



Government of Ghana

Post-Compact Monitoring and Evaluation Plan

May 2022

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1. LIST OF ACRONYMS

AC	Air Conditioning
ADM/OMS	Advanced Distribution Management/Outage Management System
AE	Accountable Entity
BA	Beneficiary Analysis
BPA	Bui Power Authority
CED	Compact End Date
DCCN	Data Center and Communications Network
DQA	Data Quality Audit
DQR	Data Quality Review
DSM	Demand Side Management
DUR	Department of Urban Roads
EC	Energy Commission
ECG	Electricity Company of Ghana
EE	Energy Efficiency
EEDSM	Energy Efficiency and Demand Side Management
EFOT	ECG Financial and Operational Turnaround
EMOP	Electricity Market Oversight Panel
ERP	Enterprise Resource Planning
ERR	Economic Rate of Return
FASA	Financial Advisory and Services Agreement
GDP	Gross Domestic Product
GES	Ghana Education Service
GHG	Greenhouse Gas Emissions
GIS	Geographic Information System
GOG	Government of Ghana
GRA	Ghana Revenue Authority
GRIDCo	Ghana Grid Company
GSA	Ghana Standards Authority
GSS	Ghana Statistical Service
HPS	High Pressure Sodium
HVDS	High Voltage Distribution System
IEs	Implementing Entities
IFC	International Finance Corporation
IPP	Independent Power Producer
ITT	Indicator Tracking Table
KBTH	Korle-Bu Teaching Hospital
KII	Key Informant Interview
kV	Kilovolt
kWh	Kilowatt Hour
LCU	Loss Control Unit
LED	Light Emitting Diode
Lis	Legislative Instruments
LV	Low Voltage
M&E	Monitoring and Evaluation

MCA	Millennium Challenge Account
MCC	Millennium Challenge Corporation
MDA	Ministry, Department, Agency
M&EE	Market and Economic Enclave
MiDA	Millennium Development Authority
MIS	Management Information System
MMDA	Metropolitan, Municipal and District Assemblies
MMS	Meter Management System
MoE	Ministry of Education
MoEn	Ministry of Energy
MoH	Ministry of Health
MSMEs	Micro, Small and Medium Scale Enterprises
MWh	Megawatt Hour
NaCCA	National Council for Curriculum and Assessment
NDPC	National Development Planning Commission
NEDCo	Northern Electricity Distribution Company
NFOT	NEDCo Financial and Operational Turnaround
PEA	Political Economy Analysis
PMC	Project Management Consultant
POC	Point of Contact
PSP	Private Sector Participation
PURC	Public Utilities Regulatory Commission
R2RR	Race to Retrofit
RSCB	Regulatory Strengthening and Capacity Building
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SESC	Sustainable Energy Service Center
SLT	Special Load Tariff
SPPD	Strategic Planning and Policy Division
STEM	Science Technology Engineering and Mathematics
TBD	To be determined
TP	Tariff Plan
UG	University of Ghana
USG	United States Government
VRA	Volta River Authority

2. ACKNOWLEDGEMENT AND ACCEPTANCE OF PLAN

Acknowledgement and Acceptance of Ghana Post-Compact Monitoring and Evaluation Plan

The grant program funded under the Millennium Challenge Compact (Compact) signed on August 5th, 2014, between Ghana, acting through its government (Government) and the United States of America, acting through the Millennium Challenge Corporation (MCC) concluded on June 6, 2022.

Recognizing that the effects and benefits of the compact program will be long-ranging and the achievement of project objectives, which are expected to contribute to a reduction in poverty in Ghana, may not be measurable for several years after the Compact's expiration, the Government has agreed to cooperate with MCC to monitor the results and evaluate progress toward meeting the project objectives after the Compact's expiration. To this end, in consultation with MCC, the Millennium Development Authority (MiDA), the entity designated by the Government to oversee the compact program, developed this Post-Compact Monitoring and Evaluation (M&E) Plan which describes future monitoring and evaluation activities, identifies the individuals and organizations that will undertake these activities, and provides a budget framework for the resources that will be needed to fully implement this Plan.

Accordingly, the undersigned, on behalf of the Government, acknowledges and accepts the terms and provisions set forth in this Post-Compact M&E Plan, and agrees the Government will undertake the activities described herein and provide any resources necessary to support such activities.

Signed, this [21] day of [MAY], 2022.



