Study on cooperative MRV as a foundation for a potential regional carbon market within ASEAN

Vietnam Country Report

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IGES
Regional Collaboration Centre – Bangkok
Promoting Action Against Climate Change

National Environment Agency
Safeguard · Nurture · Cherish

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Abbreviations

AFOLU	Agriculture, Forestry and Land Use
ASEAN	Association of Southeast Asian Nations
BUR	Biennial Update Report
CDM	Clean Development Mechanism
CH4	Methane
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalent
FiT	Feed-in-tariff
GHG	Greenhouse gases
GSO	General Statistics Office
GWP	Global warming potential
HFC	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial processes and product use
LULUCF	Land Use, Land-Use Change and Forestry
MBI	Market-based instrument
MONRE	Ministry of Natural Resources and Environment
MP	Monitoring plan
MRV	Monitoring, Reporting and Verification
N2O	Nitrous oxide
NC	National Communication
NDC	Nationally Determined Contribution
PFCs	Perfluorocarbons
PMR	Partnership for Market Readiness
SFCs	Sulfur hexafluoride
QA/QC	Quality assurance / Quality control
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

Vietnam's total greenhouse gas (GHG) emissions in 2013 were 259 MtCO2e as reported in its Second Biennial Update Report (BUR) to the UNFCCC. The energy sector accounted for 58 percent of total GHG emissions, followed by agriculture and industrial processes respectively.

Vietnam ratified the Paris Agreement on October 31, 2016 and has detailed their climate action plan for 2030 in their Intended Nationally Determined Contribution (INDC) submitted to the UNFCCC. The INDC pledge has a relative emission reduction target - to reduce emissions by 8 percent unconditionally (63 MtCO2e) and 25 percent conditionally (200 million tCO2e) by 2030 compared to a business-as-usual scenario.

Vietnam's key strategy for reducing emission reduction is to increase the share of renewables in the generation mix and the use of carbon markets to meet its INDC in a cost-effective manner.

Vietnam's Green Growth Strategy (2012) pursues the objective of a low-carbon economy and invokes the introduction of market-based instruments. Several measures lay the groundwork for implementing National Appropriate Mitigation Actions (NAMAs) in the waste, steel, cement, chemical fertilizer, wind power and biogas sectors. As part of its activities under the Partnership for Market Readiness (PMR) of the World Bank, Vietnam is focusing on the NAMA crediting for steel and waste sectors while planning to introduce an ETS in steel sector. The planned MRV system and crediting NAMA will provide the experiences for the implementation of a sector-based cap-and-trade program in the steel sector, which could start in 2020.

Since Vietnam has started exploring an ETS for the steel sector, it can be supported to consider how its ETS can be connected with other domestic Carbon Pricing Instruments (CPIs) and potential carbon markets in ASEAN with the aim of establishing a regional carbon market.

Vietnam is preparing to implement national MRV systems for five sectors covering the entire country by 2018. Since Vietnam does not currently have a comprehensive MRV system in place to measure and report GHG data and it mostly relies on the data provided in national statistics by the General Statistics Office (GSO), the country can initially be supported to develop sectoral, policy, and action level MRV systems using UNFCCC CDM Standards. Lessons learnt from other ASEAN members can also be used to develop and harmonize sectoral MRV systems in Vietnam.

1. National Climate Change Context

Vietnam joined the Association of Southeast Asian Nations (ASEAN) in 1995 and was the seventh Southeast Asian country to do so. It borders China to the north, Lao PDR and Cambodia to the west, and the East Sea to the east, south, and southwest. Vietnam is home to two major deltas, the Mekong River Delta and the Red River Delta.

As of mid-2016, the total population of Vietnam was estimated to be 92.7 million[1], making it the third most populous country among the ASEAN member states. While it has a land mass of 331,230.8 km2, it is the third most densely populated country in ASEAN following Singapore and the Philippines.

Vietnam has experienced strong economic growth over the last decades. In 2016, the Gross Domestic Product (GDP) of Vietnam was USD 202.6 billion[2] at current prices. In the 2011-2015 period, annual average GDP growth rate of Vietnam was 5.91 percent, making it one of the fastest growing economies among the ASEAN countries during that period.

As reported in its Second Biennial Update Report (BUR) to the UNFCCC, Vietnam's total greenhouse gas (GHG) emissions in 2013 was 259 MtCO2e considering LULUCF related removals, and 293.3 MtCO2e without including removals from this sector. According to the same report, from 1994 to 2013, total GHG emissions (with LULUCF) have more than doubled from 103.8 MtCO2e to 259 MtCO2e. The rapid growth in emissions is led by the growth of emissions from the energy sector, which has increased six-fold, from 25.6 MtCO2e in 1994 to 151.4 MtCO2e in 2013 due to an increased demand for energy. This is an indication of a rapidly growing economy.

