



**Report on situational analysis**  
**on**  
**MRV mechanisms and the climate data analysis**  
**Energy sector**



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This publication has been produced as part of a component of the Initiative for Climate Action Transparency project (ICAT) implemented by UNEP DTU Partnership (UDP). The views expressed in this publication are those of the authors and do not necessarily reflect the views of UDP.

## PREPARED UNDER

Initiative for Climate Action Transparency (ICAT) project supported by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, the Children's Investment Fund Foundation (CIFF), the Italian Ministry of Ecological Transition (IMET) and ClimateWorks.



The ICAT project is managed by the United Nations Office for Project Services (UNOPS)





## Acronyms

AFOLU	agriculture forestry and land use
BB	Business Botswana
BDQAF	Botswana Data quality Assessment Framework
BERA	Botswana Energy Regulatory Authority
BPC	Botswana Power Corporation
BTR	Biennial Transparency Report
BUAN	Botswana University of Agriculture and Natural Resources
BURs	biennial update reports
CBIT	Capacity-building Initiative for Transparency
CEMS	Continuous Emission Monitoring System
COP	Conference of parties
DAP	Department of Animal Production
DFRR	Department of Forestry Resources and Rangelands
DMS	Department of Meteorological Services
DoE	Department of Energy
ETF	Enhanced Transparency Framework
GCF	Green Climate Fund
GHG	Greenhouse Gases
GoB	Government of Botswana
ICAT	Initiative on Climate Action Transparency
INDCs	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Uses
KPIs	Key performance indicators
LULUCF	Land use, land-use change, and forestry



M&E	Monitoring and Evaluation
MENRCT	Ministry of Environment, Natural Resources Conservation and Tourism
MFED	Ministry of Finance and Economic Development
MRV	Measuring, reporting and verification
MPGs	Modalities, procedures and guidelines
NAMAS	Nationally appropriate Mitigation Actions
NAPF	National Adaptation Plan Framework
NC	National communications
NCCU	National Climate Change Unit
NDCs	Nationally Determined Contributions
NDP	National Development Plan
NEMES	National Monitoring and Evaluation System
NEP	National Energy Policy
NSS	National Statistics System
ODA	Official Development Assistance
PA	Paris Agreement
QA/QC	Quality Assurance/Quality Control
R&D	Research and development
SB	Statistics Botswana
TNC	Third National Communications
ToRs	Terms of reference
UB	University of Botswana
UNFCCC	United Nations Framework Convention on Climate Change



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## Executive summary

Over the years the Government of Botswana (GoB) has recognised the potential disastrous impacts of climate change. As a result, the country, became a Party to The United Nations Framework Convention on Climate Change (UNFCCC) in June 12, 1992 and ratified the convention in January 27, 1994 respectively as a non-Annex I member. This allowed the country to play a participatory role in the global effort to combat the impacts of climate change. In 2010, the Conference of the Parties (COP) which GoB is Party to, entered into the Cancun agreements, which enhanced provision for reporting by requiring the parties to submit their national communications every four years which include a national GHG inventory.

In 2015, at COP21, the parties proposed strengthening the UNFCCC requirements by establishing an enhanced transparency framework (ETF) under the Paris Agreement (PA). The main aim of the ETF is to build mutual trust and confidence. One of the requirements set by the Paris Agreement is for countries to develop and submit their nationally determined contributions (NDCs). The NDCs are effectively the backbone of the Paris Agreement. The ETF is an improvement of the current measuring, reporting, and verification (MRV) framework, and it includes provisions to track progress towards the implementation and achievement of NDCs.

Despite the lack of capacity, GoB has strived to achieve its commitments under the Convention by regularly submitting its national communications and BURs. Without an improvement in capacities, the country is likely to face similar constraints under the Paris Agreement to meet the requirements related to the submission of Biennial Transparency Reports (BTRs) as well as to regularly update its NDC.

This situational analysis was undertaken to provide a stock-taking on the current country's achievements, gaps, and weaknesses, to date with regard to meeting the PA and the new requirements of its ETF. The situational analysis involved desk review and consultation with the relevant energy sector stakeholders. The expected outcome from the situational analysis was an inventory of the GoB initiatives and measures in place in relation to transparency arrangements under the UNFCCC Convention and Paris Agreement, as well as the gaps that require to be closed by strengthening the country's capacities.

The analysis reveals that the country has a well-functioning National GHG inventory team that constitute well-trained experts covering all the GHG emission sectors (energy, industrial processes and product uses (IPPU), agriculture, forestry and land use (AFOLU), and waste). In



In addition, the country also established a multi-sectoral National Committee on Climate Change (NCCC) tasked with *coordinating and overseeing the establishment of compatible and properly networked data bases on issues of climate change, its impacts and response strategies*. Clearly, the NCCC and National Inventory team constitute the country's institutional arrangements to meet the requirements set by the Paris Agreements and its ETF.

In addition, Statistics Botswana, the national agency responsible for the development and upkeep of the National Statistics System (NSS) is actively involved in the construction of the GHG emissions inventory in the country. The parastatal has a well-functioning data base for the activity data for almost all activities (coal, fuelwood, petroleum) that are responsible for the GHG emissions. The data quality and control protocols are based on Botswana Data quality Assessment Framework (BDQAF). BDQAF has been developed in accordance with the UN Fundamental Principles of Official Statistics.

However, the current institutional arrangements have gaps and weaknesses as they do not include full participation of the emitting sectors. For instance, Botswana Power Corporation (BPC) the major emitter does not have a major role either in GHG inventory or as data provider. In addition, whilst there exist the GHG inventory team, there is no institutional arrangements for the mitigation measures. This represents an issue given the fact that NDCs are the backbone of the Paris Agreement. In addition, the ETF specifically calls for the establishment of the Quality assurance/quality Control work plan. Currently, the country does not have one. In addition, the country does not have a data management system that also facilitate an information exchange.

With regard to the legal framework contributing to the achievement of the PA and its ETF requirements, the country developed the National Energy Policy (NEP), Climate Change Response Policy and the National Adaptation Plan Framework. Of this existing policy instruments, Climate Change Response Policy was found to be lacking in creating an enabling environment for the country to achieve the Paris Agreement and its Transparency framework. The policy lacks aspects of GHG emissions and mitigation data management and exchange, institutional arrangements. On the other the NEP is well articulated and well facilitate and enhance the Paris Agreement.

Another important gap that has been identified for the country to strengthen its transparency framework is the absence of a national strategy to mainstream NDC into the National development plans (NDPs). This national document is important as it guides the country developmental pathways by mainstreaming NDC into the national development plan. Ideally, the strategy must be developed and its implementation plan highlight the adaptation and mitigation measures. It is on the basis of the national strategy that the monitoring and evaluation framework for the NDC are developed. Importantly, as the country has a National Monitoring and Evaluation System, developing a national strategy for the NDC will





automatically imply that its key performance indicators (KPIs) are included in the National Monitoring and Evaluation System (NEMES).

A review of the Nationally Appropriate Mitigation Actions (NAMAs) by the Government of Botswana indicated that the country has developed some templates for measuring and tracking the mitigation measures. However, as there are no institutional arrangement and policy frameworks instructing implementing entities, they have not been applied and their applicability cannot be assessed.

Based on the existing identified gaps and weaknesses, the following are the recommendations to strengthen the country's MRV/transparency systems:

- Setting up a task group for each sector for the GHG inventory, mitigation and adaptation with the private sector represented in all the task groups,
- Strengthen the existing National GHG inventory team to undertake stocking taking for the adaptation and Mitigation to monitor implementation of the NDC,
- Further building the capacities of the NCCC members and the national GHG inventory team to ensure that they effectively execute their mandate. This will be done through by training and build confidence on the institutions to be included in the national GHG inventory team and participate effectively,
- Strengthening the legal framework on areas of institutional arrangements and data sharing, particularly the country's Climate Change Response Policy. A perusal of this policy (which is the pinnacle for the climate change decision making and planning) reveals some significant shortfalls on areas of data management and sharing, establishment of national green growth strategy, Monitoring and reporting adaptation and mitigation,
- Developing a national strategy for mainstreaming the country's NDC into National Development Plans (NDPs). This will automatically ensure that the NDC are included in the NEMES and hence facilitate their tracking and reporting through the NSO channels. Logically, it is important that there is a green growth strategy and its implementation plan prior to the development of the tracking tools for the NDC. Thus, development a green growth strategy and its implementation plan should be followed by development of the tracking tools,
- Developing the tracking tools for the NDCs mitigation, adaptation and international support received. Currently, the country has developed some templates for the mitigation efforts which need to be strengthened,
- It is also critical that a data management system for the NDC is established to be managed by the climate change focal point. All the KPIs for the NDC should be identified, measured and included in the data management system. The data management platform should facilitate information exchange,
- Developing the QA/QC framework for the GHG emissions inventory. This is one of the requirements within the ETF under the PA, which the country is currently lacking,



- Strengthening the existing institutional arrangements to ensure that both the vertical and horizontal integration of the institutional arrangements are achieved and,
- Capacitate Improving the capacity of the energy sector institutions through training to build the confidence to be actively involved in the GHG emissions, mitigations efforts tracking and reporting modalities.



## 1.0. Introduction

Botswana has recognised the eminent and catastrophic impacts of climate change and its ability to reverse economic gains made over the years. In fact, the country has been experiencing events that are correlated to climate change such as increased incidents of flooding, droughts, seasonal changes in rainfall, hailstorms, and pest outbreaks. Recognising these eminent impacts, the Government of Botswana (GoB) became a Party to The United Nations Framework Convention on Climate Change (UNFCCC) in June 12, 1992 and ratified the convention in January 27, 1994 respectively as a non-Annex I member. The goal of the convention is to stabilize greenhouse gas (GHGs) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

In 2010, the Conference of the Parties (COP) which GoB is Party to, entered into the Cancun agreements, which enhanced provisions for reporting by requiring the parties to submit their national communications every four years which include a national GHG inventory. Furthermore, the developing countries are required to submit their biennial update reports (BURs), containing updates of national GHGs inventories, including the information on mitigation actions, needs and support received. At COP 17, the Parties agreed that the developing countries should submit their first biennial update every two years. Essentially, the Cancun agreements paved their way for the transparency agreement on GHG emissions and mitigation efforts.

In 2015, at the COP 21, the parties proposed strengthening the UNFCCC by establishing an enhanced transparency framework (ETF) under the Paris Agreement (PA). The main aim of the ETF is to build mutual trust and confidence by ensuring:

- *A clear understanding of climate change action in the light of the objective of the Convention as set out in its Article 2, including clarity and tracking of progress towards achieving Parties' individual nationally determined contributions under Article 4, and Parties' adaptation actions under Article 7, including good practices, priorities, needs and gaps, to inform the global stocktake under Article 14, and,*
- *Clarity on support provided and received by relevant individual Parties in the context of climate change actions under Articles 4, 7, 9, 10 and 11, and, to the extent possible, to provide a full overview of aggregate financial support provided, to inform the global stocktake under Article 14 (UNFCCC, 2021).*

Considering the above provisions, the GoB has strived to achieve its commitments under the Convention by regularly submitting its national communications a nationally determined contributions, nationally appropriate mitigation action and biennial update reports (BURs). In addition, the GoB has also established and operationalised planning platforms for



mainstreaming and integration of the climate change adaptation activities in its national planning and decision making. This included the establishment of the National Committee on Climate Change, development of the climate change policy, the National Adaptation Plan Framework and the national GHG inventory team amongst other.

However, despite these achievements, the country is still faced with the challenges of meeting some of the requirements such as reporting in a transparent manner and enhancing national transparency. For the country to achieve transparency level as required by the PA, there is a need to have robust institutional capacity and comprehensive arrangements, information sharing, improved data quality and a comprehensive framework for measuring, reporting and verification (MRV) of the GHG emissions inventory, NDC efforts, and impact on GHG emissions. In addition, it is also critical that the country's system is aligned to the requirements of the Enhanced Transparency Framework (ETF).

In order to strengthen the country's capacity to track progress of and report its NDC efforts, as well as on support received, there is a need to undertake stocktaking exercise to determine achievements, gaps, and needs. This exercise will be critical as it will inform the country areas of weakness and gaps which need to be strengthened to meet the ETF requirements. It is thus against this background that a situational analysis/stocktaking for the GoB MRV/transparency is undertaken with the ultimate purpose of developing/strengthening the transparency requirements to track and report the NDC efforts in a transparent and cost-effective manner.

This assignment is undertaken with the support of ICAT which was established to assist the developing countries to strengthen their transparency systems for adaptation and mitigation actions as per the country's NDC, amongst others.

### 1.1. Objective of the assignment

The objective of the assignment is to undertake a situational analysis of the country's MRV/transparency arrangements in place. This will involve a review of the country's legal and policy framework that guides the MRV/transparency including international conventions that the government is party to. In addition, the analysis will involve an assessment of data quality and information sharing mechanisms.

The specific objectives of the assignment as detailed in the terms of reference (ToRs) are:

- MRV needs and gaps assessment report; and,
- Analysis of existing MRV/transparency system and related support initiatives in the country.



## 2.0. Methods and approaches

To achieve the main objective of this assignment, which is to conduct situational analysis /stocktaking exercise for the country's MRV/transparency arrangements, two main methods were employed. The first method was desk review. Desk review involved identifying and collecting all the relevant documents on the ETF, its Modalities, Procedures and Guidelines (MPGs) as well as ICAT documentation and reviewing them to gain an understanding on the requirements and modalities for reporting and verification that will be applicable under the Paris Agreement regime.

Furthermore, national documents were also collected and reviewed as a stocktaking exercise to identify the achievements, progress, gaps and needs aimed at achieving the ETF. National documents that were reviewed included National Communications submitted to UNFCCC, biennial update reports (BURs), NDCs, NAMAs, policy and legal documents such as Climate Change Response Policy, National Energy policy (NEP) amongst others. In addition, desk review was also undertaken to gain an insight on the energy sector in the country and institutional arrangements.

The second method that was employed was stakeholders' consultation. This is an important method as it gives first-hand information on progress made by the country in aligning to the PA. Consultation was undertaken based on guiding questions which attempted to determine the stakeholder's participation, knowledge on the MRV, their experience, data quality and availability, challenges and areas that require strengthening. The key stakeholders that were consulted included Business Botswana, Debswana, Department of Meteorological Services (DMS) Department of Energy (DoE), Botswana Power Corporation (BPC), Statistic Botswana, Department of Forestry and Range Resources (DFRR), Department of Surveys, Research Institutes, Department of Surveys and Mapping, Developmental Partners. Consultation involved determining the following aspects

- level of knowledge on PA, NDCs,
- institutional involvement and areas of involvements,
- institutional arrangements,
- data quality and sharing platforms,
- Presence of the monitoring and tracking NDC policies and,
- Gaps, limitations, and area of improvements.

### 2.1. Expected Outputs

The expected output from the report is a detailed inventory of the GoB initiatives and measures in places in relation the UNFCCC Convention and Paris Agreement which Botswana



is a Party to. This will identify the gaps and weaknesses that currently exist in the systems and which require to be strengthened for the country to enhance its transparency reporting. Essentially, the stocktaking exercise will identify the legal framework and the creation of an enabling environment to facilitate the implementation of the PA and adherence to the requirements of the ETF.

### 3.0. The Paris Agreement and the Enhanced Transparency Framework

The Paris agreement (PA) is being considered as one of the major global achievements and a landmark in the global efforts to limit the GHG emissions and maintain the global temperature increase to well below 2 °C. It is a legally binding international treaty was adopted by 196



parties at COP 21 in Paris, in December 2015 and enforced on 4 November 2016. To ensure that countries reduce their GHG emissions, the Paris Agreement (Article 4, paragraph 2) requested that the countries developed and submitted their Intended Nationally Determined Contribution (INDCs) in 2015 which were later adopted as Nationally Determined Contributions (NDCs) following their ratification of the PA and its entry into force. The NDCs are therefore the backbone of the Paris agreements to achieve its long-term goals. The NDCs include the domestic/country's proposed mitigation and adaptation measures and their potential GHG emissions reductions.

### 3.1. Enhanced Transparency Framework (ETF)

One of the important elements of the PA is the Enhanced Transparency Framework (ETF) which is aimed at improving tracking the efforts of the party members in a transparent manner, as well as to build mutual trust and confidence among Parties. Under the ETF, countries agreed on a common system to report on GHG emissions and removals, progress towards implementation and achievement of NDCs, climate change impacts and adaptation, and support. Ultimately, the information obtained from the ETF will be used to assess the global efforts in achieving the set target and remove ambiguity in the GHG emissions efforts.

