

Roadmap for data collection in the Eswatini energy sector

Initiative for Climate Action Transparency – ICAT

Roadmap for improved institutional arrangements and data collection procedures in the energy sector

Deliverable # 4

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Executive Summary

This report presents a roadmap for institutional arrangements for measurement, reporting, and verification of the energy and transport sector greenhouse gas (GHG) inventory. It is a component of the *“Technical support to increase the overall transparency capacity and set-up of sectoral MRV systems in the Kingdom of Eswatini,”* funded by the Initiative for Climate Action Transparency (ICAT) and the United Nations Office for Project Services (UNOPS), managed by the Government of Eswatini through the Ministry of Tourism and Environmental Affairs (MTEA).

The report is prepared by the Centre for Sustainable Energy Research (CSER) at the University of Eswatini supported technically by the Greenhouse Gas Management Institute (GHGMI). The specific objective of this report is to recommend required Institutional Arrangements (IA) that will ensure that MTEA develops a robust a robust national MRV system that would facilitate accurate reporting of GHG inventory from the energy and transport sector to both national and international stakeholders. Currently, the MRV system for climate change operates in a network with weak links: unclear institutional set up between relevant ministries and lack of legal instruments that enforce an easy follow and sharing of data.

The roadmap is a result of a number of consultative meetings and a workshop held with a number of stakeholders namely: Energy Department at the Ministry of Natural Resources and Energy, Road Transportation Department at the Ministry of Public Works and Transport, Central Statistics Office (CSO) and representative of Municipalities. The Roadmap draws a map of critical institutional arrangements, coordination mechanisms required for sustainable and continuous data collection processes and recommendations for filling of all gaps in the energy balance data that feeds into the GHG calculations. The roadmap also recognizes includes the Road Transportation Department as key stakeholder for Tier 2 GHG emission calculations in the transport sector. The roadmap recommends a decentralized MRV system of the GHG emissions whereby relevant department lead the sectoral inventories and MTEA focusing on coordination financial and technical support as well as leading the quality assurance process. The decentralized model has a number of benefits that include a shared ownership of the GHG inventory across a number of government departments and the active participation of stakeholders in the identification of national appropriate mitigation actions. This would improve the national GHG reduction target beyond the 5% to 14% reported to the UNFCCC under the revised NDC of October 2021.

The roadmap proposes a phased implementation plan. Short-term actions (2022 to 2023) that include the drafting of the institutional arrangements between MTEA and relevant departments leading the energy and transport sector. In this period, MTEA can also establish a MRV Coordinating Unit that will facilitate data sharing agreements and the distribution of technical and financial to the departments that will be compiling the sectoral GHG inventory. Medium-term actions (2023 to 2025) that include data collection and piloting the new MRV system. Lastly, long-term actions (beyond to 2025) that would include adjusting and improving the proposed MRV system.

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Abbreviations

CSO	Central Statistics Office
CBIT	Capacity Building Initiative for Transparency
CSER	Centre for Sustainable Energy Research
EEC	Eswatini Electricity Company
ESERA	Eswatini Energy Regulatory Authority
ERS	Eswatini Revenue Service
EIPA	Eswatini Investment Promotion Authority
GHG	Greenhouse Gas
GHGMI	Greenhouse Gas Management Institute
GoE	Government of Eswatini
ICAT	Initiative for Climate Action Transparency
IPCC	Intergovernmental Panel on Climate Change
MEPD	Ministry of Economic Planning and Development
MNRE	Ministry of Natural Resources and Energy
MF	Ministry of Finance
MoU	Memorandum of Understanding
MRV	Measurement, Reporting and Verification
MTEA	Ministry of Tourism and Environmental Affairs
MPWT	Ministry of Public Works and Transport
NDC	Nationally Determined Contributions
QA	Quality Assurance
QC	Quality Control
UNESWA	University of Eswatini
UNFCCC	United Nations Framework Convention on Climate Change
UNOPS	United Nations Office for Project Services

1 Introduction

The Government of Eswatini submitted its Intended Nationally Determined Contributions (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015 and ratified the Paris Agreement on 21st September 2016. On 12th October 2021, the country submitted a Revised NDCs to the UNFCCC with the ambition of adopting an economy-wide GHG emissions reduction target of 5% to 14% by 2030 compared to a baseline scenario translating to a reduction in GHG emissions of about 1 million tonnes. Energy is listed in Eswatini's updated NDC as the key contributor to its mitigation targets, most of which are expected from the transport component through fossil fuel combustion. This means there is a need of MRV system to quantify and mitigate GHG emissions in the energy sector's transport sub-sector. For the purpose of this project, the transport sub-sector of the energy sector will be referred to as a sector, as in government it is a sector in its own right.