Table 1 below presents the breakdown of GHG emissions, by source, in 2013. It may be noted that the major source of CO2 emissions originating from the energy sector is due to the combustion of fossil fuels (125.4 MtCO2e).

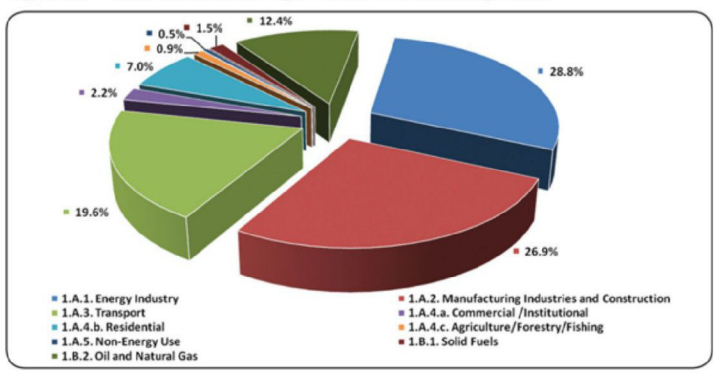
Figure 1 displays the breakdown of energy sector GHG emissions. It can be observed in this figure that fuel consumption for energy industry use, manufacturing industry and construction, and transport accounted for the largest shares of emissions in the energy sector.

Table 1: GHG emissions/removals by source in Vietnam, 2013

Greenhouse Gas Source and Sink Categories	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	Total
Energy	126.915	23.398	1.09	-	-	-	151.4
Fuel combustion	125.365	0.155	0.00365	-	-	-	
Energy industries	43.528	0.0007	0.0004	-	-	-	
Manufacturing Industry and Construction	40.233	0.008	0.001	-	-	-	
Transport	29.493	0.005	0.0003	-	-	-	
Other Sectors	11.347	0.141	0.0018	-	-	-	
Fugitive fuel emission	1.55	-	-	-	-	-	
Oil and natural gas system	0.226	-	-	-	-	-	
LULUCF	-34.36	0.101	0.019	-	-	-	-34.2
Agriculture	-	59.131	30.278	-	-	-	89.4
Industrial Processes	29.8	-	-	1.968	-	-	31.768
Waste	0.255	18.494	1.937	-	-	-	20.686
Total National Emissions – without LULUCF ($MtCO_2e$)	156.969	101.023	33.304	1.968	-	-	293.3
Total National Emissions – with LULUCF ($MtCO_2e$)	122.61	101.125	33.322	1.968	-	-	259.0

Source: Second BUR (2016)

Figure 1 – GHG emissions by source in Vietnam, 2013



Source: Second BUR (2016)

Vietnam ratified the Paris Agreement on October 31, 2016 and has detailed their climate action plan for 2030 in their Intended Nationally Determined Contribution (INDC) to the UNFCCC[3]. Vietnam's unconditional target consists of an 8 percent reduction of GHG emissions by 2030 compared to business-as-usual (BAU) emissions.

1 ASEAN Statistical Yearbook 2016/2017.
2 Ibid.
3 Vietnam's Intended Nationally Determined Contribution, (2015).

The BAU scenario starts from 2010 (the last available GHG inventory before the submission of the INDC) and projects emissions for 2020 at 474.1 MtCO2e and for 2030 at 787.4 MtCO2e. However, the unconditional emission reduction of 8 percent is proposed to be increased to 25 percent conditional on receiving international support through bilateral and multilateral cooperation, as well as through the implementation of new mechanisms under the Paris climate regime.

Under the Power Master Plan VII[4], Vietnam has committed to increasing the share of renewable energy to 4.5 percent in 2020 and to 6.0 percent in 2030. The roadmap of renewable power development which was formulated in light of Decision No. 428/QD-TTg (2016)[5] creates concrete targets for increasing the share of biomass power, wind power, solar power, and hydropower in the energy mix. Additionally, The G-20 and Asia Pacific Economic Cooperation (APEC) leaders, including the Vietnamese president, agreed in 2009 to phase out 'inefficient fossil fuel subsidies'[6], which, once implemented, would make renewables more attractive in terms of their cost in the future.

The INDC also proposes a reduction in GHG emissions from the Agriculture sector by developing sustainable agriculture and improving the effectiveness and competitiveness of agricultural production through research and development activities and the wide replication of best practices in the sector.

Additionally, Vietnam proposes to continue the trend of increased removals from LULUCF through activities that support the management and development of sustainable forests and enhancing carbon sequestration and environmental services. As mentioned earlier, Vietnam's conditional mitigation targets are, to a certain degree, contingent on taking part in the new mechanism proposed under Article 6 of the Paris Agreement. Therefore, a strong foundation would be needed to facilitate Vietnam's participation in Article 6 activities. Furthermore, the INDC explicitly mentions the use of market based instruments and this indication is further reinforced in the National Green Growth Strategy (2012)[7] which includes language on moving towards the establishment of a management system and linking with international carbon markets through trading of certified GHG emission units, carbon tax, fees, and levies. Vietnam already has experience in these mechanisms with 254 registered Clean Development Mechanism (CDM) projects, which makes it the fourth largest host country of CDM projects globally after China, India, and Brazil. CDM projects in Vietnam fall under the energy, transport, industries and waste sector.