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3. COMPACT AND OBJECTIVE OVERVIEW

3.1 Introduction and Background

This Post-Compact Monitoring and Evaluation (M&E) Plan serves as a guide for MCC and the GoG designated representative for Post-Compact M&E, preferably the National Development Planning Commission (NDPC). The Post-Compact M&E Plan picks up where the final version of the Ghana Power Compact M&E Plan left off, with updates to the evaluation plan and new roles and responsibilities for Post-Compact M&E activities. The plan will be jointly managed by the GoG designated entity and MCC.

This Post-Compact M&E Plan is a management tool that provides the following functions:

- *Describes Post-Compact Evaluation activities*, and provides a budget framework for Post-Compact M&E which draws on both MCC and country resources, and
- *Documents the role the GoG will play* in results dissemination.

The Post-Compact M&E Plan may be modified or amended, as necessary, only with the agreement of both GoG and MCC.

3.2 Problem Analysis: The Power Constraint in Ghana’s Economy

The Ghana Power Sector

The institutions operating in Ghana’s power sector and their respective functions are summarized in the table below. With the exception of Enclave Power and the IPPs, all the companies in the electricity value chain are state-owned.

Ghana Power Sector Institutions and their Functions

Institution	Function
Ministry of Energy (MoEn)	Energy policy formulation
Energy Commission (EC)	Energy policy advisory, planning, technical regulation and monitoring
Public Utilities Regulatory Commission (PURC)	Examine and approve utility rates; protect interests of consumers and utility service providers; provide guidelines for development of rates in the provision of utility services; monitor and enforce standards of performance for provision of utility services; and promote fair competition.
Volta River Authority (VRA)	Electricity generation
Bui Power Authority (BPA)	Electricity generation
Ghana Grid Company (GRIDCo)	Electricity transmission
Electricity Company of Ghana (ECG)	Electricity distribution in Southern Ghana, except for the brief period March-September 2019 (during which time PDS took over the operations under a Concession Agreement) when it operated as an asset-holding company.
Northern Electricity Distribution Company (NEDCo)	Electricity distribution in Northern Ghana
Enclave Power	Electricity distribution to the Free Zones Enclave in Ghana
Independent Power Producers (IPPs)	Electricity Generation

Power as a Constraint

Ghana was selected as eligible to develop a second MCC compact prior to completion of the first Compact. At roughly the same time it was named eligible to develop this Compact, Ghana was also named one of four countries to participate in the pilot for the Partnership for Growth (“Partnership for Growth”), an initiative intended to create the next generation of emerging markets through better coordinated and strategically focused United States Government (“USG”) programs and resources. Based on an analysis of the obstacles to economic growth (“Constraints Analysis”), conducted jointly by the Government of Ghana (GOG) and the USG, three key

constraints to economic growth were identified: insufficient and unreliable power, lack of access to credit, and insecure land use rights. The Government selected the power sector as the area of focus for its proposed second compact while the Partnership for Growth program in Ghana focuses on the power and credit sectors.

In 2012, the Ministry of Energy estimated that Ghana needed to make a total of \$4.7 billion¹ of investments to catch up and/or upgrade the existing power infrastructure. Of this amount, \$200-280 million of investment in generation was required annually to cater for load increases².

However, investment in infrastructure alone will not produce the desired improvement in reliability of electricity supply, without measures to increase the operational efficiency of the operating entities in the power sector, in particular ECG, to increase the creditworthiness of these entities, and thereby attract private capital to the power sector. Using Compact funds to address only the capital and equipment shortfalls of the public sector operators will provide limited opportunities for private sector development and participation in the power sector. However, using the Compact funds to undertake the necessary reforms and interventions that would result in opening up the power sector and making it attractive to private capital and investments will have longer-term impact in providing investment opportunities for private capital and investors. Clearly, the limited availability of public sector capital for infrastructure development necessitates the adoption of strategies that will attract private capital by leveraging public capital, and creating a conducive environment for private capital to flourish (*Source: MCA-Ghana Concept Paper (Project 1) submitted to MCC*).