1.1 Background of the ICAT project

This report presents a roadmap for contributing to a robust MRV system for GHG inventory compilation within the energy and transport sectors. It is a component of the **“Technical support to increase the overall transparency capacity and set-up of sectoral MRV systems in the Kingdom of Eswatini,”** funded by the Initiative for Climate Action Transparency (ICAT) and the United Nations Office for Project Services (UNOPS). It is managed by the Government of Eswatini by the Ministry of Tourism and Environmental Affairs (MTEA) through the Climate Change Unit (CCU) of the MTEA's Meteorological Department. The Centre for Sustainable Energy Research (CSER) is the implementing entity. The objectives of the ICAT Eswatini Project include the

- Mapping out the roles and responsibilities for the necessary institutional arrangements, as well as setting up a quality framework for data collection as part of the Energy Sector's institutional arrangements; and,
- Recommendation of necessary Memoranda of Understanding (MoU) between critical stakeholders.

The key outcomes of the ICAT project on MRV of GHG emissions inventories is to:

- Facilitate reporting and sharing of high quality and accurate data both to national and international stakeholders;
- Inform the national Climate Change Unit (CCU) under MTEA the priority area for capacity building and support; and,
- Mainstream NDCs monitoring and quantification in relevant ministries and departments responsible for the Eswatini priority sectors for mitigation and adaptation, namely, energy and transport, agriculture and land use, waste, and health and water sectors.

1.2 Determinants of a successful MRV system

A measurement, reporting, and verification (MRV) system is a framework where stakeholders at multiple levels of government interact to monitor the quality of GHG emissions inventory, gauge the effectiveness of mitigation actions, and the impact of climate action support. At national level, the MRV system on GHG emissions ensures credible GHG reports for the UNFCCC National Communications as well as to enable the country to assess mitigation potentials and thus enable policy maker to plan national appropriate mitigation actions.

There are three pillars to a robust and sustainable MRV system (Figure 1), namely:

- Institutional arrangements (IAs)
- Strong co-ordination mechanism
- Transparency

A successful MRV results in the development of

- National appropriate mitigation actions
- Accurate GHG inventory to help prioritize effective and cost-effective environmental policies.

1.2.1 Institutional Arrangements

Institutional Arrangements (IA) within the IPCC context consist of formal or informal institutional, legal and procedural agreements between the lead inventory agency, data management, quality assurance (QA) and quality control (QC) coordinators and data sources that enable continuous estimation, compilation and timely sharing of national GHG inventory reports. Institutional arrangements:

- Define the responsibilities between the partners: inventory agency, data managing agencies, and data collectors;
- Define how financial and technical support will be distributed amongst the stakeholders;
- Set the timelines for data flow from the source up to the entities responsible for GHG compilation and the submission of sectoral GHG inventories to the CCU for national and international reporting; and,
- Document all parties involved in the country MRV of GHG estimates, also identifying the lead persons each sector.

IAs are one of the supporting pillar for a robust and sustainable MRV system, however, they have to be developed based on the legal and policy frameworks. Data sharing agreements must comply with national data management laws.

1.2.2 Strong co-ordination mechanism

Good communication between collaborating institutions is one of the pillar of a successful MRV. The consistent flow of information between data providers, compilers and the national reporting entity improves trust amongst the parties leading to the continuous improvement of the MRV system. The co-ordination mechanism must include identification of required technical and/or financial support at each stage of the MRV system. Coordination and communication between role players: data providers, verifiers and GHG inventory compilers and reporters is usually facilitated through workshops and technical working groups.