Vietnam's approach to climate change mitigation is reflected in a number of national policies, strategies and programmes, as reflected in Table 2.

Table 2: Legislative acts, strategies, policies, and regulations with possible emissions-related components and potential links to MRV & CPI

Name	Time period	Description	Relevant sector
Vietnam Power Development Plan[8]	2011 –2020	On March 18 and by Decision No. 428/QD-TTg, the Prime Minister approved the adjustment of the National Power Development Plan VII (PDP 7 rev) for the period of 2016 – 2030 with the vision to 2030. Compared to the PDP 7 of July 2011, the most obvious changes in the PDP 7 rev is a stronger emphasis on Renewable Energy development and on power market liberalization.	Energy
Vietnam's National REDD+ Action Plan[9]	Phase 1: 2011-2015 Phase 2: 2016-2020	Vietnam's National REDD+ Action Plan (NRAP) was approved under Prime Minister's Decision 799/ QD-TTg, dated June 27, 2012. At the time Vietnam was at the forefront of introducing REDD+, producing one of the first NRAPs in the world. The NRAP has played a critical role in raising awareness on REDD+ and has provided an important platform for support from international donors to invest in REDD+ activities in the country.	Forestry
Law on Economical and Efficient Use of Energy[10]	January 01, 2011	The Law covers energy efficiency in all sectors of the economy and sets out the State's responsibilities in promoting this goal. This includes nationwide uniform application of statistical indicators on energy use within the national statistical indicator system (including a national energy database).	Industrial, Transport, Agriculture

4 Presentation on Vietnam's Power Development Plan by the Ministry of Industry and Trade, 2017.
5 Decision No.: 428/QD-TTg, Vietnam, 2016.
6 Fossil Fuel Fiscal Policies and Greenhouse Gas Emissions in Vietnam, UNDP, 2012.
7 Vietnam National Green Growth Strategy, 2012.
8 Vietnam Power Development Plan for the period 2011 – 2020: Highlights of the PDP 7 revised, GIZ Energy Support Programme in Vietnam, 2016.
9 McNally, R. & Nguyen, T C., Review of Vietnam's National REDD+ Action Programme and its Implementation, 2016.
10 Nachmany, M., et al., The 2015 Global Climate Legislation Study: A Review of Climate Change Legislation in 99 Countries, London School of Economics, 2015.

Table 2 (contd.): Legislative acts, strategies, policies, and regulations with possible emissions-related components and potential links to MRV & CPI

Name	Time period	Description	Relevant sector
National Climate Change Strategy[11]	2011	Targets to be achieved by 2020 (but some also refer to 2050, 2030 and 2015): reduce GHG emissions from agriculture by 20%, while securing 20% growth and lowering the rate of poverty by 20% Sets out four specific objectives: i) to ensure food security, energy security, water security, poverty reduction, gender equality, social security, public health, improved living standards and natural resource protection; ii) the development of a low-carbon economy; iii) improved public awareness including popularizing climate-friendly ways of living and modes of consumption; and iv) enhancing international co-operation.	LULUCF, Energy and industry, Transport
National Green Growth Strategy[12]	2012	Sets out objectives towards a green economy, energy efficiency, GHG reduction and improvement of living standards. It includes the target of reducing the intensity of GHG emissions by 8-10% (as compared to the 2010 level) between 2011 and 2020; and reducing GHG emissions by at least 1.5% - 2% a year until 2030.	Energy
Decision 1775/QD-TTg on "Management of GHG Emissions; management of carbon credit trading activities to the world market [13]	2012	• Strengthen the capacity for preparing the national GHG inventory for the ministries, sectors and sub-national authorities involved in the national inventory system of greenhouse gases; • Set up and operate the national system of greenhouse gas inventory and perform periodic inventory once for every two years under the process; • Improve the quality and efficiency of the management of carbon credits business activities, which generate carbon credits from the Clean Development Mechanism (CDM) under the Kyoto Protocol; • Formulate and issue relevant regulations/mechanisms/policies so that the agencies, organizations, enterprises and individuals can invest and carry out business opportunities for selling carbon credits in the global markets.	Energy, industry, waste, Transport
Renewable Energy Development Strategy[14]	2030	Reduce greenhouse gas emission by approximately 5% in 2020, approximately 25% in 2030 and around 45% in 2050.	Energy
National Action Plan to Implement the Paris Agreement and NDC [15]	2016	Fulfil commitments in the Intended Nationally Determined Contribution to mitigate GHG emissions; • Adapt to climate change; • Prepare human, technological and financial resources and contribute to the transition to a low-carbon, highly resilient economy; • Establish and operate the transparency system (MRV) to monitor and assess the implementation of adaptation, mitigation, and resource preparation.	

