Initiative for Climate Action Transparency - ICAT -

KENYA: STRENGTHENING INSTITUTIONAL ARRANGEMENTS FOR MEASUREMENT, REPORTING AND VERIFICATION (MRV) IN THE ENERGY SECTOR

Strengthening Institutional Arrangements for Measurement, Reporting and Verification (MRV) in the Energy Sector

Deliverable #2

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Abbreviations

BMUB	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
CBIT	Capacity Building Initiative for Transparency
CCAK	Clean Cookstoves Association of Kenya
CCD	Climate Change Directorate
CFL	Compact fluorescent light
GDC	Geothermal Development Corporation
GEF	Global Environment Facility
GHG	Greenhouse gas
GNIplus	Global NDC Implementation Partners
ICAT	Initiative for Climate Action Transparency
IPCC	Inter-Governmental Panel on Climate Change
KAM	Kenya Association of Manufacturers
KenGen	Kenya Electricity Generating Company Ltd.
KETRACO	Kenya Electricity Transmission Company
LECRD	Low Emission Climate Resilient Development
LPG	Liquified petroleum gas
M&E	Monitoring and evaluation
MED	Monitoring and Evaluation Department, National Treasury and Ministry of Planning
MOE	Ministry of Energy
MRV	Measurement, reporting and verification
$MtCO_2e$	Million tonnes of carbon dioxide equivalent
MW	Megawatt
NAP	National Adaptation Plan
NCCAP	National Climate Change Action Plan
NDC	Nationally Determined Contribution
NEMA	National Environment Management Authority
NIMES	National Integrated Monitoring and Evaluation System
QA/QC	Quality assurance / Quality control
SDG	Sustainable Development Goal
StARCK+	Strengthening Adaptation and Resilience to Climate Change in Kenya Plus
UNDP	United Nations Development Programme
UNEP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

Executive Summary

This report analyses institutional arrangements for the measurement, reporting and verification (MRV) of climate change actions in the energy sector in Kenya. It sets out possible institutional arrangements and stepwise approach to implementation of an MRV system for the energy sector that enable Kenya to meet the transparency requirements of the Paris Agreement and the relevant provisions of the Climate Change Act. In Kenya, MRV facilitates reporting and sharing of information, both domestically and internationally; allows the National Climate Change Council to assess if National Climate Change Action Plan (NCCAP) priority actions are implemented and achieving expected results; enables Kenya and the international community to assess progress on and achievement of it Nationally Determined Contribution (NDC); and enhances national capacities to generate, plan, implement and coordinate individual mitigation actions.

This report was valeted at a stakeholder workshop held in Nairobi on 28th August 2019. The feedback received during the workshop have therefore been incorporated.

The report includes:

i. Section 2 - defines MRV and elaborates Kenya's domestic and international requirements for MRV in the energy sector.
ii. Section 3 - describes the current situation on MRV in the energy sector, and summarizes the needs and gaps identified in the *Draft Needs and Gaps Assessment Report: MRV of NDC Implementation in the Energy and Transport Sectors* (ClimateCare, 2018).
iii. Section 4 - identifies the priority mitigation and adaptation actions in the energy sector set out in the second NCCAP 2018-2022, suggested indicators for measuring progress, and sources of data and information. The review of mitigation actions identifies emission reduction goals to 2023 and 2030, and sustainable development co-benefits. Section 4 can be a stand-alone document to guide the identification of indicators for mitigation, adaptation and co-benefits, and information/data needs.
iv. Section 5 - sets out options for an institutional structure for MRV in the energy sector including oversight mechanisms, two options for institutional leads and organization, functions and tasks, human resource needs, financial considerations, and key considerations in determining an institutional lead for MRV in the energy sector.

Institutional Arrangements for MRV in the Energy Sector

The MRV system will track progress toward achieving Kenya's mitigation and adaptation goals and NDC, improve understanding of the climate and sustainable development outcomes of mitigation actions, provide information about support received in the context of climate change actions, and contribute to improved domestic and international reporting. A robust institutional framework for effective MRV in the energy sector should encompass the relevant institutional entities, and identify the necessary staff, systems and processes.

Oversight mechanisms would provide coordination and oversight for MRV in the energy sector, and could include:

i. **MRV Steering Committee** – The inter-ministerial National GHG Coordination Team established for the GHG inventory could have an expanded mandate to provide oversight to the MRV+ system and review reports.

ii. **Energy MRV Inter-departmental Coordination Group** – Could include representatives from Climate Change Directorate (CCD), Ministry of Energy (MOE), Ministry of Petroleum and Mining, National Treasury and Ministry of Planning (climate finance, SDG reporting), relevant parastatals, Council of Governors, and relevant stakeholders from civil society and the private sector. This coordination group could help to identify sources of and facilitate access to energy sector data for MRV of energy mitigation options and M&E of adaptation actions.

iii. **Adaptation and Mitigation Technical Working Groups** – The National Adaptation Coordination Committee and the mitigation working group formed for the updating of the NCCAP could review progress on MRV of mitigation actions and M&E of adaptation actions, including review of data and analysis.

The two main options for institutional lead for MRV in the energy sector are:

i. **CCD leads energy sector MRV, and has responsibility for climate change data collection, analysis and reporting in the energy sector.** GHG emissions estimates, analysis of progress on mitigation and adaptation actions, analysis of progress toward achievement of the NDC, and tracking of sustainable development co-benefits are the responsibility of CCD. The analysis is undertaken using data and information provided to CCD by the MOE, Ministry of Petroleum and Mining and relevant parastatals

ii. **MOE leads energy sector MRV, supported by CCD, and has responsibility for climate change data collection, analysis and reporting in the energy sector.** MOE internally establishes and incorporates climate change information management, measurement, analysis and reporting in the energy sector. MOE would work with and receive information from the Ministry of Petroleum and Mining and relevant parastatals and provide CCD with energy sector climate data and reports. CCD would provide oversight, quality control, templates and guidance on reporting, and the energy MRV data repository and management system (hardware and software).

    During the validation, the stakeholders unanimously agreed that this second option was the preferred ones since the energy sector understood it's on data better. However, it was recommended that a Sector Technical Review Committee, consisting of key sector players would be formed to carry out the QA/QC and general oversight at the sector level. It was also noted that the sector has to be adequately resourced to carry out the MRV system implementation.

Five main **functions and related tasks** to deliver on the functions have been identified to MRV climate actions in the energy sector. The roles and responsibilities for the two institutional options are summarised in the table below and elaborated in the report in Section 5.4.

MRV in the Energy Sector: Functions, Tasks, Roles and Responsibilities

MRV Functions	Tasks	Roles and Responsibilities	
		Option 1: CCD lead	**Option 2: MOE lead**
1. Planning and preparation	1a. Establish inter-departmental coordination mechanism	CCD forms energy MRV inter-departmental coordination group with support from MOE. CCE forms MRV+ Steering Committee.	MOE forms energy MRV inter-departmental coordination group with support from CCD. MOE is member of MRV+ Steering Committee.
	1b. Establish inter-departmental agreements	CCD develops agreements and sends to Cabinet Secretaries of relevant ministries.	
	1c. Establish energy MRV technical team	CCD identifies energy lead on MRV team and provides relevant training.	MOE forms MRV energy technical team. CCD provides required support and is member of energy technical team.
	1d. Agree on funding arrangements	CCD identifies and accesses climate finance for MRV in energy sector.	CCD identifies and accesses climate finance for MRV in energy sector. CCD enters into agreement with MOE to allocate/transfer MRV climate finance to enable MOE to lead and undertake MRV in the energy sector.
2. Data collection and management	2a. Develop guidance and reporting templates	CCD develops reporting guidance and templates for the energy sector.	
	2b. Establish appropriate systems for energy sector data/information storage and access	CCD establishes and maintains the energy MRV data repository and management system. CCD collects data and information from MOE, Ministry of Petroleum and Mining, relevant parastatals and relevant stakeholders. MOE, Ministry of Petroleum and Mining, relevant parastatals and KAM gather required data and information and provide to CCD in requested format.	CCD provides required hardware and software to enable an energy MRV data management system that is linked to CCD's MRV data repository and management system. MOE collects data and information from Ministry of Petroleum and Mining, relevant parastatals and relevant stakeholders. MOE inputs and manages energy MRV data, following guidelines provided CCD.
	2c. Access SDG data for co-benefits reporting	CCD enters into agreement with MED, National Treasury and Ministry of Planning to access SDG data to report on co-benefits of actions in the energy sector. CCD manages SDG data and uses data for NDC and other reporting on co-benefits.	CCD enters into agreement with the National Treasury and Ministry of Planning to access SDG data for actions in the energy sector; and provides data to MOE. MOE manages SDG data that is provided by CCD and uses data for NDC and other reporting on co-benefits.
	2d. Access climate finance data	CCD enters into agreement with the National Treasury and Ministry of Planning to access climate finance data for actions in the energy sector. CCD manages data. CCD analyzes data to identify and report on domestic and international allocations for climate change actions in the energy sector.	CCD enters into agreement with the National Treasury and Ministry of Planning to access climate finance data for actions in the energy sector; and provides data to MOE. MOE manages National Treasury climate finance data provided by CCD and uses data to identify and report on domestic and international allocations for climate change actions in the energy sector.
3. Data processing and analysis	3a. Aggregate, process and analyze data to report on GHG emissions, achievement of NDC, co-benefits and adaptation results	CCD processes and analyses the energy data for MRV in the energy sector. CCD identifies and secures capacity development and financial support to develop the capacity of energy and CCD officials to undertake low carbon analysis in the energy sector.	MOE processes and analyses the energy data for MRV in the energy sector. CCD identifies and secures capacity development and financial support to develop the capacity of MOE officials to undertake low carbon analysis in the energy sector.
	3b. Identify and work to fill data gaps	CCD, working with MOE and relevant ministries and parastatals, identifies information and data gaps, and develops a	MOE, working with MOE and relevant ministries and parastatals, identifies information and data gaps, and develops a

		plan to fill gaps that first focuses on priority actions.	plan to fill gaps that first focuses on priority actions.
4. Reports and Deliverables	4a. Use processed data to develop domestic and international reports	CCD develops the energy sector reports, incorporates in relevant reports, and submits to domestic institutions and the UNFCCC.	MOE develops the sections of the reports related to climate change action in the energy sector and submits to CCD. CCD uses the reports from MOE to develop domestic and international reports.
	4b. Manage and store reports.	CCD stores and indexes all reports in its climate change data repository and management system.	MOE stores and indexes all energy inputs in its climate change data repository and management system for the energy sector (which is linked to the CCD MRV data system).
	4c. Make reports available to the public.	CCD makes copies of reports publicly available, through printing or posting published reports on website.	
5. Quality Assurance / Quality Control	5a. Control the quality of energy climate data by undertaking routine and consistent checks to ensure data integrity, correctness and completion.	CCD manager reviews technical officer's or consultant's work on an on-going basis, reviews data and reports submitted by the energy sector, coordinates review by the energy sector technical team and coordinates national consultation.	MOE manager reviews technical officer's or consultant's work on an on-going basis; reviews energy sector data submitted by other ministries, parastatals, and other entities; and coordinates review by the energy sector technical team. CCD reviews MOE submissions and reports, and coordinates national consultation.
	5b. Undertake planned system of review procedures conducted by personnel not directly involved in the process.	CCD arranges QA of energy sector data and reports.	

Financial resources for the energy sector MRV system are required to support:

i. ***Human resources*** – including:
   - Option 1:
     CCD – MRV Manager; MRV Technology Officer; 2 MRV Data Management Officers:
     MOE – Energy MRV Manager (part-time); Energy MRV Technical Officer (part-time)
   - Option 2:
     CCD – MRV Manager, MRV Technology Officer; 1 MRV Data Management Officer;
     MOE – Energy MRV Manager (part-time); Energy MRV Technical Officer

ii. ***Capacity development*** for data management officers – GHG inventory, low-carbon analysis, adaptation M&E, database management, etc.

iii. ***Appropriate technology*** – server/hardware for the climate change data repository and management system and climate registry of projects, software, computers, etc.

iv. ***Appropriate office space*** and office supplies.

If MOE is the institutional lead for MRV in the energy sector, CCD might consider allocating a portion of climate finance earmarked for MRV (such as GEF support for National Communications and Biennial Update Reports) to MOE to enable the ministry to carry out agreed MRV tasks.

Increased funding allocations from the Ministry of Environment and Forestry budget are unlikely in the short term because of the significant amount of climate finance in Kenya that is earmarked for MRV. CCD may consider revising the activities, expected outputs and expected outcomes of various climate finance-supported initiatives to better align with the MRV needs identified by CCD and MOE.

1.0 Introduction

An effective measurement, reporting and verification (MRV) system is critical to meet both domestic and international monitoring and reporting requirements. At the national level, the Climate Change Act, 2016 requires MRV of climate change actions, including in the energy sector. At the international level, this includes reporting obligations under the United Nations Framework Convention on Climate Change (UNFCCC) and the transparency requirements of the Paris Agreement, including reporting on the implementation of Kenya's Nationally Determined Contribution (NDC).

This report analyses Kenya's MRV of climate change actions in the energy sector, setting out possible institutional arrangements for the energy sector that enable Kenya to meet the transparency requirements of the Paris Agreement and the relevant provisions of the Climate Change Act. While transport is considered as part of the energy sector when developing greenhouse gas (GHG) inventories, MRV in the transport sector is considered in a separate companion report.