The purpose of the ETF, as outlined in Article 13 of the Paris Agreement, are to

- “Provide a clear understanding of climate change action in the light of the objective of the Convention as set out in its Article 2, including clarity and tracking of progress towards achieving Parties’ individual NDCs under Article 4 of the Paris Agreement (herein after referred to as “NDCs), and
- provide clarity on support provided and received by relevant individual Parties in the context of climate change actions under Articles 4, 7, 9, 10 and 11, and, to the extent possible, to provide a full overview of aggregate financial support provided, to inform the global stocktake under Article 14 (UNFCCC, 2020:p8)

In 2018, the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) established the Modalities, Procedures, and Guidelines (MPGs) for the ETF which each Party must adhere to.

The ETF is supposed to be the ultimate platform for tracking the global efforts of limiting the GHG emissions. This is evident from the resolutions undertaken at COP 21, where the members agreed that the ETF will supersede the MRV arrangements (UNFCCC, 2020). In practice, the new requirements will be enforced upon the submission of the final BR or BURs, by 2022 and 2024 respectively. The main reporting vehicle under the ETF will be the biennial transparency report (BTR) which will have to include a GHG inventory, information on tracking progress of implementation and achievement of NDC under Article 4, climate change impacts and adaptation (voluntary) and financial, technology development and transfer, and capacity-



building support provided, mobilized, and received is to be tracked and reported (UNFCCC, 2020). The first BTR shall be submitted by all Parties by the end of 2024. Figure 1 depicts the EFT framework which the parties collectively agreed upon.

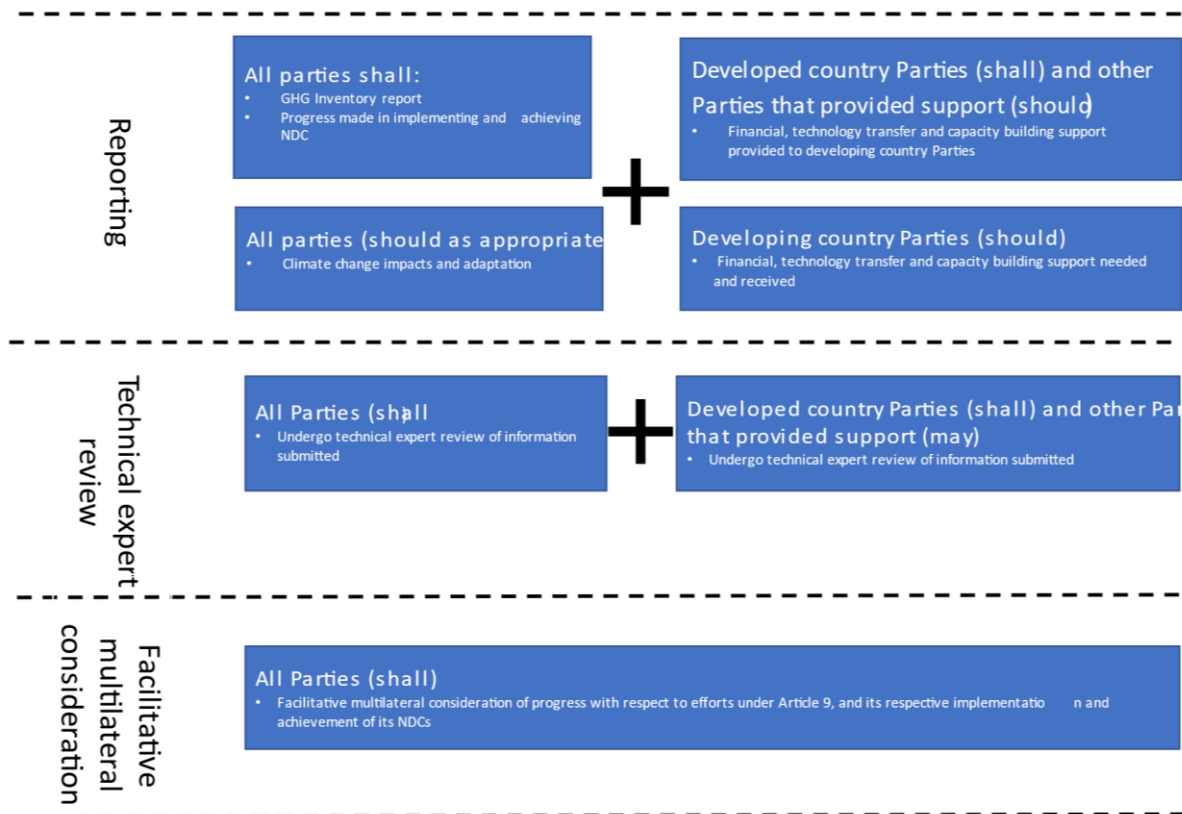


Figure 1: Framework for EFT  
Adapted from UNFCCC

The submission of new or updated NDCs will follow the UNFCCC schedule of every 5 years, with information on its progress to be reported every 2 years as part of the BTRs, as per the layout in Figure 2 below.



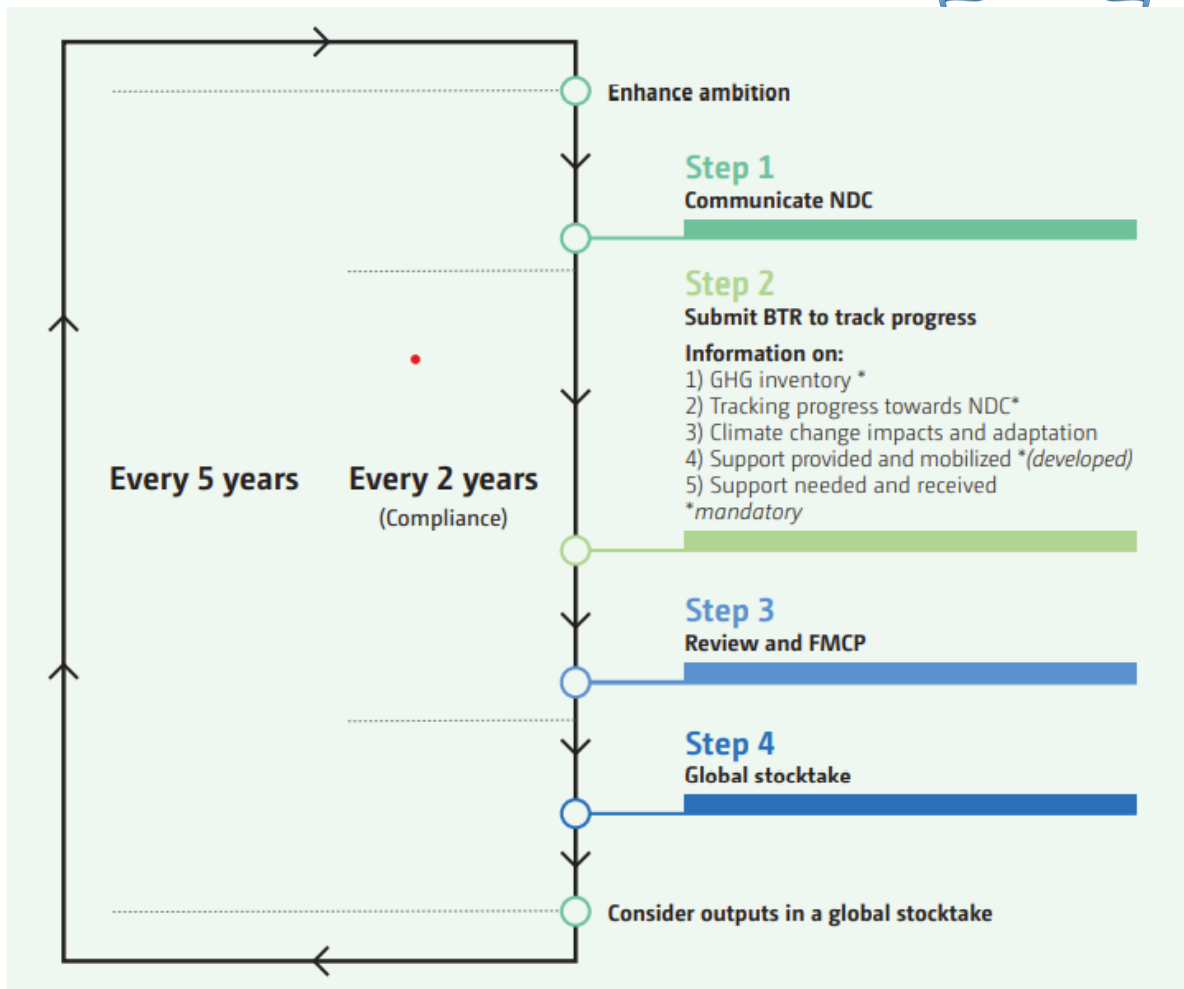


Figure 2: NDC reporting cycle  
Source: UNFCCC (2020)

According to the ETF, Parties must have national inventory arrangements, including institutional, legal, and procedural arrangements to support the continued estimation, compilation, and timely preparation and submission of their national inventory reports (UNFCC, 2020). Importantly, all the information used for the preparation of GHG inventory must be archived, including all disaggregated emission factors and activity data, all documentation on generating and aggregating data, including QA/QC, review results, and planned inventory improvements. Information that will be contained in the BTR is as depicted in Figure 3.

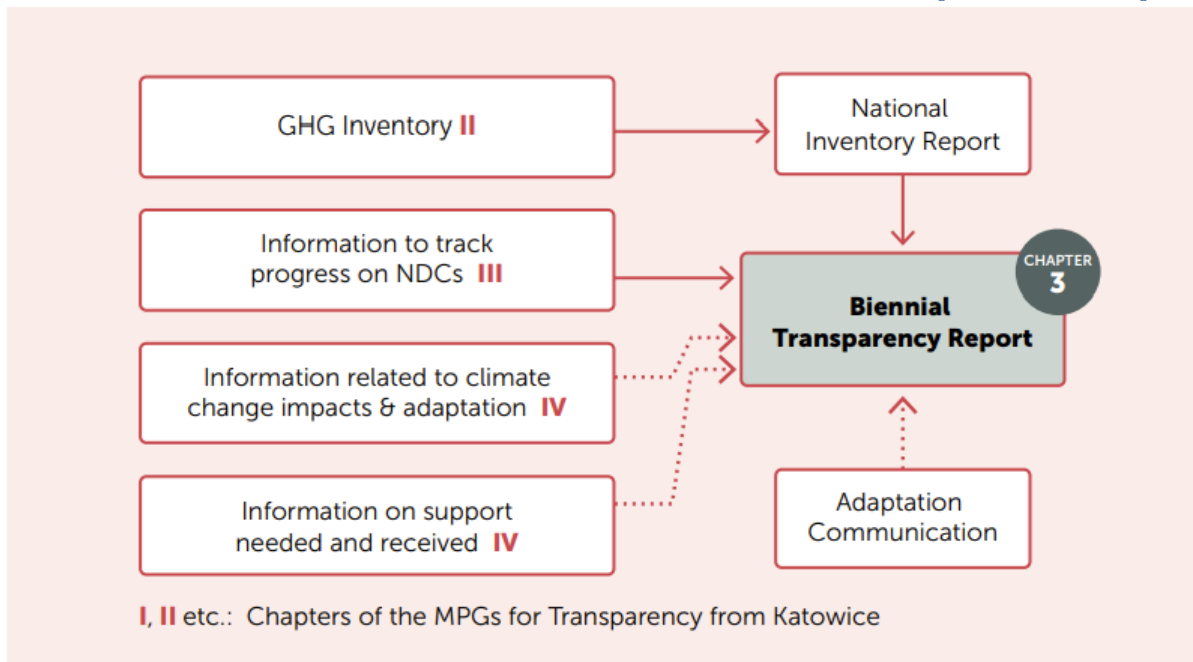


Figure 3: Information on BTR  
Source ICAT (2019)

Quality Assurance/Quality Control is an important aspect of the MRV/transparency framework (UNFCCC, 2020; FAO, 2020). Therefore, according to the MPGs, Parties must have in place an inventory QA/QC plan in accordance with the 2006 IPCC guidelines including related institutional arrangements. The QA/QC framework would involve the following aspects:

- assign specific institution for QA/QC,
- develop a QA/QC plan,
- QA & Review,
- QA/QC system & Uncertainty,
- Verification activities,
- General QC procedure,
- Reporting, documentation & Archiving,
- communicating the QC plan to all involved in GHG inventories,
- establish process and schedule for inventory review, and,
- implementing QA/QC plan.

The NDCs outlines the adaptation and mitigation plans that each country plans to implement to reduce its GHG emissions. It may highlight all the feasible mitigation efforts, whether planned or on-going, their emissions reduction efforts their conditionality and costing. The NDC ambition cycle and the ETF ultimately constitute the backbone of the PA, being the

instruments for committing to and monitoring the achievement of GHG emission reductions targets (Figure 4).

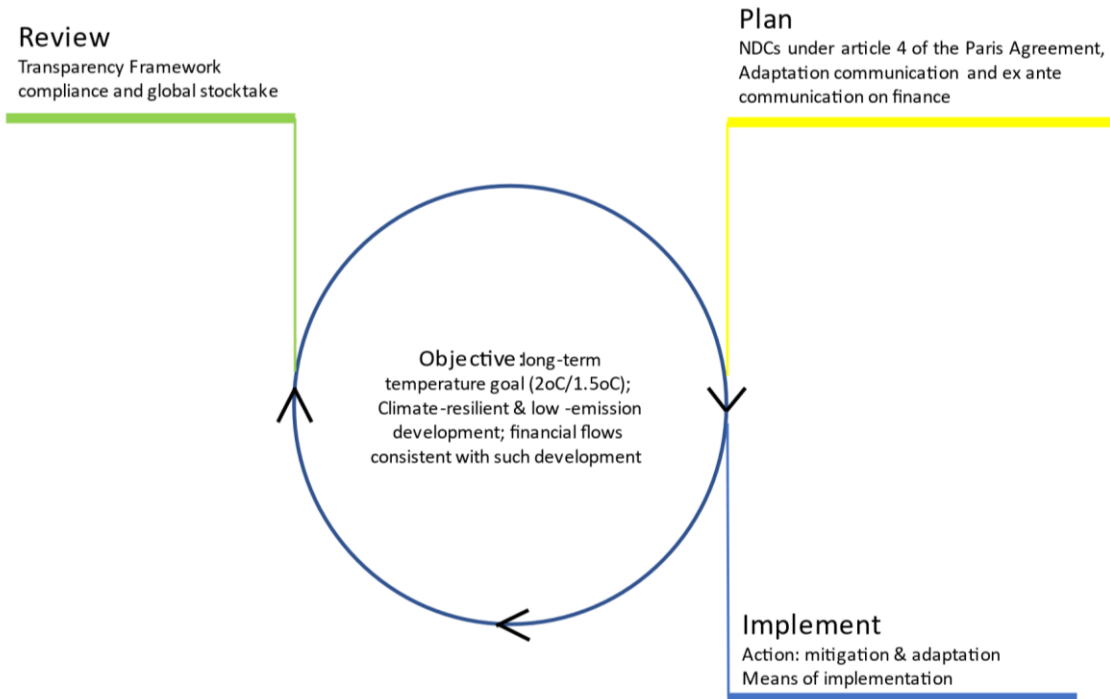


Figure 4: Link between NDC and the Transparency framework  
Adopted from UNFCCC (2020)

According to the MPGs, reporting of information to track the progress made in the implementation and achievement of their NDC shall be both in a narrative and tabular format. To this end, Parties shall identify indicators that are relevant to their NDC (UNFCCC, 2018). Possible indicators to be used include but are not limited to the following:

- net GHG emissions and removals,
- percentage reduction of GHG intensity,
- relevant qualitative indicators for a specific policy or measure,
- mitigation co-benefits of adaptation actions and/or economic diversification plans,
- (e.g. hectares of reforestation, percentage of renewable energy use or production,
- carbon neutrality, and,
- share of non-fossil fuel in primary energy consumption and non-GHG related indicators.

The process for tracking the NDC implementation is as depicted in *Figure 5* below which consistently involves identifying indicators for tracking as well as information on the baseline.