1.2.3 Transparency

The third pillar of successful MRV system is openness about the data and methodology used to compile the GHG emission inventory. The responsible entity must preserve data and records of the methodology utilized with a clear identification of data uncertainties. This allows all key stakeholders to be involved in the quality assurance and quality control of the process at national and sectorial level. Transparency requires a good data management system, or dashboard that uses harmonised methodologies, and deliver data in a timely manner. Transparency is also facilitated with the establishment of technical working groups consisting of experts from all relevant government departments, private sector and national research institutions. Transparency also includes ensuring that national reports are accessible to the public to encourage peer review process.

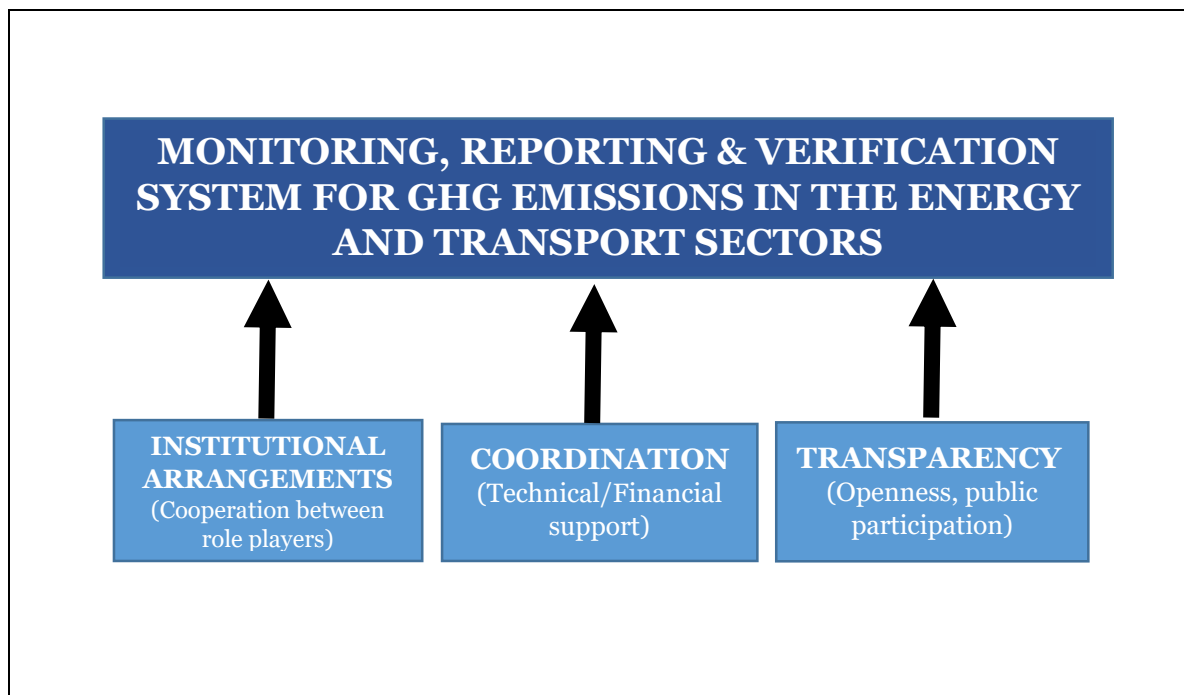


Figure 1: Pillars for a robust monitoring, reporting, and verification system.

1.3 Aim of the roadmap

The aim of this report is to advise the MTEA (Climate Change Unit, Meteorological Department) how best to organize the roles and responsibilities of all the relevant stakeholders that are involved in the estimation, monitoring and reporting of GHG from the transport and energy sectors. The stakeholders include Government departments, research institutions, and private companies.