Section 2 defines MRV and elaborates Kenya's domestic and international requirements for MRV in the energy sector. Section 3 explores the current situation on MRV in the energy sector, and summarizes the needs and gaps identified in the *Draft Needs and Gaps Assessment Report: MRV of NDC Implementation in the Energy and Transport Sectors* (ClimateCare, 2018). Section 4 identifies the priority mitigation and adaptation actions in the energy sector set out in the second National Climate Change Action Plan 2018-2022 (NCCAP), suggested indicators for measuring progress, and the sources of data and information. The review of mitigation actions identifies emission reduction goals to 2023 and 2030, and sustainable development co-benefits. This section can be stand-alone document to guide the identification of indicators for mitigation, adaptation and co-benefits, and information/data needs.

Section 5 sets out options for an institutional structure for MRV in the energy sector including oversight mechanisms, two options for institutional leads and organization, functions and tasks, human resource needs, financial considerations, and key considerations in determining an institutional lead for MRV in the energy sector. The conclusion sets out a step-wise approach to develop and implement an MRV/transparency system in the energy sector in the short, medium and long term.

2.0 Measurement, Reporting and Verification: Domestic and International Obligations in Kenya

Measurement, reporting and verification (MRV) is an important element of enhancing transparency under the UNFCCC's Paris Agreement. The term MRV came from the 2007 Bali Action Plan, meaning that climate change mitigation actions are to be implemented in a "measurable, reportable and verifiable" manner (UNFCCC, 2007). The three terms are described below:

i. **Measurement** – The monitoring and measurement of data and information on progress with and the impact of mitigation actions. This includes measurement and estimation of GHG emissions; measurement and estimation of mitigation actions and related emissions reductions; gathering information on adaptation and sustainable development co-benefits; and collecting information about financial, technology development and transfer, and capacity building support received from developed countries for mitigation activities. In Kenya, it also includes measurement and tracking of NCCAP actions to reduce emissions and adapt to climate change, and domestic budget allocations for climate change initiatives.

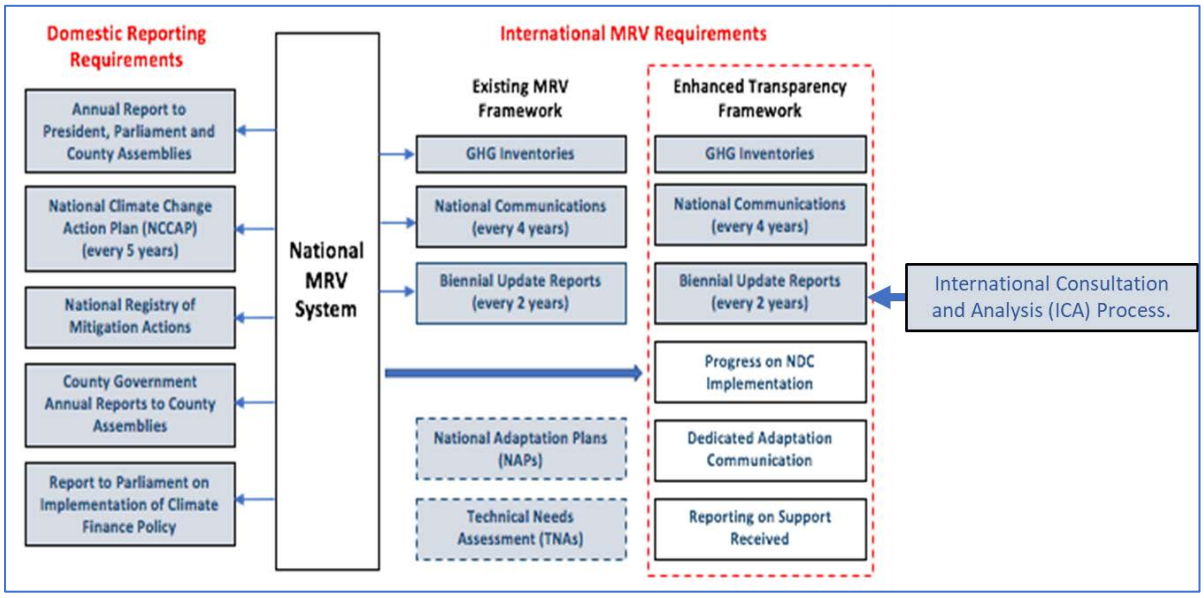
ii. **Reporting** – Compiling information in reports and other formats to meet domestic and international obligations, including GHG inventories, National Communications, Biennial Update Reports, adaptation communications, sector reports and reports to the National Climate Change Council and Parliament. Reporting should facilitate making information available to the public.

iii. **Verification** – Assessing the completeness, consistency and reliability of the reported information through periodic review and analysis by independent assessment. At the national level, this includes quality assurance and quality control (QA/QC). At the international level, international consultation and analysis is the modality for review used by Parties not included in Annex I to the UNFCCC (Desgain and Sharma, 2016).

MRV typically is associated and has primarily been used with the measurement, reporting and verification of GHG emission levels and reductions, and mitigation actions. Adaptation actions are tracked and reported on through Monitoring and Evaluation (M&E). The difference between the two lies with "verification." Verification of adaptation does not have the same relevance internationally as verification of mitigation because adaptation is less of a global good and cannot be easily compared because of a lack of global reference metric (Leiter, 2017). The ultimate goal of M&E for adaptation is to assess whether a given adaptation intervention has been successful in increasing the resilience of targeted populations and assets to the impacts of climate change (Christiansen, et al., 2016).

The key function of MRV is to enhance transparency. In Kenya, MRV facilitates reporting and sharing of information, both domestically and internationally; allows the National Climate Change Council to assess if NCCAP priority actions are implemented and achieving expected results; enables Kenya and the international community to assess progress on and achievement of NDC targets; and enhances national capacities to generate, plan, implement and coordinate individual mitigation actions. The domestic and international MRV requirements are illustrated in Figure 1 and discussed below in Sections 2.1 and 2.2.

Figure 1: General requirements (domestic and international) for Kenya's MRV system



Source: Adapted from Author and Marr et al. (2018), page 5.

2.1 Domestic MRV obligations

Kenya's domestic MRV obligations are set out in the Climate Change Act, with the National Climate Change Framework Policy (2018) and National Climate Finance Policy (2018) providing overarching guidance. The key guidance is summarised in this section, with more detail on the relevant sections of the Act and policies included in Annexes 1, 2 and 3.

The **National Climate Change Framework Policy**, 2018 states that the establishment of the MRV system should prioritise the use of existing MRV processes; integrate climate change information and data in the national statistical management system; and link with national sustainable development planning, budgeting and monitoring systems. The policy notes the need to build the capacities of national and county entities to participate in the MRV process (Government of Kenya, 2018a).

The **Climate Change Act**, 2016 provides the legal framework to deliver on the policy's goal. Obligations in regard to MRV are summarized below (*with additions related to MRV in the energy sector in italics)*:

i. National Climate Change Council (*the Cabinet Secretary responsible for energy is a member of the Council)*
   - Section 15 – Evaluate the performance of climate change duties and functions of national public entities (oversight, domestic verification).
   - Section 34 – Submit an annual report to the President, Parliament and County Assemblies on the progress made toward the implementation of climate change action plans and whether objectives of the plans were or were not met (domestic reporting, domestic verification).

ii. Cabinet Secretary responsible for climate change affairs
   - Section 8(2)(a) – Report biannually to Parliament on the status of implementation of national and international climate change obligations, and progress toward low carbon climate resilient development (domestic reporting).
   - Section 8(2)(e) – Formulate and review the NCCAP. Section 13(3) notes that the NCCAP shall prescribe measures and mechanisms to review levels and trends of GHG emissions (measurement /monitoring).
   - Section (22) – Make regulations to guide the reporting and verification of climate change actions (domestic and international reporting, domestic verification).

iii. Climate Change Directorate (CCD)
   - Section 9(8)(b) – Establish a national registry of mitigation actions by public and private entities (measurement/monitoring).
   - Section 9(8)(d) – Identify low carbon development strategies and coordinate related MRV in collaboration with other public entities (*including those with mandates and responsibilities for energy, such as the Ministry of Energy (MOE), Ministry of Petroleum and Mining and related parastatals such as Energy Regulatory Commission [ERC], Kenya Power, Kenya Electricity Generating Company [KenGen], Geothermal Development Corporation [GDC], Kenya Electricity Transmission Company [KETRACO], and National Oil Corporation of Kenya [NOCK]*) (measurement/monitoring, domestic reporting and domestic verification).
   - Section 9(8)(e) – Coordinate the adherence to international obligations, including reporting (measurement/monitoring, international reporting).

iv. National Environment Management Authority (NEMA)

- Section 17(1)(c) – Regulate, enforce and monitor compliance on levels of greenhouse gas emissions (measurement/monitoring).

v. Cabinet Secretary of the National Treasury

- Section 25 – Develop a strategy and make regulations setting out procedures and powers to identify sources of climate finance and monitor uses by state, non-state and private sector actors (measurement/monitoring).

vi. National Public Entities

- Section 15(5) – Each national public entity (*including MOE, Ministry of Petroleum and Mining and related parastatals*) through its Climate Change Unit is required to report on sectoral GHG emissions for the national inventory, monitor and review the integration of climate change functions in sectoral mandates, and report to the Council on progress and implementation (measurement/monitoring, domestic reporting).

vii. County Governments

- Section 19 – Submit annual reports to County Assemblies, with copies to the Climate Change Directorate, on progress on implementation of climate change actions (domestic reporting) (Government of Kenya, 2016a).

The **Climate Finance Policy**, 2018 is aligned with the Climate Change Act and sets out that the National Treasury is responsible for:

i. Monitoring and tracking financial, technology transfer and capacity building support received to comply with the Paris Agreement; and integrating the system with sustainable development monitoring systems (measurement/monitoring).

ii. Reporting to Parliament on the implementation of the policy (domestic reporting) and providing input to international reporting obligations on climate finance (international reporting) (Government of Kenya, 2018b).

The **Climate Change Directorate** (CCD) has responsibility for MRV and provides support to the Cabinet Secretary responsible for climate change affairs who is secretary to the National Climate Change Council. The responsibilities include the establishment of the mitigation MRV and adaptation M&E systems; data collection and management related to GHG emissions and mitigation actions including a registry of mitigation actions; collection and management of data and information on adaptation including indicator and baseline development; and domestic and international reporting.

MOE and Ministry of Petroleum and Mining and affiliated parastatals are expected to report on sectoral GHG emissions for the national inventory (*which could include the development of the energy sector inventory, or the submission of information to enable the CCD to calculate GHG emissions),* and report on progress, including on actions in NCCAP 2018-2022, which is also the implementation plan for Kenya's NDC.

The **National Treasury** is responsible for tracking climate finance, *including allocations for actions in the energy sector*. *CCD and energy sector actors will need to work closely with the National Treasury to identify the climate results of climate support received and government expenditure on climate change actions in the energy sector*.

NEMA's responsibility for regulating, enforcing and monitoring compliance on levels of GHG emissions will need to be coordinated with the MRV system established by CCD. This will be particularly relevant

when regulations are established for reporting by the private sector on GHG emissions; but this is expected to take some time and likely to be implemented in the timeframe of the third NCCAP (2023-2027) through a phased approach that begins with voluntary reporting by large emitters.

2.2 International MRV obligations

The domestic MRV arrangements discussed above in Section 2.1 underlie Kenya's international reporting to the UNFCCC that includes:

i. National Communications – First National Communication, 2002; Second National Communication, 2015.
ii. GHG inventories as part of the National Communications.
iii. Reporting on adaptation through the National Communications and submission of the Kenya National Adaptation Plan (NAP) in 2016.
iv. Nationally Determined Contribution submitted in 2015. A new or updated NDC is expected to be submitted by 2020 and every five years thereafter. The updated NDC is expected to demonstrate enhanced mitigation ambition and strengthened adaptation plans and actions.

Kenya has not yet submitted a Biennial Update Report. Non-Annex 1 Parties, consistent with capabilities and the level of support provided for reporting, were expected to submit their first Biennial Update Report in 2014 and every two years thereafter.

The Paris Agreement introduced an enhanced transparency framework (illustrated in Figure 1) that requires Kenya to report information necessary to track progress every two years from 2024. Kenya is required to submit reports on:

i. National inventories of anthropogenic GHG emissions by sources and removals by sinks, prepared using methodologies accepted by the Inter-Governmental Panel on Climate Change (IPCC).
ii. The implementation and impacts of mitigation actions and information necessary to track progress made in implementing and achieving the mitigation component of Kenya's NDC.
iii. The implementation and impacts of adaptation actions, including information related to climate change impacts, vulnerabilities and adaptation, in the form of an adaptation communication.
iv. Information on financial, technology transfer, and capacity-building support needed and received.

Agreement was reached on 15th December 2018 on the "Paris Rulebook" that provides guidelines to implement the reporting and transparency requirements of the Paris Agreement. The rulebook provides a detailed and comprehensive set of rules to govern the reporting requirements covering seven gases and multiple sectors, including energy. The rulebook indicates that countries will use common reporting tables (that are under development) to provide updates on GHG emissions and NDCs, and follow guidance that sets out elements of an adaptation communication (UNFCCC, 2018).

