plastic sub-industries.
1.3	Technical assistance to the Southeast Asia Energy Sector's Development and Investment Planning Fund (2016-2020) by MOIT	ADB		Proposing the province/city- level MRV system for energy saving and efficiency activities for several provinces and centrally-run cities such as Hanoi, Quang Ninh, Hai Phong, Quang Nam, Da Nang, and Can Tho
2	**Transport sector**			
2.1	Integrating mitigation in national infrastructure, the energy and transport sectors within the scope of the Clean Technology Fund (CTF) (2016-2020) by MONRE	ADB	- Strengthen capacity and coordination between MONRE and relevant agencies regarding the development and implementation of the MRV system, ensuring that CTF-funded project implementing agencies can report the project results as per the requirements of the CTF.	- Developing the MRV system for urban railway projects funded by CTF; - Developing the MRV system for energy efficiency projects in Viet Nam, including CTF-funded projects; - Proposing an institutional system to implement MRV for CTF-funded projects;

No.	Name of the project/ program	Funding Agency	MRV-related objectives	(Expected) Outcomes
			Develop MRV guidelines for CTF-funded projects, as well as urban railway and energy efficiency projects in the power distribution sector. At the same time, strengthening the institutional and technical capacity and coordination of the relevant agencies.	- Proposing an institutional system for MRV implementation for urban railway and energy efficiency projects in the power distribution sector; - Organizing 04 training courses, 05 seminars, and providing publications in order to strengthen the capacity to implement MRV and coordinate mitigation activities for urban railway and energy efficiency projects in the power distribution sector.
2.2	Supporting MOT to implement NDC of Viet Nam under the project "NDC Transport Initiative for Asia" (2020-2023) by MOT	GIZ	Developing the MRV system for the transport sector, including road, railway, inland waterway, maritime, and aviation.	- MRV methodology for mitigation activities in the transport sector; - Electronic MRV system in the transport sector; - Guidance on collecting MRV data in the transport sector, including road, railway, inland waterway, maritime, and aviation; - Legal documents related to the electronic MRV system.
3	**Agriculture and forestry sectors**			
3.1	Enhancing NAMA readiness: Building capacity in integrated food and energy systems in Viet Nam (2015-2018) by MARD	FAO	Developing the MRV system for the sub-sectors of cultivation and husbandry	Proposing the MRV system for the sub-sectors of cultivation and husbandry

No.	Name of the project/ program	Funding Agency	MRV-related objectives	(Expected) Outcomes
4	**Urban construction and infrastructure sectors**			
4.1	Capacity building and support to develop action plans on GHG emission reduction in the cement manufacturing sector in Viet Nam (2012-2023) by MOC	Nordic Development Fund	Developing the MRV system for the cement production sector	Proposing the MRV system for the cement production sector
4.2	Supporting Viet Nam to implement the Paris Agreement - Construction activities (2012-2023) by MOC	GIZ	Establishment of the MRV system for construction works	MRV system for construction works is established
5	**At local level**			
5.1	Supporting the planning and implementation of NAMAs (2015-2019) by MONRE	JICA	Enhancing capacity for Ministries, sectors, localities, and stakeholders in the planning and implementation of NAMAs through piloting NAMAs on low carbon cities.	Ho Chi Minh city has achieved the following main outcomes: - Piloting MRV for mitigation and GHG inventory activities in sectors such as energy, transport and waste management; - Piloting MRV and selecting low-carbon technologies for seaports; - Proposing procedures for GHG inventory, MRV procedures for mitigation activities; - Developing research reports to update action plans in response to climate change for local state management agencies.
5.2	Supporting the implementation of the national GHG reduction roadmap to achieve the NDC targets (2019-2020) by MONRE	JICA	Piloting GHG inventory activities, MRV of mitigation activities and developing the GHG emission reduction plan in Ho Chi Minh City	

4.3.3. MRV system at entity level

According to the 2020 Law on Environmental Protection, the Prime Minister will issue a list of sectors and entities required to conduct GHG inventories, which will be updated every two years based on their emission contributions to national total GHG emissions, socio-economic conditions and situations; fuel consumption, energy per unit of production, service provided for production and business entities.

Following the above regulations, listed entities are responsible for conducting GHG inventories, developing and maintaining a GHG emission database, and submitting the results every two years to MONRE for synthesising and preparing the national GHG inventory report. At the same time, listed entities will have to conduct GHG inventories, as well as developing and implementing GHG reduction plans on a yearly basis; integrating GHG emission reduction activities into their quality management, cleaner production and environmental protection programmes, and report annually the results to MONRE, relevant ministries, and provincial People's Committees.

Entities required to conduct GHG inventories are also responsible for the implementation of GHG emission reduction activities as per the guidance and technical guideline on MRV provided by relevant ministries. The regulations will comply with Vietnamese laws and general principles for the MRV system, which follows the ETF of the UNFCCC.

4.3.4. Plan for developing and completing MRV system

According to the 2020 Law on Environmental Protection, the Chapter on climate change response provides specific provisions on the MRV system at all levels. It represents Viet Nam's efforts to ensure the transparency of domestic GHG mitigation activities and to monitor GHG emission reduction targets in its NDC.

The operation of the MRV system at all levels will be specified in sub-law documents such as decrees, Prime Minister decisions, circulars, and technical guidelines issued by relevant state management agencies. After defining the responsibilities and functions of state management agencies, the MRV system will be developed into an online system, applying information technology and digital transformation to ensure its transparency.

The MRV system is closely related to the national GHG inventory system, which was issued by the Prime Minister under the Decision No.2359/2015/QD-TTg [9]. According to the plan, the national GHG inventory system and the MRV system will be completed in 2021.

CHAPTER 5
OTHER INFORMATION

5.1. Difficulties, gaps and directions for rectification

In the 2017-2020 period, Viet Nam brought into full play domestic resources and mobilised international supports, overcoming the difficulties and gaps identified in its TNC and BUR2.

5.1.1. Conducting GHG inventory

Activities and solutions to overcome the difficulties and gaps encountered in conducting the national GHG inventory are shown in the following table.

Table 5.1. Evaluating activities and solutions to overcome difficulties and gaps encountered in national GHG inventory

No.	Difficulties, gaps	Status of rectification	Evaluation	Proposed solutions
I. Difficulties and gaps identified in BUR2 and TNC				
1	Lacking primary data sources	Partly	- Some activities to survey and collect data at the grassroots level have been implemented in some localities. - Cooperation between the DCC, MONRE (the focal point) and relevant units in other Ministries and sectors has been enhanced.	- Build a system for collecting and consolidating data at the grassroots level. - Define the responsibilities of the Ministries, sectors, and localities in providing information and data.
2	Inconsistency in operational data collected from various sources	Not yet in place	A system for collecting and consolidating consistent data at the grassroots level among relevant agencies has not yet been established.	- Build a system for collecting and consolidating data at the grassroots level. - Develop a mechanism for sharing of information and data among ministries, agencies, and localities.
3	No established set of country-specific emission factors	On-going	- Some studies on country-specific emission factors are being conducted. - Resources to develop a set of country-specific emission factors are lacked.	Develop country-specific emission factors according to an appropriate roadmap.

No.	Difficulties, gaps	Status of rectification	Evaluation	Proposed solutions
4	Limited cooperation in operational information and data sharing between relevant parties	Partly	- Surveying and data collecting activities at the grassroots level have been implemented in some localities. - Cooperation between the DCC MONRE (the focal point) and relevant units in other ministries and sectors has been enhanced.	- Build a system for collecting and consolidating data at the grassroots level. - Build a mechanism of information and data sharing among ministries, agencies, and localities.
II. Newly arisen difficulties and gaps				
1	Organisational structure in national GHG inventory	Partly	- The national GHG inventory has not been operating effectively. - Regulations on the responsibilities, functions, and tasks of ministries and sectors for the implementation of national GHG inventory and sectoral GHG inventory are still lacked.	- Develop and promulgate legal documents specifying the functions and tasks of ministries and sectors in implementing national GHG inventory and sectoral GHG inventory in the 2020 Law on Environmental Protection and by-law documents.
2	Difficulties in applying the 2006 IPCC Guidelines	Partly	- Capacity of staff is limited. - Difficulties are faced in collecting data to meet the requirements of the 2006 IPCC Guidelines.	- Strengthen staff capacity on the application of the 2006 IPCC Guidelines through training courses. - Strengthen the capacity of relevant units and staff of the GSO in collecting data to meet the requirements of the 2006 IPCC Guidelines.
3	Difficulties in establishing continuous time series data on GHG inventory	Partly, including recalculation of GHG inventory results for 2010 and 2014.	The operational data in storage for GHG inventory is still missing.	- Strengthen staff capacity to research, investigate and adjust the data for the recalculation of GHG inventory results. - Conduct research and investigation to overcome data insufficiency, meeting the establishment of the continuous time series data on GHG inventory.

5.1.2. Developing and implementing mitigation activities

Activities to overcome the difficulties and gaps encountered in developing and implementing mitigation actions are shown in the bellow table.

Table 5.2. Evaluation of activities to overcome difficulties and gaps encountered in developing and implementing mitigation actions

TT	Difficulties, gaps	Status of rectification	Evaluation	Solutions
I. Difficulties and gaps identified in BUR2 and TNC				
1	No available specific technical guidelines and models appropriate to domestic conditions to evaluate and develop mitigation options for some sectors	Partly	- Issue some guidelines in developing mitigation projects. - Develop feasibility reports for NAMA implementation in some sectors and fields. - Issue guidelines on developing mitigation projects under the CDM and JCM frameworks. - Lack detailed technical guidance for assessing the effectiveness of mitigation options.	- Research and develop domestic guidelines for the assessment and development of mitigation projects. - Take advantage of available guidelines for similar projects under the currently applied mechanisms such as CDM and JCM.
2	MRV system at all levels and sectors not been officially formed	Partly	- Regulations on MRV system for mitigation were developed in the 2020 Law on the Environmental Protection adopted in November 2020. - The draft Decision of the Prime Minister on the regulation of the national MRV system for mitigation has been developed and submitted to the Prime Minister for issuance in 2021.	- Issue the national MRV system for mitigation. - Research and develop consistent MRV system operational guidelines at all levels under the national MRV system.

TT	Difficulties, gaps	Status of rectification	Evaluation	Solutions
3	Financial resources and financial mechanisms to encourage the implementation of mitigation options lacked	Partly	- Issue preferential mechanisms for renewable energies such as wind and solar power. - Pilot carbon market for solid waste management and steel production. - The number of RE projects increases rapidly. - No specific regulations in place on GHG inventory results report at the sectoral and grassroots levels of high emissions as bases for the development and issuance of financial mechanisms to encourage implementation of mitigation options. - Mechanisms to mobilise capital from the private sector is lacked.	- Develop and issue specific regulations on mitigation at sectoral and grassroots levels as the basis for the development and enforcement of financial mechanisms, and to encourage the implementation of mitigation options. - Develop regulations on reporting GHG inventories. - Research, develop and issue mechanisms and policies to mobilise capital from the private sector for mitigation. - Research, develop and issue market-based mechanisms as the foundation for the private sector to participate in and mobilise capital for mitigation.
II. Newly arisen difficulties and gaps				
1	Limitations in assessing the impact of national policy actions on mitigation	Partly	- Some national policies do not have quantitative information and objectives on GHG emission mitigation. - There are no guidelines for assessing the impact of policies on GHG emission mitigation.	- Develop a system for reporting the results of projects with potential for emission mitigation. - Establish a common data system on the implementation of policies on GHG emission mitigation carried out by ministries, sectors, and localities. - Integrate the assessment of emission mitigation potential into medium and long-term planning.

TT	Difficulties, gaps	Status of rectification	Evaluation	Solutions
2	Assessments on quantified GHG emission reductions from mitigation related sectoral and local policies not been made	Partly	- Up-to-date information on results of mitigation activities implemented by sectors and localities, especially those using domestic resources is lacked. - Assessments on mitigation co-benefits have not been quantified yet.	- Establish the MRV system for mitigation at all levels. - Raise the awareness of ministries, sectors, localities, and businesses on benefits of GHG emission reduction. - Develop a system for reporting quantitative GHG emission reductions of projects with mitigation potential.
3	Limitations in investment in the application of clean and new technologies to reduce GHG emissions	Partly	- Some mitigation technologies are not attractive to investors. - High quality human resources for researching, implementing, applying, and receiving mitigation technologies have been insufficient and incompetent. - Mitigation technologies are mostly imported and take a long transfer time.	- Establish policies to encourage, attract and develop high-quality human resources. - Strengthen mechanisms on expert exchange to take advantage of high quality human resources in the region and the world. - Promote scientific research activities to develop domestic technologies, transfer and apply technologies with mitigation potential. - Develop and implement in-depth technical training on mitigation technologies.

5.1.3. Technology transfer and application

Activities to overcome the difficulties and gaps in technology transfer and application are shown in the bellow table.

Table 5.3. Evaluation of activities to overcome difficulties and gaps encountered in technology transfer and application

TT	Difficulties, gaps	Status of rectification	Evaluation	Proposed solutions
Difficulties and gaps identified in BUR2 and TNC				
1	Appropriate standards and policy frameworks to actively promote technology transfer lacked	Partly	- The Law on technology transfer, related policies, and by-law documents have been issued. - Mitigation has not been include in the national standards for technologies. - Technology standards in Viet Nam remain different from other countries.	- Supplement supporting documents to transfer technologies with mitigation potential. - Integrate additional contents on mitigation into the development and promulgation of national technological standards. - Consolidate the Vietnamese national standards for technologies with mitigation potential.
2	Capacity for reception and operation of advanced technologies limited	Partly	- Policies to attract foreign high-quality human resources have been piloted. - Human resources for the reception and operation of mitigation technologies should be further strengthened. - No mechanism available for the expert exchange to increase the quantity and quality of human resources in the region and the world.	- Issue mechanisms and policies on international expert exchange for the application of GHG emission mitigation technologies. - Review, supplement and promulgate policies to attract high quality human resources at home and abroad. - Strengthen human resources and technical capacities for the reception and operation of mitigation technologies.
3	Lacking common global guidelines on the development of monitoring system for technology transfer.	Not yet in place	Technology transfer assessment has not been available due to lacking common global guidelines on the development of the monitoring system for technology transfer.	Countries cooperate with the UNFCCC Secretariat to propose the development of common guidelines (Criteria Framework) on the global monitoring system for technology transfer.

5.1.4. BUR3 development

Activities to overcome the difficulties and gaps encountered in BUR3 development are shown in the bellow table.

Table 5.4. Evaluation of activities to overcome difficulties and gaps encountered in BUR3 development

No.	Difficulties, gaps	Effects/Impacts	Proposed solutions
1	**National GHG inventory**		
1.1	Operational data and information lacked or incomplete; some data not reliable enough to be used	- The operational data for GHG inventory officially issued by the GSO of Viet Nam has not completely met the requirements for GHG inventory. - Many types of operational data must be collected from the scientific research results of ministries and sectors. Expert methods are sometimes used to generate missing data and documents. - Operational data from ministries and sectors (other than the GSO) is incomplete, inconsistent, not up-to-date, and has not met the criteria for periodic GHG inventory under the guidelines of the UNFCCC.	- Use expert methods. - Use research materials to access missing information and data. - Strengthen the capacity of inventory staff. - Develop the system for collecting and compiling data at the grassroots level.
1.2	Lacking country-specific emission factors	The accuracy of GHG inventory results is negatively affected.	- Develop country-specific emission factors, giving priority to sub-sectors that are the main sources of emissions. - Use domestically published research findings.

No.	Difficulties, gaps	Effects/Impacts	Proposed solutions
2	**Mitigation actions and their impacts**		
2.1	*Mitigation related policies*		
	- Some general policies lack information on the implementation by ministries and sectors. - Some policies lack statistical data on GHG emission reductions due to lack of MRV system in place. - Many policies lack specific guidelines for application. Some policies are issued but have no budget for implementation. - The current facilities and social practices do not facilitate the implementation of mitigation actions. - It remains difficult to separate specific impacts of each policy as GHG emission reduction can be collective result from the implementation of various policies from the national, sectoral and local levels; - Many policies lack direct quantitative mitigation targets. - No international guidelines available on the assessment of mitigation impacts of policy actions.	- Updating results of some general policies has not been detailed and requires much time to collect official data and information. - Updating the implementation results of some policies is ambiguous, generic and qualitative. - Policies in specific sectors such as energy have had many implementation decisions and specific guidance circulars for each sub-sector, while some sectors (such as waste treatment) do not have specific guidance circulars, creating imbalance among sectors in reporting; - The data on GHG emission reductions may be duplicated, outdated and insufficient.	- Directly contact ministries and sectors for information and data searching and verification. - Gather data from domestic administrative management documents, periodical reports on the implementation of relevant policies of the ministries and sectors. - Conduct capacity building programmes and activities for ministries, sectors, and localities in integrating climate change issues into policy making and mitigation impact assessment for developed policies. - Establish and operate a national MRV system for mitigation.