2 Institutional Arrangements for the Sectoral MRVs of GHG emissions

2.1 Existing Institutional Arrangements

The current institutional arrangement for the GHG inventory for the energy and transport sub-sectors is based on informal working relationships between the MTEA and the Ministry of Natural Resources and Energy/MNRE (data provider). It is organized in what may be referred as a top-down or centralised model, where the inventory-reporting agency is involved in the calculation of the GHG estimates and the other stakeholders provide the relevant data. The current set-up involves three key players:

- a) **MTEA** - the national designated entity responsible for reporting the national GHG inventory to the UNFCCC. It is responsible for
 - Submitting and reporting the GHG inventory;
 - Archiving and reviewing previous inventories;
 - Checking the accuracy and uncertainties (QA) of the compiled inventory;

- Contracting a private consultant or experts to compile the GHG inventory from the data provided by the national energy balance (sourced from MNRE); and,
 - Requesting MNRE to provide data on activities within the energy sector
- b) **Private Consultants or Experts Working Group** – delegated by MTEA to compile the emissions/removal estimates from the energy sector using the national energy balance data, in the form of aggregated data provided by MNRE. Aggregation of data by MNRE makes it impossible to perform Tier 2 IPCC calculations for the transport sector.
- c) **MNRE** – is the data provider for national energy balance statistics. The national energy balance statistics are communicated annually (with a two-year delay to protect competitiveness of data providers) based on the energy production and consumption data which the MNRE collects from energy producers and consumers nationally.

The organizational structure of the current setup is depicted in Figure 2.

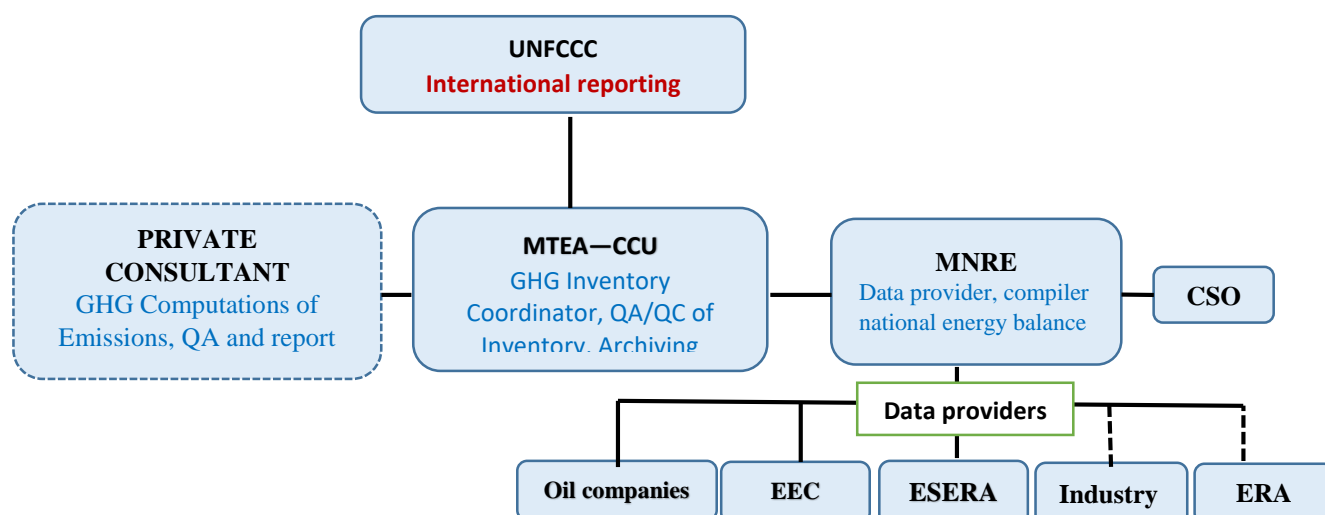


Figure 2: Current institutional arrangement structure of the GHG

There is need to decentralize the sectoral monitoring of GHG emissions inventory because the Tier 2 targets for transport require detailed information that is under the responsibility of various Government departments and units. The MTEA needs to continue with the coordination and archiving of GHG data and monitoring, if climate change financial and technical support is to reach all critical stakeholders. MTEA should also set timelines for activities.

2.2 Existing Institutional Arrangements in the Transport Sector

The transport sector in Eswatini includes road, rail and air for various sectors. The entire national fleet of vehicles is regulated by the Ministry of Public Works and Transport (MPWT). The Eswatini Revised NDC includes climate change mitigation in the transport sub-sector through the introduction of cleaner fuels (specifically, the use of 10% ethanol-blended petrol) and the promotion of the use of electric vehicles. Under the current arrangement, there is need for planning and monitoring of implementation of the NDC within the transport sector.