3.0 MRV in Kenya

Kenya has taken steps to set up an MRV+ system that includes mitigation and adaptation. This section provides details on the MRV-related work to date, on-going projects, and the MRV gaps and needs in the energy sector.

3.1 MRV in the Energy Sector: Work to Date

Kenya's MRV+ system and MRV in the energy sector build on considerable work undertaken to date, including:

i. **First National Communication and GHG inventory, 2002** – Included estimations of GHG emissions in the energy sector.

ii. **National Climate Change Action Plan, 2013-2017** – The mitigation analysis included a low carbon scenario assessment in the energy sector that:

- Developed a GHG emissions analysis for 2000 to 2010. This was similar to a GHG inventory because it used IPCC guidelines, but emissions were analysed in six mitigation sectors rather than the standard inventory sectors. Energy and transport were considered separate sectors.
- Projected emissions to 2030 to create the reference case that formed the baseline against which mitigation potential was estimated for the energy sector.
- Identified 15 potential mitigation actions in the energy sector and their mitigation potential (wedge analysis for electricity supply and energy demand).
- Identified adaptation and development co-benefits of mitigation actions through a *Development Impact Assessment*.

In the reference case of projected emissions to 2030, energy emissions grow the most of all sectors. Six electricity supply and nine energy demand mitigation options were analysed. Large mitigation potential was identified for geothermal and improved cookstoves (Government of Kenya, 2013).

The National Performance and Benefit Measurement subcomponent of the first NCCCAP included nine actions to establish an "integrated framework for measuring, monitoring, evaluating, verifying and reporting results of mitigation actions, adaptation actions and the synergies between them" (Government of Kenya, 2013). Six of these actions did not progress, suggesting that the proposed system may have been too ambitious, overly resource intensive, or required foundational actions (Murphy and Chirchir, 2017).

iii. **Second National Communication and GHG inventory, 2015** – The NCCAP 2013-2017 GHG analysis was converted to the IPCC inventory format, using the IPCC mitigation sectors and updated information where available. The inventory reported GHG emissions and removals by sinks for 2000 to 2010. The mitigation section of the National Communication included an update of the low carbon analysis of the energy sector of the NCCAP 2013-2017, revisiting the six electricity supply options and eight of the energy demand options (Government of Kenya, 2015).

iv. **National Adaptation Plan, 2015-2030** – The NAP identified one long-term, two medium-term and two short-term actions to achieve the energy sector goal to "enhance implementation of an energy generation mix plan that increases the resilience of the current and future energy systems to the impacts of future climate variability and change." (Government of Kenya, 2016b, page 23).

v. **Review of implementation of NCCAP, 2013-2017** – The review noted that substantial progress had been made on the implementation of mitigation actions and progress made toward the 2030 GHG emission reduction goals, but data collection was not at a point to enable calculation of emission reductions in the sectors. In the energy sector, total installed geothermal capacity increased, and the government was on track to meet the projected

mitigation target for 2017 when the Menengai field was to be commissioned. Various programs promoted improved cookstoves, but effort was needed to collect data. The review noted that several electricity supply projects (wind, solar, biogas, cogeneration) and energy demand initiatives (distribution of compact fluorescent bulbs, industrial energy efficiency, standards and labelling) were contributing to GHG emission reductions (Murphy and Chirchir, 2017).

vi. **Nationally Determined Contribution Sector Analysis Report: Evidence Base for Updating the National Climate Change Action Plan, 2017** – The report analysed the expected contributions by sector to achieve Kenya's mitigation NDC of GHG emission reductions of 42.9 million tons of carbon dioxide equivalent ($MtCO_2e$) by 2030 or 30% by 2030 relative to the business as usual scenario (reference case) of 143 $MtCO_2e$. The analysis determined that the electricity supply and energy demand NDC emission reduction targets would be approximately 9.32 $MtCO_2e$ and 6.09 $MtCO_2e$, respectively, by 2030. Energy sector emissions were projected out to 2050 to be consistent with the Paris Agreement; and the baseline adjusted to include crude oil production. The analysis determined that the energy sector's (excluding transport and industry) contribution to total national GHG emissions are projected to increase sharply from 7.1% of total emissions in 2015 to 29.7% of total emissions in 2030. This is a result of an expected considerable addition of coal and natural gas generation capacity in the 15-year period. Considerable shifts in policy between 2011 (that informed the NCCAP 2013-2017) and 2017 (that informed the NDC sector report) determined that projections of total electricity supply dropped by 40% by 2030. Most of this reduction was associated with the expected amount of coal-fired electricity generation. This impacted the projected baseline to 2030, resulting in a drop in overall emissions of about 7.2 $MtCO_2e$ by 2030.

   Twelve mitigation options were analysed in the energy sector, with industrial energy efficiency improvements assessed in the industry sector at the request of industry and government stakeholders. Geothermal and cookstoves provided the greatest mitigation potential. The development impact assessment of mitigation options was updated to explore how these options contribute to the attainment of the Sustainable Development Goals (SDGs).

   The analysis examined priority adaptation actions in the energy sector, expanding the list of actions set out in the NAP to include such actions as constructing new infrastructure in a manner that accounts for climate risk, and using reinforced concrete/fibreglass poles and underground cabling (Government of Kenya, 2017).

vii. **NCCAP 2018-2022** – This plan sets out priority actions for the five-year period and is the implementation plan for Kenya's NDC and NAP. Building on work to date, NCCAP 2018-2022 identified priority adaptation and mitigation actions in the energy sector in two priority areas: Energy and Transport, and Manufacturing. GHG emission reductions were estimated for the five-year period for some priority mitigation actions in the energy and manufacturing sector, expected results were established for the adaptation actions, and SDG benefits of the energy actions were analysed (Government of Kenya, 2019a). The energy actions in NCCAP 2018-2022 are discussed in greater detail in Section 4.0.

3.2 On-going MRV-related Projects and Work to Date

Several capacity building initiatives, ongoing as of April 2019, support the establishment of Kenya's MRV system in the energy sector, including:

i. **Strengthening National Capacity in Kenya to Meet the Transparency Requirements of the Paris Agreement and Sharing Best Practices in the East Africa Region** (funded by the Capacity Building Initiative for Transparency [CBIT], Global Environment Facility [GEF] and managed by Conservation International; US$ 1,000,000; 2017-2019). Actions to improve MRV in the energy sector include:
    - Strengthening the institutional arrangements for data collection and sharing, quality control and assurance, analysis, and archiving in the six mitigation sectors, including energy.
    - Improving the capacities of government institutions and staff to collect, document, and archive key data in all sectors on a regular basis for the GHG inventory process, including MOE.
    - Developing a fully functional platform for all transparency-related activities and other reporting, which for the energy sector would include reporting on: GHG emissions, and progress on mitigation actions, sustainable development co-benefits, and adaptation actions.

ii. **Low Emission Climate Resilient Development (LECRD) Project** (funded by USAID and managed by UNDP, US$8 million, 2013-2019). The LECRD project allocated about US$ 150,000 in 2018-2019 to support the development of Kenya's third GHG inventory, including the inventory in the energy sector.

iii. **UNDP NDC Support Programme** (2017-2019), and **UNDP Gender Responsive NDC Planning and Implementation** (US$ 450,000; 2017-2019). The UNDP project contracted a consultant in mid-2019 to develop a national institutional MRV framework for NDC implementation and regulations for reporting and MRV

iv. **Global NDC Implementation Partnership (GNIplus)** (funded by the German International Climate Initiative, EUR 8 million, 2018-2021). Among other activities, the project will work with the National Treasury and Ministry of Planning and CCD to develop systems to support the MRV of climate finance, including in the energy sector; and will provide support to CCD to develop a system for M&E of adaptation, including linking the system with the National Integrated Monitoring and Evaluation System (NIMES) managed by the Monitoring and Evaluation Department (MED) of the National Treasury and Ministry of Planning.

v. **NAP Global Network** (funded by the German Federal Ministry for Economic Cooperation and Development and the Government of the United States of America; US$30,000 allocated to Kenya initiative, 2018-19). Provided an update of M&E of national adaptation to support the revision of Kenya's NCCAP.

vi. **Advancing Transport Climate Strategies** (funded by the Government of Germany, EUR 500,000**,** 2016-2018). Establishment and operationalisation of a climate change unit in the Department of Transport, assessment and monitoring of the effectiveness of climate change policies and actions in the transport sector, including estimation of GHG emission reduction potentials in the transport sector and estimation of the transport sector's contribution to fulfilling Kenya's NDC.

vii. **The Initiative for Climate Action Transparency (ICAT) Support to MRV in the Energy and Transport Sectors in Kenya** (funded by the Government of Germany, the Children's Investment Fund Foundation, the Italian Ministry of the Environment and the ClimateWorks Foundation; EUR 2017-2019; US$125,000 allocated to Kenya initiative). Support to domestic MRV efforts in the energy and transport sectors through a gaps and needs assessment,

strengthening of institutional arrangements for MRV in the energy and transport sectors, and application of and training on ICAT Sustainable Development Guidance.

The MRV-related activities have resulted in the following outputs to March 2019:

i. National GHG Inventory Coordination Team formed by CCD that includes sector coordinators, including an MOE official. A GHG Inventory Coordinator has been assigned in an acting capacity in CCD.

ii. Institutional arrangements agreed for the development of the GHG inventory, including the identification and training of 20 government officials, including from MOE, that comprise the modelling team; and another 100 officials from the six UNFCCC mitigation sectors, including energy, that form the technical support teams for the sectors.

iii. CBIT has has contracted an Information Technology consultant to design the CCD's central depository for GHG emissions data.

iv. National Adaptation Coordination Committee formed by CCD to coordinate all adaptation actions, including the establishment of the M&E system. MOE is a member of the committee.

v. CCD developed a prototype registry of mitigation and adaptation projects, including energy projects, in 2017 with the support of the Government of United Kingdom-funded Strengthening Adaptation and Resilience to Climate Chance in Kenya Plus (StARCK+) project. (The registry home page is www.kenyaclimateregistry.com; but the page was not accessible / not working in April 2019).

vi. MOE provided a letter to CCD designating the Renewable Energy Directorate as the Climate Change Unit, as required under the Climate Change Act.

vii. Draft data exchange modalities were proposed between the CCD and MOE. (The draft was not available to inform this analysis.)

viii. MOE identified officers responsible for the energy sector GHG inventory. At least three MOE officials receiving training on GHG inventories in the energy sector (delivered by the GHG Management Institute with support of the CBIT and UNDP projects).

ix. One MOE officer has completed online training on the development of GHG inventories using IPCC methodologies in the energy sector.

x. MOE compiled energy data for the GHG inventory, inputted data in the IPCC format, and submitted information to the CBIT project team that is responsible for data entry and management on behalf of CCD. The CBIT team, consisting mostly of interns, has been dismantled but new recruitment of permanent staff with similar responsibilities is planned.

xi. MOE has allocated budget for training of officials on GHG emissions measurement and inventory development.

xii. The Ministry of Transport analysed sector emissions, projected emissions and potential emission reductions through mitigation options, and progress on the transportation sector's contributions to the achievement of Kenya's NDC; and provided an annual report on actions and sector emissions to the CCD.

3.3 MRV Gaps and Needs in the Energy Sector

The *Draft Needs and Gaps Assessment Report: MRV of NDC Implementation in the Energy and Transport Sectors* (ClimateCare, 2018) identified that strengthening of MRV in the energy sector requires:

i. Clear institutional arrangements for MRV in the energy sector, including a delineation of roles and responsibilities of CCD and MOE, and formal arrangements such as a data sharing agreement.

ii. Details of CCD's central depositary for: 1) GHG emissions data and data management system, including required information, processes and guidelines/templates for submitting information, and information flow processes; 2) tracking the implementation of and progress on mitigation actions and co-benefits; and 3) tracking the implementation of and progress on adaptation actions.

iii. Details of CCD's national registry of mitigation actions, and information required from MOE, Ministry of Petroleum and Mining, and affiliated parastatals.

iv. Data improvement plan that highlights data gaps and prioritises mitigation activities that require improved data for analysis, such as improved cookstoves.

v. Clarity on QA/QC processes including the roles of CCD, MOE, Ministry of Petroleum and Mining, and other experts.

vi. Capacity to assess progress and implementation of Kenya's NDC in the energy sector, such as GHG emissions projections, and assessment of GHG emission reductions from mitigation actions in the energy sector, and assessment of sustainable development co-benefits.

vii. Clarity on the linkages with NIMES, including identification of climate-related indicators in the energy sector that can be tracked through NIMES.

viii. Adequate financial and human resources to support CCD to complete MRV tasks and functions. While there is significant climate finance support through the UNDP, GNIplus and CBIT projects, this funding does not support embedded experts or interns in the CCD.

ix. Adequate financial and human resources to support MOE and Ministry of Petroleum and Mining to complete MRV tasks and functions. The small budget allocation for training on the part of the Directorate of Renewable Energy is insufficient for the tasks required.