No.	Difficulties, gaps	Effects/Impacts	Proposed solutions
2.2	*Mitigation related implementation*		
	- No institutional arrangements available for the implementation of mitigation actions at sectoral, provincial, or municipal levels. - No MRV system for mitigation, no institutional arrangements for the implementation of mitigation actions from the national to ministerial, sectoral, provincial and grassroots levels.	The data on GHG emission reductions may be duplicated, outdated, and/or insufficient.	Conduct capacity building programmes and activities for ministries, sectors, and localities in integrating climate change issues into policy making and mitigation impact assessment for developed policies
2.3	*Mitigation activities*		
	- Since 2017, many NAMAs have been synthesised in BUR2 but have not been implemented; some NAMA proposals have been submitted to the NAMA Facility but have not been approved and therefore not yet implemented. - The official summary reports of several programmes have not been published by ministries and sectors, data on emission reductions achieved by such programmes, therefore, have not been available. - Some actions experience inconsistency in schedule and emission reductions reported in BUR2 and other relevant reports.	No reports and updates available on developed NAMAs	- Access to international support to implement mitigation actions. - Establish an official information exchange channel for relevant ministries and sectors with the national focal agency on climate change.

No.	Difficulties, gaps	Effects/Impacts	Proposed solutions
2.4	*Impact assessment of mitigation activities*		
	- Many mitigation actions lack information on estimated GHG emission reductions and no MRV system for mitigation actions have been established. - The reported actions concentrate in only internationally funded actions, no reports have been available on GHG emission reductions from domestic actions (including policy actions at the local level). - Lacking information on the baseline and MRV system applicable to each project and national MRV guidelines for NDC will result in low accuracy of mitigation estimates due to possibly overlooking or overlapping GHG emission reductions. - No assessments and corresponding adjustments to GHG emission reductions to generate credits traded on the international carbon market. - Some projects only feature emission reduction estimation during the implementation period and no assessments conducted after the projects finish or on emission reductions achieved in practice. - Most of actions only have qualitative co-benefit targets and outcomes while lacking quantitative assessments, or transparent and detailed co-benefit reports. - No specific methods and studies available for assessing and selecting a set of co-benefit assessment indicators of mitigation actions. - No specific guidelines on monitoring and reporting the co-benefit impacts of mitigation actions.	- The accuracy in the estimated evaluation of GHG emission reduction remained low. - The impact assessment for actions has not been inconsistent, inaccurate, and has a high possibility of duplication, overlapping, and insufficiency. - Estimates of emission reductions of actions remain uncomprehensive and inconsistent due to the absence of a baseline and assumptions for estimates of emission reductions from different actions. - The co-benefits of actions have only been focused and assessed for actions with information on co-benefit assessment and are mainly qualitative, resulting in relative assessments.	- Research and develop domestic guidelines for assessments and development of mitigation projects. - Pilot the implementation of the MRV system model at the provincial level for mitigation activities.

No.	Difficulties, gaps	Effects/Impacts	Proposed solutions
2.5	*Market mechanisms*		
	Some new credit mechanisms do not have statistical data on registered projects, but rather on the number of RECs issued, making it difficult to identify newly registered projects by year.	The number of newly registered projects by year cannot be assessed.	Review and contact developers of registered projects to gather relevant information.
3	**Other necessary information to achieve UNFCCC targets**		
3.1	The assessment of co-benefits related to the SDGs, gender equality, etc. has only been implemented under independent and/or qualitative studies.	It is difficult to assess impacts entirely, consistently, and quantifiably, especially in the case of specific mitigation projects.	Incorporate co-benefit elements into the development and implementation of mitigation actions.
4	**Other issues**		
4.1	Impacts of the COVID-19 pandemic	- The information and data gathering process was affected. - Consulting workshops could not be organised as planned. - Resources for planned implementation of research and assessment were affected. - Implementation of certain tasks took longer time.	Conduct possible online activities.
4.2	No integrated database availabe on projects supporting climate change responses in general and climate change adaptation or mitigation in particular.	Compiling information on support received is complicated and insufficient. In addition, the spillover and cumulative impact of support cannot be evaluated.	Establish an official channel for information exchange between relevant ministries and sectors and the national focal agency on climate change. Build data collection template (table form) to gather complete and detailed information for the report.

5.2. Demand for financial, technical, technological support and capacity building for mitigation activities

5.2.1. Demand for international financial support

The demand for international financial support to realise mitigation targets in the updated NDC of Viet Nam is shown in Table 5.5.

Table 5.5. Demand for international financial for NDC undertaking until 2030 by sector [18]

No.	Sector	Potential *$MtCO_2e$*	Financial need[1] *(million USD)*
1	Energy	104.3	35,904.6
2	Agriculture	25.8	4,203.5
3	LULUCF	11.9	1,920.2
4	Waste	24.0	1,903.7
5	IP	0.8	197.9
Total		**166.8**	**44,129.9**

[1] *Reduced to 2014 with a discount coefficient of 10%*

5.2.2. Demand for technical and technological support

The demand for technical support to realise the mitigation targets in the updated NDC is shown in the bellow Table.

Table 5.6. Demand for technical support to realise mitigation targets in updated NDC until 2030 [18]

TT	Support demand	Expected goal/output	Affected sectors and areas	Leading and coordinating agencies	Level of priority
1	Develop supporting industries to reduce GHG emissions	- Reduce capital demands for equipment import and enhancement of domestic technical and technological capacity; - Complete and promote localisation to reduce price of RE technology equipment (wind and solar power) applicable to small and household scales.	- Energy; - IPPU; - Agriculture; - Waste.	- MPI, MOIT, MARD, MOT, MOC and MONRE; - People's Committee of provinces and centrally-governed cities	High
2	Develop a data collection toolkit for GHG inventory.	Develop an effective toolkit to collect data and build a database for GHG inventory at the grassroots level.	- Energy; - IPPU; - Agriculture; - LULUCF; - Waste.	- MPI, MOIT, MARD, MOT, MOC, MONRE; - People's Committee of provinces and centrally-governed cities	Very high
3	Develop a set of criteria for evaluating and quantifying impacts of implementing mitigation technologies.	- Develop a set of criteria for economic quantification of impacts/ benefits in implementing mitigation technologies; - Establish a portfolio of mitigation projects, including priority projects aiming to fulfill the committed contributions in Viet Nam's NDC.	- Energy; - IPPU; - Agriculture; - LULUCF; - Waste.	- Ministries: MPI, MOIT, MARD, MOT, MOC, MONRE; - People's Committee of provinces and centrally-governed cities	Moderate

TT	Support demand	Expected goal/output	Affected sectors and areas	Leading and coordinating agencies	Level of priority
4	Set up a venture fund for mitigation projects	- Form a venture fund to finance mitigation projects in all areas; - Create initial investment funds to promote scientific research and technological development on mitigation.	- Energy; - IPPU; - Agriculture; - LULUCF; - Waste.	- MOST, MOF and MOET; - People's Committee of provinces and centrally-governed cities - Universities and research institutions.	High
5	Establish mechanisms and policies to attract investment for mitigation.	Establish policies to encourage and attract domestic and foreign investment mitigation activities.	- Energy; - IPPU; - Agriculture; - LULUCF; - Waste.	MPI, MOIT, MARD, MOT, MOC and MONRE	High
6	Establish domestic carbon market.	- Develop and finalise the necessary legal framework for the formation of a domestic carbon market; - Research and establish the mechanism to connect the domestic carbon market with regional and international counterparts	- Energy; - IPPU; - Agriculture; - LULUCF; - Waste.	- MPI, MOIT, MARD, MOT, MOC, and MONRE; - People's Committee of provinces and centrally-governed cities	High
7	Establish MRV systems for mitigation at sectoral and local levels.	Establish MRV systems at the sectoral and local levels and ensure connectivity with the national MRV system.	- Energy; - IPPU; - Agriculture; - LULUCF; - Waste.	- MOIT, MARD, MOT, MOC and MONRE; - People's Committee of provinces and centrally-governed cities	Very high

The demand for technological support to realise mitigation targets in the updated NDC is shown in Table 5.7.

Table 5.7. Need for technological support to realise mitigation target in updated NDC until 2030

TT	Support demand	Expected target/output	Affected sectors and areas	Leading and coordinating agencies	Level of priority
1	- Implement investment, production, and business projects on energy saving and efficiency in production, manufacturing, renovation, and market conversion of vehicles, equipment, machines, production lines, public lighting, energy efficiency in households, and other means. - Use high-performance electrical equipment in households, industries, and commerce. - Apply energy efficiency improvement measures in industries such as innovating, developing, and applying technology in the production of construction materials; reduce clinker content and implement other mitigation measures in cement production.	- Increase energy efficiency in the production, manufacturing, renovation, and market conversion of vehicles, equipment, machines, production lines, public lighting, energy saving in households, and other means. - Increase the energy efficiency of high-performance electrical equipment in households, industries, and commerce. - Improve energy efficiency in the production of construction materials; reduce clinker content and implement other mitigation measures in cement production.	- Energy	- MOIT, MPI, MARD, MOT, MOC and MONRE; - People's Committee of provinces and centrally-governed cities - Enterprises.	High
2	- Optimise production processes at coal-fired thermal power plants. - Promote RE development (solar, biomass) in accordance with the potential, advantages and conditions of Viet Nam. - Reduce loss in power transmission and distribution.	- Increase the production efficiency of coal-fired thermal power stations. - Increase RE proportion (solar, biomass) in the final energy structure of Viet Nam. - Minimise loss in power transmission and distribution.	- Energy	- MPI, MOIT, MARD, MOT, MOC, and MONRE; - People's Committees of provinces and centrally-governed cties - Enterprises.	Very high

TT	Support demand	Expected target/output	Affected sectors and areas	Leading and coordinating agencies	Level of priority
3	- Accelerate the development of the public transport system. - Switch from private vehicles to public transport. - Switch freight transport modes from road to railway, inland waterways, coastal transport; improve the energy efficiency of transport vehicles. - Switch from traditional fuels to electrical energy and cleaner fuels (CNG, biofuel, etc.) for transport vehicles.	- Improve systems of urban railway, city bus, urban traffic, and non-motorised traffic connection. - Promote the switch from private vehicles to public transport. - Switch freight transport modes to mass transport forms such as railways, inland waterways, and coastal transport to reduce GHG emission per unit of cargo. - Introduce regulations limiting fuel consumption of vehicles. - Develop and implement the national roadmap for E-mobility development - Adopt electrical energy and cleaner fuels (CNG, biofuel, etc.) for transport vehicles.	Transportation	- MOT, MPI, MOIT, MARD, MOC, and MONRE; - People's Committees of provinces and centrally-governed cities; - Enterprises.	High
4	- Apply advanced technology to utilise by-products in agricultural production. - Develop the technology for biochar production.	- Apply management solutions and technology in cultivation and husbandry; improve livestock diet; restructure plant varieties; change the method of land use. - Apply technology in treating and reusing by-products and waste in agricultural production and husbandry; develop organic agriculture. - Create specialised farming areas and industries for preliminary processing of agricultural-industrial by-products for biochar production.	- Energy; - Agriculture; - LULUCF; - Waste.	- Energy; - Agriculture; - LULUCF; - Waste. - MARD, MOST, MOF, and MOET; - People's Committee of provinces and centrally-governed cities; - Universities, and research institutions.	High

TT	Support demand	Expected target/output	Affected sectors and areas	Leading and coordinating agencies	Level of priority
5	- Continue implementation of REDD+. - Improve forests coverage with priority given to production forests, large timber forests, and coastal forests; rehabilitate protective forests and special-use forests. - Zone off for the regeneration of natural forests, promote forest regeneration and enrichment on lands planned for forestry; improve forest carbon stocks and quality. - Develop agroforestry models to enhance carbon stocks and conserve soil	- Increase carbon sequestration by protecting, conserving, and sustainably using forests and forestry land, afforest, and develop forests, with priority given to production forests, large timber forests and coastal forests, and restoration of protective and special-use forests. - Improve forest carbon stocks and quality by zoning off for the regeneration of natural forests, promoting forest regeneration and enrichment on lands planned for forestry. - Enhance carbon stocks and conserve soil by developing agroforestry models.	- Agriculture; - LULUCF.	MARD, MPI and MONRE	High
6	Apply semi anaerobic waste treatment methods.	Reduce costs when maintaining an anaerobic landfill, and sanitary landfill technology which is simpler and reduces GHG emission.	Waste	- MOC, MONRE and MPI. - People's Committee of provinces and centrally-governed cities	High
7	- Destroy F-gas in cement kilns. - Prevent leakage of refrigerant from refrigerators, cold storage, and air conditioners for commercial use.	- Reduce initial investment costs compared to new constructions, reduce F-gas emissions; establish a mechanism to recover and transport F-gas for destruction, contributing to GHG emission reduction. - Strictly control the leakage of refrigerant from refrigerators, cold storage, and air conditioners for commercial use.	IPPU	- MOIT and MONRE; - People's Committees of provinces and centrally-governed cities	Very high

5.2.3. Demand for capacity building

The demand for capacity building to realise mitigation targets in the updated NDC until 2030 is shown in Table 5.8.

Table 5.8. Demand for capacity building to realise mitigation targets in updated NDC until 2030 [18]

No.	Support demand	Expected target/output	Affected sectors and areas	Leading and coordinating agencies	Level of priority
1	Design training programmes on GHG inventory and mitigation	Design and adopt intensive and long-term training programmes to build up the capacity of domestic staff on GHG inventory and the construction and implementation of mitigation technologies	- Energy; - IPPU; - Agriculture; - LULUCF; - Waste.	- MOET - Universities, and research institutions.	High
2	Build up the capacity of management agencies in the assessment of investment projects on mitigation	Build up the capacity of ministries, sectors, and localities in administrative procedure reform to facilitate organisations and businesses in accessing investment capital from domestic and international support funds.	- Energy; - IPPU; -Agriculture; - LULUCF; - Waste.	- MOIT, MARD, MOT, MOC, and MONRE; - People's Committees of provinces and centrally-governed cities; - Universities, and research institutions.	Very high

5.3. Information on efforts to achieve UN goals

5.3.1. Impact of mitigation activities on fulfilling SDGs

a) Energy: Mitigation activities have the most prominent contribution to the realisation of SDG7 'Ensure access to affordable, reliable, sustainable and modern energy for all' and SDG9 'Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation'; the least noticeable contribution to SDG15 'Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss'.

b) IP: Mitigation activities have the greatest contribution to the realisation of SDG12 'Ensure sustainable consumption and production patterns'; followed by that to SDG 8 'Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; and SDG9 'Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation'.

c) Agriculture: Mitigation activities have the greatest contribution to the realisation of SDG2 'End hunger, achieve food security and improved nutrition and promote sustainable agriculture'; and SDG9 'Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation'; the lowest level of contribution to the realisation of SDG16 'Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels'.

d) LULUCF: Mitigation activities have the greatest contribution to the realisation of SDG15 'Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss' and the lowest level of contribution to the realisation of SDG9 'Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation'.

e) Waste: Mitigation activities have the greatest contribution to the realisation of SDG7 'Ensure access to affordable, reliable, sustainable and modern energy for all'; and SDG17 'Strengthen the means of implementation and revitalize the global partnership for sustainable development'; the lowest contribution to the realisation of SDG4 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all' and SDG15 'Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss'.

5.3.2. Climate change and gender issues

Both men and women are adversely affected by climate change. However, in terms of the response capacity by gender, women tend to be more vulnerable and suffer more from climate change impacts and disaster risks due to health-related factors, access to information, and limited participation in decision-making processes in the community.

a) Impact on women's work

Women account for 50.7% of Viet Nam's total population and the percentage of women living in the urban and rural areas is 34.5% and 65.5%, respectively. Women working in the agriculture sector account for 63%, higher than that percentage of men (57%). In rural areas, most women are engaged in agricultural activities, including cultivation, livestock production and post-harvest. Therefore, the vulnerability level of of women will also be higher as agriculture is one of the most adversely affected sectors by climate change.

b) Impact on women's health

Climate change, increased natural disasters and extreme climate events will increase negative impacts on women's health, raise the infection rate of diseases and epidemics among women, especially those who are elderly, pregnant and with chronic diseases and young girls. As women are still mainly responsible for unpaid care and housework in their families, when climate change and natural disasters occur and resources decrease, more

burdens will be put on their shoulders and lasting impacts will be caused on their health. climate change, natural disasters will also increase the mortality, casualty and missing rates of women. Increased water shortage and unhygienic conditions will also lead to the risk of water related diseases such as diarrhea and cholera. Flooding-induced water pollution will also cause water-borne diseases such as eye, skin, gynecological and respiratory diseases due to unsecured sanitary conditions and the lack of clean water.

c) Impact on women's family economy and migration

Increased climate change, natural disasters, and extreme weather events have adversely affected household economy, reduced income, increased poverty, hindered people's livelihoods, contributing to a higher migration rate. The number of women migrating from their rural and mountainous areas to cities and industrial areas has been increasing and much higher than that of male migrants. In the context of migration and staying away from home, women have struggled strenuously for livelihood and faced many types of risks, difficulties and challenges. Among the female workers, ethnic minority women have a higher level of climate change-induced risks due to their limited access to education and inability to leave their community, the lack of decision-making power and qualification compared to men.