2. Analysis of National MRV systems

2.1 Carbon pricing status and outlook

In 2012, the Prime Minister signed Decision 1775/QD-TTg on Management of GHG emissions; management of carbon credit trading activities to the world market. This decision sets out a plan to establish a trading scheme for managing emissions of six types of greenhouse gases in accordance with the Kyoto Protocol - carbon dioxide (CO_2), Methane (CH_4) Nitrous oxide (N_2O), hydrofluorocarbons (HFCs), Perfuorocarbons (PFCs), sulfur hexafluoride (SFCs). The management of carbon credit trading activities focuses on observing international regulations, the formulation of a domestic carbon market, and participation in the international carbon market.

Vietnam is the first ASEAN country that plans to introduce an ETS with the support of the Partnership for Market Readiness (PMR) under the World Bank.

11 Ibid.
12 Ibid.
13 Decision 1775/QD-TTg, Government of Vietnam, 2012.
14 Second Biennial Updated Report of Vietnam to the UNFCCC, MONRE, 2017.
15 Plan to Implement the Paris Agreement, Government of Vietnam, 2016.

Activities under the Partnership for Market Readiness (PMR)

There are four main components for Vietnam under its market readiness proposal to the PMR:

Component 1: Strengthening capacity for carbon pricing approaches; **Component 2a**: Developing a market-based instrument (MBI) pilot in the steel sector; **Component 2b**: Design of no-regret measures in the solid waste sector with analysis of potential MBIs; and **Component 3**: Program management and stakeholder engagement facilitation.

Components 2a and 2b will consist of three steps for the steel and waste sectors respectively:

i) Designing core elements of NAMA;

ii) Implementing pilot crediting NAMA; and

iii) Introducing nationwide MBIs for steel (cap-and-trade system) and waste (MBIs) sectors

As part of the identification of appropriate MBIs for steel and waste sectors, a data collection system will also be developed for each sector which will include an MRV mechanism.

In addition to the PMR, the Ministry of Industry & Trade (MOIT) is also working with the World Bank to develop carbon pricing/crediting and associated MRV systems for an energy efficiency programme for which government approval is yet to be received. Emission reduction units generated by these programmes are expected to be sold to Norway and Denmark via the World Bank.

Furthermore, Vietnam has introduced an environment tax for gasoline and industries. These taxes can also be evaluated as part of introducing carbon pricing instruments in the country.

2.2 MRV at facility level

Vietnam does not currently have facility level MRV systems, however registered CDM projects have MRV systems at the project level.

Though facility level MRV systems are not available in Vietnam, data is collected from major energy consumers and industries as part of existing data collection systems for various purposes, however not specifically for measurement and reporting of GHG emissions. For example, major energy consumers have to report their energy consumption to MOIT as per energy efficiency and energy conservation laws, and energy audits are carried out every three years by independent third party entities for this purpose. Major energy consumers receive grants from the line ministries to carry out the energy audit and report their data.

A decision by the Prime Minister to line ministries requesting they provide the data required for quantification of GHG emissions to MONRE exists. However, since this is not a decree, the level of enforcement of this decision is low. As such, there are still some barriers to the collection of activity data related to the measurement and reporting of GHG emissions. However, the transport sector reports some activity data such as passenger km traveled and vehicle km traveled, which can be used to quantify the GHG emissions from this sector. Additionally, the Ministry of Construction (MoC) receives production data from the iron and steel industry, and the cement industry every year via the via the industry and cement associations, respectively.

There are several NAMAs with an integrated MRV system at different stages in Vietnam for solid waste, steel sector, chemical fertilizer, cement sector, wind power, and biogas. A summary of these NAMAs is presented in Table 3. Tables 4, 5, 7 and 8 present details on the MRV components of NAMAs, where available.