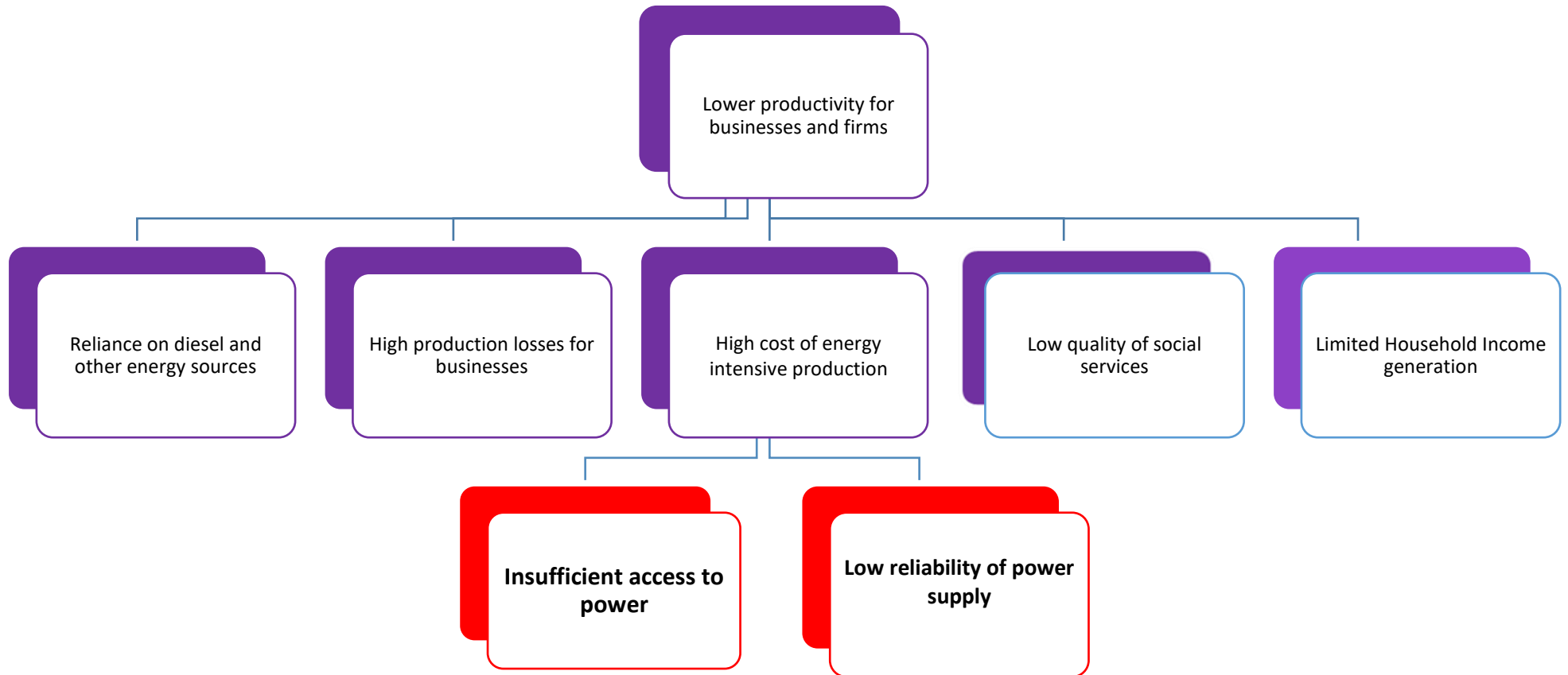
The Structure of the Power Problem Tree

The part of the problem tree that identifies power-related issues accounting for lower productivity for businesses and firms is shown in the figure below, which is a subset of the trees developed in March 2012. The full problem tree is in the Annex.

¹ Presentation on ‘Investment Opportunities in the Power Sector’, Ghana Ministry of Energy, January 2012 (reported in the MCA-Ghana Concept Paper (Project 1) submitted to MCC)

² Based on GRIDCo 10-year load forecasts 2011-2021 and Industry Estimates for Costs of Generation (reported in the MCA-Ghana Concept Paper (Project 1) submitted to MCC)

Ghana Power Compact Problem Tree



The Millennium Challenge Account Compact II: The Ghana Power Sector Problem Tree

Low reliability of power and insufficient access to power have been identified as the problems facing the Ghana power sector. The causes of each of these two problems are:

1. Low reliability of power
 - a. Governance and regulatory framework does not meet the needs of all stakeholders
 - b. Insufficient power supply to meet economic demand
 - c. Transmission capacity is constrained
 - d. Distribution system is constrained and inefficient
2. Insufficient access to power
 - a. Electrification in rural areas affects balance sheets of Distribution companies negatively
 - b. Limited government and private investment in rural electrification
 - c. High cost compared to benefits of rural electrification
 - d. High costs for off-grid options

The Power Sector Problem Tree was developed by the Ghana Power Compact Development Core Team in consultation with Focal Persons from the power sector agencies, technical advisors, and MCC counterparts. There were also consultations with potential investors, key consumers and the general public.

To make a sustainable impact on reliability and adequacy of electricity supply in Ghana, Compact II sought to solve the problems that have discouraged private development of generation capacity, as well as address the concerns of the power sector agencies and utilities.