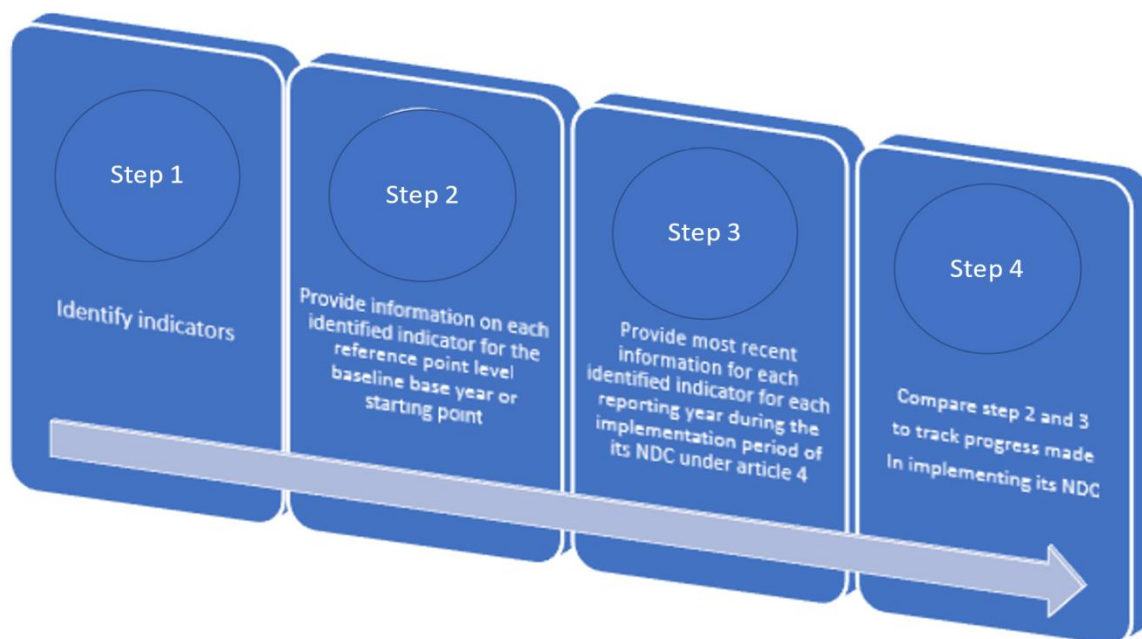


Figure 5: Framework for tracking and reporting the NDC implementation

Concerning mitigation policies and measures, actions and plans, information to be reported in a common tabular format is depicted in table 1 below. Nevertheless, the specific tabular formats are currently under negotiation within the Subsidiary Body for Scientific and Technological Advice (SBSTA).

Table 1: Tabular requirement for tracking and reporting the NDC efforts

INFORMATION THAT PARTIES “SHALL” PROVIDE IN A TABULAR FORMAT	INFORMATION THAT PARTIES “MAY” PROVIDE
Name	Costs
Description	Non-GHG mitigation benefits
Objectives	How the mitigation actions interact with each other, as appropriate
Type of instrument (regulatory, economic or other)	
Status (planned, adopted or implemented)	
Sector(s) affected (energy, transport, industrial processes and product use, agriculture, LULUCF, waste management or other)	
Gases affected	
Start year of implementation	
implementing entity or entities	

Source: UNFCCC (2020)



To ensure that developing country Parties meet the enhanced transparency requirements, the Capacity-building Initiative for Transparency (CBIT) was established within the UNFCCC (Decision 1/CP.21). The overall aim of CBIT is to strengthen both the institutional and technical capacities of the developing countries to enhance their capabilities to have robust transparency frameworks from 2020 onwards (UNFCCC, 2020). This will be achieved through strengthening the national institutions, provision of relevant tools, scheduled training, and technical assistance (World Bank, 2019).

Furthermore, the Parties also established a committee whose mandate entails amongst others, facilitate implementation of the PA and promote compliance with its provisions ("Article 15 Committee"). It assists the member states at all stage of implementation (UNFCCC, 2020).

### 3.2. Existing MRV framework and arrangements

As outlined in Decision 1/CP.24, the ETF will supersede the current MRV system by 2024. However, it is important that the current MRV arrangements are discussed as they provide the foundations for the new requirements as well as the starting point for several countries in tracking their GHG emissions and mitigation efforts. The "MRV" acronym entails:

- measuring or monitoring (M) GHG emissions, mitigation efforts and financial and technical support,
- reporting (r), as the process for compilation and information sharing primarily towards the UNFCCC, and,
- verification (V), an independent assessment of the information reported to determine their completeness and reliability.

The purposes of the MRV as detailed in the body of literature include:

- ensuring greater transparency, accuracy, and comparability of information with regard to climate change in order to identify good practices and allow an international benchmarking,
- documenting mitigation achievements and inspire other Party members,
- monitoring and quantify the impacts of policies, and,
- identify gaps and international support needs; and,
- facilitating access to international public and private finance.

The MRV is generally applied in three areas of emissions, mitigation, adaptation and support (financial and capacity transfers). However, the NDC as provided by the PA, accordingly it will be subject to the new ETF requirements, rather than MRV.

The framework for the MRV is as depicted in Figure 6 below. Developing country Parties are expected to submit their national communication and BUR detailing both the GHG emissions inventories and the mitigation actions and effects in terms of reducing the domestic GHG



emissions which will then be reviewed for transparency purposes. In this framework, developing country Parties are currently subject to less stringent reporting requirements compared to developed countries. Details of information to be reported are provided by the “Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention”, which non-Annex I Parties should submit every four years taking into account a prompt provision of financial resources; and by the “Biennial update reporting guidelines for Parties not included in Annex I to the Convention”, for the preparation of Biennial Update Reports (BURs) which shall be submitted every two years, consistent with their capabilities and the level of support provided for reporting (ISPRA, 2021). In a nutshell the ETF was developed to provide a unique transparency system with common rules applicable to all Parties, with built-in flexibility for those developing country Parties who need it in the light of their capacities.

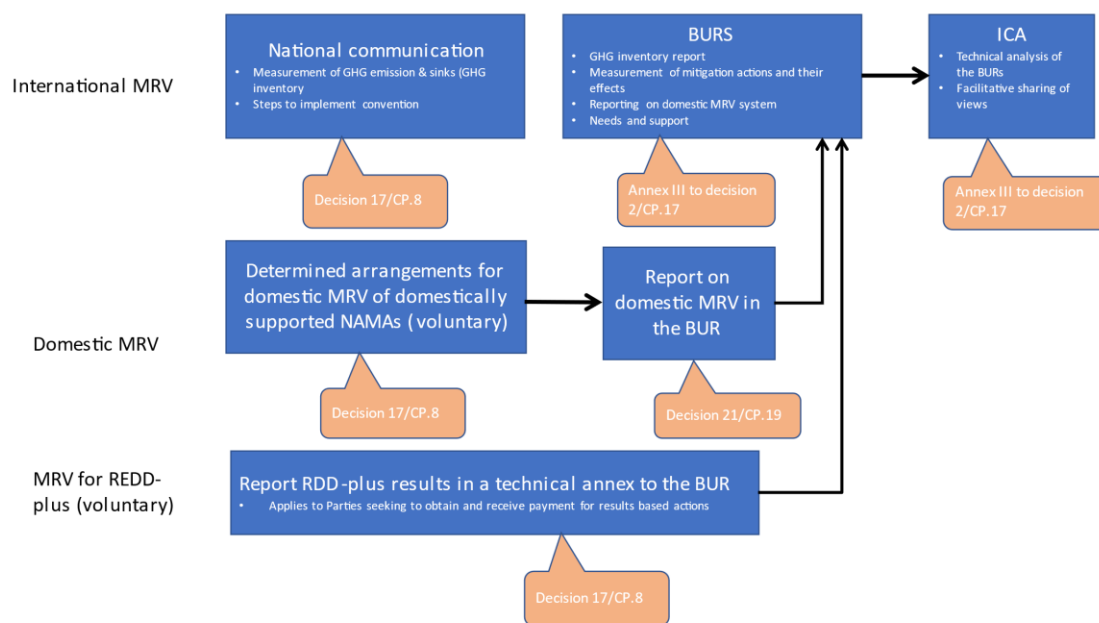


Figure 6: Key elements of the MRV framework applicable to developing country Parties  
Adopted from UNFCCC (2020)

### 3.3. Initiative for Climate Action Transparency

With the view of supporting developing countries in the alignment to the ETF and implementation of its requirements, especially in consideration of their limited institutional and technical capacity, the ICAT project was launched in 2017. Its main task is to support developing countries in strengthening their capacity to build and manage a robust and reliable transparency system that can enable them to effectively implement the Paris Agreement.



Since its inception, ICAT has worked with over 40 countries and developed robust transparency systems which have contributed to enhanced capacity building for the recipients. Among others, the Initiative has developed tools and methodologies to align to the ETF, while contributing to facilitate the evaluation of the effects of countries' national policies to track progress of their NDC efforts and impacts on GHG emissions and removal.

One of the strategies that was adopted by the initiative in building capacity of the developing countries was transformational change through evidence-based policy making.

To ensure that there is a holistic, robust, and comprehensive capacity building towards the ETF, ICAT offers a various technical support which countries can tailor to suit their needs and circumstances. These include:

- Building or enhancing transparency system for mitigation covering institutional capacity; greenhouse gas (GHG) inventories; reporting protocols and processes; data systems; and drafting of legal and regulatory documents,
- Developing capacity on adaptation measures with emphasis on stakeholder consultations; institutional capacity; reporting schemes; and data systems and tools
- Developing or implementing the NDCs emphasising on qualitative or quantitative indicators; tracking framework; and sustainable development impacts and transformational change potentials,
- Policy impacts assessment: GHG emissions dynamics; sustainable development impacts; and transformational change potential,
- Mainstreaming climate actions through transparency at the subnational level and for nonstate actor, and,
- Co-benefits analysis and synergies from enhanced climate action transparency.

Having reviewed the ETF and the MRV frameworks, in terms of reporting requirements, the next stage of the report details an assessment and stocktaking results on GoB's MRV frameworks to comply with the ETF requirements. Specially attention is paid to the institutional arrangements for the energy sector, legal frameworks governing the energy sectors and their contributions to an enabling environment for the MRV/ETF, tracking tools for the implementation of the NDC efforts, quality of the activity data. In addition, issues relating the data and information sharing platforms are discussed.

The chapter commences by describing the energy sector in the country and its institutional arrangements. This is followed by the review of the Policy and legal framework for the energy sector that has a bearing on the MRV framework for the country. Legal and policy framework is an important component of the MRV and its sustainability. Moreover, the UNFCCC has emphasised the need for a well-established legal and procedural arrangement to support reporting the country's efforts. After the legal framework, the climate change institutional arrangements are discussed and their terms of reference in as so far MRV and ETF are concerned.



#### 4.0. Botswana context to UNFCCC Transparency arrangements

Botswana is a Party to UNFCCC as a non-annex 1 country. In compliance with the UNFCCC requirements, the country has progressively submitted and improved on its reporting to the UNFCCC. The country submitted its 1<sup>st</sup> national communication to UNFCCC in 2010, its Second and Third national Communications in 2014 and 2020 respectively. Furthermore, the country submitted its NAMAs, NDCs, and BURs as per the UNFCCC reporting schedule.

##### 4.1. Energy sector in the country

The energy sector in the country falls under the Ministry of Mineral Resources, Green Technology and Energy Security (MMRGTES) portfolio. The Department of Energy (DoE) under the MMRGTES is an oversight governmental entity that is tasked with the overall governance of the energy sector (GoB, 2020). Its responsibilities include amongst others; the development of energy policy and legal frameworks, rural electrification planning and implementation processes, and resource mobilisation for the energy sectors and implementation of the policy (GoB, 2020). Consequently, it coordinates the energy development in line with National development planning objectives and priorities.

Botswana Energy Regulatory Authority (BERA) is a government parastatal established by the Botswana Energy Regulatory Act of 2016. It is an oversight body regulating all types of energy sources in the country (GoB, 2020). Its tasks include amongst others; setting and maintaining services standards; ensuring sustainable and stable supplies in the energy sector; administers licences for sector activities, advises and makes recommendations to the Ministry on energy incidental matters.

The main implementing entities (IEs) for the energy sector in the country are Botswana Power Corporation (BPC) and the Botswana Oil Limited (BOL). BPC is a government parastatal that is responsible for generation and sales of electricity throughout the country. Currently, it has monopoly of the electricity and distribution and sale of electricity in the country. Botswana Oil Limited (BOL) is government parastatal that was established specifically for the management of liquid petroleum fuels. Its function is to secure supply of petroleum products, operation and management of the government strategic petroleum reserves and is also mandated to promote citizen participation in the petroleum fuels value chain (GoB, 2020).

There are various energy sources, the dominant being electricity, biomass/wood, Liquid Petroleum Gas (LPG) and petroleum fuels. Electricity is generated from thermal (coal fired) power station and the diesel-powered generators owned and operated by BPC. The thermal power stations have total capacity 732 MW, which constitutes two plants: Morupule B (600 MW) and Morupule A (132 MW) respectively. The diesel-powered generators are in Orapa and Matshelagabedi with a total capacity of 160 MW (GoB, 2020). To meet the electricity demand deficit, the GoB imports electricity from Republic of South Africa. Electricity and coal





are main dominant source of energy in the country and their consumption is as depicted in Figure 7 below. It is projected to increase to 8.5 TWh by 2040 (GoB, 2020).

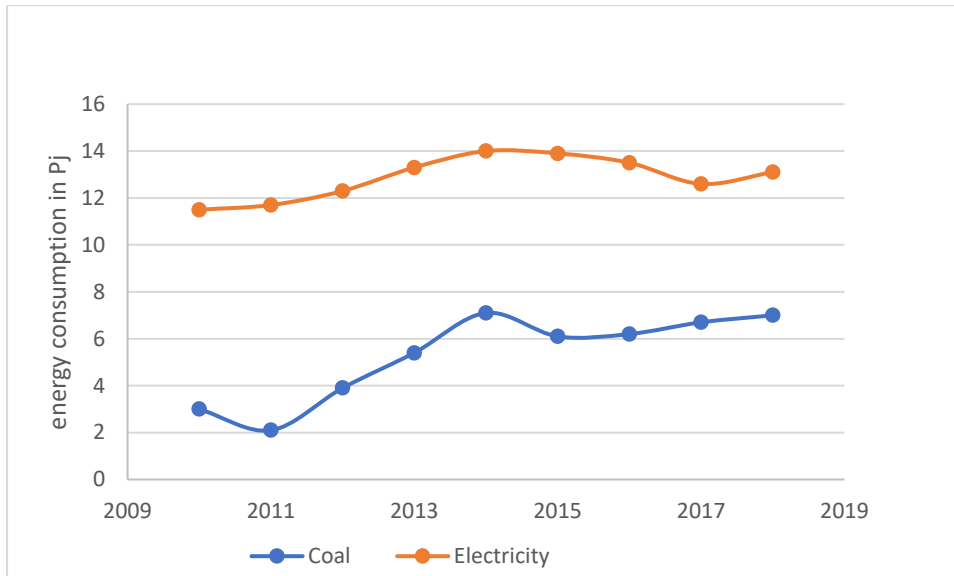


Figure 7: Dominant energy sources by consumption and their trend in the country  
Source: Statistics Botswana (2019)

The main source of electricity generation in the country are coal and diesel as depicted in Figure 8.

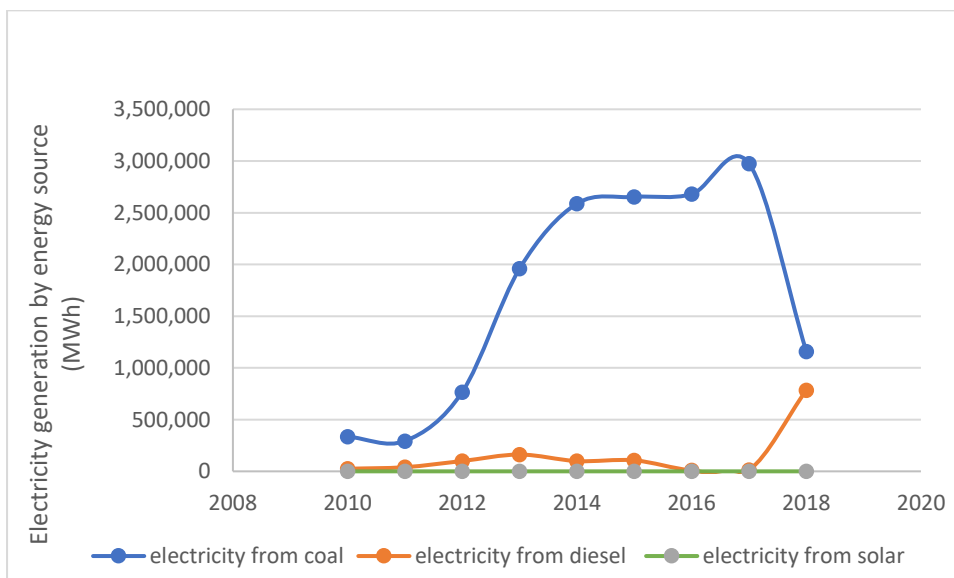


Figure 8: Electricity generation from different sources in MWh  
Source: Statistics Botswana (2019)

Coal for electricity generation is supplied from Morupule coal Mine. The country has extensive coal deposits which are estimated at between 200 and 212 billion tons. (GoB, 2019). However, there are currently, two coal mines (Morupule Coal Mine (MCM) and Minergy Coal (Pty) Ltd



with a total capacity of 7.2 billion tons (GoB, 2020). Total coal production and domestic consumption were estimated at 2.1 million and 1.9 million tons in 2019 with exports making 0.275 million tons (Statistics Botswana, 2019).