Table 3: Summary of sectoral NAMAs in Vietnam

Sector	Activity/Scope	Institutions Involved
Solid waste	With support from Japan, the Vietnam Institute of Meteorology, Hydrology and Climate Change (IMHEN) of MONRE is carrying out a study on the potential for development of NAMA on solid waste which would apply to small cities (Quy Nhon). This project is expected to be completed in 2020	IMHEN, UNESCAP OECC
Steel	The proposed steel NAMA is based partially on the UNIDO report "Energy and Resource Efficiency in the Vietnam Steel Industry" (July 2011). The report assessed GHG mitigation potential, based on a survey in 18 companies using EAF technology. The timeframe for the MOIT-UNDP project is 2012 – 2016 but the NAMA will likely have a longer timeframe. The NAMA preparation framework includes technical, legal and financial components. The establishment of an MRV system is considered crucial.	UNDP; Industrial Safety Techniques and Environmental Agency of the Ministry of Industry and Trade (MOIT)
Chemical fertilizer	The timeframe for the MOIT-UNDP project is 2012 – 2016 but the NAMA will likely have a longer timeframe. The NAMA preparation framework includes technical, legal and financial components. The establishment of an MRV system is considered as crucial.	UNDP; Industrial Safety Techniques and Environmental Agency of the Ministry of Industry and Trade (MOIT)
Cement	The goal is to develop a NAMA for the cement sector including MRV systems. The activities under this project will include: • Collection of updated sector data on emissions, technologies, costs and mitigation potential • Development of baseline emission projections for a range of scenarios • Development of an MRV system based on international standards • Development of data systems and institutions for data collection • Design of a credible support scheme and a policy mix that can help attract international climate finance • Identification of barriers related to technology, information and capacity.	MOIT NOAK/NDF
Wind power	Framework of FIRM (Facilitating Implementation and Readiness for Mitigation) of UNEP-DTU; Preliminary sectors have been identified and discussions are currently taking place to prioritize sectors for developing NAMAs within the FIRM project.	Department of Meteorology, Hydrology and Climate Change, (DNA MONRE); UNEP
Biogas in rural areas	Framework of FIRM of UNEP Centre; preliminary sectors have been identified and discussions are currently taking place to prioritize sectors for developing NAMAs within the FIRM project.	Department of Meteorology, Hydrology and Climate Change, (DNA MONRE); UNEP

Table 4: MRV system for solid waste NAMA[16]

MRV system for Solid waste NAMA	
Measurement and monitoring of emissions	**i) Boundary and scale** Activities and outcomes achieved in the scope of the NAMA which will be measured, reported and verified include the following: • Capacity building activities; • Policies, laws and regulations implemented at national and sub-national level supporting waste-to-resource activities; • Financial support received for NAMA activities from international donors; • Waste-to-resource projects are implemented and put into operation as part of the NAMA; • Outputs, outcomes and impacts of the projects implemented under the NAMA, taking note of elements that include inputs and outputs of the waste treatment plants, greenhouse gas emission reductions and investments on treatment plants. MRV will be implemented at three levels: • Project and activity level, from where data is recorded on a regular basis; • Sector level, whereby all data at activity and project are aggregated into sector level for reporting and verification; • National and international level, whereby reports on GHG mitigation activities are compiled and fed into National Communications and Biennial Update Reports.

16 IMHEN and UN ESCAP, Nationally Appropriate Mitigation Action (NAMA) programme for the solid waste sector of Vietnam, Design Study, 2016.

Table 4 (contd.): MRV system for solid waste NAMA

Measurement and monitoring of emissions (contd.)	**ii) Indicators** Indicators are quantitative or qualitative variables associated with a target that refers to a qualitative value or quantitative value. Measurement means assessing the value of the indicator for a certain timeframe, which thus serves as a standard for measuring, reporting and verifying the achievement of the outcomes.
Reporting of emissions	Data collection and reporting is an important part of MRV and will be governed by the requirements of domestic policy makers, financiers, donor organizations, and international reporting requirements. There are three key elements for data collection and reporting: i) frequency of the collection and reporting; ii) data collection instruments; and iii) responsibility for data collection. At the project/plant level, data will be collected on a regular basis and, as a minimum requirement, records should be made of waste processed (e.g. expressed in ton of waste per day) and outputs generated (e.g. quantities of compost, electricity, etc., produced). Data gathered from projects will then be aggregated at the city level by a focal point at the municipal people's committee (e.g. DOC or DONRE). Next, consolidated data at the city level is to be sent to the NAMA Management Board, which will aggregate all activity-data from NAMA projects. Specific templates will be developed to support these reporting requirements, so as to ensure the consistency of the data collected and reported.
Verification of emissions	The verification process will include the in-desk review of reports submitted, site-visits for specific waste to- resource projects and interviews with stakeholders involved in the implementation of the NAMA. The NAMA coordinating unit will be in charge of providing the necessary conditions to make available relevant information to third party verification.

Table 5: MRV system for Steel NAMA[17]

Measurement and monitoring of emissions	According to a survey conducted via the Vietnam Steel Association (VSA), there were 26 steel plants with total designed capacity over 9 million tons. The real steel production in 2013 was 5.5 million tons, of which 85 % of total production was manufactured using electric arc furnaces (EAF). The data from these plants has been analyzed via the following approach - aggregated activity data which is converted to GHG Inventory data using some default IPCC and some facility specific conversion factors and reported energy use which is collected through the national system of energy statistics.
Reporting of emissions	Reporting via the energy audit regulation for large energy users, which is applicable to most steel companies (users who consume more than 1,000 toe/year). They are obliged to audit energy use and submit energy efficiency and saving (EE&S) report to a local Department of Industry and Trade (DOIT) yearly.
Verification of emissions	Data collection should be based on a strengthened reporting (annual reporting, electronic submissions in accordance with fixed reporting template, inspection/verification rights or 3rd party verification) under existing EE&S reporting requirements.