5.4. Information on received support

5.4.1. Support received for BUR3 development

The BUR3 of Viet Nam was developed in the 2019-2020 period with financial support from GEF via UNEP and technical support from some other international organisations. Details on support received for developing the BUR3 of Viet Nam are shown in the bellow table.

Table 5.9. Support received for development of BUR3

Type of support	Source of support	Period	Information on support received
Financial	GEF/UNEP	2019-2020	Financial support for the development of BUR3
Technical	SilvaCarbon Colorado State University, USA	2020	National GHG inventory QC for the base year 2016 in the AFOLU sector

5.4.2. International support for climate change response activities

So far, the GCF has funded USD 146 million for three projects in Viet Nam with USD 20.26 million disbursed. GEF has funded over USD 400 million to implement climate change response projects. Multilateral organizations like UNIDO and financial institutions like ADB and WB have implemented or committed to disburse their support funding, mainly in the form of soft loans.

In addition to the GCF, GEF, multilateral organisations and bilateral cooperation mechanisms of developed countries have been providing financial support through bilateral projects and some regional projects for climate change response in Viet Nam.

In addition to the identified support and disbursed funding, a number of climate change response projects have been coordinated by Vietnamese agencies with partners to finalise documents for receiving support.

The update on a number of support projects for climate change response in Viet Nam over the past time is presented in Annex 4.

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ANNEXES

Annex 1. Results of Viet Nam's GHG inventory for 2016

IPCC Code	Category	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NOx	CO	NMVOCs	SO_2
		kt			*ktCO_2e*			*kt*			
Total emissions/removals		**191,651.08**	**3,815.65**	**68.76**	**23.32**			**54.85**	**1,482.34**	**22.38**	**23.55**
1	**ENERGY**	**182,291.22**	**798.05**	**4.51**							
1A	Fuel combustion activities	180,767.38	46.13	4.50							
1A1	Energy industries	90,554.60	3.06	1.38				NE	NE	NE	NE
1A2	Manufacturing industries and construction	37,701.55	8.36	1.18				NE	NE	NE	NE
1A3	Transport	35,193.17	8.12	1.60				NE	NE	NE	NE
1A4	Other sectors	17,318.05	26.59	0.34				NE	NE	NE	NE
1A5	Non-specified	NE	NE	NE				NE	NE	NE	NE
1B	Fugitive emissions from fuels	1,523.84	751.92	0.01							
1B1	Solid fuel		107.38					NE	NE	NE	NE
1B2	Oil and natural gas	1,523.84	644.54	0.01				NE	NE	NE	NE
1B3	Other emissions from energy production	NE	NE	NE				NE	NE	NE	NE
1C	Carbon dioxide transport and storage										
1C1	Transport of CO_2	NO						NE	NE	NE	NE
1C2	Injection and storage	NO						NE	NE	NE	NE
1C3	Other	NO						NE	NE	NE	NE

IPCC Code	Category	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NOx	CO	NMVOCs	SO_2
		kt			*ktCO_2e*			*kt*			
2	**IPPU**	**46,047.20**		**0.09**				**16.21**	**20.95**	**22.38**	**23.55**
2A	Mineral industry	40,917.20								7.56	22.34
2A1	Cement production	36,773.00									22.34
2A2	Lime production	3,825.00									
2A3	Glass production	319.20								7.56	
2A4	Other processes uses of carbonates	NE									
2A5	Other	NE									
2B	Chemical industry	1,271.78		0.09					9.68	5.76	0.04
2B1	Ammonia production	1,271.78							9.68	5.76	0.04
2B2	Nitric acid production			0.09							
2B3	Adipic acid production			NO							
2B4	Caprolactam glyoxal and glyoxylic acid production			NO							
2B5	Carbide production	NE	NE								
2B6	Titan dioxide production	NE									
2B7	Soda ash production	NE									
2B8	Petrochemical and carbon black production	NE	NE								
2B9	Fluorochemical production				NO						
2B10	Other	NE	NE	NE	NE	NE	NE				

IPCC Code	Category	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NOx	CO	NMVOCs	SO_2
		kt			*ktCO_2e*			*kt*			
2C	Metal industry	3,858.22						16.21	11.27	9.06	1.17
2C1	Iron and steel production	3,858.22	NE	NO				16.21	11.27	9.06	1.17
2C2	Ferroalloys production	NE	NO	NO				NE	NE	NE	NE
2C3	Aluminum production	NO	NO			NO		NE	NE	NE	NE
2C4	Magnesium production	NO			NO	NO	NO	NE	NE	NE	NE
2C5	Lead production	NE						NE	NE	NE	NE
2C6	Zinc production	NE						NE	NE	NE	NE
2C7	Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
2D	Non-energy products from fuels and solvent use										
2D1	Lubricant use	NE						NE	NE	NE	NE
2D2	Paraffin wax use	NE	NE	NE				NE	NE	NE	NE
2D3	Solvent use							NE	NE	NE	NE
2D4	Other	NE	NE	NE				NE	NE	NE	NE
2E	Electronics industry										
2E1	Integrated circuit or semiconductor	NE		NE	NE	NE	NE	NE	NE	NE	NE
2E2	TFT flat panel display				NE	NE	NE	NE	NE	NE	NE
2E3	Photovoltaics				NE	NE	NE	NE	NE	NE	NE
2E4	Heat transfer fluid							NE	NE	NE	NE

IPCC Code	Category	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NOx	CO	NMVOCs	SO_2
		kt			*ktCO_2e*			*kt*			
2E5	Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
2F	Products uses as substitutes for ozone-depleting substances				23.32						
2F1	Refrigeration and air conditioning	NE			NE	NE		NE	NE	NE	NE
2F2	Foam blowing agents	NE			NE	NE		NE	NE	NE	NE
2F3	Fire protection	NE			23.32	NE		NE	NE	NE	NE
2F4	Aerosols				IE	NE		NE	NE	NE	NE
2F5	Solvents				NE	NE		NE	NE	NE	NE
2F6	Other applications	NE	NE	NE	NE	NE		NE	NE	NE	NE
2G	Other product manufacture and use										
2G1	Electronic equipment					NE	NE	NE	NE	NE	NE
2G2	SF_6 and PFC from other product uses					NE	NE	NE	NE	NE	NE
2G3	N_2O from product uses			NE				NE	NE	NE	NE
2G4	Other	NE	NE		NE			NE	NE	NE	NE
2H	Other										
2H1	Pulp and paper industry	NE	NE					NE	NE	NE	NE
2H2	Food and beverage industry	NE	NE					NE	NE	NE	NE
2H3	Other	NE	NE	NE				NE	NE	NE	NE

IPCC Code	Category	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NOx	CO	NMVOCs	SO_2
		kt			*ktCO_2e*			*kt*			
3	**AFOLU**	**-37,489.34**	**2,376.59**	**56.66**				**38.64**	**1,461.39**		
3A	Livestock		555.47								
3A1	Enteric fermentation		443.63					NE	NE	NE	NE
3A2	Manure management		111.83	11.17				NE	NE	NE	NE
3B	Land	-39,491.24									
3B1	Forest land	-54,657.78						NE	NE	NE	NE
3B2	Cropland	3,637.60						NE	NE	NE	NE
3B3	Grassland	1,383.64						NE	NE	NE	NE
3B4	Wetland	1,046.90						NE	NE	NE	NE
3B5	Settlements	1,919.14						NE	NE	NE	NE
3B6	Other land	7,179.27						NE	NE	NE	NE
3C	Aggregated sources and Non-CO_2 emissions sources on land	2,001.90	1,821.13	45.49				38.64	1,461.39		
3C1	Biomass burning		46.38	1.23				NE	NE	NE	NE
3C2	Liming	565.79						NE	NE	NE	NE
3C3	Urea fertilisation	1,436.11						NE	NE	NE	NE
3C4	Direct N_2O emissions from managed soils			29.26				NE	NE	NE	NE
3C5	Indirect N_2O emissions from managed soils			14.16				NE	NE	NE	NE

IPCC Code	Category	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NOx	CO	NMVOCs	SO_2
		kt			*ktCO_2e*			*kt*			
3C6	Indirect N_2O emissions from manure management			0.84				NE	NE	NE	NE
3C7	Rice cultivations		1,774.75					NE	NE	NE	NE
3D	Other										
3D1	Harvested wood products	NE						NE	NE	NE	NE
3D2	Other	NE	NE	NE				NE	NE	NE	NE
4	**WASTE**	**802.00**	**641.01**	**7.50**							
4A	Solid waste disposal		372.82								
4A1	Managed waste disposal sites		372.82					NE	NE	NE	NE
4A2	Unmanaged waste disposal sites		IE					NE	NE	NE	NE
4A3	Uncategorised waste disposal sites		IE					NE	NE	NE	NE
4B	Biological treatment of solid waste		2.48	0.15							
4C	Incineration and open burning of waste	802.00	13.47	0.23							
4C1	Waste incineration	528.09	0.00	0.04				NE	NE	NE	NE
4C2	Open burning of waste	273.91	13.47	0.19				NE	NE	NE	NE
4D	Wastewater treatment and discharge		252.24	7.12							
4D1	Domestic wastewater treatment and discharge		171.63	7.12				NE	NE	NE	NE

IPCC Code	Category	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NOx	CO	NMVOCs	SO_2
		kt			*ktCO_2e*			*kt*			
4D2	Industrial wastewater treatment and discharge		80.61	NE				NE	NE	NE	NE
4E	Other	NE	NE	NE				NE	NE	NE	NE
5	**OTHER**										
5A	Indirect N_2O emissions from the atmospheric depositions of nitrogen in NOx and NH_3	NE	NE					NE	NE	NE	NE
5B	Other	NE	NE					NE	NE	NE	NE
MEMO ITEMS											
INTERNATIONAL BUNKERS											
International aviation		NE	NE					NE	NE	NE	NE
International water-borne transport		NE	NE					NE	NE	NE	NE
Multilateral operations		NE	NE					NE	NE	NE	NE

Annex 2. Results of uncertainties assessment of Viet Nam's national GHG inventory for 2016

No.	IPCC Code	Source	GHG	Emission/ Removal	Uncertainty of Emission/Removal	Uncertainty of AD	Uncertainty of EFs
				$ktCO_2e$	%		
1	1A1ai	Electricity generation	CO_2	88,482.75	10.3	7.5	7.0
2	1A1ai	Electricity generation	CH_4	67.28	100.3	7.5	82.2
3	1A1ai	Electricity generation	N_2O	340.12	505.1	7.5	476.9
4	1A1b	Petroleum refining	CO_2	251.11	10.3	7.5	7.0
5	1A1b	Petroleum refining	CH_4	0.29	100.3	7.5	100.0
6	1A1b	Petroleum refining	N_2O	0.54	505.1	7.5	505.0
7	1A1ci	Manufacture of solid fuels	CH_4	15.95	100.3	7.5	100.0
8	1A1ci	Manufacture of solid fuels	N_2O	20.13	505.1	7.5	505.0
9	1A1cii	Other energy industries	CO_2	62.95	10.3	7.5	7.0
10	1A1cii	Other energy industries	CH_4	0.03	100.3	7.5	100.0
11	1A1cii	Other energy industries	N_2O	0.03	505.1	7.5	505.0
12	1A2a	Iron and steel	CO_2	8,757.59	18.8	17.5	7.0
13	1A2a	Iron and steel	CH_4	23.30	101.5	17.5	100.0
14	1A2a	Iron and steel	N_2O	33.09	505.3	17.5	505.0
15	1A2c	Chemicals	CO_2	2,286.29	18.8	17.5	7.0
16	1A2c	Chemicals	CH_4	5.41	101.5	17.5	100.0
17	1A2c	Chemicals	N_2O	7.71	505.3	17.5	505.0
18	1A2d	Pulp, paper and print	CO_2	760.45	18.8	17.5	7.0
19	1A2d	Pulp, paper and print	CH_4	1.99	101.5	17.5	100.0

20	1A2d	Pulp, paper and print	N_2O	2.87	505.3	17.5	505.0
21	1A2e	Food processing, beverages and tobacco	CO_2	1,629.60	18.8	17.5	7.0
22	1A2e	Food processing, beverages and tobacco	CH_4	50.06	101.5	17.5	100.0
23	1A2e	Food processing, beverages and tobacco	N_2O	63.93	505.3	17.5	505.0
24	1A2f	Non-metallic minerals	CO_2	14,402.77	18.8	17.5	7.0
25	1A2f	Non-metallic minerals	CH_4	53.10	101.5	17.5	100.0
26	1A2f	Non-metallic minerals	N_2O	73.33	505.3	17.5	505.0
27	1A2g	Transportation equipment	CO_2	194.48	18.8	17.5	7.0
28	1A2g	Transportation equipment	CH_4	0.16	101.5	17.5	100.0
29	1A2g	Transportation equipment	N_2O	0.24	505.3	17.5	505.0
30	1A2h	Machinery	CO_2	246.51	18.8	17.5	7.0
31	1A2h	Machinery	CH_4	0.18	101.5	17.5	100.0
32	1A2h	Machinery	N_2O	0.26	505.3	17.5	505.0
33	1A2i	Mining and quarrying	CO_2	313.65	18.8	17.5	7.0
34	1A2i	Mining and quarrying	CH_4	0.88	101.5	17.5	100.0
35	1A2i	Mining and quarrying	N_2O	1.26	505.3	17.5	505.0
36	1A2j	Wood and wood products	CO_2	82.01	18.8	17.5	7.0
37	1A2j	Wood and wood products	CH_4	34.57	101.5	17.5	100.0
38	1A2j	Wood and wood products	N_2O	43.68	505.3	17.5	505.0
39	1A2k	Construction	CO_2	2,571.69	18.8	17.5	7.0
40	1A2k	Construction	CH_4	3.03	101.5	17.5	100.0
41	1A2k	Construction	N_2O	5.64	505.3	17.5	505.0
42	1A2l	Textile and leather	CO_2	3,352.31	18.8	17.5	7.0

43	1A2l	Textile and leather	CH_4	54.94	101.5	17.5	100.0
44	1A2l	Textile and leather	N_2O	70.86	505.3	17.5	505.0
45	1A2m	Non-specified industry	CO_2	1,734.14	18.8	17.5	7.0
46	1A2m	Non-specified industry	CH_4	4.77	101.5	17.5	100.0
47	1A2m	Non-specified industry	N_2O	6.80	505.3	17.5	505.0
48	1A3a	Civil aviation	CO_2	2,233.68	5.6	5.0	2.5
49	1A3a	Civil aviation	CH_4	0.44	50.2	5.0	50.0
50	1A3a	Civil aviation	N_2O	16.56	75.2	5.0	75.0
51	1A3b	Road transportation	CO_2	29,995.14	4.3	2.5	3.5
52	1A3b	Road transportation	CH_4	243.47	20.2	2.5	20.0
53	1A3b	Road transportation	N_2O	389.93	25.1	2.5	25.0
54	1A3c	Railways	CO_2	136.10	2.9	2.5	1.5
55	1A3c	Railways	CH_4	0.21	20.2	2.5	20.0
56	1A3c	Railways	N_2O	13.92	100.0	2.5	100.0
57	1A3d	Water-borne navigation	CO_2	11,622.23	25.0	25.0	1.5
58	1A3d	Water-borne navigation	CH_4	22.13	35.4	25.0	25.0
59	1A3d	Water-borne navigation	N_2O	59.83	103.1	25.0	100.0
60	1A4a	Commercial/institutional	CO_2	2,088.03	21.2	20.0	7.0
61	1A4a	Commercial/institutional	CH_4	10.34	121.7	20.0	120.0
62	1A4a	Commercial/institutional	N_2O	3.76	505.4	20.0	505.0
63	1A4b	Residential	CO_2	6,994.11	21.2	20.0	7.0
64	1A4b	Residential	CH_4	590.75	121.7	20.0	120.0
65	1A4b	Residential	N_2O	54.79	505.4	20.0	505.0