Another important energy source of energy is the LPG which is imported from South Africa in (in cylindrical canister form). It is mainly used for cooking at the household, food/catering sector (restaurants and hotels) and government institutions such as schools, hospitals, and prisons.

At the rural areas the dominant energy source for cooking is fuelwood. This energy source is used for cooking in rural area but also in urban areas for the household who cannot afford to buy LPG. The prolific use of fuelwood has implication in the institutional arrangements for the energy in the country. It therefore implies that the Ministry of Environment, Natural Resources Conservation and Tourism (MENRCT) through the Department of Forestry Resources and Rangeland (DFRR) is also involved in the regulation of energy resources in the country. Figure 9 depicts the proportion of household using different types of energy source for cooking at urban and rural.

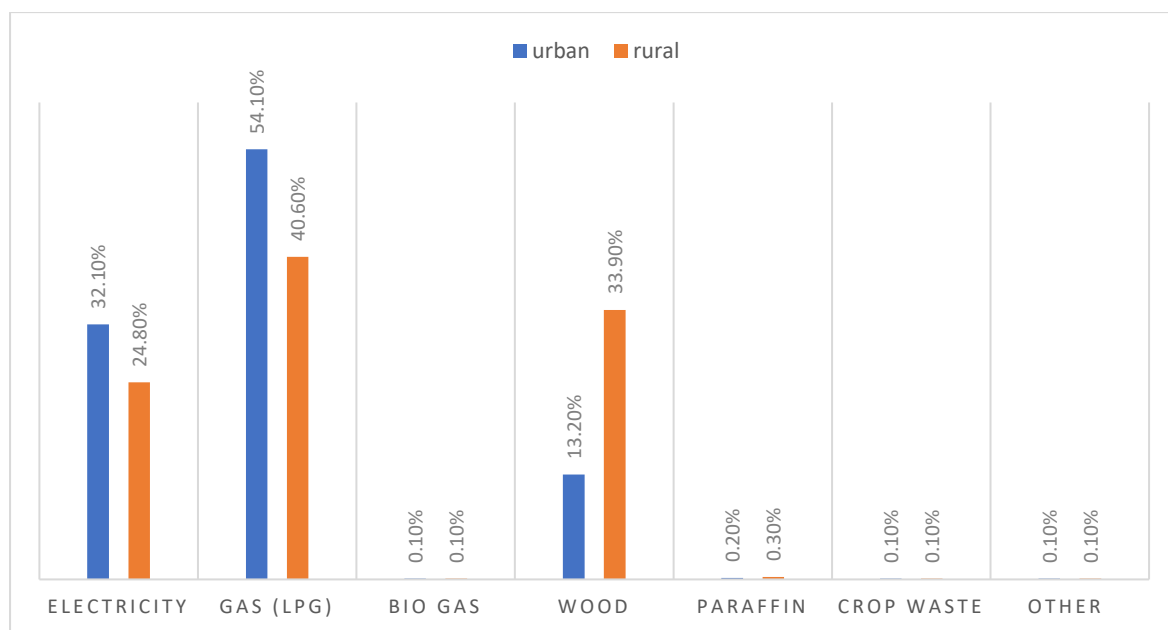


Figure 9: Proportion of household in urban and rural using energy sources for cooking  
Source: Statistics Botswana (2019)

Whilst the energy policy acknowledges the abundance of solar and aims to increase its share in the energy mix, the country still lacks behind in the development of the solar Photovoltaic (PV) systems. Currently, the country has Photovoltaic power plant that have been operational since 2012 with a capacity of 1.3 MW. According to the NEP, there are other privately owned PV system in the country with a capacity of 1.26 MW (GoB, 2020). These includes lodges in the delta which are offgrid.



It is estimated that the country receives around 3200 hours of sunshine per year with an average insolation on a horizontal surface of 21 MJ/m<sup>2</sup>. With the combination of various factors such as mainly the amendment of the Electricity Supply Act (ESA), the implementation of the NDCs could act as catalyst for the development of the solar PV in the country. For instance, recently, DoE has adopted guidelines for a Rooftop Solar (RTS) programme (BERA, 2020). The programme will allow households to install a grid-field ground or roof mounted solar system to generate electricity for uses and selling excess to BPC (BERA, 2020). In addition, the country has recently increased the intensity of solar streetlights and solar geysers. There is also on-going exploration for coal bed methane (CBM) with estimated reserve at 196 trillion cubic feet.

In the endeavour to increase the share of the renewable energy, the GoB is implementing the following energy project in the future:

- 100MW Solar Photovoltaic (2 plants, 50 MW each) and a total of 35 MW from small grid tied Solar Photovoltaic plants,
- 10 - 100MW Coal bed methane,
- 200MW Concentrated Solar Plant (CSP),
- 300MW Coal,
- 50MW Wind, and,
- 100MW Solar Photovoltaic.

The energy sector (both the mobile and the stationary sectors) is the major GHG emitter. According to the Third National communication (TNC) to the UNFCCC, energy sector GHG emissions is estimated at 7409.79 Gg CO<sub>2</sub>eq representing over accounted for 68% of all emissions (GoB, 2019). It is therefore an important sector where mitigations efforts need to be concentrated to, for the country to reduced it national GHG emissions.

Based on a brief analysis of the energy sector, the main institutional arrangements for the energy sector can be depicted as in Figure 10 below.

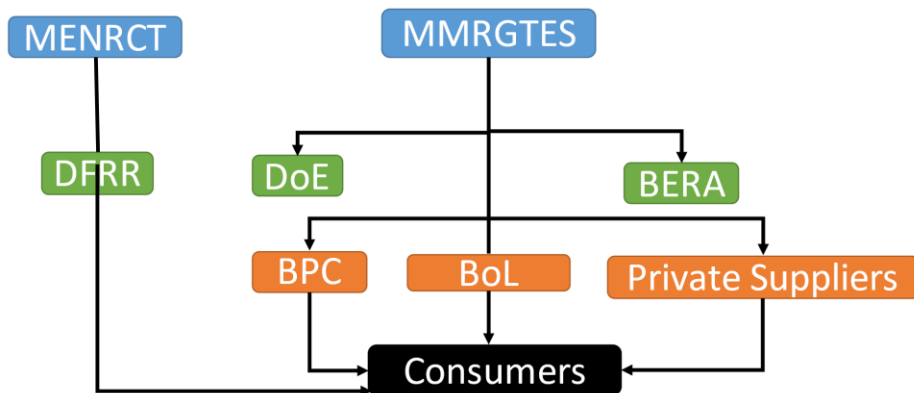


Figure 10: Institutional arrangements in the energy sector

#### 4.2. Policy and legal framework for supporting transparency framework

GoB has over the years developed and implemented several policy and legal instruments that aim at creating an enabling environment for the UNFCCC transparency arrangements.

These policies, legal frameworks, and institutions at both domestic are discussed and their functional influence on the transparency framework are highlighted. However, as the study is focused on the energy sector, emphasis on the policy and legal frameworks is placed on this sector.

##### **Botswana Climate Change Response Policy**

The Botswana Climate Change Response policy was developed and adopted in parliament in 2020. This is the overarching legal framework that aims at guiding the country’s decision making and planning processes to achieve a climate resilient, increase its adaptive capacity and coordinate efforts to meet the UNFCCC requirements. Primarily, the policy was developed to ensure that the country operates within the boundaries of the UNFCCC which the country is Party.

The objective of the policy is to mainstream climate change into development planning, promotes low carbon development pathways and ultimately reducing the country’s GHG emissions. The Policy recognises impacts of climate change and their implication in reversing the economic development and gains made over the years. Invariably, with the recognition, the policy place emphasis on the adaptation and mitigation to enhance the country adaptive



capacity and resilience to climate change adverse impacts. These will be achieved through mainstreaming and integration of the feasible and viable adaptation and mitigation into existing development processes and activities.

The policy calls for the various governmental departments and the private sector to identify mitigation projects/efforts and prepare mitigation plans for the GHG emission reductions and co-benefits to the national economic. Advocating for the government departments and the private sector to prepare the mitigation plans is tantamount to develop the monitoring of the mitigation efforts. Therefore, in this regard, the policy will to some extent create an enabling environment for the Monitoring and reporting of the mitigation efforts.

Another important aspect that is emphasised in the policy is consideration of carbon markets and trading. Inevitably, carbon trading calls for a robust MRV system to ensure that emissions reduction can be measured and verified. Consequently, this will require that the government build and maintains its carbon emissions accounts which are transparent as per the Paris Agreements.

To ensure sustainable of the climate change adaptation and mitigation efforts, the policy calls for the establishment of a National Climate Change Unit. The responsibility of the NCCU will be to implement, monitor and ensure compliance with climate change requires as defined by the domestic and international framework. Consequently, the NCCU will be an important oversight body that will ensure compliance including aspects of transparency framework.

### **National Energy Policy**

The National Energy Policy (2020) is the ultimate overarching policy framework for the energy sector. NEP has a strong bearing to the Paris Agreement and its Transparency framework. First and foremost, the NEP acknowledges the international dynamics that shape international decision-making being climate change. Likewise, the NEP is anchored around the two main global frameworks that have interlinkages to fighting climate change being;

- Agenda 2030 on Sustainable Development, and,
- The Paris Agreement on Climate change and associated Nationally Determined Contributions.

Based on these two frameworks, NEP aims at ensuring that the development of the energy sector is at par to safeguarding the country vision of sustainable environment as articulated in Vision 2036. The NEP vision is to “create an energy system that would ensure secure and reliable supply of modern energy services for all the sectors of the economy and to significantly reduce energy-related atmospheric emissions by the year 2040”. Clearly, from the NEP vision, it can be deduced that the country’s energy policy is aligned to the Paris Agreement with its stern reference to the NDC.

Its Goal is to “ provide energy security for the country and to improve access to reliable and adequate supply of energy in order to facilitate a sustainable and low carbon economic



development". Again, the policy specifically aims at the attainment of a low GHG emissions pathways are highlighted in the NAMAs and the NDCs in its quest to develop the energy sector in the country.

Subsequently, NEP is aligned to the Paris Agreement targets of contributing to global efforts of reducing the GHG emissions to limit the global warming to below 1.5 °C above pre-industrial era by 2030. In the endeavour to limit the country's GHG emissions, the policy has developed 20 robust policy statements of which, five (5) are strongly aligned to the Paris Agreement as follows:

- Policy Statement 10: the Government will support and facilitate initiatives that increase the development of on-grid and off-grid solar in order to increase the contribution of solar energy to the total energy supply mix,
- Policy Statement 13: Initiatives related to production and use of energy derived from bio-energy resources will be promoted and facilitated in order to offset the country's carbon footprint,
- Policy statement 14: Energy efficiency and conservation initiatives will be supported with a view to minimize energy wastage and to offset emissions from conventional power generation,
- Policy Statement 15: Energy extraction, production, transport and use will be done with minimal negative impacts on human health and on the environment,
- Policy Statement 18: An effective integrated energy planning will be ensured in order to achieve optimal use of locally available energy resources towards sustainable economic growth, economic diversification and low carbon development and,
- Policy Statement 20: there will be continual monitoring, regular review and evaluation of the impact of various policy positions and provisions to ensure that they remain relevant.

Furthermore, NEP emphasis for the need for research and development, and information management and planning. Taking cognisance of lack of current lack of reporting framework and data availability to prove the effect of implementing efficient measures, NEP advocates for strong research and development and information management. One of the strategic activities for policy statement 18 is "provide for a mandatory provision of energy related data and information". Undoubtedly, this advocacy will contribute to the development of the establishment of data management systems and frameworks (inclusive of the GHG emissions and mitigation measures) that is aligned to the Paris framework and its transparency framework.

### **Statistics Act of 2009**

It is an "Act to establish a body corporate to be known as Statistics Botswana; to require that official statistics be produced by means of a process that is guided by the National Statistical System; to provide principles for the production and dissemination of official statistics; and for matters incidental thereto" (GoB, 2010:pg1).



The Act led to the establishment of Statistics Botswana and thereafter the National Statistical System. According to the Act, the NSS should constitute all institutions in the country dealing with or directly involved in the production of vital statistics, use of official statistics and other statistics, research and development of statistical methods and techniques; and training and education (GoB, 2010).

Thus, through the establishment of the NSS, the Act makes a provision of the institutional arrangements for data collection and analysis. In addition, the Act makes provision for collection and data and information as it calls for the statistics or information to be exchanged among the parties or shared with the other parties, as long as confidentiality of individual data is respected (GoB, 2010). Thus, the Statistics Act provide legal framework for the institutional arrangements and information exchange for the NDC MRV systems.

### **Vision 2036**

Vision 2036 is a country strategic planning document that outlines the country's aspiration and high-level activities to achieve those aspirations. Vision 2036 emphatically acknowledges the potential impacts of climate change and their potential to reverse the gains achieved over the years. The vision thus emphasis on the identification and immediate implementation of feasible and viable adaptation and mitigation measures to reduce the country's GHG emission and hence its carbon footprints. Consequently, the country aims to achieve a low carbon footprint in its quest for high income country status.

In order to achieve a low carbon footprint, the country aims to develop and implementation emission standards which will be enforced and monitored over time (GoB, 2016).

### **National Adaptation Plan Framework**

The country developed and adopted its National Adaptation Plan Framework (NAPF) in 2019 as a strategic platform to coordinate and harmonise the implementation of the sectoral adaptation plans. The NAPF was developed with the realisation that over the years, the country has been implementing sectoral adaptation in an uncoordinated and hence a need for coordinated approach. Subsequently, the NAP Framework is meant to guide the NAP process, ensuring it takes a holistic approach and that it mainstreams and integrates climate change adaptation into all levels of planning and implementation at national and subnational levels (GoB, 2020).

The NAPF strongly calls for robust monitoring and evaluation (M&E) monitoring of the NAP process with indicators for tracking country's efforts in adapting to climate change. As the adaptation measures forms and important component of the NDC and some of the adaptation measures transcend into mitigation measure (ecosystem-based approaches) i.e., they contribute to GHG emissions reduction, the NAPF form a strong entry point to support the transparency framework.



Furthermore, the NAPF pledge improve efforts by improving on the existing climate data collection and analysis which will be used to inform decision making (GoB, 2020). One of the important aspects of transparency which the NAPF strong advocate for, is the establishment of a robust and well-coordinated information-exchange platform (GoB, 2020). Information-exchange platform is one of the prerequisites of the transparency framework as detailed in the ETF. Thus, this NAPF is also one of the country frameworks which will support the Transparency framework.

### **National Development Plan 11**

National development plan (NDP) 11 is the medium-term plan that is used as a vehicle for the implementation of the country's visions 2036. The plan is operational from 2017 to 2023. NDP 11 theme is inclusive growth for the realisation of sustainable employment creation and poverty eradication. In alignment to the Vision 2036, NDP 11 is centered on climate change as a barrier for accelerated economic growth and development. In addition, NDP categorically acknowledges that the over the years the country has produced quality environmental data. However, the sharing, integration and updating has been identified as one of the major limitations. Therefore, NDP 11 calls for the establishment of environmental information management for decision support. This will be an important tool as it will support information sharing platform on GHG emission, mitigation, and adaptation projects.

One of the most important features of the NDP the development and operationalisation of the country's National Monitoring and Evaluation System (NEMES) in 2004. The system was created to track the implementation of policies, programmes and projects. NEMES is one of the entry points for nesting the NDC so ensure national monitoring.

### **Botswana NDCs**

As per decisions 1/CP.19 and 1/CP.20, GoB developed and submitted its INDC in 2015 which were adopted as NDCs in 2017. The NDC as indicated are the backbones of the Paris Agreement and the Transparency framework was devised specifically for them. According to the NDCs, 71% of Botswana's GHG emissions reported are attributed to the energy sector. The largest two categories are electricity generation and road transport, constituting 55% and 26% respectively. Botswana NDCs covers both the adaptation and mitigation component as per the Paris Agreement requirements. Consequently, the country's NDC provide a long terms planning framework (2020-2030) for the implementation of the country's adaptation and mitigation action and contribute to global efforts of reducing the GHG emissions. The NDC were formulated and aligned to the country's vision of safeguarding the ecosystems and their services as outlined vision 2036. Furthermore, they were formulates based on the country's guiding principles of increase the renewable energy in the national energy mix, improve energy efficiency and efficiency in use of natural resources, increase food security and reduced resilience of the economy to climate calamities, and enhance environmental sustainability.