The Road Transportation Department (RTD), of the MPWT, is responsible for regulating road transportation in the country. It also works in collaboration with the Revenue Department in the Ministry of Finance (MOF). The

Revenue Department collects revenues from annual car licence renewals. The MOF also has extensive vehicle data which they collect during vehicle registration by its Central Motor Registry Department. This data can be enhanced during road license renewals where information on odometer readings, average passenger loads, and average load for freight vehicles can also be collected. The RTD capacity can be built to possess the technical resources for calculating Tier 2 GHG emissions using the Mileage Base Approach under the IPCC guidelines. The Department also has the capacity to monitor future NDCs under the transport sector that could include improvement of the efficiency of the public transport system, the introduction of park and ride facilities to ensure the use of mass transit systems, among other GHG emission reduction activities.

The existing arrangement under the transport sector is given in Table 1 below and it includes main the departments and parastatals under MPWT and MOF.

Table 1: Existing stakeholders within the transport sector and their responsibilities and institutional arrangements.

Transport sector stakeholder	Parent Ministry	Responsibilities
Eswatini Railway	MPWT	i) Policies relevant to railway ii) Maintains a 301 km rail network that is mainly used for cargo transportation of about 8 million tonnes per year.
Eswatini Civil Aviation Authority (ESWACAA)	MPWT	i) Operates the national airport and maintains aviation services ii) Regulates aviation activities in Eswatini
Royal Eswatini National Airways Corporation (RENAC)	MPWT	i) Maintains the national airline fleet
Eswatini Revenue Authority and Central Motor Registry	MF	i) Records vehicle information during registration ii) Collects vehicle licence renewal tax. iii) Updates annually the national vehicle registry via the re-issue vehicle tax slips .
Central Transport Organization (CTO) -parastatal [2013 Act]	MPWT	i) Procures and maintains Government vehicles ii) Provides fuel for Government vehicles
Roads Department	MPWT	i) Maintains the national road network. ii) Serves as custodian of the National Transport Policy
Road Transportation Department	MPWT	i) Vehicle Roadworthiness Testing and maintains the vehicle registration records ii) Regulates public transportation industry iii) Compiles road transport related statistics iv) Serves as custodian of Road Traffic Act (2007), Road Transportation Act (2007), and Road Safety Act (1983) v) Develops policies for the road transport sub-sectors: public and private transport)
Energy Department	MNRE	i) Responsible for petroleum fuel pricing ii) Responsible for compiling the national energy balance, including the production and consumption of liquid/gas fuels by the transport sector
Eswatini National Petroleum Company	MNRE	i) Carries out blending of fuel including of blending of unleaded petrol with ethanol ii) Secures the market and trade in petroleum products

The Road Transportation Department is key for leading the NDC unit within the road transport sector. It works with the Revenue Authority in the monitoring of the national vehicle fleet. The Department has shown keen

interest in the rolling out of an application (App) that would be used to digitize the annual vehicle licence renewal process. The App would also collect the annual kilometre travelled by the vehicles by recording the vehicle odometer readings annually. These data would be used to monitor transportation patterns of public and private vehicles, including vehicle technology details and vehicle loads. This would inform the Department about NDC priorities for the transport sector and as well as the GHG emissions from different road transport activities.

2.3 Two options for institutional arrangements within the energy and transport sector

The current institutional arrangement for compilation of GHG emissions for the energy and transport sectors is centralized within MTEA, as noted in the preceding section. Another viable option to the local context is a bottom-up institutional arrangement model that distributes the responsibilities for calculating GHG emissions to sectoral relevant ministries. This could enable sub-sectoral actors (e.g. vehicle owners, drivers, etc.) to be aware of their carbon footprints and also initiate efforts to manage them. A comparison of the current model and the second option is given in Table 2.

Table 2: Comparison of the existing institutional arrangement for the GHG inventory compilation with the Energy and transport sector with a more decentralized option.