The key problems in the area of Governance and Regulation that were identified at the time of developing the Compact are:

- Need for an effective Sector-Specific Legal Framework for IPPs;
- Need for a Full Cost Recovery Tariff;
- Need for increased Transparency of Tariff-Setting Process;
- Absence of Gas Pricing and Allocation Policies and Regulations;
- Distribution Companies not considered Creditworthy Off-Takers;
- Wholesale Pricing;
- Independence of the Regulatory Bodies;
- Shortfalls in Regulatory Capacities; and
- Insufficient momentum behind the Sector Reform Process.

It is worthy of note that some progress was made in relation to the identified problems, in particular:

- Need for an effective Sector-Specific Legal Framework for IPPs; and
- Absence of Gas Pricing and Allocation Policies and Regulations. These policies and regulations were finalized in August 2016.

At the inception of the Compact, adequate and reliable power generation capacity was identified as key in expanding the Ghanaian economy through industrialization and infrastructure development. Addressing the root causes of the inadequate investment in Ghana's power generation was expected to serve as the catalyst for a sustainable economic and social transformation. In the course of compact implementation, other interventions outside the Ghana Power Compact Program have resulted in the country achieving sufficient installed generation

capacity. However, there is the need to maintain adequate dependable capacity. Ghana currently has over 4,000 MW of installed generation capacity, and the maximum peak demand in 2018 was 2,525 MW³.

3.3 Program Logic

3.3.1 Compact Background

On August 5th, 2014, the Millennium Challenge Corporation (MCC), a Federal Corporation created under Title VI of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 2004 and acting on behalf of the United States Government (USG), signed a Compact with the Government of Ghana (GOG) worth US\$535,565,000 (with the Governments of the United States of America and Ghana contributing US\$498,200,000 and US\$37,365,000 respectively) to reduce poverty in Ghana through sustainable economic growth⁴. The Ghana Compact, which entered into force in September 2016, was implemented over a period of five years and nine months, and concluded in June 2022⁵. The Government of Ghana established an agency by an Act of Parliamentary (Act 702, Act 709 & 897 as amended), identified as the Millennium Development Authority (MiDA), to serve as the Accountable Entity (AE) for the implementation of Compact I and subsequently Compact II.

3.3.2 Compact Logic

The Compact-level logic model below illustrates how the Compact Program, Projects and Activities will contribute to the Compact Goal, the Program Objectives, and Project Objectives.

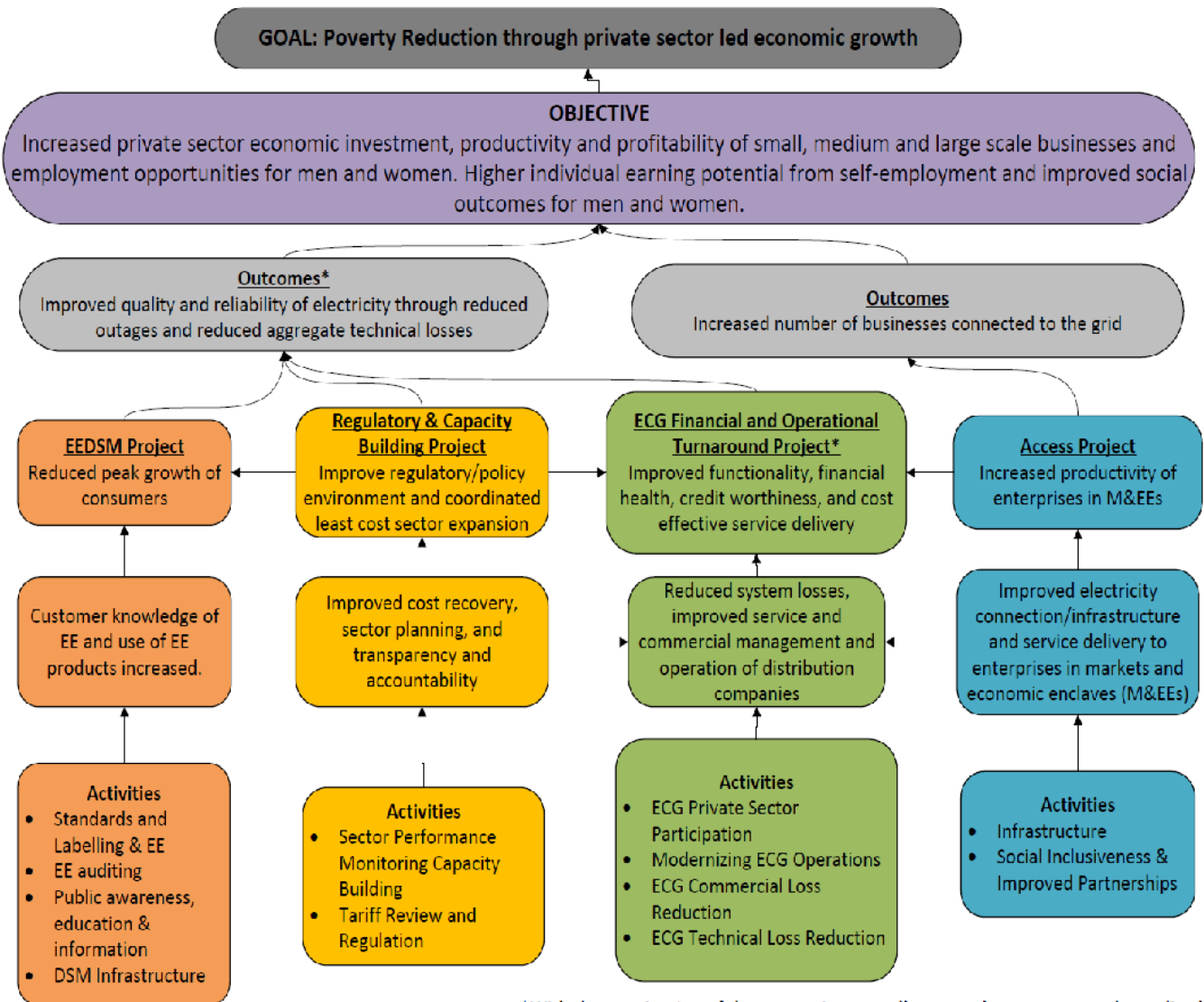
The Program Objectives were to: (i) increase private sector investment and the productivity and profitability of micro, small, medium and large-scale businesses; (ii) increase employment opportunities for men and women; (iii) raise earning potential from self-employment; and (iv) improve social outcomes for men and women. Prior to the achievement of these high-level objectives, it was envisaged that a set of hierarchically lower level, but interrelated outcomes of power distribution, access and demand-side management would be achieved. The outcomes that were expected to trigger (cause) the aforementioned program objectives (effects) include (a) increased availability and reliability of power, and (b) reduced hidden costs and increased (re)investment and expansion in the power sector.