The country's NDC covers majority of the national economy sectors being agriculture, energy (including transport), Industries, waste, and land-use change, and forestry (LULUCF) for both the adaptation and mitigation activities. Table 2 and Table 3 depicts the emissions reductions as based on the INDC which were later adopted to the NDC.

Table 2: Projected emissions reduction

GHG Type	Projected total GHGs by 2030 in Gg CO <sub>2</sub> eq.	Projected emissions reduction by 2030 in Gg CO <sub>2</sub> eq.
CO <sub>2</sub>	14730.4	2283.09
CH <sub>4</sub>	58.7	15.13
N <sub>2</sub> O	3645	309.55
	18434.1	2607.77

Table 3: NDCs mitigation measures

Sector name	Mitigation	GHG type	Projected emission reduction
Energy	Solar power	CO <sub>2</sub>	569.29
		CH <sub>4</sub>	10
		N <sub>2</sub> O	182.87
	Energy efficiency		
	Efficient lighting	CO <sub>2</sub>	264.9
		CH <sub>4</sub>	0.1
		N <sub>2</sub> O	96
	Efficient refrigeration	CO <sub>2</sub>	29.2
		CH <sub>4</sub>	0.01
		N <sub>2</sub> O	9.18
	Solar street lights		
	Solar Energy appliances use		
	Geysers	CO <sub>2</sub>	71
		CH <sub>4</sub>	0.02
	N <sub>2</sub> O	16.5	
Solar water Pumps	CO <sub>2</sub>	0.9	
Public Transport System	CO <sub>2</sub>	1347.8	
	CH <sub>4</sub>	5	
	N <sub>2</sub> O	4.4	
Agriculture		CH <sub>4</sub>	
Waste		CH <sub>4</sub>	400

For the adaptation, the NDC also covered agriculture, water, health and ecosystems (flora and fauna). For the water sector, some of the adaptation measures are already on-going and include conjunctive use groundwater and surface, enhancing recharge by construction of earth dams and other innovative feasible technologies with emphasis on strategic wellfield



and acquirers such as Artesia. Another important adaptation of the water sector creation of an enabling environment to promote decentration of the economic activities to abundant water resources area such as Maun, Shakawe and Kasane. The ecosystem-based approach is promoted by the NDC as being instrumental in increase ecosystems' ability to increase its services and offer buffer to the climate adversities mainly drought and flooding. It is also promoted in agriculture sector jointly with the smart and conservation agriculture. Lastly, for the health sector, improving the health sector service and control of tropical disease such as malaria and diarrhoeal disease control are some of the adaptation measures that are emphasised.

In total, it was estimated that the NDC proposed activities (adaptation and mitigation) will cost in the region of approximately P175 billion for the implementation period of NDC.

Subsequently, the GoB has already developed the NDC which has been adopted by UNFCCC and is currently under review. It is based on this NDC which will be updated following the UNFCCC cycle of review due in 2021, that this situational analysis is undertaken to determine systems in place for its monitoring in terms of tracking the adaptation and mitigation measures and finance received.

The review of the legal and policy framework reveals some significant progress undertaken by the country to create an enabling environment for the country compliance with the PA and its transparency frameworks. For instance, the country developed the climate change policy, the National NAP frameworks whose objective is to ensure strengthen the country's implementation of the sectoral adaptation plans. In addition, the NEP advocates strongly for mandatory provision of energy related data and information management systems. In addition, the climate change response policy calls for the establishment of the climate change unit for strengthening institutional arrangements.

However, there is a significant gap in the legal and policy frameworks. Firstly, there is an absence of the climate resilient economy strategy or the green growth strategy whose objective is to mainstream climate change adaptation and mitigation into the national planning purposes such as NDPs. This therefore leaves the NDC unhinged in the national development process. A clear example where is NDC adaptation and mitigation are integrated and mainstreamed is Ethiopia. Ethiopia developed its climate resilient green economy strategy whose purpose is to mainstream adaptation and mitigation into the national planning processes through their 10 years development plan. Thus, in Botswana there is a vacuum between its NDC and the NDPs.

In addition, there is climate change response policy is no equivocally clear on the climate change data sharing amongst the sector and also on vertical and horizontal integration of the institutional arrangements for the PA and its Transparency frameworks.



## 5.0. Situational analysis on Botswana MRV systems

### 5.1. Institutional arrangements for the development of the MRV

Botswana has systematically and progressively concentrated its effort in building an interfaced institutional architecture to ensure that it implements climate change interventions and comply with UNFCCC requirements. The following existing institutions, and their responsibilities are the country's endeavour to address the challenges of the climate change and comply with the UNFCCC requirements.

#### **Department of Meteorological Services (DMS)**

DMS, through its climate change focal point is the lead entity for the coordination of the country's response to climate change. Subsequently, the DMS is the National Focal Point to the UNFCCC. The DMS coordinates the country's reporting to the UNFCCC, guides in the formulation of the legal framework, and coordinates the country efforts to meet the UNFCCC requirements.

In addition, DMS collects and analyse climate change data for the country and disseminates the information for climate preparedness and early warning systems. It also advice on meteorological data as well as adverse effects of weather and climate in Botswana

#### **The National Climate Change Committee (NCCC)**

At the national level, the country established the National Climate Change Committee (NCCC) which constitutes Government Ministries/departments, Non-Governmental Organisations (NGOs), and the private sector. The NCCC was established as an advisory body to coordinate the implementation of Botswana's obligations under the UNFCCC such as the Paris Agreement and its Transparency framework. The Deputy Permanent Secretary (DEA) in the Ministry of Environment, Natural Resource Conservation and Tourism is the chairperson of the Committee.

The responsibilities of the NCCC which are critically relevant to the Paris Agreement and its Transparency framework include amongst others:

- Oversee the preparation of the National Communication to the Climate Change Secretariat and the CoP and ensure the formulation of appropriate national responses to climate change issues,
- Coordinate and oversee the establishment of compatible and properly networked data bases on issues of climate change, its impacts and response strategies, and,
- Provide guidance in the development of the areas of concern and facilitate development of national research programmes and projects on climate change issues,

its impacts and response strategies, and advise on further studies for which funding may be sought from the Global Environment Facility or any other financial mechanism.

The duties and responsibilities of the established NCCC are directly aligned to the PA and its transparency framework. Specifically, the PA requires party members to develop and submit their national communications which entails climate change impacts, adaptation and the country's mitigation efforts. Another important duty of the NCCC that has a bearing on the Transparency framework/MRV is the establishment of compatible and properly networked data bases on issues of climate change, its impacts and response strategies. One of the most important and overarching aspect of the Transparency framework is a well-functioning data base on the response strategies mainly adaptation and mitigation efforts. As the NCCC is tasked with the establishment of the functional and efficient data base, it implies that the GoB has taken significant stride towards the establishment of frameworks that can contribute to the achievements of the PA and its Transparency framework.

Though the ToRs of the NCCC are well articulated and aligned to the PA and its Transparency Frameworks, it is worth noting that the since its inception in early 2000, the committee has not yet developed the well-functioning data base. In addition, the NCCC has not spearheaded for the creation of an enabling environment for the implementation of the NDC such as mainstreaming strategy for mitigation and adaptation into the NDPs.

#### **National GHG emission team**

The National focal point (DMS) has mobilised and established a multi-disciplinary national GHG inventory team for the sole purpose of constructing and compiling the GHG emissions for the biennial reporting and NC. The national team constitutes consortium of expertise covering all the thematic areas of the GHG emission sectors being energy, industrial processes and product uses (IPPU), agriculture, waste, land-use, and land use change and forestry (LULUCF). It is made up of expertise from Botswana University of Agriculture and Natural Resources (BUAN), University of Botswana (Physics Department), Statistics Botswana, Department of Forest Resources and Rangeland (DFRR) Department of Waste Management and Pollution Control (DWMPC), and DMS (Annex 5). The private sector is excluded from this team. The national inventory team has been responsible for the GHG inventory for the country for all the biennial report as well as the national communications. The national GHG inventory team reports to the climate change focal point housed at DMS (Figure 11).

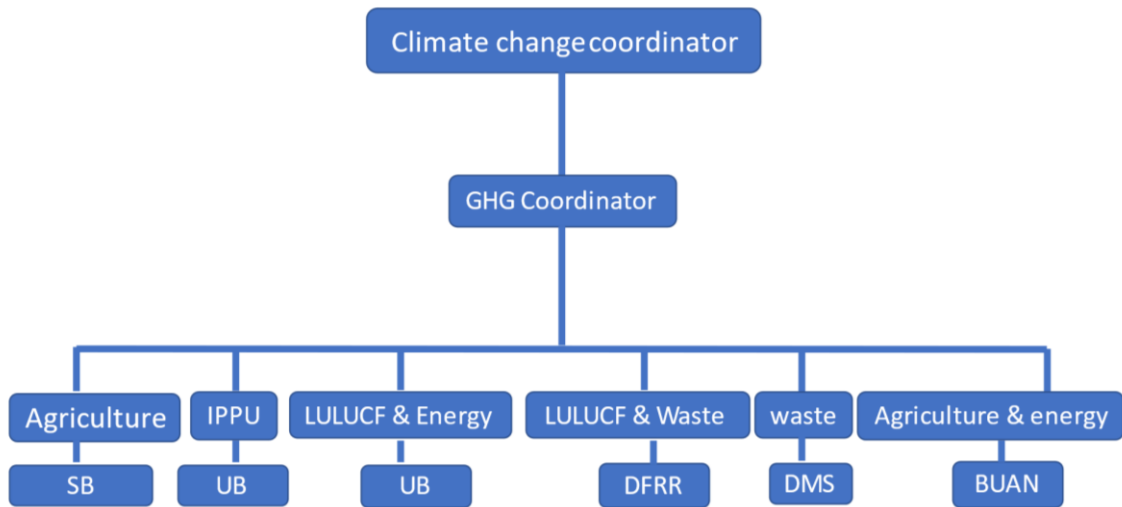


Figure 11: National GHG inventory team arrangements

However, the current institutional arrangement for the National GHG inventory is a far-fetched from the ideal structure as depicted in Figure 12 below. As depicted in Figure 12, a GHG inventory should constitute the QA/QC expert and Uncertainty expert. However, some additional responsibilities are assigned to sector experts, *e.g.*, quality control and archiving/documentation is done by an expert from Statistics Botswana who is also responsible for AFOLU and energy. Currently, these key positions are absent in the current GHG inventory team. Furthermore, the task Group for each sector is yet to be formed.

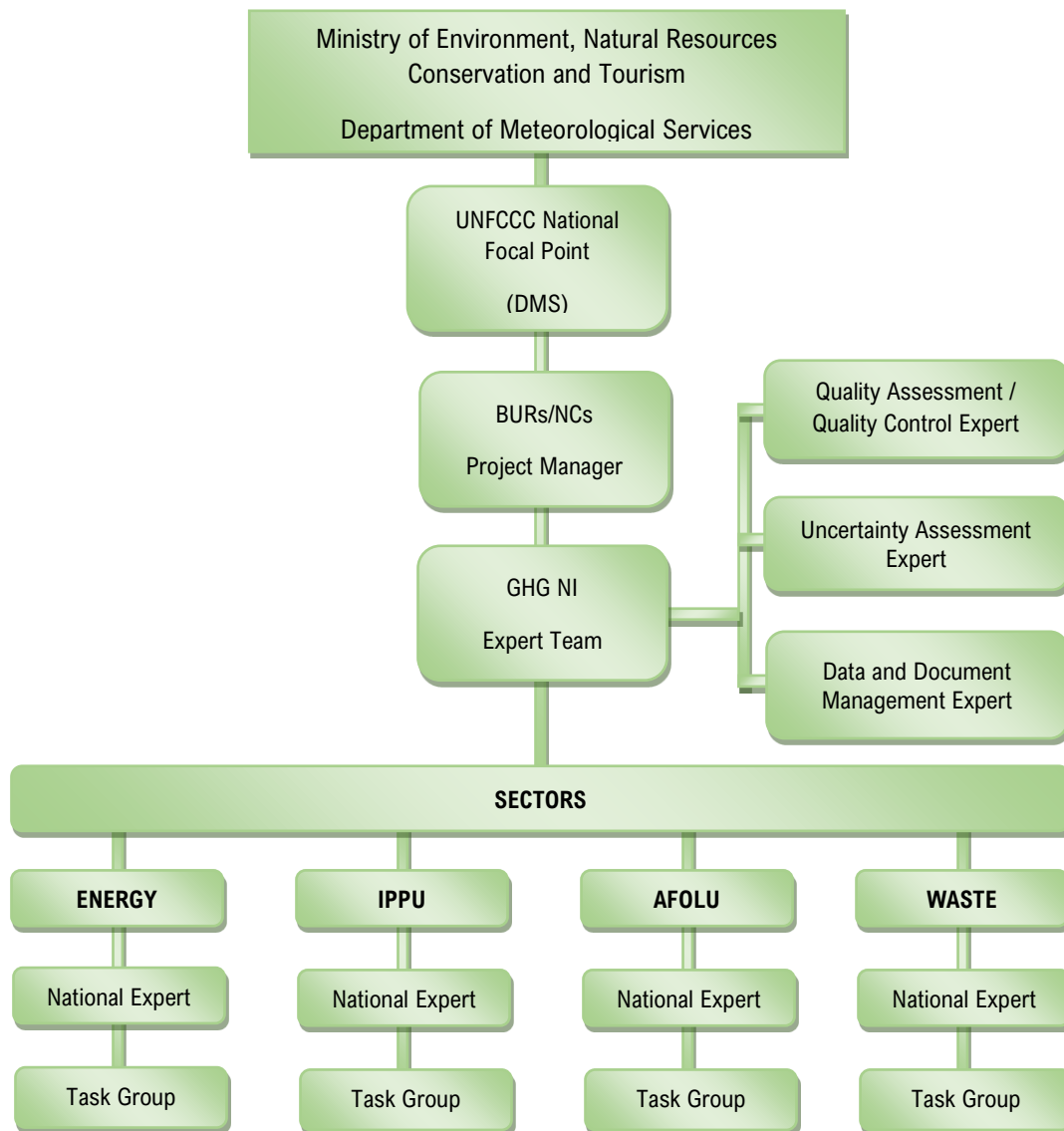


Figure 12: Ideal structure for the National GHG inventory team

Despite some of the highlighted shortfalls, the GHG national team is functioning and develops a reasonable quality of GHG inventory. Thus, this is another important institutional arrangement where a team of trained experts from the tertiary institution, government department and Statistics Botswana is tasked with developing the national GHG Inventory.

**Statistics Botswana (SB)**

SB is a national agency responsible for the development and upkeeping of the National Statistics System (NSS). Its task includes collection, processing, analysis, dissemination and archiving of statistical information across the economy covering all the economic sectors that are reported in the NC (agriculture, energy, environment/systems, health, tourism, and



demographic, amongst others. Amongst the statistic that is produced by SB include the GHG emissions under the Environment statistic. The parastatal has a well-functioning data base for the activity data for almost all activities that are responsible for the GHG emissions.

The data base includes electricity generation, coal consumption, fuelwood consumption, petroleum products consumption and mitigation activities such as solar boreholes. To capture data across the major economic sectors, officers from SB have been deployed to major economic sectors (*e.g.*, Ministry of Transport of Communications, Ministry of Health and Wellness, Ministry of Education & Skills Development, Ministry of Agriculture & Food Security) to provide technical support, and for easy collection of administrative data.

The data for the energy sector and other GHG emitting sectors is compiled into quarterly and annual reports and SB has an active portal for the activity data<sup>1</sup>. On this basis, it can be unequivocally stated the country has existing data base for the GHG inventory and the activity data for most of the energy sector.

In terms of data quality, SB has developed a Botswana Data quality Assessment Framework (BDQAF) which guides its data quality and control protocols. The BDQAF has been developed in accordance with the UN Fundamental Principles of Official Statistics. One of the principles that underpins the BDQAF is accountability and transparency. The BDQAF is based on the underlying principle that the agency must present information according to scientific standards on the sources, methods and procedures of the statistics (UNECE, undated).