Institutional arrangement option	Advantages	Disadvantages
A) Current model: Centralized roles within MTEA	<ul style="list-style-type: none"> MTEA controls timelines and budget of the inventory activities Builds more technical capacity to MTEA staff. Direct lines of communication between coordinators 	<ul style="list-style-type: none"> MTEA must employ technical staff or consultants Maintaining institutional memory is complicated with the use of private consultants. Less engagement with other relevant Ministries Inventory compilers rely on secondary data provided by relevant Ministries over whom MTEA lacks QC/QA oversight.
B) Proposed model: Distributed roles to relevant Ministries (i.e. MNRE for the energy sector and MPWT for the transport sector)	<ul style="list-style-type: none"> Leverages on technical staff support from MNRE and MPWT Provides potential economic to MTEA Provides shared ownership of GHG inventory leading to mutual beneficial relationship between ministries. Promotes easy flow of data, monitoring of sectoral components in Eswatini's NDCs Provides a robust MRV system in the sector Eases the burden for MTEA and allow the CCU to focus on MRV coordination and quality assurance process. 	<ul style="list-style-type: none"> Increased coordination among diverse partners adds complications. MTEA has less control over timelines and enforcement of calendars. Requires robust formal institutional arrangements to ensure that Ministries work in synch.

2.4 Proposed Institutional Arrangements

A robust MRV system for GHG emissions from the energy and transport sector requires a formalized institutional arrangement between MTEA, and the MNRE and MPWT, who are responsible for the energy and transport sectors in the country, respectively. Consultations held with the Energy and Road Transport Departments, during the development of this Roadmap, led to the endorsement of a centralized MRV system by both departments. This centralized MRV system would lead to each of these Departments establishing sub-sectoral units that would be responsible for GHG emissions for the energy and transport sector, respectively.

Participants at the stakeholder's meeting also submitted that the current updated NDC's targets of a 5 to 14% reduction of GHG emissions below business-as-usual projections by 2030 could be doubled under the proposed institutional arrangements. This is due to the fact that the transport sector has great mitigation potential, especially to improve the efficiency of the public transport sector. The quantification of GHG emissions using the Vehicle Mileage Approach would also provide the RTD with good data to develop relevant policies for a low carbon transport system. RTD also highlighted that national policies for testing road worthiness and the establishment of a park and ride system that could be established by municipalities could also assist the country to improve the achievement of its NDC GHG emission reduction targets.

The proposed MRV institutional arrangement that was endorsed in the stakeholder's workshop for the energy and transport sector is given in Figure 3. The organizational structure puts the MTEA at the centre of the MRV process, focusing primarily on coordination and quality assurance of GHG emission reports. MTEA is also responsible for establishing or leading three MRV support committees, namely, the Climate Change Steering Committee, GHG Emissions MRV Coordinating Committee, and sectoral MRV Technical Working Group (for the energy and transport sectors).