66	1A4c	Agriculture/forestry/fishing/fish farms	CO_2	8,235.91	21.2	20.0	7.0
67	1A4c	Agriculture/forestry/fishing/fish farms	CH_4	143.54	121.7	20.0	120.0
68	1A4c	Agriculture/forestry/fishing/fish farms	N_2O	32.00	505.4	20.0	505.0
69	1B1ai	Underground mines	CH_4	2,652.99	39.4	3.6	39.2
70	1B1aii	Surface mines	CH_4	0.35	92.5	4.6	92.3
71	1B2a	Oil	CO_2	767.48	41.8	11.3	40.3
72	1B2a	Oil	CH_4	14,270.02	327.3	9.2	327.2
73	1B2a	Oil	N_2O	2.88	600.1	12.5	600.0
74	1B2b	Natural gas	CO2	756.36	116.5	11.6	115.9
75	1B2b	Natural gas	CH_4	3,777.10	118.2	11.8	117.6
76	1B2b	Natural gas	N_2O	0.18	600.1	12.5	600.0
77	2A1	Cement production	CO_2	36,773.00	33.5	15.0	30.0
78	2A2	Lime production	CO_2	3,825.00	15.1	15.0	2.0
79	2A3	Glass production	CO_2	319.20	42.7	5.0	42.4
80	2B1	Ammonia production	CO_2	1,271.78	28.6	4.0	28.3
81	2B2	Nitric acid production	N_2O	24.12	25.1	2.0	25.0
82	2C1	Iron and steel production	CO_2	3,858.22	24.1	8.9	22.3
83	2F3	Fire protection	HFCs	23.32	16.1	9.6	12.8
84	3A1ai	Dairy cows	CH_4	538.81	41.2	10.0	40.0
85	3A1aii	Other cattle	CH_4	6,861.05	41.2	10.0	40.0
86	3A1b	Buffalo	CH_4	3,879.89	41.2	10.0	40.0
87	3A1c	Sheep	CH_4	17.66	41.2	10.0	40.0
88	3A1d	Goats	CH_4	282.94	41.2	10.0	40.0
89	3A1f	Horses	CH_4	27.27	41.2	10.0	40.0

90	3A1h	Swine	CH_4	814.11	41.2	10.0	40.0
91	3A2ai	Dairy cows	CH_4	61.68	18.9	10.0	16.0
92	3A2ai	Dairy cows	N_2O	65.91	138.6	17.3	137.5
93	3A2aii	Other cattle	CH_4	688.27	18.9	10.0	16.0
94	3A2aii	Other cattle	N_2O	658.76	138.6	17.3	137.5
95	3A2b	Buffalo	CH_4	464.20	18.9	10.0	16.0
96	3A2b	Buffalo	N_2O	379.51	138.6	17.3	137.5
97	3A2c	Sheep	CH_4	2.49	18.9	10.0	16.0
98	3A2c	Sheep	N_2O	5.48	138.6	17.3	137.5
99	3A2d	Goats	CH_4	34.62	18.9	10.0	16.0
100	3A2d	Goats	N_2O	102.90	138.6	17.3	137.5
101	3A2f	Horses	CH_4	6.11	18.9	10.0	16.0
102	3A2f	Horses	N_2O	5.55	138.6	17.3	137.5
103	3A2h	Swine	CH_4	1,034.78	18.9	10.0	16.0
104	3A2h	Swine	N_2O	756.37	138.6	17.3	137.5
105	3A2i	Poultry	CO_2	839.20	18.9	10.0	16.0
106	3A2i	Poultry	CH_4	985.80	138.6	17.3	137.5
107	3B1a	Forest land remaining forest land	CO_2	-42,704.93	59.6	10.2	68.4
108	3B1bi	Cropland converted to forest land	CO_2	-793.85	77.2	15.0	75.7
109	3B1bii	Grassland converted to forest land	CO_2	-11,030.95	77.2	15.0	75.7
110	3B1biii	Wetlands converted to forest land	CO_2	-65.85	18.1	15.0	10.2
111	3B1biv	Settlements converted to forest land	CO_2	-9.59	52.2	15.0	50.0
112	3B1bv	Other Land converted to forest land	CO_2	-52.62	52.2	15.0	50.0
113	3B2a	Cropland remaining to cropland	CO_2	-1,026.04	118.0	14.1	117.2

114	3B2bi	Forest land converted to cropland	CO_2	5,623.33	146.1	14.1	145.4
115	3B2bii	Grassland converted to cropland	CO_2	-891.27	134.2	15.0	133.2
116	3B2biii	Wetlands converted to cropland	CO_2	-53.32	111.2	15.0	110.2
117	3B2biv	Settlements converted to cropland	CO_2	-8.93	118.2	15.0	117.3
118	3B2bv	Other land converted to cropland	CO_2	-6.17	118.2	15.0	117.3
119	3B3bi	Forest land converted to grassland	CO_2	1,168.70	115.2	15.0	114.2
120	3B3bii	Cropland converted to grassland	CO_2	216.13	134.2	15.0	133.3
121	3B3biii	Wetlands converted to grassland	CO_2	-0.79	117.2	15.0	110.2
122	3B3biv	Settlements converted to grassland	CO_2	-0.35	118.2	15.0	117.3
123	3B3bv	Other Land converted to grassland	CO_2	-0.05	118.2	15.0	117.3
124	3B4bi	Land converted to peat extraction	CO_2	526.56	33.5	15.0	30.0
125	3B4biii	Land converted to flooded land	CO_2	513.90	76.5	15.0	75.0
126	3B4biii	Land converted to other wetlands	CO_2	6.43	76.5	15.0	75.0
127	3B5bi	Forest land converted to settlements	CO_2	890.65	96.6	18.0	94.9
128	3B5bii	Cropland converted to settlements	CO_2	1,016.12	76.5	15.0	75.0
129	3B5biii	Grassland converted to settlements	CO_2	12.37	76.5	15.0	75.0
130	3B6bi	Forest land converted to other land	CO_2	5,335.51	33.5	15.0	30.0
131	3B6bii	Cropland converted to other land	CO_2	1,350.75	76.5	15.0	75.0
132	3B6biii	Grassland converted to other land	CO_2	493.00	76.5	15.0	75.0
133	3C1a	Biomass burning in forest land	CH_4	11.35	100.8	10.0	100.3
134	3C1a	Biomass burning in forest land	N_2O	3.16	72.0	10.0	71.3
135	3C1b	Biomass burning in cropland	CH_4	1,244.59	133.8	53.2	122.7
136	3C1b	Biomass burning in cropland	N_2O	309.49	113.6	53.2	100.4

137	3C1c	Biomass burning in grassland	CH_4	31.78	147.0	53.2	137.0
138	3C1c	Biomass burning in grassland	N_2O	9.95	125.1	53.2	113.3
139	3C1d	Biomass burning in all other land	CH_4	10.80	112.5	51.0	100.3
140	3C1d	Biomass burning in all other land	N_2O	3.01	87.7	51.0	71.3
141	3C2	Liming	CO_2	565.79	82.5	106.1	70.7
142	3C3	Urea fertilisation	CO_2	1,436.11	53.9	20.0	50.0
143	3C4	Direct N_2O emissions from managed soils	N_2O	7,754.11	135.4	50.0	125.8
144	3C5	Indirect N_2O emissions from managed soils	N_2O	3,752.55	160.5	50.0	152.5
145	3C6	Indirect N_2O emissions from manure management	N_2O	221.90	110.3	12.0	109.7
146	3C7	Rice cultivations	CH_4	49,693.02	63.2	30.0	55.6
147	4A	Solid waste disposal	CH_4	10,438.86	26.8	17.3	20.6
148	4B	Biological treatment of solid waste	CH_4	69.45	40.2	40.0	4.0
149	4B	Biological treatment of solid waste	N_2O	39.44	72.1	40.0	60.0
150	4C1	Waste incineration	CO_2	528.09	64.0	50.0	40.0
151	4C1	Waste incineration	CH_4	0.13	94.3	50.0	80.0
152	4C1	Waste incineration	N_2O	11.38	94.3	50.0	80.0
153	4C2	Open burning of waste	CO_2	273.91	66.1	50.0	43.3
154	4C2	Open burning of waste	CH_4	377.15	98.6	50.0	85.0
155	4C2	Open burning of waste	N_2O	50.70	98.6	50.0	85.0
156	4D1	Domestic wastewater treatment and discharge	CH_4	4,805.66	23.6	19.5	13.2
157	4D1	Domestic wastewater treatment and discharge	N_2O	1,886.55	142.8	142.5	10.0
158	4D2	Industrial wastewater treatment and discharge	CH_4	2,257.05	45.5	32.0	32.4

Annex 3. Information on GHG emission reduction activities and projects

Annex 3-1. Updated outcomes on GHG emission reduction activities and projects reported in BUR2

Status	Outcomes	
	GHG emission reduction	Other co-benefits and impacts
I. Inter-sectoral GHG emission reduction activities and projects		
1. Viet Nam Partnership for market readiness (VNPMR)		
The project was implemented from 2017 to 2020, during which all 03 components had been completed, including: Component 1: Strengthening the capacity to prepare carbon pricing approaches and support the development of market-based instruments. Component 2: Building the readiness for piloting market-based instruments. Component 3: Enhancing program management and stakeholders' engagement.	The project does not have specific targets for GHG emission reduction	- Promoting sustainable development. - Encouraging and facilitating both community and private sector participation in GHG emission reduction investments.
II. GHG emission reduction activities and projects in energy sector		
1. Low carbon transition in energy efficiency sector (LCEE)		
The project was implemented from 2013 to 2017 with all 02 components completed, including: Component 1: Improving energy efficiency in small and medium-sized enterprises related to 03 sectors: brick production, ceramics production, and food processing. Component 2: Improving energy efficiency in construction works to implement the National technical regulations on energy efficiency buildings (QC09:2013/BXD).	- Component 1: Directly saving 416,316.18 MWh/year and reducing 231,514.15 tCO_2e/year; indirectly contributing to decreases of 57,552.94 MWh/year and 44,260.62 tCO_2e/year. Component 2: Increasing the potential for energy efficiency in large buildings to 23-40% with emission reduction	- Reducing environmental pollution from traditional brick and ceramics production, and using natural resources economically and efficiently; - Improving product quality through the use of advanced production technologies, efficient and environment-friendly use of energy;

Status	Outcomes	
	GHG emission reduction	Other co-benefits and impacts
	by 2027 expected to reach 2,959,558 MWh/year and 1,669,191 $MtCO_2e$/year if QCVN09:2013 is complied with; 4,069,392 MWh/year and 2,295,137 $MtCO_2e$ (in accordance with demonstration models for new buildings).	- Generating more incomes and employment for farmers as a result of biomass collection, transport, and sale. - Promoting the use of RE in the industrial sector and construction works; - Improving capacity and knowledge for stakeholders about energy saving and efficiency.
2. Viet Nam energy efficiency for industrial enterprises (VEEIE)		
Implemented from 2017 to 2022, the project includes 02 components: Component 1: Participating financial institutions (PFI) involved in lending (including Vietcombank and Bank for Investment and Development of Viet Nam (BIDV)) to businesses to invest in energy-saving projects with a total value of USD 156.3 million in 5 years. Component 2: Supporting the project implementation (USD 1.7 million).	Saving 4,639,000 MWh and reducing GHG emission to 5,027,000[2] tCO_2e. Expected annual emission reduction reaching 4,835 $MtCO_2e$ at the end of the project.	- Reducing other pollutants. - Reducing costs of products and services and ensuring employment. - Promoting the environmentally friendly industry.

[2] *http://documents1.worldbank.org/curated/en/454681493226492762/pdf/PAD1719-PAD-PUBLIC-PAD-disclosable-versionP151086-updated-SECPO-0328-2017.pdf*

Status	Outcomes	
	GHG emission reduction	Other co-benefits and impacts
3. Development and promotion of LED technologies for general lighting in Viet Nam		
The project was implemented from 2016 to 2019, during which all 02 components had been completed, including: Component 1: Transferring skills, knowledge, and technologies in LED light production. Component 2: Demonstrating the domestic production of cost-effective commercial LED lighting fixtures.	- Reducing GHG emissions by 1,246[3] tCO_2e (directly), and 2,049,510[4] tCO_2e (indirectly).	- Developing a roadmap for the development of the LED lighting industry until 2025. - Developing 04 Viet Nam standards for LED products. - Developing and implementing the Energy labelling and certification programme for LED lighting products. - Organising 05 training courses for more than 300 engineers and technicians nationwide. - Increasing the market share of Vietnamese LED light manufacturers from 1% in 2014 to 49% in 2019.
III. GHG emission reduction activities and projects in the IP sector		
1. Energy efficiency improvement in commercial and high-rise residential buildings (EECB)		
Implemented from 2016 to 2021, the project includes 03 components: 1) Improving and implementing QC 09:2013/ BXD; 2) Creating market development and support initiatives; 3) Demonstrating and upscaling energy efficiency technological solutions in the construction sector.	- Reducing emissions by 38,656 tCO_2e in the 2016-2020 period. - Reducing indirect emission by 72,188.49 tCO_2e (10 years after the project implementation).	- Raising awareness of the design, construction, operation, and management of energy efficiency works. - Contributing to the formation of a green building development mindset. - Creating jobs and increasing incomes. - Improving consumer health and behaviors. - Carrying out the technological transfer and achieving technological autonomy.

[3] *https://www.vn.undp.org/content/vietnam/en/home/presscenter/speeches/2019/project-debrief-on-the-development-of-the-led-lighting-sector-in.html*

[4] *https://www.vista.gov.vn/news/cac-linh-vuc-khoa-hoc-va-cong-nghe/hoi-nghi-tong-ket-du-an-va-trao-doi-ve-phat-trien-chieu-sang-led-o-viet-nam-488.html*

Status	Outcomes	
	GHG emission reduction	Other co-benefits and impacts
2. Promotion of non-fired brick production and utilization in Viet Nam		
Implemented from 2016 to 2019, the project includes four components: 1) Policy support for non-fired brick technology development; 2) Development of technical capacity to apply and operate non-fired brick production and use its products; 3) Sustainable financial support for the application of non-fired brick production technologies; 4) Demonstration of non-fired brick production technology, investment and upscaling.	Achieving a total GHG emission reduction of 383,000 tCO_2e in 5 years of the project's implementation, a total indirect emission of 13,409,000 tCO_2e, which is accumulated within 10 years after the project ends.	Achieving a GHG emission reduction of 36,560TOE, and increasing the market share of non-fired bricks to 28.5% in 2019 (an increase of 15.5% compared to 2015) through project activities including project demonstration and upscaling, capacity building, and policy support.
IV. Activities and projects for GHG emission reduction in AFOLU sector		
1. Low carbon agricultural support programe (LCASP)		
Implemented from 2013 to 2019, the project includes 03 components: Component 1: Livestock waste management (i) Standardising and disseminating design packages to the biogas value chain management; (ii) Enhancing capacity for relevant agencies to monitor the existing biogas plants; (iii) Providing financial support for biogas plants; (iv) Enhancing capacity for design, construction, and monitoring of biogas plants; (v) Enhancing capacity and providing equipment for related units to manage the national biogas database	Outcomes directly related to GHG emission reduction (no specific estimate of GHG emission reduction is yet available): (i) Decreasing livestock wastewater discharged into the environment by 69.4% with COD decreased from 1,848.3 to 564.6; (ii) Achieving an amount of biogas plant emissions in the LCASP project of 0.54 tCO_2/m^3. (iii) Converting 10% of bio-slurry to organic fertilisers;	- Reducing 2.85 hours of daily workload for women and children; - Organising 2,284 training courses on operating instructions, safety, and maintenance of biogas plants for 62,992 farmer households, of which 23,696 people are female, 4,955 people are ethnic minorities; - Organising 37 technician training classes with 1,264 participants, of which 295 are female, 18 builder training classes with the participation of 495 people, of which 28 are female; -Organising 02 workshops to orient the biogas development management and carbon credit sale activities;

Status	Outcomes	
	GHG emission reduction	Other co-benefits and impacts
Component 2: Credit for biogas value chains (i) Signing contracts of credit counseling; (ii) Final report on credit research. Component 3: Technology transfer for low-carbon agricultural production	(iv) Using at least 88.4% of the energy produced from biogas plants.	- Organising 640 training courses on low carbon technology transfer with a total of 20,978 participants, of which 9,324 are female (by the end of 2018).
2. Biogas programme for the livestock sector in Viet Nam in the 2016-2020 period (Phase 3)		
Implemented from 2003 to 2020, the program has built 179,483 biogas plants, in which: - From 2003 to 2006, 24,179 biogas plants were built in 20 provinces and cities; - From 2007 to June 2016, 133,304 biogas plants were built in 55 provinces and cities; - From November 2006 to December 2020, 22,000 biogas plants were built in 40 provinces and cities.	- Reducing 570,000 tCO_2e/year;	- Reducing environmental pollution caused by livestock waste; - Contributing to the achievement of the national strategic targets on green growth; - Supplying clean and cheap energy for rural people; - Contributing to protecting forests, and reducing the use of fossil fuels and GHG emissions.