Therefore, the existence of the SB which maintains NSS for the country partially meet the requirement for the Transparency framework as it has a well-established and functional data portal. In fact, the agency produces and disseminate information on GHG emissions inventory and other relevant activity data. Furthermore, in compliance with the international principle of official statistics, SB has developed a BDQAF to ensure transparency and accountability. This is in line with the Paris Agreements and its Transparency Framework. However, it is important to note that still there is a need for the national GHG inventory team to have its QA/QC framework and plan which is independent from the SB quality control. Furthermore, there is a need to have an implementation plan for the QA/QC plan.

### **Line ministries**

In addition to the identified committees and the NGOs, the ministries and the relevant departments are involved in the implementation and mainstreaming of the relevant ministerial climate change adaptation and mitigation activities into their ministerial portfolio. For instance, the Ministry of Agriculture and Food Security through its department is campaigning for the climate smart agriculture activities mainly zero to low tillage, water conservation activities, soil conservation and mulching to cover the soil surface to reduce

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<sup>1</sup> [Statistics Botswana | home \(statsbots.org.bw\)](https://statsbots.org.bw)



evaporation. Moreover, these climate smart agriculture activities also promote soil carbon store and hence agriculture mitigation. Thus, it is the responsibility of the governmental departments to monitor and evaluate their adaptation and mitigation efforts are defined in the NDC and the national communications to the UNFCCC.

## 5.2. Existing MRV tools for the country

One of the most critical elements of the ETF is the establishment and operationalisation of tools to track the Parties' NDC (which may include both adaptation and mitigation components). As adaptation and mitigation measures are implemented by different Implementing entities, it is critical that there is a tracking instrument which the implementing entities can complete and submit to the climate change focal point. For instance, the mitigation measures for energy are spread throughout all the economic sectors (agriculture, households, councils, WUC, BPC etc). It is therefore imperative that the implementing entities are able to track the mitigation efforts and their potential GHG emissions reduction and submit the results to the climate change focal point.

An assessment of the NAMAs and the INDCs reveal that Botswana has developed a set of MRV tracking tools for the mitigation efforts and the international support received. Annex 1 to 3 depicts the tracking tools for the mitigation efforts, international support received and their impact on the GHG emissions reductions that were initially developed. In addition, the NAMAs have also developed a set of tools for reporting template for the mitigation and international support for the mitigation efforts. Therefore, the country has made some efforts in developing its MRV tools to track and monitor its efforts.

Whether these instruments have been used by the implementing partners and their applicability will be addressed in the next chapter of the report.

Thus, the next stage of the assessment will be to determine the extent to which the MRV are being used and their shortfall. This analysis will contribute to improving the existing tools and strengthening the institutional arrangements for ETF.

## 5.3. Finding from desk review on institutions and instruments

The desk review has identified some of the significant efforts and strides made by the GoB which are aligned to the PA and the ETF. Furthermore, they will also contribute to creating an enabling environment for the institutional arrangements. Firstly, the GoB has established an NCCC whose duties and responsibilities include amongst others to coordinate and oversee the establishment of compatible and properly networked data bases on issues of climate change, its impacts, and response strategies. In addition, there is also a function unit within the DMS, the climate change focal point. Its duties include coordinating the government climate change mandates and requirement as set out in the Convention. The climate change focal unit under the DMS has also established the national GHG inventory team whose task is to develop the GHG inventory as per the PA and the ETF.





Therefore, in terms of institutional arrangements, the country has established some functional unit whose collective duties and responsibilities is to meet the country's requirements. However, within the various governmental department and private sector, there appears to be a vacuum on data and information exchange and participation on NDC reporting. The established committees and units do not transect into the governmental departments and private sector. Therefore, from the desk top review, horizontal integration of the country climate change institutional arrangements does not fully facilitate institutional connectivity on the matters incidental to the PA.

Furthermore, whilst there is an institutional arrangement in place, it is important that their functionality is assessed. This will be addressed later in the report under stakeholder consultations. However, one thing that is coming out strongly from the desk-review is the blur/obscure and undefined role of the DoE in climate change sphere. This is disturbing given the fact that energy sector contributes over 75% of the national GHG emissions. DoE must be at the forefront in the implementation of the NDC and reporting/tracking the penetration of the various mitigation efforts from both the private and government sector.

Regarding the legal and policy frameworks, desk review identified a series of policies that create an enabling environment for the country's efforts to achieve the PA and adhere to the ETF. The most eminent one is the NEP, which is well articulated in terms of operationalising the country's internal process for the PA and ETF. For instance, NEP advocates for the provision of energy related data and information. This will aid in the establishment of the instruments and the data platform to monitor and track GHG emissions, energy efficient technology and solar appliances.

The climate change response policy on the other hand has some significant deficiencies in addressing the requirements of the PA and the ETF. The Policy acknowledges climate change impacts and strongly calls for mainstreaming adaptation and mitigation to build a resilient green economy. Besides that, the policy is silent to tracking and monitoring GHG emissions, establishment of the data base and information exchange platform.

Regarding the existence of the tracking instruments, the country had initially developed the tracking instruments. The tracking tool have been developed for the mitigation efforts for the energy sector, the international support received and the reporting templates for the mitigation. However, these instruments have left some of the mitigation measures for the energy sector such as solar streetlights, solar boreholes and biogas, amongst others. In addition, there is a need to improve them by adding the key performance indicators.

#### 5.4. Consultation with Energy key stakeholders

In the endeavour to assess the country's institutional capacity, arrangements, their functionality and involvement in the MRV/transparency framework, consultations were undertaken with the key energy stakeholders. All stakeholders as depicted in Figure 10 who represent the Energy sector were consulted. Furthermore, private sector represented by the



Business Botswana (BB) and the research institutions represented UB and BUAN were also consulted. Foremost, the Ministry of Finance and Economic Development (MFED) which is the Green Climate Fund (GCF) National Designated Authority was also consulted to determine their involvement in reporting the international support received. Critically United Nations Development Programme (UNDP), a developmental partner which has been involved in the funding the country's UNFCCC requirements such as NCs, BURs, mitigation, and the country's capacity building, was also consulted. A total of 14 institutions whose mandate covers the energy sector were consulted.

Consultation was undertaken through electronic questionnaire surveys (Annex 6) in accordance with the Covid 19 protocols followed by rigorous follow-ups through telephonic interviews. Annex 4 depicts the list of the stakeholder consulted for the energy sector.

#### 5.4.1. Institution familiarity with the PA and Transparency framework

The starting point in assessing/analysing the existing MRV/transparency system and related support initiatives in the country was to determine the institutions knowledge on PA and the ETF and also the country's NDC. This aspect is important as institutions can only participate in the programme that they have knowledge on. Therefore, stakeholders were assessed on this knowledge.

Such assessment revealed that the majority of the institutions under the energy sector are quite knowledgeable on the subject matter. Only three (4) out of the 14 consulted institutions in the country indicated limited to no knowledge on the PA and its transparency requirement. The institutional knowledge on the PA was demonstrated by the responses given on describing the requirements. The institutions that indicated knowledge of the PA described the PA and its transparency requirement exceptionally well. They indicated that the UNFCCC members have committed to reduce their GHG emissions to limit the global temperature to below 2 °C. Furthermore, they elaborated that the countries are required to comply and report their National GHGs, produce NC detailing the GHG emissions, adaptation and mitigation measures. In addition, the institutions responded that countries are supposed to produce a GHG emissions inventory biennially in a transparent manner.

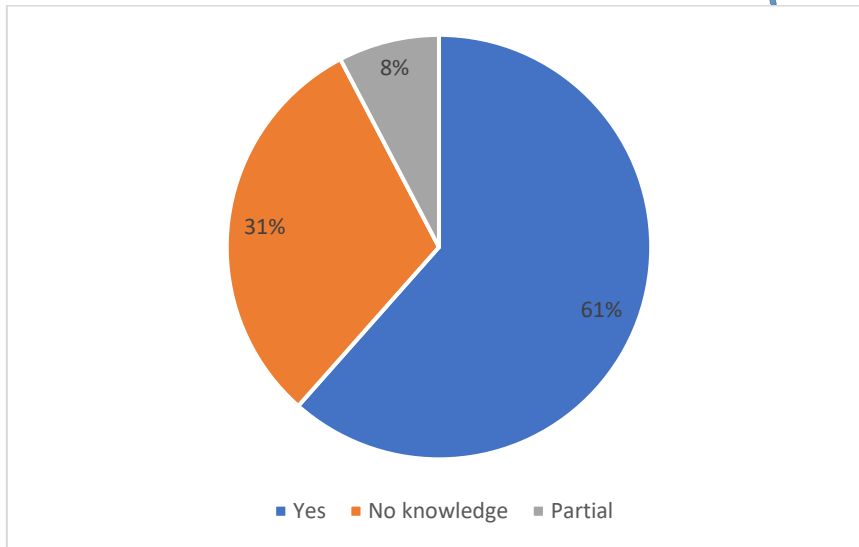


Figure 13: Knowledge of the PA and Transparency framework

Following their knowledge on the PA and their transparency requirements, the consulted energy sector institutions were quizzed on the knowledge on the country’s NDC. Consistently but slightly above the response on the knowledge on PA and its transparency requirements, most of the stakeholders indicated knowledge on the country’s NDC. 77% of the institutions under the energy sector have knowledge on the country’s mitigation activities to reduce GHG emissions. Figure 14 depicts the response on the institutional knowledge of the NDCs.

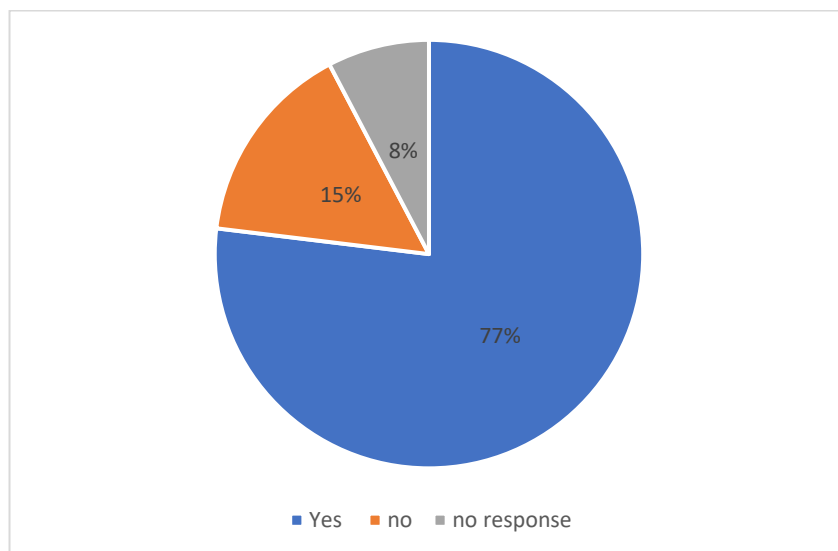


Figure 14: Knowledge of the country’s NDC by the energy sector

Consequently, response given by the institutions under the energy sector, it can be deduced that most of them are knowledgeable on the PA and its transparency requirements. Only a few institutions are not well-informed about the country’s obligations to the UNFCCC. Therefore, this is the initial gap that have been identified in the energy sector institutions.



5.4.2. Institution involvement in the MRV

Having established the institutional knowledge on the PA country’s obligations and the NDCs, the next step involved an assessment of the institutions participation in contributing to the country’s PA efforts. Therefore, institutions were quizzed on their involvements in MRV for the GHG emissions, mitigation and financing. The results are consistent with the institution’s knowledge on the country’s NDC. 77% of the consulted institutions reveal that they participate in the MRV as depicted in Figure 15.

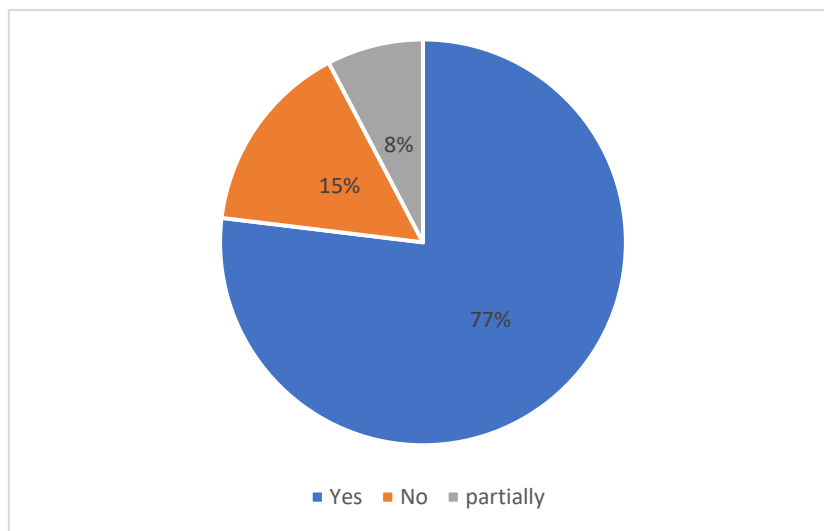


Figure 15: Institutional involvement in the MRV

For those institutions which participated in the MRV, 80% of them indicated that they are involved in the provision of the data for the preparation of the National GHG emissions. For instance, BERA has indicated that they are involved in awarding licenses for the power generating systems greater than 100 kW. In addition, they indicated that they are developing a database for all the power generating systems greater than 100 kW which will be used to monitor the GHG emissions and avoided GHG emissions from the solar independent power producers (IPPs). Technically, their involvement is in provision of the data for power producers which is useful for both mitigation and GHG emissions.

BPC as the largest producer of fossil fuel-based electricity and hence the largest emitter indicated their involvement. They indicated that they have a Continuous Emission Monitoring System (CEMS) which is timely calibrated to ensure reliability (Internal & external). This continuous emissions monitoring systems is consistent to the recommended monitoring instruments for mitigation efforts (Annex 1) which suggested flow meters for BPC. Furthermore, BPC indicated that it also submits the monthly reports on to the national regulator.

Another important stakeholder particularly in the international support for mitigation and adaptation is MFED. According on the ETF, the support received needs to be reported and the



resultant GHG emissions impacts. MFED is the focal point for GCF and therefore keep records for the GCF support received and other international funding. The ministry thus indicated that is involved in the MRV by keeping database for the financed projects which can be accessed from their website. However, the data base is limited to the GFC funding.

The pinnacle of the MRV system in the country is Statistics Botswana. SB is responsible for the development and upkeeping of the National Statistics System (NSS) including the management of data on GHG emissions and the required activity data. In this regard, SB is directly involved in the development of the GHG emissions including the mitigations measures. Thus, as a custodian of official statistics, SB provides most of the activity data needed for estimation of GHG emissions and removals. Furthermore, it has representation in the NCCC, as well as the National GHG Inventory Team.

Another important stakeholder particularly in the mitigation sphere is the Department of Animal Production (DAP) under the Ministry of Agriculture and Food Security (MoA). Livestock subsector constitutes the highest number of boreholes in the country which are mostly diesel engine powered. The MoA through the LIMID programme is assisting farmers to transit from the diesel-engine to solar boreholes. In this regard, DAP is keeping a database on the solar boreholes which is a mitigation measure for climate change.

The response from the energy sector stakeholders indicates that most of the stakeholders participate in the MRV (GHG and mitigation) through provision of the data. Therefore, there is some degree of participation. One of the mitigation measures that have intensified in the country is the solar streetlight. The mitigation falls under BITRI which unfortunately did not participate in the consultation progress.

#### 5.4.3. Data quality and availability

PA and its transparency requirements hinge on the data quality, reliability, and accessibility. It was therefore necessary to assess the data for the GHG emission, mitigation and support received in terms of quality, availability, and accessibility. The response from the consulted institutions indicated that there is a significant amount of data generated from the GHG emissions. SB houses and operates the NSS and therefore most of the activity data can be easily accessed from their web portal. These data are generated by BPC using the flow meters for emissions (CEMS) and produce daily coal consumption by the Morupule power stations. The data is produced using the Microsoft excel spreadsheets software. Furthermore, BPC undertakes annual projections on coal consumption, and these are compared with the actual consumption values. Thus, in terms of GHG emissions from the coal fired power station, the activity data for GHG emissions can be described as readily available and reliable. Moreover, the estimated GHG emissions from the activity data can be reconciled with the data from the CEMS. Subsequently, the activity data for the formal energy sector can be described as highly reliable and can be crosschecked with the CEMS data. Most of the stakeholders emphatically



noted that the activity data for the GHG emissions is highly reliable and highly accessible. This data can be obtained from the BPC annual report, The Morupule Colliery mine and SB.