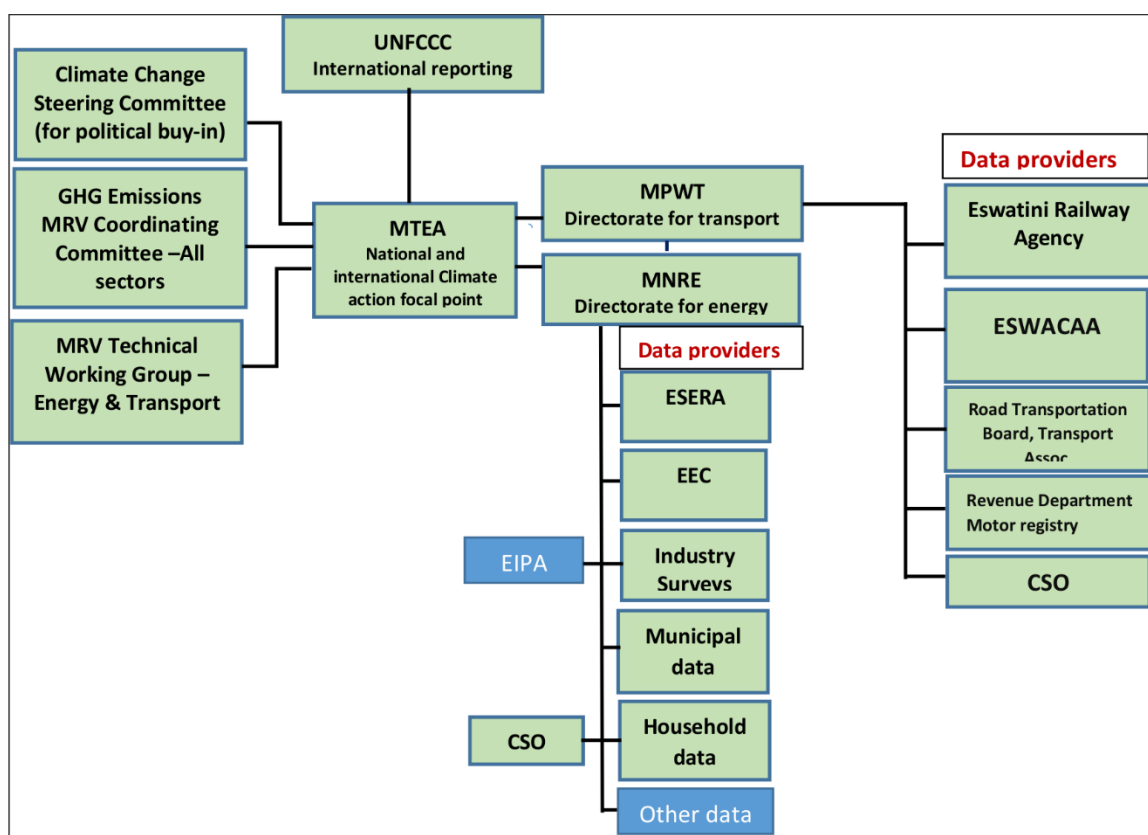


Figure 3: Proposed institutional arrangement for the energy and transport sector

In the endorsed MRV system, the MNRE would be responsible for data collection and compilation of the GHG emissions from the energy sector. The Energy Department already has a good working arrangement with data providers since it collects energy fuel production and consumption data to compile the national energy balance. It was noted in the stakeholder workshop that to improve data collection from the industrial and commercial sector the Department need to collaborate with the EIPA and Municipalities as they have the necessary legal framework to require data from industries within their jurisdiction. It was also pointed out that the collaboration with the municipal councils could reduce fatigue in the data provider since this will reduce the number of stakeholders requesting annual data.

For the transport sector, the GHG emission data will be collected and compiled by the MPWT with RTD leading the process. The Department will utilise the Mileage Based Approach under the IPCC guidelines. The data from the Transport sector could also be verified from the GHG emission for the sector based on the fuel consumption data that would be compiled by the Energy Department (MNRE).

2.5 Roles and Responsibilities

The proposed institutional arrangements indicated in the organizational chart, Figure 3, required the setting of clear boundaries for roles and responsibilities of MRV of GHG emission within the energy and transport sector. Table 3 below presents the summary of roles and responsibilities between MTEA and the two other relevant Ministries.

Table 3. Roles and responsibilities of the key stakeholders of the GHG inventory of the energy and transport sector.

Stakeholder	Role and Responsibilities
Climate Change Unit at MTEA	<ol style="list-style-type: none"> Establish the MRV Coordination Unit to: <ul style="list-style-type: none"> Oversee the GHG inventory across all sectors of NDCs Recommend technical and financial support to sectoral MRV system Compile and integrate all sectoral MRV reports for national and UNFCCC dissemination Recommend new national mitigation actions base on sectoral MRV reports Establish the MRV Technical Working Group (Energy and Transport) to: <ul style="list-style-type: none"> Verify sectoral GHG emissions calculations Recommend guidance on sectoral GHG inventory calculation methodologies Recommend improvements on sectoral data collection arrangements
Energy Department at MNRE	<ol style="list-style-type: none"> Establish an Energy Sector NDC unit to: <ul style="list-style-type: none"> Coordinate with CCU on energy sectors NDCs reports Compile the GHG inventory of energy sources Ensure that national energy balance data is adequate for GHG emissions calculations Document, store and safe keep GHG emission data Oversee sectoral MRV system budgets and technical support needs.
Road Transportation Department at MPWT	<ol style="list-style-type: none"> Establish a Transport Sector NDC unit to: <ul style="list-style-type: none"> Coordinate with CCU on the transport sector NDCs reports Compile the GHG inventory of road transport sector using the vehicle mileage approach Collect the vehicle kilometres travelled using the car license renewal application data that will be developed for the Revenue Department Calculate GHG impacts of transport sector policies Oversee sectoral MRV system budgets and technical support needs.
Central Statistics Office at Ministry of Economic Planning and	<p>The CSO is the designated office that manages national data and statistics and in the MRV system it must</p> <ul style="list-style-type: none"> oversee data collection and dissemination arrangements across all the MRV