17 Nguyen. T. & Phul, I., Establishment of MRV procedures for NAMA development in the steel industry. Vietnam Journal of Science and Technology. 2016

MRV in Cement sector - Current status

No consistent MRV system has been established and operated for the cement sector in Vietnam; hence no institutional arrangement for MRV exists.

The MRV system for the NAMA in the cement sector is structured into two sub-components:

- MRV of GHG emissions (and emission reductions)
- MRV of non-GHG impacts (including co-benefits and support)

It is divided into two levels, namely installation (plant) level and sector level.

Application of the MRV system at a sector level is a new management practice for both the NAMA operating entity (MOC) and other relevant authorities. Further details are available in Table 6.

Table 6: MRV system for Cement NAMA[18]

Measurement and monitoring of emissions	MRV system of GHG emissions at the cement plant level is based on already existing practices at almost all cement plants in Vietnam: • Measurement of 29 indicators (similar to CSI indicators) on energy consumption and CO2 emissions is currently practiced as part of regular measurement activities in cement plants • The procedures and frequency for recording and data archiving varies by cement plant • The challenge is to increase of the accuracy of data monitored. Additional installation of direct measurement devices and improvement in data management practices is required to ensure high data quality. Data inputs and calculated results from 47 cement plants accounting for 85% of total of 55 rotary kiln cement plants in operation Data is collected from two sources: Top-down: Current Master Plan for list of rotary kiln cement plants with specific capacity and location Bottom-up: Sectoral data collection via questionnaire and site visits; the following types of data is collected, among others: • General plant information • Clinker and cement production • Mineral components (MIC) in cement production • Energy consumptions: fossil fuels and electricity; alternative fuels; waste heat use • Calculate power balance and KPIs • Calculate CO2 emissions from calcination and energy use
Reporting of emissions	Reporting of data measured is largely limited to within the cement plant for management purposes.
Verification of emissions	Verification at the plant level is limited to the internal QA/QC, not yet involved any independent third party

Table 7: MRV system for Wind NAMA[19]

Measurement and monitoring of emissions	The measurement boundary contains all activities and outcomes related to the wind NAMA, which can be measured, reported and verified, including: • Policy support for wind power development • Capacity building activities • Financial sponsors received for NAMA activities • Wind power projects invested in and operated during NAMA's implementation • Outputs, outcomes and impacts of the NAMA project The monitoring and reporting plan is set up based on the indicators for measuring the outputs and impacts of NAMA implementation. The indicators are quantitative or qualitative variables associated to the targets that were defined by the NAMA proposal. All the indicators will be measured and compared to baseline scenario to define the impacts of NAMA.

18 Final Readiness Plan for the Cement Sector in Vietnam, Nordic Partnership, 2016.
19 NAMA Proposal, Supporting Program for Wind Power Development in Vietnam, Facilitating Implementation and Readiness for Mitigation (FIRM) Project - Vietnam, 2015.

Table 7 (contd.): MRV system for Wind NAMA

Reporting of emissions	Data collection and reporting will be governed by the requirements of financiers, domestic policy makers and international reporting requirements. Collection and reporting will be implemented regularly as required by the regulations of MRV, which will be developed in the initial phase of the NAMA program.
Verification of emissions	The scope of verification will cover all activities of NAMA, from initial planning to implemented activities, indicators measured, outputs, outcomes, and those impacts. The verification process will include the desk review of the reports, site visits for specific wind power projects and interviews with stakeholders involved in the implementation of the NAMA, including the independent research, statistical data, etc. The project management unit will be required to provide all necessary conditions to support such as relevant information, external data and a list of stakeholders. The verification process may consist of internal verification and external verification depending on activities and outputs. Internal verification will be implemented by a domestic consultant organisations involved in the NAMA project. Internal verification should be carried out regularly to ensure that data collection and NAMA activities are implemented properly.

Table 8: MRV system for Biogas NAMA[20]

Measurement /Monitoring of emissions	The information and data to collect as per the Measurement Plan: : • Biogas volume (m3) providing to electric generator • Electric generation (KWh) • BOD, COD,Coliform and Salmonella bacterium in waste-water post treatment Direct measurement at the field of pilot projects (by gas meter, electric meter and analysing the component of waste water in the laboratory). The Department of Meterology, Hydrology, and Climate Change (DMHCC) is responsible for collecting information and data coordination with technical staff at pig farms. Data from biogas NAMA farms will be received annually.
Reporting of emissions	Reporting of emissions is to be conducted as follows: • As a prerequisite to receiving support from the programme, pig farms under this NAMA will be responsible for submitting reports as per a template provided by the programme. • Banks participating in the NAMA will be asked to provide information on loan progress and approvals. • All collected data will be compiled by the programme office where the biogas MRV is prepared.
Verification of emissions	Establishment of third party verification system. A representative or random sample will be taken for verification. The program office will compile the final MRV report of biogas NAMA.