With regard to the use of fuelwood consumption as energy source for households, the SB undertake household surveys from which statistics on energy sources for cooking, space heating, and lighting are derived. The data generated is compiled into Botswana Environment Statistics reports. Similarly, to the coal emissions this data is easily accessible from the SB portal. In terms of data reliability, it is collected and produced based on the BDQAF in accordance with the UN Fundamental Principles of Official Statistics. Therefore, there is some level of reliability in the data that is used as activity data for the generation of the GHG emissions. Nevertheless, there still exist some data gaps in terms of the actual fuelwood consumption (e.g., in kg/capita, kg/user household per annum, or by sector) in Botswana. Therefore, there is need for more studies to come up with the recent fuelwood consumption rate for Botswana.

The livestock sector also consumes a significant amount of diesel for groundwater pumping as most of the farmers use diesel-pump boreholes. SB also produces data on borehole by type (solar, petrol, diesel, electricity, and wind) throughout the country. Once again, this data is produced based on the BDQAF and is easily accessible from the SB portal. However, the activity data (petroleum products) going to the farmers is not easily accessible and it is difficult to differentiate whether farmers are purchasing for the transportation or for the groundwater pumping. In this regard, this activity data will be questionable and not good quality.

Regarding the mitigation data, the stakeholders also indicated that the existence of the data generated. For instance, BERA indicated that it issues licenses for the IPPs and it is in the process of creating a database for the producers. Therefore, using the IPPs licenses systems database, the solar plants and their size can be easily tracked over the years.

Similarly, the DAP also highlighted that through the LIMID, it keeps records of the farmers who have been financially assisted to equip their boreholes with solar PV systems. This data can be sourced from SB through its Agriculture Statistics Unit which undertakes agricultural annual surveys in partnership with the MoA. Amongst the indicators included in the surveys are boreholes by type (diesel-powered, solar, wind and manual) for the traditional and commercial sector in the country. For the off-grid households reliant on the solar systems and the biogas digesters, SB also produces the data.

One of the mitigation measures that has been vigorously pursued by the GoB is solar streetlight. This initiative is undertaken throughout the country by various stakeholders such as BITRI, and councils. For instance, City of Francistown Council, Gaborone City Council, Southern District Council, and other districts have been engaged in the installation of the streetlights. However, the data on these solar streetlights, in terms of numbers, functional ones, damaged ones, and replacement is seriously lacking. The inaccuracy of data on this mitigation project (solar streetlight) is compounded by widespread damage from the road



accidents and vandalism. Therefore, this is one area where efforts need to be geared up to improve data quality, accessibility, and reliability.

The last mitigation which the GoB has long pursued prior to the PA and its transparency framework is the installation of the solar geyser in government institutions and council houses. In addition, the private sector is also involved in this initiative. However, data in this area is conspicuously lacking. For the council houses, in many instances, the solar geysers are installed but not functional whilst for the private households information on the number of solar geysers installed on annual basis is lacking.

In terms of the financial support data, MoFED indicated that they have an active system that is continuously updated on the financial support received from the GCF. There is therefore a need to improve the systems to capture all the finance received including government spending on the mitigation measures and the official development assistance (ODA) from various countries.

Thus, from the responses of the stakeholders, it can be deduced that activity data for the generation of the national GHG emissions exists and it is centrally stored in a server at SB. In addition, SB also undertakes household surveys which collect statistics on the use of fuelwood as a source of energy. Though this data is collected and compiled in accordance with the Fundamental Principles of Official Statistics, its accuracy will not be comparable to the coal data. On the other hand, there is a need to improve the data on the mitigation due to the decentralisation of the mitigation measures. Therefore, there is a need to have a centralised system for the mitigation measures and improvement on data collection for the mitigation measures.

In terms of plans to improve the activity data for the GHG emissions and mitigation and financial efforts, the stakeholders indicated that they are putting system in place. Only 15% of the stakeholders indicated that availability of systems is in place. However, it is important to note that these stakeholders are the lead in terms of generating activity data for the GHG emissions. Some of the systems in place and planned ones include calibrations of the CEMS, engagement of the external auditors for the emissions. Furthermore, BERA indicated that they have started negotiating with the independent producers to leverage on automated data acquisition technologies such as Supervisory Control and Data Acquisition (SCADA) to monitor and collect systems data for both billing in case of solar IPPs and reporting to BERA. SB on the other hand has a database which stores data that is guided by BDQAF to continuously improve on the data quality.

Table 4 below depicts the summary of the data availability, quality and measures that can be used to improve its availability and quality.



Table 4: Summary of data availability, quality/reliability and measures to improve its availability and reliability

Data type	availability	quality % reliability	data custodian	measure to increase quality and availability
emission from power generation	highly	high	BPC and Statistics Botswana	compare the estimates from the coal use with flow meters at power plants
emissions from fuelwood	medium	medium	Statistics Botswana and DFRR	<ul style="list-style-type: none"> <li>● increase frequency of fuelwood use survey</li> <li>● continuously update domestic electricity connectivity</li> <li>● collaborate the findings with fuelwood permits given by DFRR</li> </ul>
NDC mitigation measures	low	Low	Private sector (farmers, households, businesses) district councils, business and government project	<ul style="list-style-type: none"> <li>● create a council register for renewable energy projects throughout the country</li> <li>● MOA with private sector and constructors to submit installed renewable projects at statistics Botswana</li> <li>● MoU with Botswana Tourism Organisation to collect data on tourism facilities with renewable energy facilities</li> </ul>

#### 5.4.4. Existence of MRV tools/monitoring plans

MRV tools are critical for the tracking of the GHG emissions, mitigation and financial support received. Stakeholders were quizzed on their awareness of the monitoring plans for the GHG emissions and the mitigation activities. 56% of the respondents indicate that they are not aware of the monitoring plans to track the GHG emissions and mitigation measure, while 44% indicated their awareness. For those that indicated their awareness, some of the monitoring tools that they revealed could be used to monitor and track the GHG emissions and mitigation included 2006 IPCC Guidelines and 2006 IPCC Software, NPD 11 National Monitoring and Evaluation System (NEMES), BERA Strategy and associated Annual Performance Plan and the World Bank for financial support.

In addition, others indicated excel spreadsheet where the GHG emissions are tracked over the years as the case of the national communication which tracks the country's national GHG





emissions over the years. However, none of the respondents were aware of the developed NAMAs monitoring templates for tracking the mitigations and the financial support received.

Whilst the institutions are knowledgeable on the availability of the monitoring tools at the various individual levels, the institutions are not aware of the standardised systems to track the country mitigation. It is therefore critical that the stakeholders within the various institutions are capacitated on the PA agreements and its requirements. Foremost, it is paramount that the stakeholders have trained on the available nationally developed tracking tools and possibly an improved version of the monitoring templates in annex 1 to 3.

#### 5.4.5. Institutional arrangements for MRV

Sound and effective institutional arrangements are critical for the tracking and reporting of country's NDC mitigation and adaptation efforts. In order to improve the institutional coordination (vertical and horizontal) for MRV, it was necessary first to determine the extent to which the energy sector stakeholders have knowledge on the current existing ones and determine their functionality. Stakeholders were thus asked about the existence of the institutional arrangements for the national communications and the NDCs. As per Figure 16, 62% of the stakeholders indicated that there are no institutional arrangements for the MRV in the country. This response is disturbing given the fact that some of the stakeholders that were consulted are members of the NCCC whose mandate is well articulated on the TORs. Even within the same institution, the response was different between the two respondents with one respondent indicating lack of the institutional arrangement and other respondent indicating existence of institutional arrangements. This may indicate that an institutional arrangement is in place but not works effectively.

For those that indicated that there are institutional arrangements, they indicated that there is a strong institutional arrangement for the National GHG inventory which is coordinated by the Focal Point housed at the DMS. They elaborated that the national expert under each sector collects some of the data from their respective agencies and submit it to the coordinator and archivist. In addition, those who responded positively indicated that there is the NCCC which is made up of various government line-ministries, the private sector and the NGOs. They indicated that this is an institutional arrangement to coordinate the GHG emissions and other UNFCCC requirements.

Subsequently, whilst the respondents indicated that there is national GHG inventory team, it is important to note that there is no arrangement for the mitigation and financial support received. NDC Mitigation activities just like GHG emission inventory covers all the sectors and therefore a similar arrangement like the GHG emissions inventory would suffice.

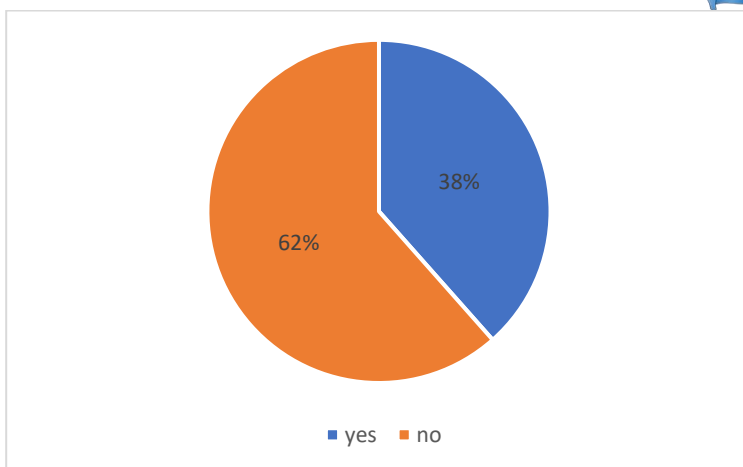


Figure 16: knowledge on institutional arrangements for the MRV

Based on the consultation from the stakeholders, it can be deduced that though there are institutional arrangements in existence, the stakeholders are not familiar with these structures. One of the possible reasons for lack of knowledge on the current institutional arrangement is lack of representation and participation in the functioning of the energy sector institutions in the current committees. Hence a need to improve their vertical integration in these committees.

To improve the institutional arrangements, stakeholders suggested strategic activities as follows:

- Include more Actors in the National GHG Inventory Team with clear roles. Currently, there are only six (6) members and the research institutions occupy two spots. It will be ideal to include BPC the major GHG emitter in the team and Ministry of Agriculture and Food security in the team,
- Setup a task group for each sector for the GHG inventory,
- Expedite the formulation and implementation of the Data Management Strategy at Statistics Botswana as part of operationalizing the BSDS/NSDS. This will facilitate efficient data sharing and an enhanced data management which will strengthen the country's capacity to meet the transparency framework,
- Capacitating the NCCC members and the national GHG inventory team to ensure that they effectively execute their mandate. This will be done through training and it will build confidence of the institutions to be included in the national GHG inventory team and participate effectively,
- Involvement of the data suppliers in plenary sessions. Furthermore, there is also a need to consult and give the feedback on the GHG emissions, adaptation and mitigation results after data have been collected from them. This will strengthen their involvement and participation in the NDC MRV systems. Therefore, lack of systematic involvement of the stakeholders was seen as the major impeding factor in strengthening the institutional arrangements,



- Improve the legal frameworks for improved institutional arrangements in the MRV. Furthermore, the stakeholder recommended a review and improve project planning and implementation framework so as to incorporate structures that are available for continuous data gathering and reporting for all our mitigation projects, and,
- The need for investing in Research and development (R&D) was also identified as a vehicle which can be used to strengthen the institutional arrangements for the MRV in the energy sector.

#### 5.4.6. Institutional capacity needs for undertaking MRV

Having assessed stakeholders' knowledge on country's institutional arrangements for the PA and the ETF, a further analysis was undertaken to determine the institutional capacity needs to participate in the country MRV. All of the institutions that participated in the consultation exercise indicated that their institutional need are capacity building on the MRV aspects. The institutions revealed that they require training on UNFCCC methodology such as GHG emission inventory. In addition, the stakeholders indicated that need for capacity building on IPCC guidelines relating anthropogenic emissions and removals. In addition, other sectors indicated that need for expertise and skill development to produce land use/cover maps annually to be able to provide data for GHG estimations. Lastly, training on the development of the tracking indicators and setting the targets for the NAMAs and NDC was also identified.

Thus, capacity building is essential for the energy sector institutions to play a meaningful role in the NDC tracking and monitoring exercise.

#### 5.4.7. Information storage and exchange platform for tracking and monitoring

Information storage and exchange platform for the tracking and monitoring of the NDC activities and GHG emissions is another critical aspect of the PA and its requirements. It is critical that the information is centrally stored for the GHG emissions, activity data, adaptation, and mitigation, to ensure that it is easily accessible to the independent verifiers and third parties. Consultation was undertaken with the stakeholders and 70% of them indicated that there is no information storage and exchange platform for the country's NDC and national communication whilst 30% indicated that they are available information storage. For those that indicated that there is information storage they indicate that there are published reports for the activity data, GHG emissions inventory and the national communication. Their response is consistent with the desk review which indicated that the SB produce annually reports for the activity data for constructing GHG emissions inventories and produce GHG emissions inventory. Furthermore, it also publishes data on some of the mitigation such as solar boreholes amongst others.

However, this is not sufficient to be called an information storage and exchange platform for the NDC adaptation and mitigation as it will require the independent auditors to go through all these reports to extract information on the activity data and mitigation. Therefore, there



is a need for the country to have a dedicated information data management system which stores the data in an organised manner.

All the data for the construction of the GHG emissions inventory, together with the adaptation, mitigation, mitigation reduction, their costing and source of the funding should be stored in a dedicated website which is managed by the focal point.

#### 5.4.8. Quality of the reports for the MRV requirements

Over the years, the GoB has produced and submitted the National Communications, NDCs and the biennial reports. The stakeholders were quizzed on the quality of the reports. The national communications and the BURs have been received and reviewed by the UNFCCC expert review team. The review from the expert review team has indicated that the reporting standards for the country are in accordance with the UNFCCC PA agreements and its transparency frameworks.

#### 5.4.9. Policy and legal framework for MRV

The stakeholders were at variance in terms of the adequacy of policy and legal framework for provision of conducive and an enabling environment for the MRV. Stakeholders indicated that government recently approved the Climate Change Policy in April 2021. However, in general stakeholders noted that most of the existing legal and policy instrument lack specific aspects to stimulate an environment of transparency as per the MRV. For instance, the existing policies such as Forest Policy need to be updated to include aspects of MRV. In addition, the Climate Change Response Policy does not contain aspects that will create an enabling environment for the PA and its Transparency framework. Consequently, the needs for improvement of the legislative framework and technical standards so that all statistical data is sourced from all data providers including corporate sectors was raised.

Stakeholders also noted that the importance of institutionalizing data management and exchange platforms for the NDC activities which can be enforced by legal framework. However, what seems to be lacking from the stakeholders' response is the mainstreaming of the NDC into national planning and targets. This will improve the tracking and monitoring of the NDC. Stakeholders alluded to the fact that already there is the NEMES and if there is a national strategy for the NDC such as green growth strategy, then the key performance indicators (KPI) will be included in the NEMES. This will make national reporting of the NDC (adaptation and mitigation) mandatory.



## 6.0. Discussion of findings from desk review and consultation

The findings from the desk review and consultation reveal interesting and promising results on the country progress made towards achieving the PA and the ETF. Equally, the desk review and the consultation reveal some significant shortfall within the existing structures that needs to be closed and strengthened.

First and foremost, the GoB has established the two NCCC and the National GHG inventory team for the sole purpose of the coordinating the country's reporting requirements to the UNFCCC. The ToRs of these committees are well aligned to the PA and the ETF requirements. The National GHG inventory team constitutes well trained experts and covers all the GHG emission sector.

In addition, the NCCC has been established to ensure that it covers all the sectors (governmental, private and NGOs). One of the specific tasks of the NCCC is to coordinate and oversee the establishment of compatible and properly networked data bases on issues of climate change, its impacts and response strategies. However, from the consultation and desk review, there is no existing of a well-functioning data base for the climate change, impacts and response strategies (adaptation and mitigation strategies).

An assessment of the two functioning institutional arrangements (NCCC and the national GHG inventory team) has identified a vacuum between these committees and the other institutions. For instance, the national GHG inventory team need to be supported by a task group for each sector for the GHG inventory. The creation of the task group will constitute members from the emitting sectors such as the private sector and the governmental departments. For instance, the energy task team should constitute BPC, Mines (Debswana), DoE. Through such arrangements, this will create involvement and participation of the sectors in the reporting and tracking of the GHG emissions. Currently, these institutions are excluded from the GHG emissions inventory and hence the institutional arrangement is not complete as far as horizontal integration is concerned.

Another important finding from the consultation and desk review is the absence of a well-defined institutional arrangement for the mitigation efforts similar to the GHG emissions inventory. Mitigation efforts are a key component of the NDC and by default of the PA. There are no institutional arrangements to track and report the mitigation efforts as defined in the country's NDC. Whilst the GoB has over the years through the public and private sector implemented some significant mitigation measures (renewable energy, solar boreholes, national energy saving bulbs campaign, introduction of smart meters, climate smart agriculture and solar geysers etc) there are no institutional arrangements in place to track and report them. It is therefore important that institutional arrangement for the mitigation sector possibly similar to the GHG inventory is established to comply the energy sector mitigation and estimate their potential GHG emission reduction.