Status	Outcomes	
	GHG emission reduction	Other co-benefits and impacts
3. UN-REDD Viet Nam phase II programme (2013-2018)		
The project was implemented from 2013 to 2018, during which all components had been completed, including: - Component 1: Building capacity to operate the National REDD+ action plan (NRAP); - Component 2: Developing and implementing REDD+ Action Plan in 06 pilot provinces; - Component 3: Operating the National forest resource monitoring system to monitor and serve the MRV and the national REDD+ information system on safeguarding; - Component 4: Building the national benefit sharing mechanism; - Component 5: Developing mechanisms for social and environmental safeguards under Cancun Agreements; - Component 6: Strengthening regional cooperation on REDD+ implementation in the lower Mekong.	Focusing on capacity-building activities without setting specific targets for reducing GHG emissions in Phase II.	- Economic, environmental, and social efficiency: Contributing to protecting 156,496ha of forests, planting new 999 ha of forest, developing livelihoods, building a number of village infrastructure in 345 villages with 440,927 people. - Policy: Promulgating the National programme on REDD+ (the Decision No.419/QD-TTG dated April 5, 2017 by the Prime Minister) and the National programme on REDD+ implementation Plan (the Decision No.5264/QD-BNN- TCLN dated December 28, 2018, by the MARD); integrating REDD+ activities into forest protection and development plans; developing and implementing 06 provincial REDD+ action plans (PRAPs) and 35 REDD+ grassroots plans; - Implementing capacity building for sustainable forest management for six forestry companies, six management boards of protection forests, two groups of afforestation households (565 households) with 201,273ha of sustainably managed forests, and 15,051ha of plantation forest certified for sustainable forest management (FSC).

Annex 3-2. Recently implemented NAMAs

Housing NAMA towards carbon-net neutral housing
Summary: - Objectives: To promote the transition to low emission in high-rise residential buildings for the middle-income segment in Viet Nam with the focus on new buildings through the implementation of appropriate emission reduction measures, thus contributing to Viet Nam's achievement of objectives in GHG emission reduction. - Components: The NAMA proposal includes a technical component with three main groups of activities: (i) the development and completion of policies for construction facilities with low-carbon emission; (ii) technical support during the implementation of the NAMA project; (iii) Capacity building/scaling up, and a financial component with the following activities: (i) financial support from French Development Agency (AFD) and BIDV for investors and house buyers; (ii) EUR 8 million of non-refundable grants from the NAMA Facility for Viet Nam. - Sponsoring agency: GIZ financed the development of the NAMA proposal. **Field:** Energy **GHG:** CO_2 **Implementing agency:** MOC **Implementation period:** 05 years since 2022
Quantitative objectives: (i) To reach 27,000 tCO_2e of accumulated GHG emission reduction at the end of the project's implementation; (ii) To reach 192,000 tCO_2e of accumulated GHG emission reduction in 10 years after the project's implementation; (iii) to have 17 construction units and 3,400 apartment owners invest in low-carbon buildings and 200 auditors receive training by the end of the project; (iv) to issue 01 green bond by the end of the Project; (v) to have 34 buildings registered as low-carbon buildings per 5-star standards of the carbon performance labelling system (CPLS); (vi) to mobilize a total of EUR 200 million in public investment and EUR 257.9 million in private investment by the end of the project.
Tracking metrics: i) The amount of GHG emission reduction achieved; (ii) the number of units/individuals benefiting directly from the Project; (ii) the number of green bonds issued to reinvest in low-carbon buildings; (iv) the number of buildings registered as per 5-star standards according to CPLS; (v) the amount of funding mobilised from the public and private sectors.
Funding: The funding for NAMA's implementation includes: - A concessional loan of EUR 200 million from AFD for projects meeting green building and low emission standards; - EUR 8 million of non-refundable grants from the NAMA Facility to reduce the interest rate (expected to be 2% lower) compared to the market price for housing construction and development firms and buyers of apartments in green buildings with low emission.

Information on international market mechanisms: No information on market mechanisms has been provided				
Specific objectives	**Actual or planned steps to achieve the objectives**	**Achieved/ expected outcomes**	**Estimated amount of emission reduction**	**Co-benefits and other impacts**
To have 17 low-carbon buildings registered, built, audited, and certified with 5-star standards according to CPLS	- Developing CPLS and related policies; - Establishing the National registration system for buildings to enable construction units and apartment owners to register; - Developing and implementing the MRV system; - Improving capacity in designing and constructing low-carbon buildings for construction units; - Establishing assessment, certification, and registration systems for independent auditing units; - Establishing financial support and concessional loan mechanisms for construction units and owners of apartments in low-carbon buildings.	The NAMA proposal was submitted to the NAMA Facility in September 2020.	- 27,000tCO_2e of accumulated GHG emission reduction at the end of the project's implementation; - 92,000tCO_2 e of accumulated GHG emission reduction in 10 years after the project's implementation;	- 17 construction units and 3,400 homeowners investing in low-carbon buildings, and 200 auditors trained; - 01 green bonds issued; - 34 buildings registered as low-carbon buildings per 5-star standards of CPLS; - EUR 200 million of public investment capital and EUR 257.9 million of private investment capital mobilised

Annex 3-3. Recently implemented inter-sectoral mitigation activities and projects

Support for Viet Nam in the implementation of the Paris Agreement (VN-SIPA)
Summary: - Objectives: To strengthen the national legal framework and capacity to support the implementation of the Paris Agreement, with a focus on Viet Nam's NDC implementation. - Components: i) Component 1: Strengthening capacity to develop, review, update and implement NDC and the Paris Agreement; ii) Strengthening Legal Framework for implementation of the Paris Agreement and the integration of NDC into the sector strategies of ministries; iii) Component 3: Implementing ecosystem-based adaptation pilot solution in Ha Tinh and Quang Binh; iv) Component 4: Developing some NAMAs; Component 5: Strengthening the coordination of projects under the International Climate Initiative (IKI); and Component 6: Providing consultancy, capacity building and technical assistance to contribute to the development of the National Adaptation Plan (NAP). **- Sponsoring agency:** Germany's Federal Ministry of the Environment, Nature Conservation, and Nuclear Safety (BMU) provides its support under the IKI framework via GIZ. **Field:** Inter-sectoral **GHG:** GHGs will be specified in NAMA proposals regarding activities across agriculture, transport, construction, and domestic investment sectors. **Implementing agency:** MONRE coordinates with the MPI, MOT, MOC, MARD, and the People's Committees of Ha Tinh and Quang Binh provinces. **Implementation period:** September 2019-August 2023
Quantitative objectives: Quantitative objectives will be specified in the NAMA proposals.
Tracking metrics: Tracking metrics will be specified in the NAMA proposals.
Funding: Total: USD 12,611,400, including USD 11,721,400 of ODA and USD 890,000 of reciprocal capital.
Information on international market mechanisms: Information on international market mechanisms will be specified in NAMA proposals.
Methodology: The methodology will be specified in the NAMA proposals.
Assumption: Assumptions will be specified in the NAMA proposals.

Support for Viet Nam in the implementation of the Paris Agreement (VN-SIPA)		
Specific objectives	**Actual or planned implementation to achieve the objectives**	**Achieved/expected outcomes**
- To strengthen the legal framework to implement NDC and the Paris Agreement; - To contribute to the review and update of NDC appropriate to domestic and international contexts.	- Performing NDC review and update; - Evaluating Viet Nam's contributions to global efforts; - Strengthening the capacity of national, ministerial, and sectoral focal points; - Supporting the Working Team regarding negotiations on Climate Change; - Conducting the capacity building for GHG inventory implementation.	- Approving the project on Viet Nam's participation in the Global Effort Assessment; - Issuing the Guidelines of the National Climate Change Committee on reporting mechanisms of the Paris Agreement; - Developing an online portal for NDC information; - Developing mechanisms to promote activities of the NDC Implementation Program (NDC-IP); - Supporting MONRE in implementing the Decision N°.2359/2015/QD-TTG dated December 22, 2015 by the Prime Minister on establishing the national GHG inventory system.
To strengthen the legal framework to implement the Paris Agreement and integrate NDC into ministries' sectoral strategies	- Supporting the development of national and sectoral legal documents and technical instructions; - Assisting the identification of needs and financing capacity for climate change response.	Proposing at least 01 national legal document and 01 sectoral legal document to submit to state management agencies for consideration.
To piloti ecosystem-based adaptation	- Ecosystem-based adaptation in Ha Tinh; - Ecosystem-based adaptation in Quang Binh.	Implementing the climate risk assessment for ecosystem-based adaptation model

Support for Viet Nam in the implementation of the Paris Agreement (VN-SIPA)		
To develop 05 feasible investment projects on GHG emission reduction in line with NAMA	- Promoting NAMA in agriculture, transportation, construction, and domestic investment.	Completing one NAMA proposal in each sector: agriculture and rural development, transportation, construction, and two NAMA proposals in the country.
To strengthen the coordination of projects under IKI	- Organizing and participating in regular IKI meetings; - Developing bulletins, and quarterly reports on project activities, climate change policies, and IKI information in Viet Nam.	- Organizing at least one experience sharing forum on the implementation of IKI projects in Viet Nam; - Organizing periodic meetings and exchanges among the IKI project implementation units; - Periodically (quarterly) publishing and informing relevant stakeholders news about IKI activities in Viet Nam.
Providing consultancy, capacity building, and technical assistance to contribute to NAP development	- Supporting NAP development; - Developing feasible adaptation project; - Participating in sharing international experiences in adaptation.	- Incorporating outcomes of ecosystem-based adaptation in Ha Tinh and Quang Binh provinces into NAP; - Developing the monitoring and evaluation system for the implementation of agricultural adaptation plans within the NDC framework; - Proposing at least 02 feasible projects to implement climate change adaptation tasks in the Paris Agreement; - Preparing some contents related to losses and damages within the Paris Agreement; - Developing and defining methodology, database requirements, and gap analysis in risk assessment of losses and damages to the agriculture sector in Viet Nam.

Annex 3-4. GHG emission reduction activities and projects by sector (with estimated emission reduction outcomes)

I. ENERGY AND IP SECTORS
1. Promotion for the adoption of energy-efficient industrial boilers and operating practices in Viet Nam
Summary: **- Objectives:** to reduce energy consumption and GHG emissions through promoting the use and operation of energy-efficient boilers in the industry sector. **- Components:** i) Policy and regulatory framework in support of the industrial boiler standardization system; ii) Awareness and capacity enhancement for State agencies, users (industrial enterprises), boiler suppliers/manufacturers, and other stakeholders; iii) Financial support and implementation of energy-efficient boiler utilization and production in Viet Nam. **- Sponsoring agency:** UNIDO. **Field:** Energy **GHG:** CO_2 **Implementing agency:** MOIT **Implementing time:** November 2015-May 2020
Quantitative objectives: total energy saved: 1,955,304 GJ/year; total GHG emission reduced: 183,736 tCO_2e/year
Tracking metrics: i) the number of enterprises performing boiler efficiency improvement and energy-efficient boiler replacement solutions; (ii) the amount of energy savings, the amount of GHG emission reduced of enterprises after performing boiler efficiency improvement solutions and energy-efficient boiler replacement; and (iii) the number of training courses on energy-efficient boiler use and operation and the number of attendants in these training courses.
Funding: USD 12,053,000 (ODA: USD 1,831,000; MOIT's reciprocal capital in cash: USD 21,200; and USD 10,200,800 of in-kind co-funded fund and loans from coordinated organisations for the project implementation in Viet Nam)
Information on international market mechanisms: No information on market mechanisms has been provided
Methodology: The amount of annual fuel savings of enterprises is calculated based on (a) the amount of annual fuel reduction of enterprises after implementing boiler efficiency improvement solutions and energy-efficient boiler replacement and (b) the fuel supplies for new boilers of enterprises. The amount of CO2 emission reduction is calculated by the amount of annual fuel savings of enterprises multiplied by the conversion factor of each type of fuel. The modified methodology for calculating the GHG emission reduction benefits of GEF-funded energy conservation projects (version 1.0) - utilises the financial instruments module.

Assumption: The calculations of energy savings and GHG emission reductions are based on estimates of energy savings obtained from analysis reports from several facilities using boilers in Viet Nam's industries which are surveyed during the project's preparation.				
Specific objectives	**Actual or planned implementation to achieve the objectives**	**Achieved/expected outcomes**	**Estimated amount of emission reduction**	**Co-benefits and other impacts**
- To develop, apply and comply with regulations and guidelines on industrial boiler standardization systems; - To raise awareness and disseminate information about energy-efficient boilers to users (industrial enterprises), consultants, energy service companies, and boiler suppliers/manufacturers; - To strengthen the technical capacities of Government agencies, industrial enterprises, boiler suppliers/ manufacturers, energy consultancy firms, and financial/banking institutions; - To improve access to financial sources and incentives for investment projects on production and use of energy-efficient boilers; - To increase the number of industrial enterprises using energy-efficient boilers.	03 components: (1) Policy and regulatory framework in support of the industrial boiler standardization system; (2) Awareness and capacity enhancement for state agencies, users (industrial enterprises), boiler suppliers/ manufacturers, and other stakeholders; (3) Financial support and implementation of energy-efficient boiler utilisation and production in Viet Nam.	- Completing review reports and recommendations to complete regulations and standards on minimum energy efficiency; - Amending and submitting for the promulgation of TCVN 8630:2010 and TCVN 7704:2007; - Completing the database on industrial boilers; - Developing technical documents for the evaluation, operation, and improvement solutions of boiler efficiency; - Organising related seminars, technical training and training courses; - Completing 10 demonstration projects of efficient boiler operation and five boiler replacement projects; and providing technical assistance to implement 149 boiler efficiency improvement projects and 67 boiler replacement projects.	By January 31, 2019, the amount of energy saved had been estimated to reach 2,905,368 GJ/year, equivalent to a GHG emission reduction of 487,866 tCO_2e/year.	- Enhancing capacities for enterprises in efficient boiler operation; - Promoting industrial competitiveness and safe working environment in boiler manufacturing companies; - Partially reducing coal dust, CO, and other toxic gases, improving the working environment, reducing health risks, especially for workers at sites where the boilers are installed; - Improving competitiveness and labour productivity of enterprises.

2. RE development (REDP)
Summary: **- Objectives:** (i) to develop and connect renewable energy sources to the national grid for commercial use, ensuring sustainable development; (ii) to support Vietnamese enterprises in investing in the construction of renewable energy projects; (iii) to support the completion of the legal framework on RE, focusing on addressing some barriers to commercial fund mobilisation in RE development; (iv) to provide technical assistance to improve the capacity of specialized universities, agencies, and units operating in RE development. **- Sponsoring agency:** the WB and the Swiss Federal Economic Cooperation **Field:** Energy **GHG:** CO_2 **Implementing agency:** MOIT **Implementing time:** 2009 - 2018
Quantitative objectives: i) About 250MW of electrical capacity from installed RE sources available for power generation; ii) About 15-25 small RE power projects built and connected to the national grid.
Tracking metrics: i) The amount of electricity supplied to the grid from REDP-funded RE projects (GWh); ii) The amount of electricity supplied to the grid from RE projects using avoidable cost tariff (ACT) (GWh); iii) The percentage of REDP-funded RE (small-sized hydropower) projects meeting new social and environmental best practices.
Funding: USD 318.3 million, including USD 204.272 million of ODA (non-refundable aid: USD 2.272 million)
Information on international market mechanisms: CDM
Methodology: ACM0002 - Unified method for grid-connected power generation projects from RE sources
Assumption: i) It is expected that about 24 projects with a total capacity of 210MW of electricity will be installed in the REDP project; (ii) The operation performance of all hydropower projects reaches 50% of the total capacity with an emission factor of 0.598 tCO_2e/MWh.

Specific objectives	Actual or planned implementation to achieve the objectives	Achieved/expected outcomes	Estimated amount of emission reduction	Co-benefits and
- To develop commercially viable RE resources; - To mobilise additional financial resources for the power sector; - To develop effective and transparent policies and legal bases for RE development; - To promote the involvement of private sectors in the energy sector.	Three components carried out include: - Component 1: Investment in RE projects; - Component 2: Support for the development of policy mechanisms, management, and monitoring capacity of RE projects; and - Component 3: Support for investment preparation and training for RE development.	- Financing 19 RE projects (with a total installed capacity of 320.4 MW); - Organising training on tenders, project management, finance, and environmental and social impact assessment; - Supporting RE development strategies by 2030 with a vision to 2050, supporting for reviewing and adjusting the National electricity development plan for the period of 2011-2020 with a vision to 2030.	As of December 31st, 2020, it is 3.5 $MtCO_2e$.	- Developing training programs, upgrading laboratories, training teachers and students of Universities; - Providing 1,260 GWh/year for the grid from renewable energy projects funded under REDP; - Providing 11,193 GWh/year for the grid from connected renewable energy projects using ACT; and - Having 10% of RE projects funded by REDP meet environmental and social best practices.