4.0 Assessing Progress on Mitigation Actions, Adaptation Actions and Sustainable Development Co-benefits in the Energy Sector

MRV in the energy sector will focus on enabling CCD, MOE, Ministry of Petroleum and Mining and affiliated parastatals to meet domestic obligations and international transparency requirements, including assessing progress and reporting on Kenya's NDC (see Box 2). Kenya's NDC will be achieved through actions in the six mitigation sectors, including energy. The NDC calls for the promotion and implementation of the following mitigation actions in the energy sector:

- Expansion in geothermal, solar and wind energy production, other renewables and clean energy options.
- Enhancement of energy and resource efficiency across the different sectors.
- Clean energy technologies to reduce over-reliance on wood fuels (Government of Kenya, 2015).

Box 1: Kenya's Nationally Determined Contribution (NDC)

- Mitigation contribution - seek to abate GHG emissions by 30% by 2030 relative to the business as usual scenario of 143 $MtCO_2eq$.
- Adaptation contribution - ensure enhanced resilience to climate change towards the attainment of Vision 2030 by mainstreaming climate change into the Medium Term Plans (MTPs) and implementing adaptation actions.

Achievement of the NDC is subject to international support in the form of finance, investment, technology development and transfer, and capacity development.

Source: Government of Kenya (2015).

The adaptation NDC calls for enhanced "implementation of an energy generation mix plan that increases the resilience of the current and future energy systems to the impacts of future climate variability and change." The over-arching actions are aligned with Kenya's NDC adaptation actions.

The GHG emission reductions expected in the energy sector are elaborated in the NDC sector analysis report that examined the expected contributions from the six mitigation sectors. The NDC target for the energy sector for 2030 is emission reductions of 15.41 MtCO2e or 10.77% of Kenya's total expected contribution (about one-third of the expected emission reductions from the projected baseline needed to achieve Kenya's NDC) detailed below in Table 1.

Table 1: Emission reduction potential in the energy sector: Technical potential and NDC 30% emission reduction target

Sector	GHG emissions reduction technical potential ($MtCO_2e$)				NDC target $MtCO_2e$
	2015	2020	2025	2030	2030
Electricity generation	0.28	2.24	8.61	18.63	9.32
Energy demand	2.74	5.16	7.92	12.17	6.09
Total emission reduction potential in the energy sector in 2030					15.41
Total national GHG emissions in 2030					143
% of Total GHG Emission Reductions in the Energy Sector in 2030 (NDC target is 30%)					10.77%

Source: Government of Kenya (2017). *Nationally Determined Contribution Sector Analysis Report 2017: Evidence base for updating the Kenya National Climate Change Action Plan.*

4.1 Measuring Progress on and Results of Climate Change Actions

NCCAP 2018-2022 identifies the mitigation actions that will take place over the next five years to reduce GHG emissions in the energy sector. These actions take place in the climate change priority areas of manufacturing, and energy and transport. Table 2 sets out the priority actions, expected results by June 2023, expected NDC contribution by 2030, estimated emission reductions by June 2023, suggested indicators, information needed to track progress, and the source of information.

Significant co-benefits and sustainable development impacts are expected to result from the mitigation actions in the energy sector. Some of these can be difficult to measure, such as increases in general standards of living because of access to electricity or reductions in time needed to collect fuel wood. Table 3 identifies the SDGs and indicators that could be tracked to demonstrate the co-benefits of mitigation actions.

NCCAP 2018-2022 identifies adaptation actions in the energy sector. Table 4 includes the priority adaptation actions included in NCCAP 2018-2022, expected results by June 2023, the alignment with actions in the NAP, suggested indicators and sources of data.

Table 2: NCCAP 2018-2022 priority mitigation actions in the energy sector: Expected results and indicators to track progress

NCCAP 2018-2022 priority mitigation actions in the energy sector	Expected result by 30th June 2023	NDC expected contribution to 2030	Estimated GHG emission reductions to 30th June 2023	Suggested indicator	Information needed for GHG measurement	Source of information
Energy		15.41 $MtCO_2e$ per year by 2030 10.77% of 2030 projected emissions	16.3 $MtCO_2e$ per year by 2023	Annual carbon emission levels in the energy (excluding transport) sector - CO_2e	Domestic consumption of fossil fuels Domestic consumption of biomass fuels Domestic lubricant consumption Energy consumption by sectors	Ministry of Energy Ministry of Petroleum and Mining GHG Inventory
Increase renewable energy for electricity generation that is climate resilient and accounts for needs of rural areas	2,405 Megawatt (MW) of new renewables developed, to include: geothermal, biomass/co-generation, hydro, solar, wind		9.2 $MtCO_2e$ per year by June 2023	MW of new renewable electricity generation: geothermal, biomass/co-generation, hydro, solar, wind Quantity of renewable energy in electricity mix / Total electricity generation	MW and type of new renewable energy installed between 2018 and 2023	Ministry of Energy Energy Regulatory Commission KenGen Kenya Power Geothermal Development Corporation Council of Governors
Increase captive renewable energy generation capacity	Increase captive renewable energy generation capacity by 250 MW (at least 50 MW of solar, wind, hydro and 200 MW of cogeneration)					
Improve energy efficiency and energy conservation	Losses in transmission and distribution reduced from 18% in 2018 to 14% in 2023 3.3 million compact fluorescent light (CFL) bulbs distributed to households Energy efficiency and conservation projects that focus on: ▪ Efficient lighting ▪ Energy efficiency in buildings ▪ Minimum energy performance standards		*Emission reductions not calculated for NCCAP 2018-2022*	% of electricity lost during transmission and distribution Number of CFL bulbs distributed through CFL initiative Number of energy efficiency and conservation projects	Total electricity sent to grid, % loss of electricity during transmission and distribution Number of CFL bulbs distributed; assumptions about replacement/addition Review of energy efficiency projects (government and development partner supported; case studies to provide examples of emission reductions)	Ministry of Energy KenGen Kenya Power KETRACO Kenya Bureau of Standards

Promote the transition to clean cooking with alternative fuels, such as liquified petroleum gas (LPG), ethanol and other clean fuels in urban areas	Number of households using LPG, ethanol or other cleaner fuels for cooking increased by 1.5 million		0.8 $MtCO_2e$ per year by June 2023	Number of households using LPG, ethanol or other cleaner fuels for cooking LPG penetration rate	National household survey of consumers on demand for LPG, ethanol and other clean fuels, and types of cooking stoves used Number of LPG cylinders distributed to households through the Mwananchi Gas Project from 2018 to June 2023	Ministry of Energy Ministry of Petroleum and Mining National Oil Corporation Kenya National Bureau of Statistics
Encourage the uptake of clean biomass (charcoal and wood) cookstoves and alternatives in rural areas	Number of households using improved biomass cookstoves increased by 4 million Biogas technology scaled up through the construction of 6,500 digesters for domestic use and 600 biogas systems in various schools and public facilities		6.3 $MtCO_2e$ per year by June 2023	Number of households using improved biomass cookstoves (charcoal and fuel wood) Percentage of households using biomass for energy Percentage of households using LPG Number of digestors for domestic use constructed Number of biogas systems constructed in schools and public facilities	National household survey of consumers on demand for woodfuel and charcoal, and types of cooking stoves used National survey of use of biogas at the household level Number of biogas systems installed in schools and public facilities	Kenya Forest Service Ministry of Energy Kenya National Bureau of Statistics Ministry of Education Kenya Prison Service Council of Governors
Manufacturing		0.78 $MtCO_2e$ per year by 2030		Energy intensity of the economy: Total primary energy use /GDP (Declines in energy intensity are a proxy for efficiency improvements)	Primary energy supply GDP	Ministry of Energy Kenya National Bureau of Statistics GHG inventory
Increase energy efficiency in the manufacturing sector	Number of companies participating in energy efficiency initiatives is doubled to 1,000 (including 1,000 energy audits) Minimum energy performance standards developed for five more appliances	0.5 $MtCO_2e$ per year by 2030	*Emission reductions not calculated for NCCAP 2018-2022*	Number of companies participating in energy efficiency initiatives; energy savings as a result of initiatives Number of minimum energy performance standards developed	Report from Center for Energy Efficiency and Conservation, including review of company reports to determine energy savings Number of and details on minimum energy performance standards developed between 2018 and June 2023	Ministry of Energy Kenya Association of Manufacturers Kenya National Bureau of Standards

Source: Government of Kenya (2019a); Government of Kenya (2019c); Government of Kenya (2017); and Stiebert and Murphy (2017).

Table 3: Priority NCCAP 2018-2022 mitigation actions in the energy sector - SDG targets and indicators to track progress

NCCAP 2018-2022 mitigation actions	Sustainable Development Goal and target	Indicator	Other potential indicators to measure development benefits	Data required	Source of data
Increase renewable energy for electricity generation that is climate resilient and accounts for needs of rural areas Increase captive renewable energy generation capacity	**Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all** 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix 7.4 - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in accordance with their respective programmes of support	Proportion of population with access to electricity Renewable energy share in the total final energy consumption	Cost savings from reduced reliance on imported fossil fuels for electricity generation (also linked to energy security)	Number of customers connected to grid or mini-grids Number of households with solar household systems Share of renewable energy in electricity generation Expenditure on (or amount of) imported fossil fuels	Ministry of Energy Ministry of Petroleum and Mining KenGen Energy Regulatory Commission Geothermal Development Corporation Council of Governors
Improve energy efficiency and energy conservation Increase energy efficiency in the manufacturing sector	**Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all** 7.3 - By 2030, double the global rate of improvement in energy efficiency **Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation** 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	Energy intensity measured in terms of primary energy and GDP Investments in energy efficiency as a proportion of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology for sustainable development services	Cost savings to manufacturers as a result of decreased electricity use	Primary energy supply and GDP Number of companies participating in energy efficiency initiatives and estimated emission reductions Cost savings as a result of Investments in energy efficiency (case studies) Climate finance and official development assistance allocated to energy efficiency initiatives	Ministry of Energy Kenya National Bureau of Statistics Kenya Association of Manufacturers National Treasury and Ministry of Planning
Promote the transition to clean cooking with alternative fuels such as LPG, ethanol and other clean fuels in urban areas Encourage the update of clean biomass (charcoal	**Goal 3 - Ensure healthy lives and promote well-being for all at all ages** 3.9 - By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	Mortality rate attributed to household and ambient air pollution	Reduce number of household biomass related deaths from 21,560 annually in 2018 (49% of deaths) to 20% in 2022	Estimates of reductions in deaths from indoor air pollution based on replacing wood/charcoal cookstoves with alternative fuels, or more inefficient cookstoves	Ministry of Energy Kenya National Bureau of Statistics Ministry of Health Kenya Forest Service

and wood) cookstoves and alternatives in rural areas	**Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all** 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services **Goal 15 - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss** 15.2 - By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	Proportion of population with primary reliance on clean fuels and technology Forest area as a proportion of total land area Proportion of land that is degraded over total land area	Proportion of population with primary reliance on wood fuel for energy needs	National household survey of consumers on demand for LPG, ethanol and other clean fuels, and types of cooking stoves used National household survey of consumers on demand for wood fuel and charcoal, and types of cooking stoves used Hectares of forest cover Hectares of degraded land	

Source: United Nations (2017); and Government of Kenya (2019a).

Table 4: NCCAP 2018-2022 priority adaptation actions in the energy sector: Expected results and indicators to track progress

NCCAP 2018-2022 priority adaptation actions	Expected result by 30th June 2023 – NCCAP 2018-2022 and Adaptation Technical Analysis Report (ATAR)	NAP expected contribution to 2030	Suggested indicator	Source of information
Energy Sector		Enhance implementation of an energy generation mix plan that increases the resilience of the current and future energy systems to the impacts of future climate variability and change	MW of new renewable electricity generation installed between 2018 and 2023: geothermal, biomass/co-generation, hydro, solar, wind Quantity of renewable energy in electricity mix / Total electricity generation Percentage of electricity generated by geothermal *(linked to data to assess mitigation progress)*	Ministry of Energy KenGen Kenya Power Energy Regulatory Commission Geothermal Development Corporation Council of Governors
Electricity Supply		**NAP / NDC Sector Review Actions**		
Increase renewable energy for electricity generation that is climate resilient and accounts for needs of rural areas	Prioritize geothermal energy as climate resilient and green energy – develop 1,102.3 MW by June 2023 Substitute thermal power plants with geothermal Increase other climate change resilient renewable energy technologies network to provide power to off-grid areas	Short-term: Increase the solar, wind, and other renewable energy systems network to provide power to off-grid areas Medium-term: Increase small hydro and geothermal power generation plants	MW of new renewable electricity generation installed between 2018 and 2023: geothermal, biomass/co-generation, hydro, solar, wind Quantity of renewable energy in electricity mix / Total electricity generation Percentage of electricity generated by geothermal *(linked to data to assess mitigation progress)*	Ministry of Energy KenGen Energy Regulatory Commission Geothermal Development Corporation Council of Governors
Climate proof energy infrastructure	Incorporate emerging and projected climate scenarios and impacts on the design, construction, operation and maintenance of energy infrastructure. Establish and implement climate change risk-based construction standards for energy infrastructure Use concrete poles to replace wooden poles Optimize existing hydropower plants Improve water management and conservation	Short-term: Conduct risk and vulnerability assessments of energy infrastructure Short term: Use reinforced concrete posts and underground cabling Medium-term: Consider use of fibreglass poles Medium-term: Construct new infrastructure in a manner that accounts for climate risks	Number, types and size of energy infrastructure climate-proofed Number of concrete poles used in place of wooden poles Number of fibreglass poles used in place of wooden poles Frequency of power outages	Ministry of Energy KenGen Energy Regulatory Commission Geothermal Development Corporation Kenya Electricity Transmission Company Council of Governors

Promote environmentally sustainable practices in energy sector	Protect water catchment areas feeding the hydro-power generating stations Conserve and rehabilitate 1,000 hectares of water catchment areas	Long-term: Continue the rehabilitation of water catchment areas in order to provide sustainable ecosystem services, including energy production	Hectares of water catchment areas rehabilitated, conserved and protected	Ministry of Energy
Energy Demand				
Promote the transition to clean cooking		Short-term: Promote modern cooking fuels and technologies	Increase in number of households using improved biomass cookstoves Increase in number of households using LPG and other cleaner fuel cookstoves *(linked to data to assess progress on mitigation)*	Ministry of Energy

Source: Government of Kenya (2019a); Government of Kenya (2019b); Government of Kenya (2017); and Government of Kenya (2016).