The MFED is the focal point for the international support received. In this regard there are some institutional arrangements that exist for the international support. However, it is important to note that this institutional arrangement does not cover all the funding but limited to Green Climate Fund. There is therefore a need to strengthen this arrangement to include all other source of funding. In addition, there are no institutional arrangements for the international support received as MFED is the only implementing entity and does not involve other organisation (private sector)

Regarding tracking tools, some efforts have been made to develop the tools to track the mitigation measures as depicted in Annex 1 to 3. However due to lack of institutional arrangements on tracking the mitigation measures, these instruments have not been used and their completeness and applicability is not known.

Data quality, information management and exchange are an essential element of the PA and its transparency framework. Quality Assurance/Quality Control is an important aspect of the MRV/transparency framework (UNFCCC, 2020, FAO, 2020). Therefore, according to the PA, parties must have in place an inventory QA/ QC work plan in accordance with the IPCC guidelines and have an institutional arrangement for the QA/QC work plan. One of the recommendations for the QA/QC is the establishment of the QA/QC work plan. However, through literature review and the consultation there is no existence of the QA/QC work plan. On the other hand, the provider of activity data for generation of the GHG emissions has a well-established data quality framework-BDQAF. Regardless, it is important that the country has QA/QC system in place conforming to the UNFCCC requirements.

Furthermore, through consultation and desk review, country does not have a well-established information management and exchange platform for the NDC mitigation and adaptation activities. This is logical given the fact that the country has not been tracking its mitigation and mitigation activities over the years. Whilst SB has a well-functioning website where the GHG emissions and activity data can be extracted this cannot be defined as a system for the NDC activities since an independent verifier will have to go through all the report and analysis of the data.

The legal and policy framework is another important aspect of the PA and the transparency/MRV framework. Legal and policy framework is important for the creation of an enabling environment for PA and for its sustainability. Amongst the existing policy instruments that have a strong bearing to the PA and its transparency requirement is the NEP. The NEP will create a conducive and enabling environment as it is a strong advocate for the provision of energy related data and information. However, the Climate Change Policy Response which is the ultimate governing policy instrument for guiding the national response to climate change and global international requirements is inadequate in creating a conducive environment for the MRV systems for the country. The Policy is lacks aspect on data management, information exchange and on matter incidental to monitoring and evaluation of the national adaptation and mitigation.



Another important document that appears to be conspicuously absent is a country's national strategy on mainstreaming NDC into the NDP. The development of a national strategy for mainstreaming the NDC measures into the national development planning processes will ensure that the adaptation and mitigation are included in the NEMES and hence the KPIs are developed. Moreover, it is more logical to develop its implementation plan first before the country can start to implement measures to track and monitor the NDC measures.

Developing the national mainstreaming strategy will enhance the country's NDC monitoring and evaluation systems through the NSO office as they will be included in the existing NEMES.

Therefore, there is a need to strengthen the legal and policy framework to support the sustainability and reporting of the NDC based on the developed country's climate resilient strategy.

## 7.0. Conclusions

Based on the desk review and the consultation with the relevant stakeholders, the following conclusions are drawn:

- The PA and the ETF require Parties, among others, to report their GHG inventory and information to track progress towards their NDC. In order to ensure that the party member states comply with the MRV requirements, UNFCCC has over the last two decades provided the international community with vast experience in the field of monitoring, reporting and verification (MRV) of climate action. This experience includes guidelines, capacity building and training on GHG emissions inventory, M&E of the mitigation efforts amongst others,
- Being a Party to UNFCCC, the GoB has progressively taken measures to ensure that it complies with the PA and the ETF. The measures include setting up of a climate change focal unit at the DMS, the NCCC, and the National GHG inventory team,
- Furthermore, the country has established the policy frameworks to create an enabling environment to enhance and facilitate measuring and report in a transparent manner following the PA and the ETF,
- Some of the policy instruments include NAMAs, NEP, Climate change Response Policy, Vision 2036, National Adaptation Plan framework amongst others,
- These efforts have resulted in the country to achieve some of the UNFCCC requirements such as development and submissions of the NC, BURs, NAMAs, NDCs amongst others,
- However, there are still some grey areas, gaps and weaknesses that needs to be closed and strengthened from the institutional arrangements and legal frameworks viewpoint respectively,
- For instance, the National GHG inventory team seems to be working in vacuum and has no horizontal integration with the sectors. There is therefore a need to strengthen horizontal integration through the formation of the task group for the subsectors,



- Another important gap that has been identified is the lack of institutional arrangements for the mitigation efforts. Mitigation efforts and financial support received are scattered across various institutions such as MoA (department of animal production, crops), councils, private sector, etc. There is thus a need to have a well-defined institutional arrangement for the MRV, and,
- Another important aspect that has been identified is the lack of a national strategy for the NDC implementation. This makes it difficult for the sectors to implement the NDC (adaptation and mitigation measures) and for tracking and reporting purposes. The country has an existing NEMES framework to the extent that if there is national strategy for the NDC such as green growth strategy, then the NDC KPIs can be included in the NEMES.

## 8.0. Recommendations

The following are the recommendations to strengthen the country's MRV/transparency systems to ensure that it adheres to the PA and the ETF:

- Including two additional entities in the National GHG Inventory Team preferably BPC and the Ministry of Agriculture and Food security in the team,
- Setting up a task group for each sector for the GHG inventory with the private sector represented at all the task groups,
- Strengthen the existing National GHG inventory team to undertake stocking taking for the adaptation and Mitigation to monitor implementation of the NDC,
- Building the capacities of the NCCC members and the national GHG inventory team to ensure that they effectively execute their mandate. This will be done by training and it will build confidence of the institutions to be included in the national GHG inventory team and participate effectively,
- Strengthening the legal frameworks on areas of institutional arrangements and data reporting/sharing, particularly the country's Climate Change Response Policy. A perusal of this policy (which is the pinnacle for the climate change decision making and planning) reveals some significant shortfalls on areas of data management and sharing, establishment of national green growth strategy, Monitoring and reporting adaptation and mitigation,
- Developing a national strategy for mainstreaming the country's NDC into NDP. This will automatically ensure that the NDC are included in the NEMES and hence facilitate their tracking and reporting through the NSO channels. Logically, it is important that there is a green growth strategy and its implementation plan prior to the development of the tracking tools for the NDC. Thus, the national strategy for mainstreaming and its implementation plan should be followed by development of the tracking tools,
- Developing the tracking tools for the NDCs mitigation, adaptation and international support received. Currently, the country has developed some templates for the mitigation efforts which need to be strengthened,





- It is also critical that a data management system for the NDC is established to be managed by the climate change focal point. All the KPIs for the NDC should be identified, measured and included in the data management system. The data management platform should facilitate information exchange,
- Developing the QA/QC framework for the GHG emissions inventory. This is one of the requirements by the PA and its transparency framework which is lacking in the country,
- Strengthening the existing institutional arrangements to ensure that both the vertical and horizontal integration of the institutional arrangements are achieved, and,
- Reinforcing the capacity of the energy sector institutions through training to build the confidence to be actively involved in the GHG emissions, mitigations efforts tracking and reporting modalities.



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Annex 1: tracking tool for international support and impact

<b>Name of mitigation measure</b>					
	preparation stage (1)	developmental stage (2)	completed (3)	submitted for funding (4)	
<b>Development of proposal for funding</b>					
	Rejected (0)	conditional approved (1)	Approved (2)	Funds disbursed (3)	
<b>Status of submitted proposal</b>					
	preparation stage (1)	construction of infrastructure (2)	constructed at advanced stage (3)	construction completed (4)	operational phase (5)
<b>Implementation of mitigation measure</b>					
	no change in emissions (0)	Below target (1)	At target (2)	Above target (3)	
<b>Impacts of the mitigation on emission</b>					
Description of all mitigation co-benefits					
Co-benefits performance	No co-benefit (0)	Below target (1)	At target (2)	Above target (3)	
Co-benefits 1					
Co-benefit 2					



Annex 2: Reporting structure for international assistance

Sector	Financial assistance					Source of funding/country
		Proposal submitted	Approvals	Amount	Amount disbursed	
Energy	efficient lighting					
	Refrigeration					
	solar power plant					
	solar geysers					
	transport					
Waste	landfill gas facility					
	Technical Assistance					
		Technical transfer	Type	Number of personnel trained		Source of assistance
Energy	efficient lighting					
	refrigeration					
	solar power plant					
	solar geyser					
	transport					
Waste	landfill gas facility					



Annex 3: Monitoring instrument for mitigation efforts

Sectors	Mitigation measure	Parameters	Method of monitoring	Instruments	Method of analysis	Responsible agents
Energy	Efficient lighting	<ul style="list-style-type: none"> <li>percentage penetration of CFL and LED</li> <li>percentage of number of household replacing incandescent bulbs with CFLs and LED</li> </ul>	Household survey	Questionnaire	Statistical analysis	BPC
	Efficient refrigeration	<ul style="list-style-type: none"> <li>percentage penetration of efficient fridges</li> <li>percentage of household replacing less efficient fridges with efficient ones</li> </ul>	Household survey	Questionnaire	Statistical analysis	BPC
	Increase share of renewable energy	<ul style="list-style-type: none"> <li>Percentage share of renewable solar electricity to coal fired electricity generation</li> </ul>	MBA	Flow meters	Statistical analysis	BPC
	Improved use of public transport	<ul style="list-style-type: none"> <li>Replacement of mini-buses with buses</li> <li>Number of households using public transport</li> <li>Reduced petroleum imports</li> <li>Introduction of bus lanes</li> </ul>	Transport and infrastructure survey	Questionnaire	Statistical analysis	DRTS
Waste	Capture of LFG	<ul style="list-style-type: none"> <li>Landfill gas captured</li> </ul>	MBA	Flow meters	Statistical analysis	DWMPC



Annex 4: Stakeholders consulted

Name	Institution
Lesedi Bafetanye	Botswana Energy Regulatory Authority
Tshireletso Lucas	Botswana Power Corporation
/Stephen Mopalo	Botswana Power Corporation
Joyce Lepetu	Botswana University of Agriculture and Natural Resources
Ms Rolang Mpe	Business Botswana
Kgotso Oteng	Department of Animal Production, MoA
Oagile Johannes Setlhare	Department of Energy
Dr. Gina Maswabi	Department of Energy
Onalenna Ojesi	Department of Surveys and Mapping
Lesika Basalumi	Department of Forestry and Range Resources
Boineelo T Sealetsa	MFED- Focal Point for the GCF in Botswana
Obakeng Sethamo	SASSCAL Botswana Node
Kakanyo Fani Dintwa	Statistics Botswana
Galebonwe Ramaphane	University of Botswana
Rethobogile Botebele	United Nations Development Programme

Annex 5: The national GHG team

Last Name	Country	Affiliation (institution the expert is working for)	Role in national GHG inventory system
Ramaphane, G	Botswana	University of Botswana	GHG Coordinator and IPPU
Dintwa, F	Botswana	Statistics Botswana	Sector Lead Agriculture
Nkoni, G	Botswana	University of Botswana	Sector Lead LULUCF and Energy
Phunyuka, G	Botswana	Department of Forestry and Range Resources	Sector expert LULUCF and Waste
Sebeela, C	Botswana	Department of Meteorological Services	Sector lead Waste
Likuku, A	Botswana	BUAN	Sector Lead Agriculture and Energy



Annex 6. Questionnaire used for stakeholder consultations

**The Initiative for Climate Action Transparency (ICAT) Questionnaire for Botswana**

This questionnaire is developed to assess the extent to which the Government of Botswana has developed the Measuring Reporting and Verification (MRV)/transparency agreement as per the UNFCCC and the Paris Agreement protocols. The assessment is realized through consultations with relevant stakeholders under the energy and transport sectors, and it will form basis for the situational analysis. The interview questions are guided by the following topics, among others: knowledge on Paris transparency Agreements, existence of MRV framework, level of expertise in MRV, the GHG and gap analysis, use of the existing MRV, challenges and barriers that exist to implement the MRV transparency frameworks and areas of capacity needs.

1. Name and title of person and institution responsible for the completion of the stakeholder consultation

Name:	
Position:	
Institution:	
Mandate/Activity:	
Email:	
Website:	
Phone:	

2. Are you familiar with requirements of the Paris Agreement MRV/Enhanced Transparency Framework *Yes* \_\_\_ / *No* \_\_\_

3. If Yes, kindly explain their requirements \_\_\_\_\_

4. Are you aware of the country's NDC/mitigation and adaptation actions for reduced GHG emissions *Yes* \_\_\_ / *No* \_\_\_

5. Is your organisation involved in MRV for the following:
- a. MRV for GHG emissions *Yes* \_\_\_ / *No* \_\_\_
  - b. MRV for mitigation and their potential reduction *Yes* \_\_\_ / *No* \_\_\_
  - c. MRV for financing and technological transfers *Yes* \_\_\_ / *No* \_\_\_

6. If yes, kindly explain the extent of your organisation's participation, status of data availability, reliability and accessibility when developing the MRV





7. What data information system already exists for your sector and data stored and relevance to MRV

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8. What additional data would be required in your opinion for

- a. GHG Emissions for the sector \_\_\_\_\_
- b. GHG\_Mitigation analysis \_\_\_\_\_
- c. Financing and technical support received \_\_\_\_\_

9. What resources would be required to meet those data gaps

- \_\_\_\_\_

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10. Kindly describe the data quality in undertaking

- a. GHG emissions \_\_\_\_\_
- b. Mitigation efforts \_\_\_\_\_
- c. Financing and technical support received \_\_\_\_\_

11. What plans are in place for data Quality Control/Quality Assurance (QA/QC) \_\_\_\_\_

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12. Are you aware of any instruments/TOOLS/monitoring plans for tracking the following in your sector:

- a. GHG emissions Yes\_\_\_ / No\_\_\_
- b. Mitigation measures Yes\_\_\_ / No\_\_\_
- c. Adaptation measures Yes\_\_\_ / No\_\_\_
- d. Finance and technical support Yes\_\_\_ / No\_\_\_

13. If yes, kindly provide these instruments/TOOLS

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14. If yes to 12, have you used these instruments/TOOLS to monitor and track

- a. GHG emissions Yes\_\_\_ / No\_\_\_
- b. Mitigation efforts Yes\_\_\_ / No\_\_\_
- c. Finance and technical support Yes\_\_\_ / No\_\_\_

15. Are there any existing institutional arrangements in your sector in terms of development of MRV for

- a. GHG emissions Yes\_\_\_ / No\_\_\_
- b. Mitigation measures Yes\_\_\_ / No\_\_\_
- c. Adaptation measures Yes\_\_\_ / No\_\_\_
- d. Finance and technical support Yes\_\_\_ / No\_\_\_

16. If yes to 15, kindly explain the institutional arrangement (e.g. who collects data, who analyses data, who reports on results and to Who, who validates the results)

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17. How can the institutional arrangements be improved to strengthen the country's capacity to meet the transparency framework for:
- a. GHG emissions \_\_\_\_\_
  - b. Mitigation efforts \_\_\_\_\_
  - c. Finance and technical support \_\_\_\_\_
18. Are there any existing information storage and exchange platform for your sector for tracking and monitoring:
- a. GHG emissions Yes \_\_\_ / No \_\_\_
  - b. mitigation measures Yes \_\_\_ / No \_\_\_
  - c. adaptation measures Yes \_\_\_ / No \_\_\_
  - d. finance and technical support Yes \_\_\_ / No \_\_\_
19. Kindly describe your institutional capacity (capacity needs) in terms undertaking and MRV for the following:
- a. GHG emissions \_\_\_\_\_
  - b. Mitigation measures \_\_\_\_\_
  - c. Adaptation measures \_\_\_\_\_
  - d. Finance and technical support \_\_\_\_\_
20. Kindly identify areas of capacity improvements to meet the transparency framework \_\_\_\_\_
- 
21. Over the years, the Government has submitted National Communications, NAMAs, NDC, kindly describe and if possible provide review assessment in terms of quality and the report as measured against the Paris agreement requirements \_\_\_\_\_
- 
22. What is your view on existing policy/legal framework for an effective MRV system \_\_\_\_\_
- 
23. What additional policy/legal framework would be required to achieve effective MRV system for your sector and Botswana \_\_\_\_\_
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**General Comments:**



**THANK YOU.**