3. Viet Nam Low emission energy programme (V-LEEP)
Summary: **- Objectives:** to support the implementation of green growth; to develop the low-emission energy sector in Viet Nam by supporting the development of policies and mechanisms to incentivize low emissions in the energy sector, and at the same time attract public and private investment in RE development and efficient use of energy. **- Sponsoring agency:** USAID. **Field:** Energy **GHG:** CO_2 **Implementing agency:** MOIT **Implementing time:** 2016-2020
Quantitative objectives: To support the mobilisation of USD 250 million to invest in RE resources development, saving 533 million kWh of electricity consumption in industrial establishments; and to reduce emissions by about 360,000 tCO_2e throughout the life cycle of the proposed energy efficiency solutions.
Tracking metrics: The amount of electricity saved in industrial facilities; the amount of CO_2 reduced throughout the life cycle of the proposed energy efficiency solutions, and the financial aid mobilized for investments in RE resources development.
Funding: Approximately USD 9,107,147.88
Information on international market mechanisms: No information on market mechanisms has been provided
Methodology: Internationally-approved methodology
Assumption: Internationally-approved methodology

Specific objectives	Actual or planned implementation to achieve the objectives	Achieved/expected outcomes	Estimated amount of emission reduction	Co-benefits and other impacts
- To contribute to mobilising USD 250 million of investment in RE resources development; - To save 533 million kWh of electricity consumption and reducing emissions by 360,000 tCO_2e; - To propose a direct power purchase agreement model (DPPA) between renewable energy generating units and electricity users, pilot and build a roadmap for widespread application of DPPA in Viet Nam; and - To support clean energy development in Viet Nam in three sectors: developing low-emission energy strategies; developing RE; and encourage policy compliance and investment in efficient energy use.	Component 1: Supporting the implementation of low-emission strategies for the energy sector; Component 2: Building capacity and improving the conditions for RE development; and Component 3: Improving energy efficiency and compliance with regulations on energy saving.	- Researching on the development of MOIT's Action Plan Framework for the 2021-2030 period; - Researching on the development of regulations on minimum energy consumption for several industries (sugar, sugarcane, cement); and - Completing the 'Proposed DPPA model' report and reporting the DPPA mechanism to the Prime Minister.	Implementation outcomes have not been announced	- Reducing the use of fossil fuels and ensuring energy security; and - Reducing environmental pollution; - Contributing to Viet Nam's achievement of SDGs.

II. AFOLU SECTOR
1. Viet Nam sustainable agriculture transformation (VnSAT)
Summary: **- Objectives:** to support the implementation of the Government's Agricultural restructuring plan by strengthening the institutional capacity of the sector; to reform sustainable farming practices and improve value chains of rice and coffee industries in Viet Nam's two key commodity-producing regions, the Mekong River Delta and the Central Highlands. **- Sponsoring agency:** International Development Association (IDA/WB) **Field:** AFOLU **GHG:** CO_2 **Implementing agency:** MARD **Implementing time:** 2015-2020
Quantitative objectives: Reducing 1,000,000 tCO_2e/year in implementing areas
Tracking metrics: 5 indicators: PD01 - Number of beneficiaries (people); PD02 - Area applying sustainable farming methods: Rice acreage (hectares), both current and replanting coffee area (hectares); PD03 - Increasing profit/hectare of productive land of farmers: Rice output (%), coffee output (%); PD04 - GHG emission reduction in rice cultivation in the implementing area (tCO2e); PD05 - Increasing public service quality of the MARD (Authority/Department) and Departments of Agriculture and Rural Development (DARDs) in supporting project implementation (using the scorecard assessment tool)
Funding: USD 301 million (including a loan of USD 238 million from WB; the Government's reciprocal capital of USD 28 million; and private investment capital of USD 35 million)
Information on international market mechanisms: No information on market mechanisms has been provided
Methodology: Internationally-approved methodology
Assumption: Internationally-approved methodology

Specific objectives	Actual or planned implementation to achieve the objectives	Achieved/ expected outcomes	Estimated amount of emission reduction	Co-benefits and other impacts
- To apply advanced technologies to 200,000 hectares of rice production of 140,000 farmer households, increasing 30% in profit; - To apply sustainable farming and advanced technologies to 69,000 hectares of coffee of 63,000 farmer households, increasing profit by VND 15 million/ha; - To enable the access of approximately 140,000 rice farmer households in the Mekong River Delta to the application of sustainable farming techniques and value chain linkages, increasing their income by roughly 30%; and - To enable the access of approximately 63,000 farmer households in the Central Highlands to the application of sustainable farming techniques and coffee replanting, increasing their income by roughly 20%.	Component A: Strengthening institutional capacity for agricultural restructuring; Component B: Sustainable rice development; Component C: Sustainable coffee development; and Component D: Project management	- Component A: Increasing MARD's budget efficiency by 45%; developing three medium-term public expenditure frameworks for recurrent and investment expenditures; implementing 07 agricultural restructuring plans; - Component B: Implementing sustainable rice cultivation practices to achieve the 'Three reductions, Three gains' (3G3T) procedure (148,289 hectares), and the 'One must, Five reductions' (1P5G) procedure (88,712 hectares); increasing farmers' profits by 26.4%; increasing the rice area under consumption contracts to 113%; - Component C: Practicing sustainable coffee cultivation (36,266 hectares), sustainable coffee replanting (13,137 hectares), increasing farmers' profits by 15.8%; and - Credit component: disbursing 100% of the allocated fund for component C (USD 50 million), and 48% for component B (USD 19.2 million).	Reducing 1,172,439 tCO_2e of emissions, reaching 117% of the end-of-term objective (1,000,000 tCO_2e).	- Increasing average profit/ hectare for rice by 26.4% and average profit/hectare for coffee by 15.8%. - Reducing negative impacts on the environment through reducing the amount of water for irrigation, fertilisers, and pesticides in rice and coffee cultivation; and - Strengthening institutional capacity.

2. Sustainable rice production and GHG emission reduction (AVERP) in Thai Binh province
Summary: **- Objectives:** to promote technological innovations to improve efficiency and productivity in rice production while reducing GHG emissions from rice cultivation; to promote the participation and investment of the private sector in the orientation of the rice market. **- Sponsoring agency:** the governments of Australia, Canada, UK, US, and the Bill & Melinda Gates Foundation under the AgResults initiative. **Field:** AFOLU **GHG:** CH_4 **Implementing agency:** Thai Binh People's Committee (Thai Binh DARD) **Implementing time:** 2016-2021
Quantitative objectives: 375,000 tCO_2e in emission reduction
Tracking metrics: The amount of GHG emission reduction; the number of farmer households supported with the development of livelihoods; and the rate of saving on rice production costs
Funding: USD 6,847,289 - 8,074,343
Information on international market mechanisms: No information on market mechanisms has been provided
Methodology: Internationally-approved methodology
Assumption: Internationally-approved methodology

Specific objectives	Actual or planned implementation to achieve the objectives	Achieved/ expected outcomes	Estimated amount of emission reduction	Co-benefits and other impacts
To address production conditions that are not linked to consumer markets by offering prizes of economic value based on real outcomes (pull mechanisms), and review the efficiency and performance of the financial 'pull mechanisms'.	- Phase 1: Piloting rice cultivation technologies to mitigate GHG emissions and increase rice yields (2017-2018); and - Phase 2: Upscaling the mentioned technologies to farmer households (2019-2020).	- Phase 1 (ended): selecting 04 technology packages to continue performing in phase 2; and - Phase 2: Cultivating the fourth crop at the time of writing.	Reducing 375,000 tCO_2e	- Supporting the livelihood development of roughly 75,000 farmer households in the Red River Delta; and - Saving approximately 15% in costs due to reduced input costs.
3. Viet Nam forests and deltas programme - VFD (phase 3)				
Summary: - Objectives: to address long-term climate change risks, taking into account gender issues in both forest landscapes and deltas. - Phase 1 of the project supports the implementation in the four provinces of Son La, Quang Ninh, Thanh Hoa, and Lam Dong towards more adaptive and sustainable development. Phase 2 focuses on supporting the Government of Viet Nam in implementing the Payment for Forest Environmental Services (PFES) program. Phase 3 continues the implementation of PFES activities. **- Sponsoring agency:** USAID. **Field:** AFOLU **GHG:** CO_2 **Implementing agency:** MARD **Implementing time:** April 2018-December 2020				

Quantitative objectives: To reduce 50,600,000 tCO_2e
Tracking metrics: - Indicator 1: The number of trainees in landscape sustainability; - Indicator 2: The number of agencies whose capacity in the sustainable landscape is improved; - Indicator 3: The number of policies, documents, and guidelines on sustainable landscapes officially proposed, promulgated, or implemented; - Indicator 4: The amount of capital mobilized from the public and private sectors for sustainable landscapes; - Indicator 5: The number of people benefiting from implementing sustainable resource management; - Indicator 6: The amount of GHG emission reduction or absorption in tons of CO_2 through sustainable landscape activities; - Indicator 7: The amount of emission reduction projected by 2030 through policies or tools on sustainable landscapes; - Indicator 8: The number of units and households receiving payments for forest environmental services through electronic payment; and - Indicator 9: The number of tools, technologies, and methods regarding GHG emission reduction and/or climate change adaptation that are developed, tested, and/or applied.
Funding: USD 5,643,572 (including USD 5 million of ODA and USD 643,572 USD of reciprocal capital)
Information on international market mechanisms: No information on market mechanisms has been provided
Methodology: Internationally-approved methodology
Assumption: Internationally-approved methodology

Specific objectives	Actual or planned implementation to achieve the objectives	Achieved/ expected outcomes	Estimated amount of emission reduction	Co-benefits and other impacts
- To research, pilot, and propose to promulgate PFES mechanisms for forest carbon sequestration and storage services; - To review, pilot, and propose the institutionalization of the PFES policy implementation monitoring and evaluation system; and - To review, pilot, and propose the institutionalisation of the PFES payment to forest owners through electronic transactions, and bank transfers.	- Researching and piloting in Quang Ninh and Thanh Hoa provinces; - Developing technical guidelines for calculating the amount of carbon sequestration in forests; - Developing documents for the development of the Decree on carbon sequestration and storage services in forests; - Piloting the set of monitoring and assessment indicators in the provinces participating in the project;	By June 2020, the indicators had been achieved against the project objectives as follows: - Indicator 1: 6867 people, reaching 107% of the indicator; - Indicator 2: 4 agencies, reaching 2% of the indicator; - Indicator 3: 10 documents, reaching 67% of the indicator; - Indicator 4: 128 million, reaching 34% of the indicator; - Indicator 5: 1,669,671 people, reaching 111.31% of the indicator; - Indicator 6: 16,896,081 tCO2e, reaching 33% of the indicator; - Indicator 7: 230,860,832 million, reaching 104% of the indicator; - Indicator 8: 3,558 households, reaching 30% of the indicator; and - Indicator 9: 6 solutions/tools, reaching 86% of the indicator.	By June 2020, the emission reduction has reached 16,896,081 tCO_2e.	- Enhancing capacity for sustainable landscapes; - Developing policies and guiding documents on sustainable landscapes; - Increasing mobilized fund for sustainable landscapes; - Increasing revenues for units and households implementing sustainable resource management.

	- Applying remote sensing technologies for forest area monitoring; - Developing reports on related activities through electronic transactions, and bank transfers; - Piloting and developing regulations on PFES payments through electronic transactions, and bank transfers; and - Developing a manuals for PFES implementation.			

4. Scheme on emission reduction and transfer of emission reduction rights in northern Central region
Summary: **- Objectives:** As the first payment scheme based on GHG emission reduction in Viet Nam from REDD+ implementation, it aims to build an effective REDD+ implementation system, and contributes to sustainable forest management, green economic growth, and poverty alleviation and climate change mitigation at regional and global levels. **- Sponsoring agency:** Forest Carbon Partnership Facility (FCPF) **Field:** AFOLU **GHG:** CO_2 **Implementing agency:** MARD and the 6 northern Central coastal provinces of Thanh Hoa, Nghe An, Ha Tinh, Quang Binh, Quang Tri and Thua Thien-Hue. **Implementing time:** 2018-2025
Quantitative objectives: To reduce 25 $MtCO_2e$
Tracking metrics: The acreage of forests and changes in the acreage of forests; the amount of GHG emission reduction
Funding: The national budget, ODA, and other legitimate funds (Forest environment service fees, private sector, credit services, etc.), funds from the transfer of FCPF emission reduction credits.
Information on international market mechanisms: FCFP will buy 10.3 tCO_2e in the total emission reduction of the scheme
Methodology: Methodology of FCPF
Assumption: According to FCPF's methodology

4. Scheme on emission reduction and transfer of emission reduction rights in northern Central region				
Specific objectives	**Actual or planned implementation to achieve objectives**	**Achieved/expected outcomes**	**Estimated amount of emission reduction**	**Co-benefits and other impacts**
- To facilitate emission reduction; - To promote sustainable forest management and strengthen forest carbon storage; and - To promote climate change adaptive agriculture and sustainable livelihoods for people who rely on forests.	- Component 1: Facilitating emission reduction; - Component 2: Promoting sustainable forest management and strengthening forest carbon storage; - Component 3: Promoting smart and climate change adaptive agriculture and sustainable livelihoods for people who rely on forests; and - Component 4: Implementing program management and emissions monitoring.	With approximately USD 51.5 million from FCPF, the scheme pays for forest owners, households, individuals, and communities in mountainous areas in 6 northern Central provinces of Viet Nam. According to the agreement, WB will buy 10.3 MMTCDE from the emission reduction and increased carbon sequestration in the northern Central region.	25 $MtCO_2e$	- Maintaining sustainable livelihoods, culture, and communities of people whose lives rely on forests; - Improving scientific and technical knowledge for ethnic minority people in mountainous areas; - Raising people's awareness of the value of forest resources; - Generating income and creating jobs; - Promoting smart and climate change adaptative agriculture; - Conserving biodiversity; - Protecting and maintaining ecological services; - Protecting and developing medicinal plants/traditional medicines; - Regulating water resources and managing watershed; - Contributing to sustainable forest management; - Improving provincial forest management services; - Improving the field of land use; - Improving district-level planning of land use.

Annex 3-5. Recently implemented GHG emission reduction activities and projects by sector (without estimated emission reductions)

Description	Sector	Time of implementation	Funding	Specific objectives	Achieved/expected outcomes
1. Promoting the investment market of Energy Efficiency and Savings in the industrial sector of Viet Nam sponsored by the Korean Government and Korea International Cooperation Agency (KOICA)					
Objectives: To promote energy conservation and efficiency in the industrial sector through the development of the Energy Efficiency & Savings investment market. **Implementing agency:** MOIT	Energy	November 2015-February 2020	- Non-refundable ODA: USD 1.9 million - MOIT's reciprocal capital in cash: USD 48,570	- To improve the capacity and raise awareness of Energy Service Companies (ESCOs), energy conservation centers, state management agencies, and related partners on the implementation of investment projects on energy saving and efficiency through ESCO business model; - To contribute to the realization of the ESCO model through the implementation of energy-saving and efficiency investment pilot projects and policy recommendations.	- Organizing training for state management staff in energy saving and efficiency and technical staff of ESCOs and energy efficiency centers in Korea in 2018; - Completing energy audit reports for 10 pilot enterprises; - Organizing communication, guidance, and knowledge-sharing activities.

Description	Sector	Time of implementation	Funding	Specific objectives	Achieved/expected outcomes
1. The Danish-Vietnamese energy partnership programme for the 2017 - 2020 period (DEPP programme)					
Objectives: To implement cost-effective opportunities for a broader range of low-carbon transformation in energy systems in Viet Nam. **Implementing agency:** MOIT	Energy	2017 - 2020	- Non-refundable ODA: DKK 21.6 million; - MOIT's reciprocal capital: VND 3 billion.	- To increase the sustainability of Viet Nam's energy systems; - To effectively integrate RE into Viet Nam's electricity systems to increase the proportion of RE sources; and - To implement cost-effective opportunities for low-carbon conversion in the industry sector.	- Completing and publishing the Energy Outlook Report for 2017 and 2019; - Completing and publishing the first Vietnamese Technology Handbook; - Improving capacity in planning for the energy sector; forecasting load and electricity output from variable RE sources; improving capacity in demand calculation and ensuring the provision of ancillary services; and - Reviewing and proposing amendments and adjustments to technical processes related to auxiliary services of electrical systems.