4.2 Data Gaps in Measuring the Impact of Climate Change Actions

The measurement of the mitigation impact of priority actions in the energy sector first requires a robust **GHG inventory** – this is the foundation for low carbon scenario assessment and the basis for the projected baseline to 2030 (or 2050), against which emission reductions are measured. Data gaps identified in the energy sector in the second GHG inventory and recommendations for addressing the data gaps are listed below:

i. Gap – National energy balances, including imports, exports, consumption and international bunker data for major economic sectors are not available (such as residential, commercial, transportation).

   Recommendation – National energy balances should routinely be prepared by the Ministry of Energy and Ministry of Petroleum and Mining.

ii. Gap – Estimates of woodfuel and charcoal consumption have very high uncertainty and are not based on recent surveys.

   Recommendation – A comprehensive nation-wide bottom-up survey of producers and a top-down survey of consumers should be conducted to reduce the level of uncertainty associated with production and demand for woodfuel and charcoal (Stiebert and Murphy, 2017).

The **assessment of mitigation options** in the energy sector requires calculation of the expected GHG emission reductions that result from the action. Data problems are lower in the electricity supply sector than other sectors considered in the NCCAP 2013-2017 and Second National Communication analysis because there are relatively few well studied, commercially operated sources of electricity and emissions, and supply side data on fuel and electricity consumption. In assessing the potential GHG emission reductions of mitigation actions, there are gaps in data in assessing the mitigation impact of landfill gas generation of electricity. Limited data is available on rates of waste generation and landfilling in Nairobi, but not much is known about waste practices across most of Kenya.

The assessment of energy demand mitigation actions is more challenging because of information gaps, described below:

i. Gap – No comprehensive source of information on the historical end-use consumption patterns of different consumers of fossil fuels exists (such as appliance use and technology choice for cooking, lighting, heating water, etc.). Kenya's industrial sector is very fragmented with a large portion of small and medium enterprises meaning limited available information on the type of technologies used in the sector and their energy-use characteristics. The uncertainty in end-use allocation does not affect overall estimates of emissions, but it does impact the uncertainty associated with estimates of mitigation potential where specific end-uses are targeted.

   Recommendation – To improve the analysis of demand side mitigation options, it is critical that fuel consumption and related emissions be allocated to end-uses. MOE, working with CCD, MED and the Kenya National Bureau of Statistics., could work to strengthen statistics capacity and embed energy data in statistical plans. Collection of information on energy consumption at the household level and in the manufacturing sector would provide data for GHG calculations and climate change reporting.

ii. Gap – Biomass consumption data was often contradictory and therefore not reliable. Data on the distribution of cooking devices used by urban and rural households only indirectly

Indicated fuel consumption. This is a large gap given that clean cooking is a significant mitigation action to meet Kenya's NDC target.

Recommendation – Improve information on cookstoves through a national household survey of consumers that identifies the types of cooking (such as biomass, LPG, ethanol), and if biomass, the type of cookstove used. This is important baseline data needed to track the GHG mitigation impact of the promotion of LPG cooking and efficient biomass cookstoves in rural areas. MOE requested that the 2019 national census collect this data.

Measurement of the **sustainable development co-benefits of mitigation actions** in the energy sector could focus on SDG indicators up to June 2023 and adopt a more complex analysis over time. MED, National Treasury and Ministry of Planning has identified national-level SDG indicators that can be measured in Kenya with available data or data that can be produced with minimum effort in one to two years (Sustainable Development Goals Knowledge Platform, 2017). Linking with the MED SDG team could enable CCD and MOE to collect meaningful information on the sustainable development impacts of mitigation actions in the energy sector in an efficient and cost-effective manner.

Measurement of progress on adaptation actions in the energy sector can be linked with mitigation reporting because many of the indicators are the same (e.g., renewable energy generation and geothermal energy generation). Assessing the implementation of and progress on other adaptation actions will require the development of baseline information and tracking of information to, for example, determine the use of concrete and fibreglass poles. Work is also needed to understand the extent of climate-proofing of energy infrastructure.

A significant gap is the **MRV of climate finance** and support in the energy sector. Information was not available on the progress of tracking international climate finance flows, official development assistance and domestic expenditure on climate actions in the energy sector. This is expected to be developed by the National Treasury and Ministry of Planning with the support of the GNIplus project.

5.0 Institutional Arrangements for MRV in the Energy Sector

A robust institutional framework for an effective MRV system in the energy sector should encompass the relevant institutional entities, and identify the necessary staff, systems and processes. This section discusses the establishment of an institutional structure for an MRV system to track progress on climate change actions in the energy sector. The section sets out suggested objectives of the MRV system; over-arching guidance to ensure the system builds on existing work and institutions; functions and tasks to MRV energy actions and institutional responsibilities and assignments; suggested institutional structures to fulfill tasks and functions; oversight institutional mechanisms; human resource needs to deliver on roles and responsibilities; and financial considerations.

Any suggestions and recommendations in this report need to be considered along with the proposed MRV structure being presented under the CBIT and LECRD projects. However, it is also planned that the recommendations will provide useful input into the process of determining the overall national MRV system for Kenya.

It is assumed that the GNIplus project will address the transparency requirements of M&E of adaptation and reporting on climate finance received. Energy sector actors, such as MOE and the Ministry of Petroleum and Mining, should be engaged in the development of the systems. Energy

sector actors will need clarity on expected data inputs and reporting requirements, and the types of information and reports they will receive from CCD on adaptation M&E and climate finance.

5.1 Objective of Kenya's MRV System in the Energy Sector

The objective of MRV of climate actions in the energy sector is to improve transparency of climate actions and enable the Government of Kenya to understand and report on the energy sector's contribution toward national climate change goals, including Kenya's NDC. The energy sector is expected to deliver 10.77% of expected GHG emission reductions by 2030 (see Table 1). MRV enables the Government of Kenya to meet its legal obligations on measuring, monitoring and reporting on climate change actions. These obligations include the Climate Change Act, 2016, and the UNFCCC and its Paris Agreement, including Kenya's NDC submitted under the Paris Agreement. As set out in Article 2(6) of the Constitution of Kenya, "any treaty or convention ratified by Kenya shall form part of the law of Kenya."

The MRV system will track progress toward achieving Kenya's mitigation and adaptation goals and NDC, improve understanding of the climate and sustainable development outcomes of mitigation actions, provide information about support received in the context of climate change actions, and contribute to improved domestic and international reporting.

5.2 Building on Existing Institutional Arrangements and Work to Date

The establishment of the MRV system in the energy sector should build on existing work and be integrated with the institutional processes established to develop the GHG inventory, including:

i. **The GHG inventory process** is the basis of MRV in the energy sector, and there is no need for a separate MRV structure or system. The data collection and reporting systems for the GHG inventory are the foundation for planning and decision making on mitigation actions in the energy sector, including those actions to achieve Kenya's NDC.

ii. **The governance structures established to develop and deliver the Third GHG Inventory and NCCAP 2018-2022**. This includes the Adaptation National Coordination Committee, Mitigation Technical Group, Oversight Committee of 20 government officials established for the inventory, and the energy technical teams designated to provide input to the third GHG inventory.

iii. **A "National Climate Change Registry"** was developed in 2017 as a web-based tool that included information on mitigation, adaptation and enabling projects and actions that took place between 2013 and January 2017, including actions in the energy sector. The Technical Assistance to the Government of Kenya component of the StARCK+ programme developed the registry, purchased the domain name, and paid for an active website to 2020. The registry was handed over to the Climate Change Directorate in May 2017.

iv. **NIMES, which tracks the implementation of Kenya's Medium Term Plans, and MED's system for SDG reporting** could provide relevant information for reporting on co-benefits. CIMES, which is the county equivalent of the NIMES could be brought in later for reporting on the co-benefits at the county level.

v. **The climate finance tracking system** being established by the National Treasury and Ministry of Planning, could also be aligned with the energy MRV system.

vi. **The MRV+ system proposed in NCCAP 2013-2017** provides a framework and important learning that could be applied in the development of the MRV system for the energy sector. The proposed MRV+ system was comprehensive, but also complex and costly. A stream-lined version of the system could be considered.

5.3 Oversight Institutional Mechanisms for MRV in the Energy Sector

MRV in the energy sector requires coordination and oversight to ensure that data quality and reporting meet domestic and international obligations, are delivered in a timely manner, and are coordinated with other reporting sectors. The oversight institutional mechanisms could include:

i. **Steering Committee overseeing MRV^{+} system** – The inter-ministerial National GHG Coordination Team established for the GHG inventory could have an expanded mandate to provide oversight to the MRV+ system and review reports.
   - *CCD: provides secretariat services to the steering committee.*
   - *MOE: member of the committee responsible for providing updates on MRV in the energy sector. The MOE would work close consultation with the Ministry of Petroleum and Mining.*

ii. **Adaptation and Mitigation Technical Working Groups** – The National Adaptation Coordination Committee and the mitigation working group formed for the updating of the NCCAP could review progress on MRV of mitigation actions and M&E of adaptation actions, including review of data and analysis.
   - *CCD: leads and coordinates the Adaptation and Mitigation Technical Working Groups.*
   - *MOE and Ministry of Petroleum and Mining: members of the Adaptation and Mitigation Technical Working Groups responsible for providing updates and reviewing progress on MRV and M&E in the energy sector.*

iii. **Energy MRV+ Inter-departmental Coordination Group –** Could include representatives from CCD, MOE, Ministry of Petroleum and Mining, affiliated parastatals, National Treasury and Ministry of Planning (climate finance, SDG reporting, NIMES), KNBS and the Council of Governors. It may be useful to include representatives of ministerial M&E committees that collect information and prepare reports for NIMES and SDG reporting. This coordination group can help to identify sources of and facilitate access to energy sector data for MRV of energy mitigation options and M&E of adaptation actions. The group can help to streamline information requests and prevent duplication of effort.
   - *CCD: co-leader and coordinator of the Energy MRV+ Inter-departmental Coordination Group.*
   - *MOE: co-leader of the Energy MRV+ Inter-departmental Coordination Group.*

5.4 Options for the Institutional Lead for MRV in the Energy Sector

A series of functions and tasks need to be agreed and undertaken by CCD, MOE, Ministry of Petroleum and Mining, and other actors in the energy sector. The Climate Change Act requires that Climate Change Units of national public entities report on climate change actions on an annual basis, including on sectoral GHG emissions for the national inventory. The following public entities potentially have data and information that is needed for the MRV of climate actions in the energy sector:

i. Ministry of Energy
ii. Ministry of Petroleum and Mining

iii. Energy and Petroleum Regulatory Authority (EPRA)
iv. Geothermal Development Corporation (GDC)
v. Kenya Electricity Generating Company (KENGEN)
vi. Kenya Electricity Transmission Company (KETRACO)
vii. Kenya Bureau of Standards (KEBS)
viii. Kenya Power and Lighting Company (KP)
ix. National Oil Corporation of Kenya (NOCK)
x. Rural Electrification and Renewable Energy Commission (REREC)

The Country Governments, which are responsible for energy planning, may also have relevant information. Non-governmental organizations may also have important information for MRV in the energy sector. The Kenya Association of Manufacturers (KAM), through the Centre for Energy Efficiency and Conservation that was established in conjunction with the Ministry of Energy, is an important source of information and data in regard to industrial energy efficiency. The Clean Cookstoves Association of Kenya (CCAK) has information on cookstoves.

The CCD could receive information from the Climate Change Units of the above listed public entities; or alternatively, it could receive a consolidated energy sector report that includes comprehensive information and data developed by the MOE with input from relevant Ministries and parastatals.

The two main institutional options for MRV in the energy sector are:

i. **CCD leads energy sector MRV**, and has responsibility for climate change data collection, analysis and reporting in the energy sector. GHG emissions estimates, analysis of progress on mitigation and adaptation actions, analysis of progress toward achievement of the NDC, and tracking of sustainable development co-benefits are the responsibility of CCD. The analysis is undertaken using data and information provided to CCD by the various energy-related ministries and parastatals. An energy MRV Technical Team could bring together the various institutions that have relevant information to input to CCD for MRV in the energy sector.

ii. **MOE leads energy sector MRV, supported by CCD, and has responsibility for climate change data collection, analysis and reporting in the energy sector**. MOE internally establishes and incorporates climate change information management and reporting in the energy sector. MOE would work with and receive information from the Ministry of Petroleum and Mining and affiliated parastatals, and provide CCD with energy sector climate data and reports.