³ Energy Commission (2019). Electricity Supply Plan for the Ghana Power System.

⁴ Please refer to the Compact Document for a detailed description.

⁵ Under the Consolidated Appropriations Act of 2021 (H.R. 133), Congress authorized MCC to extend any compact in effect as of January 29, 2020, for up to one additional year beyond the normal five-year compact term, to account for delays related to COVID-19. Therefore, in June 2021, MCC extended the Ghana Compact implementation period by 9 months, through June 6, 2022.

Overall Program Logic



*With the termination of the concession, not all expected outcomes may be realized

3.3.3 Project Descriptions and Logic

The overall program logic illustrated above is complemented by lower-level logic models at the Project, and/or Activity levels (as necessary) depending on Compact design and implementation. All logic models clearly summarize the outputs, outcomes, and goal expected to result from the Compact. A description of the objectives of each Project is included below.

The project description and the project-specific logic models, each illustrating its theory of change with the underlying assumptions and risks, are presented below. The logic diagrams are included as annexes to the M&E Plan.

ECG Financial and Operational Turnaround (EFOT) Project Description and Logic

Summary of Project and Activities

The *ECG Financial and Operational Turnaround (EFOT) Project's* objective was to improve the quality and reliability of electricity through reduced outages and cost-effective service delivery by ECG, reduce aggregate technical, commercial and collections losses, and ensure ECG can serve as a creditworthy and credible off-taker under power purchase agreements. The Project Objective was to be achieved by reducing implicit subsidies (created by losses, underpricing and under-billing) and ensuring cost-recovery and re-investment in the distribution sub-sector, through introduction of PSP in the governance and management of ECG, and through infrastructure and foundational investments designed to reduce losses and improve service quality. There were five Activities under the Project.

Private Sector Participation Activity: This Activity was to provide support for the design and execution of an Acceptable ECG PSP Transaction. Funding for this Activity was intended to cover the following interventions:

- Transaction Advisory services to, among others, advise the Government on the design and implementation of an international tender to select an Acceptable ECG PSP Provider, supporting the Government until Financial Close;
- Assistance with communications strategy, outreach, and consultation to gain support of stakeholders;
- Consultation with management and employees of ECG to gain support for PSP, and;
- Consultancy to design the Institutional set-up for the Acceptable ECG PSP Transaction.