Description	Sector	Time of implementation	Funding	Specific objectives	Achieved/expected outcomes
3. RE and energy efficiency, phase 2					
Objectives: To achieve the objectives set out in the National power development plan, the Green growth strategy, the Green growth action plan, the National action programme on sustainable production and consumption to 2020 with a vision to 2030 and the National programme on energy efficiency **Implementing agency:** MOIT	Energy	2019 - 2021	- Non-refundable ODA: EUR 3,415,000; - MOIT's reciprocal capital: VND 2 billion.	To develop and complete legal frameworks and regulations to manage large-scale RE installation, thus improving energy efficiency in the industry sector, strengthening capacity, and raising awareness of all stakeholders.	- Mitigating climate change through increased use of RE and increased energy efficiency; and - Improving energy security through increasing renewable energy projects and taking initiative in input supply, which contributes to reducing dependence on imported energy.
4. ASEAN low carbon energy programme (LCEP)					
Objectives: To support countries in building roadmaps for low-carbon energy development, focusing on sustainable energy infrastructure development and green financial markets for RE development and energy efficiency use for countries in Southeast Asia (Myanmar, Indonesia, Malaysia, Philippines, Thailand, and Viet Nam) **Implementing agency:** MOIT	Energy	2020-2022	GBP 800,000	- To implement a number of tasks in the National programme on energy efficiency for the 2019-2030 period. - To mobilise financial resources for investment in energy efficiency; - To improve the capacity in developing offshore wind power projects and operating energy technical infrastructure.	- Promoting RE development; - Promoting energy conservation and efficiency; - Reducing environmental pollution; and - Contributing to Viet Nam's achievement of SDGs.

Description	Sector	Time of implementation	Funding	Specific objectives	Achieved/expected outcomes
5. Climate protection through sustainable bioenergy markets in Viet Nam (BEM)					
- General objectives: To provide consumers and the environment with benefits from the fair and sustainable supply and use of energy in terms of society, ecology, and economy in Viet Nam. **- Specific objectives:** To remove barriers against the sustainable use of biomass in electricity and heat generation. **Implementing agency:** MOIT	Energy	2019-2023	- Non-refundable ODA: EUR 4 million; - MOIT's reciprocal capital: VND 1.617 billion.	- To support the adjustment of the policy framework for planning and licensing the implementation of biomass energy projects at the provincial level; - To strengthen the capacity of the private sector in construction implementation, and the capacity of financial institutions in mobilizing capital for the implementation of biomass energy investment projects; - To promote technological cooperation and connect Vietnamese and international businesses, research institutes, and universities regarding the use of biomass resources for electricity and heat generation.	- Reducing climate change through improving RE application conditions, supporting the reduction of GHG emissions by minimizing the use of fossil fuels, and avoiding CH4 emissions; - Improving energy security, reducing dependence on imported energy sources; - Promoting industrial growth and creating jobs, indirectly contributing to poverty alleviation and hunger eradication; and - Increasing the competitiveness of related industries in Viet Nam.

Description	Sector	Time of implementation	Funding	Specific objectives	Achieved/expected outcomes
6. Smart grid for RE and energy efficiency (SGREEE)					
Objectives: To support the implementation of the Smart grid roadmap and promote modernisation and automation of the national electricity transmission and distribution system **Implementing agency:** MOIT	Energy	2017 - 2021	- Non-refundable ODA: EUR 5 million; - MOIT's reciprocal capital: EUR 297,980	- To develop and complete the legal framework and relevant regulations for smart grid development; - To improve planning and technical capacities of experts and managers in smart grid construction and implementation; and - To cooperate in technology, focusing on modern technology solutions; research and develop technology products and energy efficiency software; implement RE connection and operation; follow trends of smart home and smart city construction products and services.	- Completing the following reports: 'Review and proposal of the legal framework on smart grids for RE and energy efficiency in Viet Nam', 'Review of the regulations on the electricity transmission system and regulations on the electricity distribution system in Viet Nam, and research about international experiences on the connection standards of RE plants in order to propose appropriate modifications to current regulations in Viet Nam', 'Technological assessment of smart grids for RE and energy efficiency'; 'Promoting the implementation of load adjustment programmes in Viet Nam'. - Organising the 2019 Smart Grid Week in Viet Nam.

Description	Sector	Time of implementation	Funding	Specific objectives	Achieved/expected outcomes
7. Sustainable natural resources management					
Objectives: To strengthen the national capacity for sustainable natural resource management by focusing on forest management, biodiversity, and livelihood development **Implementing agency:** MARD	AFOLU	2015-2020	Total investment capital: USD 12,116,137, including: - Non-refundable ODA from JICA: JPY 1,251,000,000, equivalent to USD 10,320,890. - Reciprocal capital: USD 1,795,247.	- To promote policies and legal framework for sustainable natural resource management, and reform the forestry sector, National REDD+ action programme, and biodiversity data; - To implement the objectives set out in the National REDD+ action programme (NRAP); - To develop a roadmap for the management and monitoring of forest resources and biodiversity of Lang Biang biosphere reserve together with co-management agreements and benefit-sharing mechanisms; - To share the project outcomes and data to strengthen sustainable forest and biodiversity management systematically.	- Supporting the development of the Law on Forestry, and decrees stipulating in details the implementation of a number of articles of the Law on Forestry and Viet Nam standards; - Calculating preliminary outcomes of carbon emissions/sequestration for the 2014 -2018 period; - Developing provincial-level action plans and the national database on biodiversity; - Incorporating data/information into FORMIS, and completing the integration of mobile application data into FORMIS.

Description	Sector	Time of implementation	Funding	Specific objectives	Achieved/expected outcomes
8. General protection and management of forest ecosystems in Quang Nam, Kon Tum and Gia Lai provinces					
Objectives: To maintain the integrity of forest ecosystems, the biodiversity of natural forest ecosystems in the southern Central region and the Central Highlands, improving the living standards of local ethnic minority communities **Implementing agency:** MARD, and DARDs of Quang Nam, Kon Tum, and Gia Lai provinces	AFOLU	2014 - 2020	Total budget: EUR 11.29 million	To sustainably protect and manage 23,552.90 ha of natural production forests in Quang Nam, Kon Tum, and Gia Lai; secure stable and regular incomes for 31 communes and 72 villages by diversifying products from forests (including 66 models in the project area with a total established area of 22,560.75ha, and 06 extended models outside the project area with a total extended area of 992.15ha in Kon Tum and Gia Lai provinces).	Sustainably protecting and managing forests, preventing deforestation and forest fires.
9. Sustainable forest management and biodiversity to reduce CO_2 emissions					
Objectives: To strengthen the biodiversity of forest ecosystems and the integrity of landscape ecosystems in the Northern mountainous region of Viet Nam, contributing to the region's adaptation to climate change and supporting the livelihood of residents. The project is implemented in Yen Bai, Lai Chau, Lao Cai, Ha Giang, and Bac Kan provinces. **Implementing agency:** MARD	AFOLU	2014 - 2021	EUR 26.07 million, including EUR 20.5 million of ODA (EUR 15 million of concessional loans and EUR 5.5 million of non-refundable ODA). Viet Nam's reciprocal capital: EUR 5.57 million.	- To improve biodiversity values and quality of special-use forest ecosystems; and - To improve forest management capacity, focusing on increasing the value of biodiversity, production forest ecosystem services and protective forests (including habitats, and land and water resources protection); and to increase economic efficiency through the application of silviculture techniques.	Implementing 61,506ha of special-use forests in four conservation areas; protecting and managing 12,199ha of the community forest, and sustainably managing 8,400ha of acacia and pine forests.

Description	Sector	Time of implementation	Funding	Specific objectives	Achieved/expected outcomes
10. Supporting the readiness for REDD+ in Viet Nam-phase 2 (FCPF-2)					
Objectives: To support the improvement of the organizational and technical capacity for the Steering Committee, REDD+ Office, a number of relevant agencies at the central level, and 06 provinces under the Project on emission reduction and transfer of emission reduction rights for the northern Central Region's readiness for REDD+. **Implementing agency:** MARD	AFOLU	18/11/2016 - 30/6/2020	Funding: USD 5,693,000, including: - Non-refundable ODA: USD 5 million - Reciprocal capital: USD 693,000.	- To support the development of roadmaps, plans, and negotiations for an emission reduction payment agreement (ERPA). - To support the reformation of state forestry companies and forest management boards to develop procedures and policies to encourage REDD+ in the emission reduction programme; - To assess the implementation of the Decree No.118/2014/CP-ND on the arrangement, innovation, and development to improve the performance of agricultural and forestry companies.	- Supporting the development of three decrees and three circulars guiding the implementation of the 2017 Law on Forestry; - Finalising the provincial REDD+ action plans (PRAP) for the above-mentioned 06 provinces; - Developing Vietn Nam's legal timber guidelines; - Providing technical support in issuing forest certification, managing and promoting REDD+ services; - Organising seminars (13 consultation workshops, 10 training courses, and relevant communication activities).

Description	Sector	Time of implementation	Funding	Specific objectives	Achieved/expected outcomes
11. Improving resilience of vulnerable coastal communities to climate change impacts in Viet Nam - Component 2. Mangrove planting					
Objectives: To strengthen the resilience to climate change-related impacts, supporting life stability and safety of people; to increase forest cover and improve the quality of mangroves, contributing to increasing carbon sequestration to reduce GHG emissions and enhance biodiversity. **Implementing agency:** MARD and the five provinces of Nam Dinh, Thanh Hoa, Quang Nam, Quang Ngai and Ca Mau.	AFOLU	2017 - 2021	Approximately USD 10.5 million of ODA and reciprocal capital of MARD and five provinces.	To support the reforestation, rehabilitation, improvement, and planting of a part of 4 thousand hectares of coastal mangroves to improve the protection function of coastal forests.	- Replanting 1,448/4,000ha of mangroves by the end of 2019, reaching 36% of the project objective; 100% of the objective is expected to be achieved by the end of 2021; - Implementing 14 livelihood models in the five provinces with 402 beneficiary households.

Annex 4. Updates on climate change response projects in Viet Nam from 2017 to present

I. Internationally funded complete and ongoing projects responding to climate change

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
I. Public financial support - multilateral									
I.1. Public multilateral financial support – GEF									
1	Mekong River Delta integrated climate resilience and sustainable livelihoods (ICRSL)		392,990,831 in which: + 200,000 funded to develop project documents; + 6,090,831 funded by GEF via WB; +386,700,000 is co-financing funding.	On-going	GEF/WB	Non-refundable grant	Adaptation, capacity building, technical assistance	MARD	2017-2021
2	Implementation of Eco-industrial park initiative for sustainable industrial zones in Viet Nam (phase 2)		7,524,000	On-going	GEF/ UNIDO	Non-refundable grant	Mitigation, policy improvement, capacity building	MPI	2017-2020
3	Preparation of the BUR3 to the UNFCCC		352,000	On-going	GEF/ UNEP	Non-refundable grant	Financing, technical assistance	MONRE	2019-2022

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
4	Energy efficiency improvement in commercial and high-rise residential buildings in Viet Nam (EECB)		3,198,000	On-going	GEF/ UNDP	Non-refundable grant	Mitigation, policy improvement, capacity building	MOC	2016-2021
I.2. Public multilateral financial support - GCF and CTF									
5	Improving the resilience of vulnerable coastal communities to climate change impacts in Viet Nam		40,529,625 in which 29,523,000 is non-refundable ODA, the rest is from other donors	On-going	GCF/ UNDP	Non-refundable grant	Adaptation, capacity building, technical assistance	-MARD; - MOC; - People's Committees of Nam Dinh, Thanh Hoa, Thua Thien-Hue, Quang Ngai, Quang Binh, Quang Nam and Ca Mau provices	2017-2022
6	Scaling up energy efficiency for industrial enterprises in Viet Nam		497,200,000 in which 11,300,000 is non-refundable ODA, the guaranteed loan from GCF is 75,000,000, the rest is co-financing from other donors	On-going	GCF/WB	- Non-refundable grant; - Guaranteed loan; and - Preferential loan;	Mitigation	MOIT	2018-2025

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
7	Strengthening the resilience of smallholder agriculture to climate change-induced water insecurity in the Central Highlands and southern Central coastal regions of Viet Nam		156,292,842 in which 30,205,367 is non-refundable ODA, the rest is co-financing from other donors	On-going	GCF/WB	- Non-refundable grant; - Guaranteed loan; and - Preferential loan;	Mitigation	MOIT	2020-2026
I.3. Public multilateral financial support- UN organisations - FAO, UNEP, UNDP, UNIDO and other organisations									
8	Promotion of energy efficiency industrial boiler adoption and operating practices in Viet Nam		12,053,000, including: + Non-refundable grant: 1,831,000 + In kind co-financing and loan from Vietnamese Stakeholders: 10,200,800 + Counterpart fund of MOIT: 21,200	On-going	UNIDO	- Non-refundable grant; and -Preferential loan;	Mitigation, policy improvement, capacity building	MARD	2015-2020
9	Viet Nam HCFC phase-out project (Phase I)		250,000	Comp-lete	UNIDO	Non-refundable grant	Mitigation, capacity building	MOIT	2017-2019

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
I.4. Public multilateral financial support - ADB, WB									
10	Viet Nam dam rehabilitation and safety improvement project (WB8)		443,000,000	On-going	ODAWB	Non-refundable grant	Adaptation, capacity building, technical assistance	MARD	2016-2022
11	Project for improved land governance and database (VILG)		180,000,000	On-going	ODAWB	Preferential loan	Adaptation	MONRE	2017-2021
12	Trung Son hydropower project		330,000,000	On-going	ODAWB	Preferential loan	Mitigation	EVN	2020
13	Reducing transmission loss project		500,000,000	On-going	ODAWB	Preferential loan	Mitigation	EVN	2020
14	Scaling up energy efficiency for industrial enterprises (ESCOs) in Viet Nam		150,000,000	Comp-lete	ODAWB	Preferential loan	Mitigation	MOIT	2018
15	Phasing out fuel subsidies		200,000	Comp-lete	ODAWB	Non-refundable grant	Mitigation	MOIT	2018
16	Variable RE integration study		200,000	Comp-lete	ODAWB	Non-refundable grant	Mitigation	MOIT	2018
17	EVN credit rating		300,000	Comp-lete	ODAWB	Non-refundable grant	Mitigation	EVN	2018
18	RE mapping (wind, solar, hydropower, biomass)		2,200,000	On-going	ODAWB	Non-refundable grant	Mitigation	MOIT, EVN	2020

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
19	Maximising financing for energy development		300,000	Comp-lete	ODAWB	Non-refundable grant	Mitigation	MOIT, EVN	2018
20	National solar strategy and Rooftop strategy for Ho Chi Minh City and Da Nang		600,000	Comp-lete	ODAWB	Non-refundable grant	Mitigation	MOIT, People's committee of HCMC and Da Nang	2019
21	Solar auction design and implementation (P166827)		2,500,000	Comp-lete	ODAWB	Non-refundable grant	Mitigation	MOIT	2018 - 2019
22	LNG strategy		500,000	Comp-lete	ODAWB	Non-refundable grant	Mitigation	MOIT	2019
23	Develop energy efficiency (EE) targets and mandatory EE regime for Viet Nam		300,000	Comp-lete	ODAWB	Non-refundable grant	Mitigation	MOIT	2019
24	Power sector development policy series		2,000,000	Comp-lete	ODAWB	Non-refundable grant	Mitigation	MOIT	2018
25	Lao - Viet Nam interconnector		10,000,000	On-going	ODAWB	Preferential loan	Mitigation	MOIT, EVN,	2020
26	Extension of Yaly hydropower plant		702,000	Comp-lete	Financed by Global Green Growth Institute (GGGI)	Non-refundable grant	Mitigation and capacity building	MOIT	2017 - 2018

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
27	EU - Viet Nam Energy Facility		10,494,000	On-going	Financed by EU via GIZ	Non-refundable grant	Mitigation and capacity building	MOIT	2018 - 2021
28	Supporting hydroelectric electricity production increase in Viet Nam		2,320,000	On-going	Financed by EU via AFD	Non-refundable grant	Mitigation and capacity building	EVN	2018 - 2023
29	Da Nang solar energy development		696,000	On-going	Financed by EU	Non-refundable grant	Mitigation and capacity building	Da Nang Energy Conservation and Technology Consultant Center (DECC)	2017 - 2021
30	Civil Society meets RE&EE - trainings, seminars and communication skills to boost RE&EE as a key tool for sustainable development and green growth strategy in Viet Nam (E-Enhance)		696,000	On-going	Financed by EU	Non-refundable grant	Mitigation and capacity building	GreenID Center	2017 - 2021
31	Enhancing readiness for solar power deployment in Viet Nam		225,000	Comp-lete	Financed by ADB	Non-refundable grant	Mitigation	ADB	2017 - 2018
32	Enhanced policy for increased green finance in Viet Nam		677,000	Comp-lete	Financed by GGGI	Non-refundable grant	Mitigation, capacity building and technical assistance	MPI	2017 - 2018