20 UNEP-DTU, Facilitating Implementation and Readiness for Mitigation (FIRM) Project, NAMA Proposal, Biogas for Onsite Power Generation for Medium/Large Pig Farms, 2015.

2.3 National GHG inventory and MRV procedures

The development of a national MRV system is a national priority for Vietnam. This priority is reinforced in the Plan for Implementation of the Paris Agreement, issued by the Prime Minister under Decision No. 2053/QD-TTg of March 28, 2016[21]. This plan sets out the implementation of MRV for mitigation, MRV for adaptation, and MRV for resource allocation.

As of 2016, according to Vietnam's second BUR, a background study for the implementation of a national MRV system is being carried out. The overarching aims of this study are to develop a methodology and establish relevant documents on the implementation of MRV of climate actions; to establish and maintain a registration system for climate action; implement monitoring and supervising activities of climate change programmes and activities; and reporting on the progress and outcomes of the implementation of climate change projects and programmes based on monitoring and verification outcomes for certifications of achievements[22].

The National Committee for Climate Change is responsible for giving guidance for executing the Plan for Implementation of the Paris Agreement. The Ministry of Natural Resources and Environment (MONRE) is the government's coordinating agency to assist in the execution of the Implementation plan of the Paris Agreement. MONRE is also responsible to guide, monitor, assess, inspect, and summarize progress of implementation, which includes GHG monitoring and developing guidelines and mechanisms on MRV. MONRE is also the government's focal point to the UNFCCC.

Additionally, the Implementation plan of the Paris Agreement devolves responsibility for establishing sectoral MRV systems to various line ministries as in Table 9 below.

National GHG Inventory

Decision No. 2359/QD-TTg dated December 22, 2015[23] is related to the approval of the Vietnam National GHG Inventory system. The model set out under the decision is one of centralised management. As per this system, the General Statistics Office (GSO) of the Ministry of Planning and Investment (MPI) collects data from the relevant line ministries and agencies, and feeds it to the MONRE, which is responsible for carrying out the inventory and preparing the technical report as the focal point for the National GHG Inventory. Figure 2 details the institutional arrangement for the National GHG Inventory System.

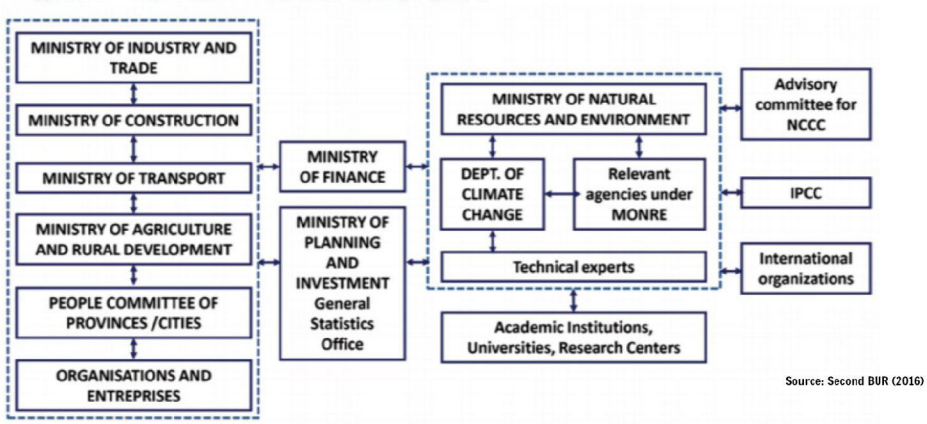
The National GHG Inventory of 2013, which formed the basis for Vietnam's second BUR, was in accordance with the arrangement set out in Decision No. 2359/QD-TTg. Additionally, the Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE) of MONRE was in charge of Quality Control (QC)/Quality Assurance (QA) processes.

Table 9: Missions for the establishment of sectoral MRV systems

Mission	Governing/Coordinating Agency	Implementation Timeline
Establishment of the MRV system for mitigation actions in Industrial Processes sector	Ministry of Industry and Trade (MOIT)	2018
Establishment of the MRV system for mitigation actions in LULUCF sector	MONRE, Ministry of Agriculture and Rural Development (MARD)	2018
Establishment of the MRV system for mitigation actions in Agricultural sector	Ministry of Agriculture and Rural Development (MARD)	2018
Establishment of the MRV system for mitigation actions in Construction sector	Ministry of Construction (MOC)	2018
Establishment of the MRV system for mitigation actions in Transport sector	Ministry of Transport (MOT)	2018

Source: Second BUR (2016)