MiDA executed the Financial Advisory Services Agreement (FASA) with the International Finance Corporation (IFC) in June 2015. Through the FASA, IFC supported MiDA to procure the services of a private sector entity to operate, maintain, and invest in the electric distribution assets of the Electricity Company of Ghana (ECG) through a twenty (20) year Concession Agreement. In March 2019, the concession went into effect. In October 2019, however, the Government of Ghana and ECG terminated the Concession Agreements, and so the intended deliverable of a viable PSP arrangement was not sustained.

Modernizing Utility Operations Activity: The original objective of this Activity was to introduce modern tools to ECG, build the capacity of ECG's Staff to use the tools, and provide a robust communication network for ECG. Specific planned interventions included:

- Installation of a Geographic Information System (GIS) based distribution management system, grid digitization, and customer census to record and store basic data;
- Installation of an Enterprise Resource Planning (ERP) system and integration with existing enterprise applications for the purpose of facilitating the flow of information between business functions within ECG and managing connections to external stakeholders;
- Provision of technical assistance to strengthen Project implementation through the hiring of qualified advisors as well as technical assistance to ECG;
- Upgrade of Data Center and Communications Network (DCCN) to assist ECG in creating a data center of current industry standards and with the capability of hosting ECG's existing and planned IT systems and business processes;
- Loss characterization study to distinguish between technical and commercial losses in the ECG Target Regions;
- Technical assistance for tariff applications to provide ECG with the support and training needed to develop a rate case filing complaint with the Tariff Plan (TP);
- Institutionalizing gender responsiveness to support gender auditing, development of a gender policy at ECG and support activities for strengthening Institutional capacity of ECG to implement a gender policy and enhance the capacity of female employee associations through knowledge sharing, networking, and the development of internships and mentoring to university students in science and technology, particularly women; and
- Assistance to the ECG Training Center in Tema in the form of provision of training tools and development/updating of course curricula.

Following the termination of the PSP contract, MiDA no longer implemented some of the Sub-Activities originally planned under this Activity. Below are the affected Sub-Activities along with the reasons for dropping them out of the scope.

- a) *ERP and DCCN:* Was removed from the scope following the de-obligation of the Tranche II Funds.
- b) *Loss Characterization Study:* MiDA decided to use the results of ECG's Loss Characterization Study and so the activity was no longer necessary.
- c) *Tariff Methodology:* The Tariff Methodology was not approved until the ECG Concession Agreements were executed, eliminating the need for ECG to file a rate case compliant with the Tariff Plan.
- d) *ECG Training Center in Tema:* ECG decided to commercialize the Training Center, prompting MiDA to withdraw the funds earmarked for the activity.

Reduction in Commercial Losses and Improvement of Revenue Collection Rates Activity: The Commercial Losses and Improvement of Revenue Collection Rates Activity (also referred to as the Reduction in Commercial Losses Activity) were to address commercial and collection losses. Specific interventions to address commercial losses included:

- Creation of service connection standards and normalization of existing services to update existing standards with a new design; train ECG personnel to enforce the new standards; and repair and upgrade non-conforming services.

- Strengthening the loss control program by providing the loss control units (LCUs) at ECG with the means (training, tools, and equipment) to more effectively reduce commercial losses.
- Installation of automated meter readers at special load tariff service locations and on selected non-special load tariff service locations in the ECG Target Regions as well as installation of metering at critical nodes of the distribution system in the ECG Target Regions to provide ECG with the ability to identify and monitor where technical and commercial losses are occurring.
- Replacement of legacy credit meters with pre-payment meters in the ECG Target Regions to improve collection efficiency and timely closing of monthly financial statements.

MiDA no longer implemented some of the Sub-Activities originally planned under this Activity. The de-scoped Sub-Activities are Normalization of Service Connection Standards, Installation of Automated Meter Readers at Special Load Tariff (SLT) service locations and on selected non-SLT service locations, Installation of Metering at Regional and District Boundaries, as well as installation of metering at critical nodes of the distribution system in the ECG Target Regions and Replacement of Legacy Meters with Pre-paid Meters.

The reasons for the partial de-scoping of the Activity are threefold:

- a) ECG secured US\$60 million World Bank Funding soon after the Compact was signed to improve its Commercial Losses and Revenue Collection operations. Most of this funding was allocated to programs similar to those planned under the Compact. MiDA and ECG therefore agreed that MiDA should drop some of the planned Sub-Activities.
- b) ECG in 2017 wrote to MiDA to request that MiDA use part of the budget for Replacement of Legacy Meters to implement a Meter Management System (MMS) to integrate the seventeen different prepaid metering systems in ECG at the time. The MMS will transfer control of revenue management from prepaid system vendors to ECG, improve reliability of pre-paid vending, and give customers greater convenience and better experience with prepayment metering.
- c) MiDA and MCC agreed to drop a number of the planned sub-Activities as a result of the de-obligation of Tranche II funding