The suggested institutional structures are illustrated in figures 2 and 3.

During the final validation workshop, it was established that the preferred option by the stakeholders would be the second one, where the MOE leads the energy sector to collect the data, carry out all the QA/QC, data analysis and reporting. The sector would also be responsible for data storage and archiving. However, it was noted that for this to work well a strong Sector Technical Review Committee would be required to provide oversight of the outputs of the sector to the CCD. Another critical requirement would be adequate resource provision for the sector to implement the MRV system

Figure 2: Option 1 - CCD leads energy sector MRV

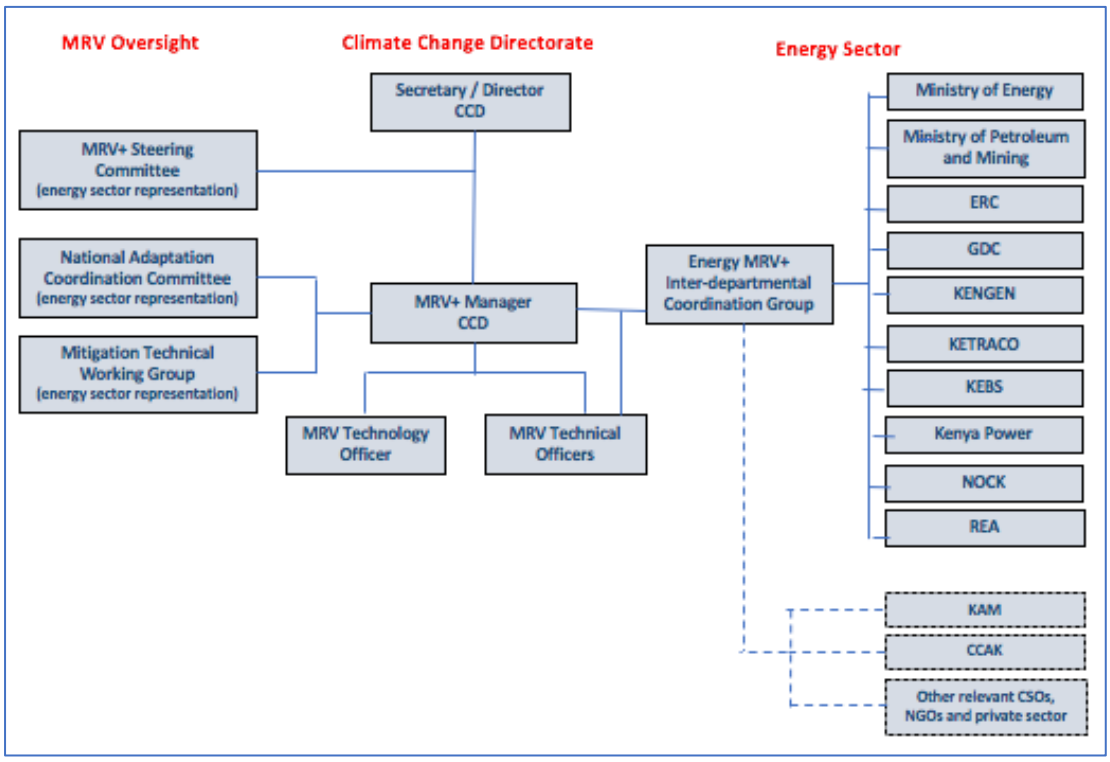
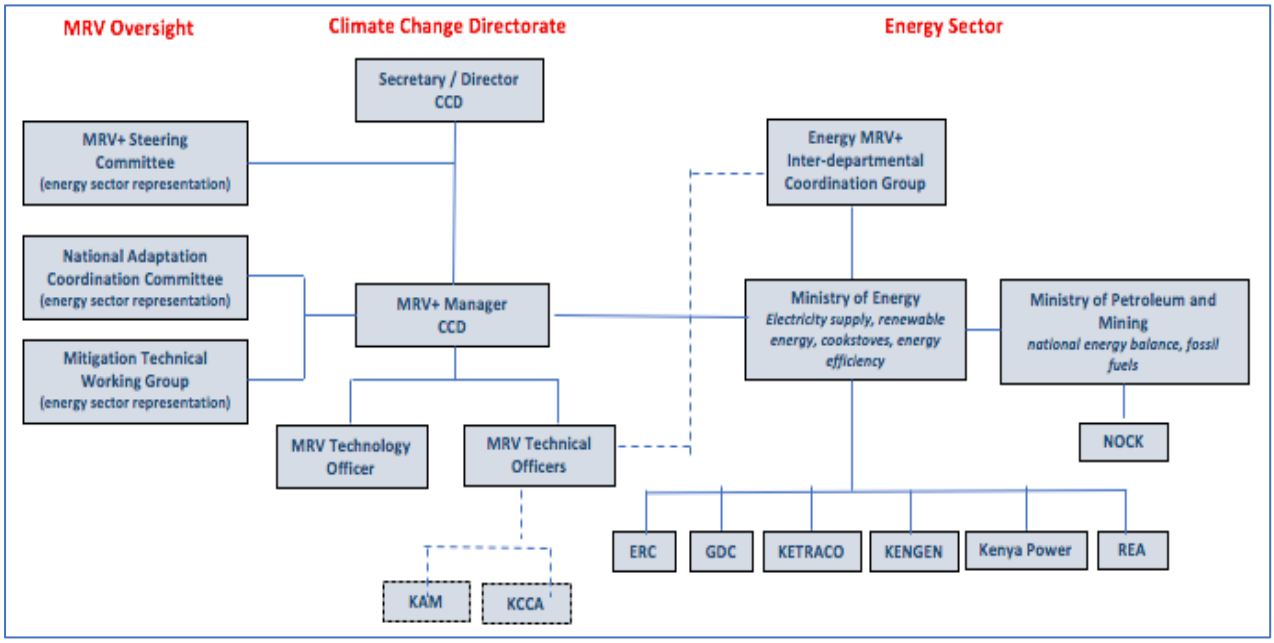


Figure 3: Option 2 - MOE leads energy sector MRV, supported by CCD



5.4 Functions and Tasks: Roles and Responsibilities

Five main functions have been identified to MRV climate actions in the energy sector. These are discussed below and summarised in Table 5. The analysis identifies potential responsible institutions to deliver on the functions and tasks.

Table 5: MRV in the Energy Sector: Functions, Tasks, Roles and Responsibilities

MRV Functions	Tasks	Roles and Responsibilities	
		Option 1	Option 2
1. Planning and preparation	1a. Establish inter-departmental coordination mechanism	CCD forms energy sector coordination team. MOE provides support to CCD	MOE forms coordination team with support from CCD.
	1b. Establish inter-departmental agreements	CCD develops agreements and sends to Cabinet Secretaries of relevant ministries.	
	1c. Establish energy MRV technical team	CCD identifies energy lead on MRV team and provides relevant training.	MOE forms MRV energy technical team. CCD provides required support and is member of energy technical team.
	1d. Agree on funding arrangements	CCD identifies and accesses climate finance for MRV in energy sector.	CCD identifies and accesses climate finance for MRV in energy sector. CCD enters into agreement with MOE to allocate/transfer MRV climate finance to enable MOE to lead and undertake MRV in the energy sector.
2. Data collection and management	2a. Develop guidance and reporting templates	CCD develops reporting guidance and templates.	
	2b. Establish appropriate systems for energy sector data/information storage and access	CCD establishes and maintains the energy MRV data repository and management system. CCD collects data and information from MOE, Ministry of Petroleum and Mining, relevant parastatals and KAM. MOE, Ministry of Petroleum and Mining, relevant parastatals and KAM gather required data and information and provide to CCD in requested format.	MOE establishes and maintains the energy MRV data repository and management system, following guidelines provided CCD. MOE collects data and information from Ministry of Petroleum and Mining, relevant parastatals and KAM. CCD provides required hardware and software to enable an energy MRV data management system that is linked to CCD's MRV data repository and management system.
	2c. Access SDG data for co-benefits reporting	CCD enters into agreement with MED, National Treasury and Ministry of Planning to access SDG data to report on co-benefits of actions in the energy sector. CCD manages SDG data and aligns with NDC reporting on co-benefits.	CCD enters into agreement with the National Treasury and Ministry of Planning to access SDG data for actions in the energy sector; and provides data to MOE. MOE manages SDG data that is provided by CCD and uses data for NDC and other reporting.
	2d. Access climate finance data	CCD enters into agreement with the National Treasury and Ministry of Planning to access climate finance data for actions in the energy sector. CCD manages data.	CCD enters into agreement with the National Treasury and Ministry of Planning to access climate finance data for actions in the energy sector; and provides data to MOE. MOE manages National Treasury climate finance data provided by CCD and to use data to identify and report on domestic and

			international allocations climate change actions in the energy sector.
3. Data processing and analysis	3a. Aggregate, process and analyze data to report on GHG emissions, achievement of NDC, co-benefits and adaptation results	CCD processes and analyses the energy data for MRV in the energy sector. CCD identifies and secures capacity development and financial support to develop the capacity of energy and CCD officials to undertake low carbon analysis in the energy sector.	MOE processes and analyses the energy data for MRV in the energy sector.
	3b. Identify and work to fill data gaps	CCD, working with MOE and relevant ministries and parastatals, identifies information and data gaps, and develops a plan to fill gaps that first focuses on priority actions.	MOE, working with MOE and relevant ministries and parastatals, identifies information and data gaps, and develops a plan to fill gaps that first focuses on priority actions.
4. Reports and Deliverables	4a. Use processed data to develop domestic and international reports	CCD develops the energy sector reports, incorporates in relevant reports, and submits to domestic institutions and the UNFCCC.	MOE develops the sections of the reports related to climate change action in the energy sector and submits to CCD. CCD uses the reports from MOE to develop domestic and international reports.
	4b. Manage and store reports.	CCD stores and indexes all reports in its climate change data repository and management system.	MOE stores and indexes all energy inputs in its climate change data repository and management system for the energy sector (which is linked to the CCD MRV data system).
	4c. Make reports available to the public.	CCD makes copies of reports publicly available, through printing or posting published reports on website.	
5. Quality Assurance / Quality Control	5a. Control the quality of energy climate data by undertaking routine and consistent checks to ensure data integrity, correctness and completion.	CCD manager reviews technical officer's or consultant's work on an on-going basis, reviews data and reports submitted by the energy sector, coordinates review by the energy sector technical team and coordinates national consultation.	MOE manager reviews technical officer's or consultant's work on an on-going basis; reviews energy sector data submitted by other ministries, parastatals, and other entities; and coordinates review by the energy sector technical team. CCD reviews MOE submissions and reports, and coordinates national consultation.
	5b. Undertake planned system of review procedures conducted by personnel not directly involved in the process.	CCD arranges QA of energy sector data and reports.	

1. Planning and Preparation

An initial step to establish an **inter-departmental coordination mechanism** is the identification of the organizations that collect and have the required data and information for MRV in the energy sector. An energy inter-departmental coordination team could be formed, comprised of the key groups that need to provide and generate data for MRV in the energy sector. This could include representatives from CCD, MOE, Ministry of Petroleum and Mining, affiliated parastatals, National Treasury and Ministry of Planning (for climate finance, SDG reporting and links to NIMES), and KNBS. It may be useful to include representatives of ministerial M&E committees that collect information and prepare reports for NIMES and SDG reporting.

Responsibility:
Option 1: CCD to form energy sector coordination team, with support from MOE.
Option 2: MOE to form coordination team with support from CCD.

Inter-departmental agreements could be established. This could entail a memorandum of understanding (MOU) or letter of agreement between CCD and relevant public entities, such as MOE and the Ministry of Petroleum and Mining. This agreement would clarify expectations, including data sharing procedures, and set out information and data needs for the MRV system. The agreements should build on the agreed data formats and proposed data exchange modalities under the GHG inventory process. The agreement between the CCD and national public entities in the energy sector could include: information and data to be provided, including data specifications and quality required (informed by work in 2. Data collection and storage, below); timelines for provision of data and information; and details of reports to be developed with the energy data.

Responsibility: CCD to develop agreements.

An **energy MRV technical team could be formed in the MOE**, comprised of the officials that will deliver MRV tasks. The CCD official with responsibility for MRV in the energy sector could work closely with the MOE team.

Responsibility: MOE to form Energy MRV technical team.

A key part of planning and preparation is **funding arrangements**. CCD should lead on accessing climate finance for MRV, and should ensure that sufficient funds from various climate finance mechanisms that support MRV are allocated to MOE enable the ministry to deliver on its MRV role. Possible funding mechanisms and projects include CBIT, LECRD project, GNIplus, GCF-funded adaptation planning project, and UNEP-GEF funding for GHG inventory preparation.

Responsibility: CCD to identify climate finance options for MRV in the energy sector.