Figure 2 – The National GHG Inventory System



Source: Second BUR (2016)

21 Decision No. 2053/QD-TTg, Vietnam, 2016
22 Second Biennial Report, Vietnam, 2017.
23 Decision No. 2359/QD-TTg

For the compilation of the 2013 Inventory, Vietnam's sectoral emissions were estimated based on: (i) Revised 1996 IPCC Guidelines for National GHG Inventories; (ii) 2006 IPCC Guidelines for National GHG Inventories; (iii) IPCC Good Practice Guidance and Uncertainty Management in National GHG Inventories; (iv) Sector specific guidance from IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry; and (v) Agriculture and Land Use GHG Inventory (ALU) software for inventory of LULUCF sector. Tier 1 methods were used to estimate emissions from Energy and Industrial Processes Sectors while both Tier 1 and Tier 2 methods were used for Agriculture, LULUCF, and Waste sectors.

The following table summarizes the data sources and methods used to compile the 2013 national GHG inventory in the various sectors.

Table 10: Methods and Data Sources

Sector	Method	Data Sources		
Energy	Tier 1	Vietnam Energy Statistics 2013	IPCC default values for EFs Country-specific value for coal mining	IPCC default values Country-specific calorific values
Industrial Processes	Tier 1	Statistical Yearbook of Vietnam 2014	IPCC default values for EFs	IPCC default values
Agriculture	Tier 1/Tier 2	Statistical Yearbook of Vietnam 2014 Statistical Yearbook of Agriculture and Rural Development 2014	IPCC default values for EFs Country-specific value for rice cultivation and manure management	IPCC default values Country-specific for fraction of manure handled using manure system
LULUCF	Tier 1/Tier 2	Statistical Yearbook of Vietnam 2014 Statistical Yearbook of Agriculture and Rural Development 2014 Land matrix from 2002 to 2012, Department of Remote Sensing, MONRE	IPCC default values for EFs	IPCC default values Results from studies
Waste	Tier 1/Tier 2	Statistical Yearbook of Vietnam 2014 State of Environment Reports of 40 provinces/ cities	IPCC default values for EFs	IPCC default values Results from studies

Source: Second BUR (2016)

2.4 Other initiatives and future developments

Vietnam is currently in the process of finalizing their revised NDC, which is expected to be published in 2019.

The transport sector is in the process of undertaking many new initiatives to reduce GHG emission by, among others, focusing on the use of biodiesel, adoption of Euro 5 standards, the implementation of MRV for light railway system, and the implementation of a GIZ project to develop emission reduction scenario for transport sector.

MONRE and MOF are in the process of developing CPIs for the steel sector. CPIs, such as a cap-and-trade or a carbon tax will be implemented for particular sectors.

IMNEH is currently conducting a study on existing MRV systems and a domestic carbon market, which is expected to be completed by 2019.

3. Concluding remarks and future outlook

Vietnam has taken several bold steps to promote the generation of renewable energy, such as: proposing to increase the share of renewable energy in the energy mix to 6 percent by 2030; phasing out fossil fuel subsidies for fossil fuel power plants by 2020; putting a greater emphasis on renewable energy development in the National Power Development Plan VII (2016 – 2030); and proposing to reduce GHG emissions by 25 percent in 2030 through the increased use of renewable energy.

Vietnam has taken high level decisions to facilitate the development of a national MRV system, chief among these are: (a) setting up and operating a national system of greenhouse gas inventory (decision 1775); and (b) developing a national MRV system for Vietnam (decision No. 2053/QD-TT). Within this context, Vietnam is preparing to implement a national MRV system for five sectors covering the entire country by 2018. Since Vietnam does not currently have a comprehensive MRV system in place to measure and report GHG data, it largely relies on the data provided in the national statistics reports by the GSO. Experiences and lessons learned from Vietnam and ASEAN member states can be used to develop and harmonize sectoral MRV systems in Vietnam.

The country has undertaken a number of strong measures indicating a consideration towards the use of carbon markets for emission reduction, these cover, among others: explicitly referring to the use of market instruments in their INDC; and indicating the possibility of linkages with international carbon markets through trading of certified GHG emissions. Additionally, the government's decision on "Management of GHG Emissions; management of carbon credit trading activities to the world market" specifies the improvement of the quality and efficiency of management of carbon credits business activities; and formulating relevant regulations so that institutions can invest in low emission projects to generate and trade carbon credits.

Therefore, Vietnam's key strategies appear to be promoting renewable energy generation and using carbon markets to implement their NDCs in a cost-effective manner. These strategies are further bolstered by the status of the country as the first ASEAN member state to introduce an emission trading scheme (for the steel sector) with support from the PMR. Since Vietnam has already begun exploring an ETS for the steel sector, it can be further supported to consider how this ETS could be connected with other domestic CPIs and potential carbon markets in ASEAN in the future.

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