Technical Loss Reduction Activity: The interventions under this Activity were to result in lowering thermal losses for the primary and secondary distribution systems in the ECG Target Regions. Specific interventions included:

- Updated distribution design and construction standards based upon currently accepted best practices to ensure compliance with international best practice for low loss and economical designs.
- Low voltage bifurcation and network improvements to reduce the length of the low voltage circuits to ensure they do not exceed a length that affects the quality of service and a technical loss threshold.
- Introduction of reactive power compensation for primary substations to optimize power levels at 33/11 kV substations.
- Installation of bulk supply points with feeders to existing primary substations to ease overloading based on the current demand forecast and to avoid rolling brownouts.
- Installation of primary substations with interconnecting sub-transmission links and medium voltage offloading circuits to help reduce technical losses and avoid extended outages caused by failures or maximum capacity reached at geographically adjacent substations.

Following the termination of the PSP contract and the de-obligation of Tranche II Funding, MiDA either dropped or scaled down some of the Sub-Activities originally planned under this Activity. Below are the affected Sub-Activities.

- The planned introduction of reactive power compensation for primary substations to optimize power levels at 33/11 kV substations Activity was dropped.
- Of the eight (8) Primary Substations and associated Interconnecting sub-transmission circuits and medium voltage offloading circuits that were planned (i.e. Kotobabi, Korle Gonno, Kanda, University of Ghana Medical Centre-Legon, Oyarifa, Katamanso, Dunkonah and Anyaa), only two (University of Ghana Medical Centre-Legon and Kanda) are being executed.

Outage Reduction Activity: The Outage Reduction Activity was to improve service and increase sales. The planned interventions under this Activity included:

- Installation of outage management system to identify outage locations and causes and serve to reduce outage frequencies and durations.
- Sectionalizing study of ECG Target Regions and automation of medium voltage networks and system control and data acquisition expansion to locate sectionalizing devices in the 11 kV network to reduce the geographic area affected by outages.
- Provision of specialized vehicles, tools, and equipment required for fault clearance and restoration of outages in the ECG Target Regions.

The only sub-activities carried out and completed under this activity were the consultancy contract for the Definition, Procurement and Supervision of the Implementation of an Outage Management System/Advanced Distribution Management System (ADMS/OMS) for the Electricity Company of Ghana (ECG), and the provision of specialized vehicles, tools, and equipment required for fault clearance and restoration of outages in the ECG Target Regions. Other planned sub-activities under the consultancy contract for the OMS could not be carried out following the termination and closure of the contract in November 2019 due to the de-obligation of Tranche II Compact Funds.

Project Logic

Unreliable power had been a major constraint to growth of businesses in Ghana. To effectively support the growth requirements of the economy, key challenges in the distribution of power needed to be addressed. ECG, the leading Distribution Company in Ghana, did not run on a commercial basis and incurred high technical and commercial losses, which deterred private investment, led to low quality of service and high cost of electricity service provision.

The EFOT Project was designed to deliver short-, medium-, and long-term goals. In the short term, the Project was to improve the financial sustainability of ECG by reducing commercial losses, improving billing and collection, ensuring cost reflective tariffs, regular automatic adjustment of tariffs and improving financial management generally within ECG. Ghanaians were expected to experience improvements in the quality of Power under EFOT through the reduction of unplanned outages and distribution technical losses resulting in an improved voltage profile. Similarly, the operational management of ECG was to be transformed by improving outage response time, reducing cost per kWh of electricity generation and reinvestment and maintenance in capital

expenditure. Consequently, ECG was to regain the ability to adhere to commercially agreed time limits for payments of power purchase bills to IPPs. However, vital institutional capacity building activities must complement the PSP option to achieve planned improvements in short term outcomes. Also, sufficient infrastructure investments including private sector participant contributions were needed to achieve loss reduction targets within ECG.

The medium-term outcomes included improving the financial viability of ECG, positioning ECG as a credible off-taker, improving satisfaction among ECG customers and enhanced investment capacity within ECG, resulting in sustainable service delivery. Customers’ reliance on diesel and petrol generators was to be reduced resulting in the increase in electricity consumption. To achieve the above it was critical that the Generation and sector-wide master plan was implemented and key policy and regulations from the Compact were sustainably implemented, ECG’s credit guarantee provided assurance to power producers of the Company’s worthiness and customers observed improvements in outage response time and frequency of load shedding.