2. Data Collection and Management

CCD should develop robust **guidance and reporting templates** for the energy sector, setting out the data to be provided by the energy sector and timelines (which will inform the inter-departmental agreements). Reporting guidelines should consider data necessary for the GHG inventory, baseline data for indicators, information for assessment of progress on mitigation actions for NDC reporting (e.g., MW of renewable energy, number of LPG canisters distributed, etc.), information needed to update projected emissions for the reference case, and information on adaptation actions. CCD should consider the common approaches being developed under the Paris Rulebook in the development of reporting templates.

Responsibility: CCD to develop reporting guidance and templates.

The collection and supply of necessary data for MRV in the energy sector needs to be clearly defined. This includes information for the GHG inventory, baseline data and information to report on indicators for mitigation and adaptation, data and information on co-benefits and relevant SDGs, and information on climate finance. A large amount of data and information will be collected, and **appropriate systems for energy sector data/information storage and access should be established** to enable efficient monitoring and reporting. Currently, there is a lack of data infrastructure to store information, and to share data between CCD, MOE and other energy actors.

Considerations for the data repository and management system include:

i. Ability to record and store data year on year, so the system is also an archive of data.
ii. Supports detailed record keeping, including source of data, who provided the data, when the data was provided, and assumptions (spreadsheet or database).
iii. Sensitive data and information (such as those linked to security issues or commercial confidentiality) is secure and only available to authorised people.

The **climate change data repository and management system for the energy sector** is likely to be a server located at CCD (with a link to MOE hardware). The operator would oversee data collection and data storage and insure that all climate relevant data for the energy sector is indexed and stored. This could include entering and maintaining the registry of mitigation actions in the energy sector. Efforts should be made to integrate the climate data repository and management system for the energy sector with existing M&E systems. It will be important to review data gaps and data collection efficiency and take remedial action as necessary.

Initial data collection could be considered a pilot phase that only includes national government entities. This would enable MOE and CCD to gather data necessary for reporting on energy emissions at a national aggregated level. Data collection from County Governments and private entities should be phased in after initial learning. It is important to note that MOE does not have the authority to request climate information from these groups, that responsibility lies with CCD.

Responsibility:
Option 1: CCD establishes and maintains the energy MRV data repository and management system, with data and information provided by MOE and other relevant public entities.
Option 2: MOE establishes and maintains the energy MRV data repository and management system, following guidelines provided CCD, with data and information provided by relevant public entities.

CCD could **enter into an agreement with MED, Ministry of Planning to access SDG data to report on development impacts in the energy sector** in the short term. This information would be shared with energy sector actors, and would be stored and compiled in the climate change data repository and management system for the energy sector. More detailed reporting on co-benefits could take place in subsequent phases.

Responsibility: CCD to enter into agreement with MED, Ministry of Planning to access SDG data to report on co-benefits of actions in the energy sector.

CCD could **enter into an agreement with the National Treasury to access climate finance data in the energy sector.** This information would be shared with energy sector actors, and would be stored and compiled in the climate change data repository and management system for the energy sector.

Responsibility: CCD to enter into agreement with the National Treasury to access climate finance data for actions in the energy sector.

3. Data Processing and Analysis

The aggregation, processing and analysis of data is required to report on climate results. This includes:

i. Converting data into GHG emissions using IPCC guidelines and GHG emissions Inventory software.
ii. Updating the reference case of projected GHG emissions, including projections to 2050.
iii. Measuring indicators and calculating emission reductions through mitigation actions in the energy sector, using low carbon analysis technique, including models or spreadsheet applications.
iv. Linking SDG data and climate finance data with mitigation actions in the energy sector.
v. Measuring indicators and tracking progress on adaptation actions.

All analysis should be indexed and stored in the climate change data repository and management system.

Responsibility:
Option 1: CCD processes and analyses the energy data for MRV in the energy sector.
Option 2: MOE processes and analyses the energy data for MRV in the energy sector.

This work will facilitate **identification of data gaps**, which should be prioritised based on their relative importance for domestic and international reporting and understanding progress on emission reductions in the energy sector. Information on the cookstoves mitigation option would likely be a priority given its importance in reducing GHG emissions. Procedures should be established to fill data and information gaps.

Responsibility:
Option 1: CCD, working with MOE and relevant public entities, identifies information and data gaps, and develops a plan to fill gaps that first focuses on priority actions.
Option 2: MOE, working with Ministry of Petroleum and Mining and relevant parastatals, identifies information and data gaps, and develops a plan to fill gaps.

Capacity will be needed in the energy sector on **low carbon scenario analysis** to update the reference baseline of projected emissions and to assess the emission reductions of mitigation actions. CCD and energy sector officials could be trained on low carbon analysis techniques, including models, spreadsheets and other emissions estimation tools.

Responsibility: CCD identifies and secures capacity development and financial support to develop the capacity of energy and CCD officials to undertake low carbon analysis in the energy sector.

4. Reports and Deliverables

The processed data will be used to develop a wide range of reports by CCD and MOE to fulfil domestic and international climate change reporting obligations. The information should also be reported back and available to energy sector public entities who may use the information in annual climate change reports and SDG reporting.

MRV reports will be stored in the the climate change data repository and management system, which serves as an archive of reports. This could include reports to the President, Parliament and the National Climate Change Council; GHG inventory; National Communications; Biennial Update Reports; Adaptation Communications; NDC progress report / mitigation analysis; registry of mitigation projects; and reports on climate finance.

Responsibility:
Option 1: CCD develops the reports and submits to relevant domestic institutions and the UNFCCC. CCD stores and indexes all reports in its climate change data repository and management system.
Option 2: MOE develops the sections of the reports related to climate change action in the energy sector and submits to CCD. MOE stores and indexes all energy inputs in its climate change data repository and management system for the energy sector. CCD uses the reports from MOE in its domestic and international reporting.

5. Quality Assurance / Quality Control

The IPCC defines Quality Control (QC) as a system of routine technical activities to measure and control the quality of climate data. The QC system for the energy sector should ensure that data is complete and nothing is missing; provide routine and consistent checks to ensure data integrity, correctness, and completeness; and identify and address errors and omissions (Institute for Global Environmental Strategies, 2014). This internal review can include managerial review of a technical

officer's or consultant's work; CCD review of inputs received from the energy sector; review by the energy sector technical team; and review through national consultation.

Responsibility:
Option 1: CCD reviews technical officer's or consultant's work on an on-going basis, reviews reports and data submitted by the energy sector, coordinates review by the energy sector technical team and coordinates national consultation.
Option 2: MOE reviews technical officer's or consultant's work on an on-going basis, reviews data submitted by the energy sector, and coordinates review by the energy sector technical team. CCD reviews MOE submissions and reports, and coordinates national consultation.

Quality Assurance (QA) activities are performed after QC procedures and include a planned system of review procedures conducted by personnel not directly involved in the process. These reviews should be undertaken by independent third parties. Local experts not engaged in the data collection and analysis process could be contracted to review reporting on climate change progress, including the inventory and low carbon analysis. Development partners could be requested to provide expert review.

Responsibility: CCD arranges for QA of energy sector data and reports.

5.4 Human Resource Needs to Deliver on Roles and Responsibilities

Human resource needs have been identified to deliver on the identified functions in sections 5.2 in the short term, exploring needs for Option 1 (led by CCD) and Option 2 (led by MOE). To ensure delivery, clear goals and expected outcomes should be set out in employee performance contracts and assessed in employee appraisals. If consultants are used, tasks should be set out in a clear, phased manner, with payment issued for achievement of expected deliverables.

In the short term, CCD and MOE could consider embedded advisors or interns supported through climate finance. Recent university graduates could be contracted as MRV technical officers and trained in the short term on data management, GHG emissions reporting guidelines and methodologies, and emissions calculations. The embedded advisors/ interns would need to be provided with a desk and computer to ensure the data is retained by the CCD and to enable a working relationship with CCD officials, including the MRV Manager.

Ideally, if these embedded advisors/ interns deliver, they would be hired by the CCD. Alternatively, CCD could seek to retain these embedded advisors/ interns through on-going funding provided by the GEF for National Communications and Biennial Update Reports. Proven embedded experts/interns could be offered training on MRV including low carbon scenario assessment, development of projected baselines and assessment of mitigation options and actions.

Table 6: Energy MRV Human Resource Needs

<table>
<tr><th>Option 1 – CCD leads energy sector MRV

Climate change data collection, analysis and reporting in the energy sector is the responsibility of CCD, with data and information provided by MOE, Ministry of Petroleum and Mining, relevant parastatals and other entities</th><th>Option 2 – MOE leads energy sector MRV

Climate change data collection, analysis and reporting in the energy sector is the responsibility of the MOE, supported and guided by CCD. Data and information provided to MOE by Ministry of Petroleum and Mining, relevant parastatals and other entities</th></tr>
<tr><td colspan="2">Climate Change Secretary / Director, CCD
Options 1 and 2:
- Overall management of MRV+ system.
- Chair of the Steering Committee overseeing the MRV+ system.
- Approval and delivery of climate change reports for international reporting: GHG inventory, national communication and other transparency reports to the UNFCCC.
- Approval and delivery of climate change reports for domestic reporting: President, Parliament, County Assemblies and National Climate Change Council.</td></tr>
<tr><td colspan="2">MRV Manager, CCD
Full-time position that could be a re-casting/expanding of the role of the GHG Inventory Coordinator in the short term.
Options 1 and 2:
- Oversee and manage the MRV+ process, including establishing and managing the climate change data repository and management system.
- Work with relevant national public entities, including in the energy sector, to clarify data needs, build buy-in, request and collect data. Develop agreements, request information, and follow up to secure delivery of data and information from government partners, including MOE, Ministry of Petroleum and Mining, and affiliated parastatals.
- Establish relationships with non-governmental entities, including the Kenya Association of Manufactures and the Kenya Clean Cookstoves Association, to access information and data for energy MRV.
- Provide oversight of quality and comparability of information on GHG emissions, mitigation results and adaptation results achieved in each sector, including the energy sector.
- Review performance of and suggest continuous improvements of the MRV+ system, ensuring any activities relevant to the improvement of the MRV+ system are carried out.
- Manage and oversee the work of the MRV technology officer and the MRV data management officers.</td></tr>
<tr><td>Option 1 – In addition to the above tasks, the MRV+ Manager will:
- Produce and update the GHG inventory on a regular basis, including the energy sector.
- Develop and maintain the registry of climate change actions, including in the energy sector.
- Lead the development of national communications and transparency reports for the UNFCCC, with sections on the energy sector. Maintain familiarity with current international reporting obligations.
- Lead the development of reports to meet domestic reporting requirements, including the energy sector.</td><td>Option 2 – In addition to the above tasks, the MRV+ Manager will:
- Develop the GHG inventory through a compilation of sector reports and input, including from MOE and other actors in the energy sector.
- Input energy sector actions provided by MOE and other energy sector actors in the registry of climate change actions.
- Incorporate energy sector reports in the development of national communications and transparency reports for the UNFCCC. Maintain familiarity with current international reporting obligations.
- Incorporate energy sector reports in domestic reporting to the President and Parliament.</td></tr>
<tr><td>MRV Technology Officer, CCD
Part-time position – tasks potentially could be performed by a Ministry of Environment and Forestry technology officer, which would ensure compatibility with existing systems.</td><td>Option 2 – In addition to the tasks in option one, the MRV+ Manager will:
- Set up and maintain the climate change data repository and management system for the energy sector and related ICT tools in MOE for MRV in the energy sector.</td></tr>
</table>

<table>
<tr><th>Option 1 – CCD leads energy sector MRV
Climate change data collection, analysis and reporting in the energy sector is the responsibility of CCD, with data and information provided by MOE, Ministry of Petroleum and Mining, relevant parastatals and other entities</th><th>Option 2 – MOE leads energy sector MRV
Climate change data collection, analysis and reporting in the energy sector is the responsibility of the MOE, supported and guided by CCD. Data and information provided to MOE by Ministry of Petroleum and Mining, relevant parastatals and other entities</th></tr>
<tr><td>Option 1
- Set up and maintain the server, climate change data repository and management system for the energy sector, and related information and communications technology (ICT) and tools for the MRV+ system in CCD.
- Train users of the climate change data repository and management system for the energy sector.</td><td>- Train MOE and other energy sector users on the climate change data repository and management system for the energy sector.</td></tr>
<tr><td>MRV Data Management Officers, CCD
Option 1: 2 full-time positions
- Input and manage data provided by various national public entities, including MOE, Ministry of Petroleum and Mining and relevant parastatals.
- Undertake calculations of GHG emissions in the energy sector using IPCC methodologies.
- Develop the GHG inventory in the energy sector.
- Analyse data and information, including low carbon analysis of mitigation options and progress toward achievement of NDC, in the energy sector.
- Organise and analyse data on adaptation, including a review of progress on adaptation in the energy sector, and reports on progress for the national communication, Adaptation Communication, and progress toward the achievement of the adaptation NDC.
- Organize and analyse data on co-benefits/SDGs of mitigation actions in the energy sector.
- Organize and analyse data on climate finance in the energy sector.
- Disseminate energy sector analysis and final reports to relevant public entities, including MOE and Ministry of Petroleum and Mining.</td><td>MRV Data Management Officers, CCD
Option 2: 1 full-time position
- Compile input and manage data provided by MOE on behalf of various national public entities in the energy sector, including:
- Reports on energy sector GHG emissions and energy chapter for the GHG inventory.
- Reports on progress on mitigation including progress toward achievement of energy NDC and co-benefits.
- Reports on progress on adaptation in the energy sector, including analysis for the national communication and Adaptation Communication.
- Low carbon analysis of mitigation options, assessment of co-benefits, assessment of adaptation, climate finance support in the energy sector.
- Energy information for the climate registry.
- Disseminate final reports to relevant public entities, including MOE and Ministry of Petroleum and Mining.</td></tr>
<tr><td colspan="2">Energy MRV Manager, MOE Climate Change Unit
Part-time responsibility of MOE officer.
Options 1 and 2:
- Participate on MRV+ steering committee.
- Co-lead the Energy Inter-departmental Coordination Group.
- Manage the Energy Sector MRV Technical Officers.
- Approve and submit energy reports to the CCD.</td></tr>
<tr><td>Option 1 – In addition to the above tasks, the Energy MRV Manager will:
- Review MOE annual reporting on the integration of climate change functions in sector mandates.
- Review MOE information on sectoral GHG emissions provided to CCD.</td><td>Option 2 – In addition to the above tasks, the Energy MRV Manager will:
- Review reports on energy sector GHG emissions and energy chapter for the GHG inventory.
- Review reports on progress on energy mitigation options, including low-carbon analysis of mitigation options,</td></tr>
</table>