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
33	Viet Nam green growth urban action		1,119,000	Comp-lete	Financed by GGGI	Non-refundable grant	Mitigation, capacity building and technical assistance	MOC	2017 - 2018
34	Sustainable environment of coastal cities (P156143)		236,200,000	On-going	ODA WB	Preferential loan	Adaptation and investment	People's Committee of Quang Binh, Khanh Hoa, Binh Thuan, Ninh provinces	2017 - 2022
35	Forest sector Modernisation and coastal resilience enhancement project		150,000,000	On-going	ODA WB	Preferential loan	Adaptation, mitigation, and investment	MARD	2017 - 2023
36	Da Nang sustainable city development project (P159049)		72,520,000	Comp-lete	ODA WB	Preferential loan	Adaptation, mitigation, and investment	People's Committee of Da Nang City	2017 - 2019
37	Central Highlands connectivity improvement project (P159238)		150,000,000	On-going	ODA WB	Preferential loan	Mitigation and investment	MT	2017 - 2023

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
38	Scaling up urban upgrading project (P159397)		240,000,000	On-going	ODA WB	Preferential loan	Adaptation, mitigation, and investment	People's committee of Ben Tre, Soc Trang, An Giang, Vinh Long, Bac Lieu	2017 - 2023
39	Medium cities development projects (P159426)		53,000,000	On-going	ODA WB	Preferential loan	Mitigation and investment	People's committee of Lao Cao, Ha Nam, Nghe An	2017 - 2020
40	Support Programme for national targets (P159737)		153,000,000	On-going	ODA WB	Preferential loan	Adaptation, mitigation, and investment	MARD	2017 - 2021
41	Emergency natural disaster ceconstruction project (P163146)		118,000,000	On-going	ODA WB	Preferential loan	Adaptation and investment	- MARD; - People's Committees of Binh Dinh, Quang Ngai, Phu Yen, Ninh Thuan, Ha Tinh provinces	2017 - 2021
42	Financing for Viet Nam energy efficiency (P151086)		101,700,000	On-going	ODA WB	Preferential loan	Mitigation and investment	MOIT	2017 - 2022

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
43	Dynamic city integrated development project (P160162)		80,000,000	On-going	ODA WB	Preferential loan	Adaptation, mitigation, and investment	People's Committee of Thai Nguyen	2018 - 2023
44	Mekong Delta Integrated climate resilience and sustainable livelihoods project (ICRSL), GEF (P159976)		60,900,000	On-going	ODA GEF/WB	Preferential loan	Adaptation, mitigation, and investment	MONRE; MARD	2018 - 2022
45	Commercial smallholder support project (CSSP) in Cao Bang and Bac Kan		45,000,000	On-going	ODA IFAD	Preferential loan	Adaptation, mitigation and capacity building	People's Committees of Bac Kan and Cao Bang provinces	2017-2023
46	Addressing the 2030 Agenda on climate change and food security through climate-smart agriculture		224,575	Comp-lete	ODA FAO	Non-refundable grant	Adaptation, mitigation and capacity building	MARD	2017-2019
47	Basic infrastructure for inclusive growth in the northeastern provinces sector project		150,000,000	On-going	ODA ADB	Preferential loan	Adaptation, mitigation and capacity building	People's Committees of Bac Kan, Cao Bang, Ha Giang, and Lang Son provinces	2018-2023

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
48	Basic infrastructure for inclusive growth in the north central provinces sector project		149,000,000, including: - Reciprocal Capital from budget: USD 52,000,000 - Preferential loan: USD 97,000,000	On-going	ODA ADB	Preferential loan	Adaptation, mitigation and capacity building	People's Committees of Ha Tinh, Nghe An, Quang Binh and Quang Tri provinces	2018-2023
49	Secondary green city development project		170,000,000	On-going	ODA ADB	Preferential loan	Adaptation, mitigation, capacity building , technology transfer and investment	People's Committees of Ha Giang, Vinh Phuc, Thua Thien-Hue provinces	2018-2023
50	Water efficiency investment in drought-affected provinces (WEIDAP)		100,850,000	On-going	ODA ADB	- Non-refundable grant: 850,000 - Preferential loan: USD 100,000,000	Adaptation, mitigation, capacity building, technology transfer, and investment	- MONRE - People's committee of Binh Thuan, Dak Lak, Dak Nong, Khanh Hoa, Ninh Thuan provinces	2019-2026

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
II. Bilateral Support Activities									
51	Project for promoting investment market for energy efficiency in industrial sector in Viet Nam		1,900,000	On-going	KOICA	Non-refundable Grant	Mitigation, capacity building and policy improvement	MOIT	2015-2020
52	Viet Nam - Denmark energy partnership programme (DEPP)	21,600.000 DKK	3,150,000	On-going	Denmark	Non-refundable Grant	Capacity building, policy improvement and technical assistance	MOIT	2017-2020
53	Viet Nam low emission energy programme (V-LEEP)	211,065,000.000 VND	10,000,000	On-going	USAID	Non-refundable grant	Mitigation, capacity building, and policy improvement	MOIT	2016-2020
54	ASEAN low carbon energy programme in Viet Nam	800,000 GBP	1,040,000	On-going	USGRANT	Non-refundable grant		MOIT	2020-2022

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
55	Support to Viet Nam for the implementation of the Paris Agreement	10,300,000 EUR	11,820,228	On-going	UK	Non-refundable grant	Mitigation, capacity building, technical support and policies	MONRE	2017-2021
56	Climate protection through sustainable bioenergy markets in Viet Nam	4,000,000 EUR	4,400,000	On-going	ODA German (by BMZ under the IKLU initiative) via GIZ	Non-refundable grant	Mitigation, capacity building, technical support	MOIT	2019-2023
57	Smart grid for RE and energy saving	5,000,000 EUR	5,500,000	On-going	ODA German (by BMZ under the IKLU initiative) via GIZ	Non-refundable grant	Mitigation, energy saving, and technical support	MOIT	2017-2021
58	AgResults Viet Nam emissions reductions pilot (AVERP)		Based on the results of implementation and awarding of sponsors,	On-going	SNV		Agriculture development and mitigation	People's Committee Thai Binh (Thai Binh's MARD)	2016-2021

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
59	Forest and delta of Viet Nam (phase 3)		5,000,000	On-going	Winrock Interna-tional/ USGRANT	Non-refundable grant	Forestry, bio-diversity, mitigation, technical support, and capacity building	MARD (Management board for forestry projects)	2018-2020
60	FF-2: Support for the REDD+ readiness preparation in Viet Nam phase 2		5,693,000	On-going	WB	- Non-refundable grant: 5,000,000; - Reciprocal Capital: 693.000	Forestry, bio-diversity, mitigation, technical support, and capacity building	MARD (Management board for forestry projects)	2016-2020
61	Emissions reduction in the northern Central region		51,500,000	On-going	The carbon fund of FF/WB	Payment based on results of REDD + implementation in the northern Central region	Forestry, bio-diversity, mitigation, technical support, and capacity building	MARD (Management board for forestry projects)	2018-2025

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
62	Ecosystem-based adaptation on the northern central coast of Viet Nam: restoration and co-management of degraded dunes and mangroves	1,892,000 EUR	2,081,200	On-going	ODA German (by BMZ under the IKLU initiative) via "UNIQUE forestry and land use GmbH"	Non-refundable grant	Adaption	MARD and People's Committee of Quang tri	2017-2021
63	REDD+ reforestation project through PPP and PPF models in Cat Tien National Park	1,749,351 EUR	1,924,286	On-going	ODA German (by BMZ under the IKLU initiative) via GIZ	Non-refundable grant	Mitigation, REDD+	People's Committee of Lam Dong	2017-2020
64	Applying seasonal climate forecasting and innovative insurance solutions to climate risk management in the agriculture sector in Southeast Asia	678,839 EUR for Viet Nam, Laos, Cambodia, Myanmar	746,723	On-going	ODA German (by BMZ under the IKLU initiative) via WMO	Non-refundable grant	Adaptation, technical support	MARD	2017-2020

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
65	Ambitious city promises: Commitments for low-carbon urban development in Southeast Asian large cities	3,101,000 EUR for 4 cities	3,411,100	Comp-lete	ODA German (IKI of BMUB) via GIZ	Non-refundable grant	Mitigation, capacity building, technical support	MONRE	2017-2020
66	Forest landscape restoration based on forestry in the framework of REDD+ through community and business collaboration -Learning from experiences in Southeast Asia	2,317,710 EUR for Viet Nam, Laos, Thailand	2,549,481	On-going	ODA German (by BMZ under the IKLU initiative) via GIZ	Non-refundable grant	Mitigation, REDD+, technical support	MARD	2017-2022
67	Improving weather forecast capacity in Viet Nam (ODA Finland phase 3)		716,517	On-going	ODA German (by BMZ under the IKLU initiative) via RECOFTC organization	Loan	Adaptation, capacity building	MONRE	2017-2020

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
68	Effective grid in small and medium cities (phase 2)		172,402,500	On-going	ODA Finland: 548,179 USD; Reciprocal Capital: 168,338 USD	Loan	Mitigation, technology transfer	MOIT	12/ 2017
69	RE Development Fund - GET FiT Viet Nam		16,640,127	On-going	Funded by German via KfW Development bank	Non-refundable grant	Mitigation and investment	MOIT	From 2017
70	RE programme (solar, wind, hydropower)		390,182,300	On-going	Fund-ed by German via KfW Devel-opment bank	Loan	Mitigation, and investment	MOIT	From 2017
71	Emergency seservoir operation and effective flood management using water related disaster management information system		18,440,000	On-going	Funded by Japan via JICA	Non-refundable grant	Adaptation, capacity building, risks and disasters management	MARD, People's committee of Thua Thien-Hue	2017-2021

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
72	Energy sector policy support programme to enhance access to sustainable energy in rural areas of Viet Nam		120,000,000	On-going	EU budget	Non-refundable grant	Mitigation and financial support	MOIT	2017-2021
73	Ecosystem-based adaptation on the northern central coast of Viet Nam: restoration and co-management of degraded dunes and mangroves		2,156,948	On-going	ODA German (by BMZ under the IKLU initiative) via "UNIQUE forestry and land use GmbH"	Non-refundable grant	Adaptation- and capacity building	MARD, Quang Tri Department of ARD	10/ 2018 - 9/2022
74	Operationalising REDD+ through public-private partnerships for sustainable landscapes in Lam Dong		2,007,546	On-going	ODA German (by BMZ under the IKLU initiative) via SNV	Non-refundable grant	Adaptation and capacity building	Lam Dong Department of ARD	4/2018-3/2022

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
75	Denmark energy partnership programme		1,200,000	On-going	ODA Denmark via DANIDA	Non-refundable grant	Mitigation and capacity building	MOIT	11/ 2018-5/2022
76	Partnership for blended finance on water - start up		100,000	On-going	ODA Denmark via DANIDA	Non-refundable grant	Adaptation and capacity building	VWSA	2017 - 2020
77	Viet Nam Materials Marketplace		100,000	Comp-lete	ODA Denmark via DANIDA	Non-refundable grant	Adaptation, capacity building and technology transfer	VCCI	2017 - 2018
78	Viet Nam Renewable Energy Week 2018		25,000	Comp-lete	ODA Denmark via DANIDA	Non-refundable grant	Mitigation and capacity building	VSEA	2017 - 2018
79	Enhancing cold water aquaculture sustainability via transfer of Finnish water saving and environmentally friendly technologies		132,597	Comp-lete	ODA Finland qua through Fisheries Research Institute No. 1 (RCA1)	Non-refundable grant	Mitigation and technology transfer	MARD	2018

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
80	Sustainable energy for urban households in Ha Noi		137,161	Comp-lete	ODA Finland	Non-refundable grant	Mitigation and capacity building	MOC	2017
81	Support for the integrated management of the bays of Hai Phong, Ha Long and Bai Tu Long	1,200,00 EUR	1,459,200	Comp-lete	ODA France via AFD	Non-refundable grant	Mitigation and capacity building	MONRE	2017
82	GEMMES Viet Nam Programme		1,216,000	On-going	ODA France via AFD	Non-refundable grant	Mitigation, adaptation, and capacity building	MONRE	2018-2022
83	Expansion of the Yaly hydropower Plant		79,040,000	Comp-lete	ODA France	Preferential loan	Mitigation and investment	EVN	2018-2019
84	Solar power plant Se San 4		42,560,000	On-going	ODA France	Preferential loan	Mitigation and investment	EVN	2017 - 2023
85	Assistance for damrey and flood affected communities in Central Viet Nam		285,000	On-going	ODA Australia	Non-refundable grant	Adaptation and capacity building	People's Committee of Quang Nam and Thua Thien Hue	2017 - 2022
86	ASEAN low carbon energy programme		19,635,375	Comp-lete	ODA UK	Non-refundable grant	Mitigation and capacity building	MOIT	2018

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
87	The Weather and climate science for service partnership for Southeast Asia (WCSSP SE Asia)		916,318	On-going	ODA UK	Non-refundable grant	Adaptation and capacity building	BMONRE	2018 - 2022
88	Viet Nam - Belgium Study and Consultancy Fund (SCF)		488,041	On-going	ODA Belgium	Non-refundable grant	Adaptation, mitigation, and capacity building	MARD, MOF, People's Committee of Hoa Binh	2018 - 2020
89	An innovative solution to protect Vietnamese coastal riverbanks from floods and erosion	299,000 EUR	344,521	Comp-lete	ODA	Non-refundable grant	Adaptation and capacity building	- HCM university of Technology; - Danang university of Technology; - HCM Architecture University	2018 - 2019
90	ANGAGEN: Towards a sustainable pangasius breeding, a selection approach	499,580 EUR	574,202	On-going	Belgium	Non-refundable grant	Adaptation- and capacity building	Can Tho university	2017-2020
91	Establishing integrated coastal management platform for some coastal provinces		3,500,000	On-going	ODA Belgium	Non-refundable grant	Adaptation and capacity building	MONRE	2017 -2020

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
92	Promoting investment market for energy efficiency industrial sector in Viet Nam		1,900,000	On-going	ODA Korea	Non-refundable grant	Mitigation and capacity building	MOIT	2018 -2021
93	Bioeconomy regional strategy		2,700,000	Comp-lete	ODA Switzer-land via the Swiss Devel-opment Organ-isation (Helve-tas)	Non-refundable grant	Adaptation- and capacity building	Helvetas Vietnam	2017 -2019
94	Smart grids for RE and energy efficiency (SGREEE)	5,000,000 EUR	5,706,244	On-going	ODA Ger-man via GIZ	Non-refundable grant	Mitigation, and capacity building	MOIT	2017 -2020
95	Enhancing operational functionalities of National Load Dispatch Centre to integrate renewable energies		11,459,020	On-going	ODA Italy	Preferential loan	Mitigation, capacity building, and technology transfer	MOIT	2018 -2022

No	Project Name	Implementation budget		Status	Financial Resources	Type of Support	Purpose	Executing Agency	Time frame
		Currency	USD						
96	Research to integrate outdoor wind and solar energy into the national electricity system of Viet Nam		343,771	On-going	ODA Italy	Preferential loan	Mitigation, capacity building, and technology transfer	MOIT	2018-2020
97	Improving SME productive capacity and competitiveness in Viet Nam		17,589,596 including: non-refundable grant of 401,066 and preferential loan of 17,188,530	Comp-lete	ODA Italy	Non-refundable grant and preferential loan	Mitigation, adaptation, capacity building and technology transfer	People's Committee of HCMC	2018-2019
98	Enhancing the development of observing system of hydropower reservoirs and the decision support system in operating hydropower reservoir in the Red and Thai Binh river basins.		3,896,067 including non-refundable grant of 458,361 and preferential loan of 3,437,706	On-going	ODA Italy	Non-refundable grant and preferential loan	Adaptation, capacity building and techno logy transfer	MARD	2019-2022

II. Other climate change response projects committed to be financed

No	Name	Fund		Status (Promised /Signed)	Financial Sources (ODA, OOF, v.v.)	Funding Tools (Non-refundable grant, preferential loan, non-concessional loan, etc)	Purpose (Reduction, Adaption, Multi purposes, etc)	Sector/ Department	Ex-pected date of launching
		Currency (Million VND) (EUR/ JPY)	USD (or converted to USD)						
1.	Building Vietnamese capacity in managing data flows and reporting information to satisfy the Paris Agreement's ETF		5,174,800	Accepted	GEF/ UNDP	Non-refundable grant/ Preferential loan	Multi-purpose	MONRE	-
2	Viet Nam Scaling up energy efficiency (VSUEE)		11,450,000	Planning	GCF/ WB	Non-refundable grant	Capacity building, mitigation, technical assistance and finance	MOIT	-
3	Viet Nam: Respond to tropical storms		2,500,000	Accepted	ADB	Non-refundable grant	Adaptation and capacity building	MARD	-
4	Urban services adaptation to Ho Chi Minh City climate		360,000,000	Proposed	ADB	Preferential loan	Adaptation, capacity building, technology transfer and investment	People's committee of HCMC	-
5	Development of Viet Nam's fourth NC to the UNFCCC		500,000	Preparing for launching	GEF/ UNEP	Non-refundable grant	Finance and technical assistance	MONRE	2021-2024