Development (MEPD)	sector <ul style="list-style-type: none"> participate in the MRV Coordinating Committee
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3 Roadmap: MRV System Launch and Timelines

3.1 Timelines for the MRV setup

The roadmap proposes the following activities in timelines:

- **Short term actions (2022 to 2023):** This would include the drafting of the institutional arrangements between MTEA (Climate Change Unit) and MNRE (Energy Department), and between MTEA and MPWT on creating an App for car licence renewals and include the relevant information. Under the proposed decentralised MRV system, MTEA would focus more on quality assurance, coordination, and setting of reporting timelines.
- **Medium term actions (2023 to 2025):** This would include data collection under the improved arrangements and testing the efficiency of the MRV system. This should also include the development of a web-based GHG data collection system as well as dashboard for sectoral GHG emissions to promote national reporting and easy verification by the expert working committees.
- **Long term actions (beyond to 2025):** This would include adjusting and improving the MRV system. In this period the MRV system should be fully operational and the dashboard for annual GHG emissions including the energy and transport sector be readily accessible at national level for monitoring and evaluations.

3.2 Preliminary Actions for the MRV Set-up

To level the ground for the institutional arrangements that would support the MRV system in the energy and transport sectors, the following tasks must be carried out by MTEA (the lead agency for Eswatini Climate Action):

- Establish a budget-sharing arrangement with the relevant departments at MNRE and MPWT that would be responsible for compiling the energy and transport GHG inventory. This should include agreements on personnel support, where necessary.
- Provide technological support to the staff at relevant departments at MNRE and MPWT on GHG inventory compilations (including the use of inventory calculation tools). The responsible staff at the Department of Road Transportation at the MPWT would need to be trained on how to compile the GHG inventory Tier 2 or Tier 3 calculation using the vehicle mileage approach. The responsible staff at the Energy Department at MNRE would need to be trained on GHG inventory compilation using the Energy Balance data.

- c) Set-up MRV a technical working group (TWG) consisting of experts from the energy and transport sectors who are on the ground to steer the GHG emissions MRV system. The TWG should be coordinated by the Climate Change Coordinator at MTEA –CCU, including the provision of secretariat services. The composition of the technical group should include the following: Coordinator of Climate Change (Chair of the working group), Staff responsible for GHG inventory reporting (MTEA), Representatives of MNRE (Energy Department), Representatives of MPWT (Department of Road Transportation and Department of Roads), Representatives of National Research Centres (CSER at UNESWA), and Industry Representatives. The number of group members should not exceed 10 people.

4 Conclusions and way forward

This roadmap demonstrates that it is possible for Eswatini to establish robust MRV systems and the supporting institutional arrangements in the energy and transport sub-sectors without the need to prepare a new legal framework. The process would rely on the Statistics Act for national data sharing. However, there is a need for data-sharing agreements and new institutional arrangements between the MTEA and the sectoral departments for energy and transport located at the MNRE and MPWT, respectively. There is also need, in the short term, for MTEA to arrange the sharing of the finance that it receives for climate change reporting with the MNRE and the MPWT to enable these two ministries (their departments) to undertake the MRV of GHG inventory. The finance would support the necessary personnel and technological support that is proposed improved institutional arrangements.

The MRV Coordinating Committee or unit under the MTEA can perform the allocation financial budgets to priority sector. It is also recommended that the Climate Change Steering Committee formed by the Principal Secretaries of the relevant Ministries be established to provide the political support for the institutional arrangements. The road map also endorses a decentralized model for sector MRV systems which would require the establishment of sectoral MRV expert group to perform the quality control and quality assurance of the sectoral GHG inventories.

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