Option 1 – CCD leads energy sector MRV **Climate change data collection, analysis and reporting in the energy sector is the responsibility of CCD, with data and information provided by MOE, Ministry of Petroleum and Mining, relevant parastatals and other entities**	**Option 2 – MOE leads energy sector MRV** **Climate change data collection, analysis and reporting in the energy sector is the responsibility of the MOE, supported and guided by CCD. Data and information provided to MOE by Ministry of Petroleum and Mining, relevant parastatals and other entities**
- Review MOE reports on mitigation and adaptation in the energy sector, including progress toward achievement of NDC.	assessment of co-benefits, and analysis of progress toward the achievement of the NDC. - Review reports on progress on adaptation in the energy sector, including progress on the achievement of the adaptation NDC. - Review reports of climate finance support in the energy sector provided by CCD and the National Treasury and Ministry of Planning. - Review of energy information submitted to the climate registry. - Lead process to fill information gaps and improve quality of energy sector data and information.
Energy MRV Technical Officer**, **MOE Climate Change Unit *Option 1: Part-time responsibility of officer of MOE* - Participate as a member of the CCD-led Mitigation and Adaptation Technical Working Groups. - Collect MOE data and information required for the GHG inventory in the energy sector, and submit to CCD in the required reporting format. - Develop annual reports on the integration of climate change functions in the MOE mandate. - When requested, provide underlying data and information to CCD for calculation of GHG baseline projections, analysis of mitigation options and co-benefits, and analysis of adaptation options.	***Energy MRV Technical Officer**, **MOE Climate Change Unit*** *Option 2: 1 full-time position in MOE* - Participate as a member of the CCD-led Mitigation and Adaptation Technical Working Groups. - Manage the climate change data repository and management system for the energy sector. - Collect and manage energy sector data and information required for MRV in the energy sector. - Develop GHG inventory in the energy sector and submit to CCD. - Undertake low-carbon analysis of energy mitigation options, including baseline projections, assessment of impact of actions, assessment of co-benefits, and assessment of progress toward achievement of NDC, and submit to CCD as required. - Analyze and report on progress on adaptation actions, including progress on the achievement of the NDC, and submit to CCD as required. - Maintain a registry of climate actions in the energy sector and share with CCD. - Develop annual reports on the integration of climate change functions in the MOE mandates.

5.6 Financial Resource Considerations in Establishing MRV of Energy Actions

The MRV system for the energy sector will require funding for:

i. Human resources – including:

- Option 1:
  CCD – MRV Manager; MRV Technology Officer; 2 MRV Data Management Officers
  MOE – Energy MRV Manager (part-time); Energy MRV Technical Officer (part-time)

- Option 2:
  CCD – MRV Manager, MRV Technology Officer; 1 MRV Data Management Officer
  MOE – Energy MRV Manager (part-time); Energy MRV Technical Officer

ii. Capacity development for data management officers – GHG inventory, low-carbon analysis, adaptation M&E, database management, etc.

iii. Appropriate technology – server/hardware for the climate change data repository and management system and climate registry of projects, software, computers, etc.

iv. Appropriate office space and office supplies.

Increased funding allocations from the Ministry of Environment and Forestry budget are unlikely in the short term because of the significant amount of climate finance in Kenya that is earmarked for MRV, including the CBIT, LECRD, UNDP and GNIplus initiatives. CCD may consider revising the activities, expected outputs and expected outcomes of these climate finance-supported initiatives to better align with the MRV needs identified by CCD and MOE.

5.7 Key Considerations in the Determining the Institutional Structure for MRV in the Energy Sector

Taking a decision on an institutional structure for MRV in the energy sector requires consideration of mandates, technical capacity, cost effectiveness, funding. Some key considerations are discussed below of the two options are discussed below. The two options are:

i. CCD develops the energy sector climate change analysis and reports, based on data and information provided the relevant national public entities that hold energy data, including MOE.

ii. MOE develops the energy climate change analysis and reports, based on data and information provided by energy parastatals and the Ministry of Petroleum and Mining and affiliated parastatals, and supported by CCD.

Key considerations:

i. **Cost Effectiveness** – Is it cost effective to develop energy MRV capacity in two ministries in the short term?

ii. **Mandate** – Is the MOE in a position to take on responsibilities beyond those mandated in the Climate Change Act, which include annual reporting on actions to mainstream climate change and reporting on sectoral GHG emissions? The latter has initially focused on the provision of data and information about electricity supply for the GHG inventory.

iii. **Access to required information** – Is MOE able to access the needed information and data from relevant ministries, parastatals and other entities to effectively MRV climate action in the energy sector (e.g., energy balances of fossil fuels, end uses of fossil fuels)? MOE is not the "owner" of all required information to MRV energy climate change actions. CCD would have to set up agreements with the relevant public entities and then provide information to MOE.

iv. **Technical capacity/ Capacity development** – Does MOE have the technical capacities in-house to deliver on an expanded climate change MRV function? Is there commitment to allocate officer time to the MRV role or to create new staff positions? Will the CCD ensure that capacity development opportunities provided by international entities include MRV training for MOE officials?

v. **Funding** – Is MOE able to take on an expanded MRV role for which it has only a small budget and no committed year-to-year funding? Access to climate finance to support this MRV function could be limited because CCD has responsibility for MRV and would approach and coordinate with potential funders in this regard. Is CCD in a position and willing to allocate monies from climate finance initiatives to MOE for the MRV of climate action in the energy sector (such as funding for embedded advisors, required technology)?

Annex 1: Climate Change Act, 2016 – Sections related to MRV

- Section 3: Objective and Purpose
  - (i) mobilize and transparently manage public and other finances for climate change response
- Section 4: Guiding values and principles
  - (e) ensure integrity and transparency
- Section 8: Powers and duties of the Cabinet Secretary
  - (2)(a) formulate and periodically review the climate change policy, strategy and National Climate Change Action Plan and submit to the Council for approval.
  - (2)(e) report biannually to Parliament on the status of implementation of international and national obligations to response to climate change, and progress toward attainment of low carbon climate resilient development
- Section 9: Climate Change Directorate
  - (8)(b) establish and manage a national registry for appropriate mitigation actions by public and private entities
  - (8)(c) serve as the national knowledge and information management centre for collating, verifying, refining and disseminating knowledge and information on climate change
  - (8)(d) in collaboration with other agencies and the national and county government levels – (i) identify low carbon development strategies and coordinate related measurement, reporting and verification
  - (8)(e) coordinate adherence of the country's international obligations including associated reporting requirements
- Section 13: National Climate Change Action Plans
  - (3) The National Climate Change Action Plan shall prescribe measures and mechanisms - (m) to review levels and trends of greenhouse gas emissions
- Section 15: Climate change duties of public entities
  - (5) Each state department and national government public entity shall have the following duties – (b) report on sectoral greenhouse gas emissions for the national inventory; (d) regularly monitor and review the performance of the integrate climate change functions through sectoral mandates; (f) report annually to the Council on the status and progress of performance and implementation of all assigned climate change duties and functions.
  - (9) Upon receiving the reports from the State Departments, the Council shall undertake an evaluation on performance of climate change duties and functions.
- Section 16: Climate change duties of private entities
  - (2) The Council shall make regulations governing the nature and procedure for reporting on performance by private entities, including the authority to monitor and evaluate compliance
- Section 17: Monitoring compliance
  - (1)(a) monitor, investigate and report on whether public and private entities are in compliance with the assigned climate change duties
  - (1)(c) regulate, enforce and monitor compliance on levels of greenhouse gas emissions as set by the Council under this Act.

- Section 19: Mainstreaming climate change actions in County Government functions
  - (5) a county government shall at the end of every financial year, through the designated County Executive Committee Member, submit a report on progress of implementation of climate change actions to the County Assembly for review and debate, and a copy of this report will be forwarded to the Directorate for information purposes.
- Section 22: Reporting on climate change actions
  - The Cabinet Secretary shall make regulations to guide the reporting and verification of climate change actions.
- Section 24: Public participation
  - (4) the Council and the Directorate shall publish and publicize all important information within their mandate.
- Section 25: Financial provisions
  - (9) The Cabinet Secretary for the National Treasury shall, within one year of the Act coming into force, develop a strategy and make regulations setting out procedures and powers to identify sources of climate finance and monitor uses by various state, non-state and private sector actors, to enhance integrity and to eliminate corrupt practices.
- Section 34: Reports
  - (1) The Council shall, at least three months before the end of each financial year, prepare an annual report setting out –
    a) the financial statements of the Council;
    b) a description of the activities of the Council;
    c) the progress made towards implementation of the climate change action plans;
    d) whether the objectives of the action plans for the year under review were met and the manner in which those objectives were or were not met;
    e) the action taken by the national and county governments to address the impacts of climate change during that year;
    f) any further efforts which may be necessary to achieve the objectives of the action plans;
    g) recommendations on legal and administrative measures necessary for mitigating and adapting to the effects of climate change; and
    h) any further information relating to the functions of the Council.
  - (2) The Council shall submit a report prepared under sub-section (1) to the President, Parliament and the county assemblies and shall publish the Report in the *Gazette* and in such other manner as it considers appropriate.

Annex 2: National Climate Change Framework Policy – Sections related to MRV

The National Climate Change Framework Policy, approved by Parliament in 2018, includes guidance on climate change measurement, reporting and benefit measurement. The policy statements in Section 9.4 determine that the Government will:

i. Establish an integrated MRV framework for performance, outcomes and benefits of mitigation, adaptation and climate finance actions.

ii. Prioritize the use of existing MRV processes, data collection and information management systems to ensure efficiency in climate change related monitoring, reporting and benefit measurement.

iii. Prioritize the integration of climate change parameters, data and information required for MRV into the national statistical management system.

iv. Ensure that the national MRV system is transparently linked with national sustainable development planning, budgeting and monitoring systems.

v. Enhance awareness and build capacities of both national and county entities to participate in the MRV process and systems.

Annex 3: National Climate Finance Policy – Sections related to MRV

The Climate Finance Policy, 2018 provides information on the role of the National Treasury in monitoring and reporting on climate finance. The sections set out below define and provide guidance on this role.

Section 4.1 Legal and Regulatory Framework

Interventions:

e) Develop laws and regulations for tracking climate finance mobilisation and application, in line with guidelines to comply with reporting requirements of the Paris Agreement on financial, technology transfer capacity building support received by developing countries.

Section 4.5: Monitoring, Reporting and Verification Framework

The Government will establish a national Monitoring, Reporting and Verification (MRV) framework to provide a clear overview of domestic and international climate financial flows, trends, sources and purposes.

Interventions:

a) Develop a strategy and make regulations setting out procedures and powers to monitor financial, technology transfer, and capacity building support received to comply with the Paris Transparency Framework.

b) Develop a strategy to monitor and track uses of climate finance by various national, county, non-state and private sector actors, to enhance integrity and to eliminate corrupt practices.

c) With the support of the climate finance mechanism (Climate Change Fund), establish a climate finance tracking system, including development of required subsidiary legislation, taking into account international best practices and the Paris Transparency Framework requirements.

d) Prioritise and enhance the use of existing MRV processes, data collection and information management systems (such as the Integrated Financial Management Information System [IFMIS], National Integrated Monitoring and Evaluation System [NIMES] and Electronic Project Management Information System [E-ProMIS]) for completeness, transparency, comparability, accuracy and efficiency in regard to climate finance.

e) Integrate the climate finance tracking system with performance, outcomes and benefits sharing and reporting.

f) Ensure that the climate finance MRV system is transparently linked with national and county sustainable development planning, budgeting and monitoring systems.

g) Publish and disseminated update information on climate finance, and provide necessary inputs to international reporting obligations on climate finance.

Section 5: Governance

Section 5.1: Implementation

The National Treasury will lead and facilitate the implementation of this Policy. The National Treasury shall mobilise adequate resources for the successful implementation of the Policy and develop required laws and regulation.

Section 5.2: Institutions

a) The National Climate Change Council, established under the Climate Change Act, 2016 and chaired by the President, will guide the implementation of this Policy and receive at least bi-annual reports on the implementation of this Policy.

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