In the long term, among outcomes, Ghanaian businesses were to experience an increase in investment coupled with the ability to churn out value added products and reduce sales losses, which will invariably lead to increased wage employment. It was also expected that, all things being equal, household expenditure on energy will decrease. It must be noted that achievement of results under the EFOT Project depended on coordinated actions from all other Compact program components, including sector expansion to meet demand. Deterioration in conditions under which businesses operate in Ghana (inflation, interest rates and credit availability, exchange rates) and other factors outside of Compact scope may impact the likelihood of investment and deter private sector investment in the Power sector.

The key assumptions and risks that underlie the accomplishment of the theory of change are summarized in the table below. These assumptions and risks were external to the Program.⁶

Summary of Key Assumptions and Risks: ECG Financial and Operational Turnaround Project

Project	Assumptions	Risks
ECG Financial and Operational Turnaround Project:	<ul style="list-style-type: none"> ● Sector Government reforms achieved ● Customer ability to pay ● Payment of bills by GOG ● Availability of credit ● Customer willingness to pay ● Impact can be seen on national level hidden costs ● Availability of skilled labor 	<ul style="list-style-type: none"> ● Tampering and vandalism of ECG assets ● Increased load shedding ● ECG staff resistance to change ● Political interventions in sector ● Consumer resistance to tariff increases

In October 2019, in response to the Government of Ghana’s decision to terminate the concession agreement between the Electricity Company of Ghana Ltd (ECG) and private operator Power

⁶ The M&E Team documented the trends in risk factors for each Project and how their potential impact on the anticipated results. An assumption and risk status tracking table was developed to help track and explain how these exogenous factors are impacting on Compact results, especially where deviations from the performance targets exceed the ±10 percent deviation from indicator target.

Distribution Services Ghana Ltd (PDS), MCC de-obligated \$190,000,000 of Compact funding, due to the Government's failure to adhere to its responsibilities under the Compact as outlined in Sections 8.1 and 8.2 of the Compact document. Therefore, several interventions and infrastructure components described in the activities above were subsequently de-scoped, including investments in an ERP, removal of six (of eight originally planned) distribution substations, and reductions in the scope of GIS-based mapping of the distribution network and customer database. In addition, the Outage Reduction Activity was de-scoped in its entirety. Under the remaining \$316 million Compact funds, the EFOT Project supported the construction of two new Bulk Supply Points (including interconnecting circuits), two primary substations and related interconnecting circuits, and line bifurcation and network upgrades in six districts in Accra. Additionally, under the Modernizing Utility Operations Activity, the project supported GIS mapping on a more limited basis, as well as technical assistance to ECG (including updating design and construction standards for the utility), and gender responsiveness. Under the Commercial Loss Reduction Activity, funding was used to invest in the Meter Management System (MMS) – the platform for prepayment meters and vending system and creating/supporting a Loss Control Unit within ECG. Due to the reductions in overall scope of the EFOT Project, not all medium and long-term outcomes may be fully realized.

Regulatory Strengthening and Capacity Building (RSCB) Project Description and Logic

Summary of Project and Activities

The *Regulatory Strengthening and Capacity Building Projects* aimed at ensuring the sustainability of all power sector investments, promoting greater transparency and accountability for results in the sector, and enhancing evidence-based decision making among sector institutions. The project therefore sought to make the power sector more financially self-sustaining and less reliant on cross-subsidies among tariff categories or other direct or implicit subsidies from the Government. The Project was designed to support the creation of an enabling environment for private investment in the power sector. To achieve its objective, the project focused on strengthening independent monitoring of service quality, and improving capacity for ratemaking and other regulatory processes, including the review and restructuring of tariffs to enable the utilities to recover costs.

The Regulatory Strengthening and Capacity Building Project consisted of two Activities – capacity building of the sector performance monitoring capabilities to ensure better reporting and tariff review, focused on the process of ratemaking and the structure of tariffs.

The *Sector Performance Monitoring Capacity Building Activity* supported the Ministry of Energy (MoEn), National Development Planning Commission (NDPC), Public Utilities Regulatory Commission (PURC), and Energy Commission (EC) to monitor performance and ensure service quality through regulatory monitoring and independent verification.

Specific intervention included:

- Capacity and needs assessments with regards to data quality, monitoring systems (data collection, analysis, reporting, quality control, and communications) on key performance metrics identified for the Compact and Partnership for Growth and listed in the Electricity Supply and Distribution (Technical and Operational) Rules (L.I. 1816, 2005).
- Technical assistance in developing and implementing monitoring and reporting systems, including the development or improvement of MIS systems for MoEn.
- Provision and training for EC and PURC staff on equipment and processes for proper independent monitoring and verification, including benchmarking and developing more

realistic performance targets for licensed and regulated entities, either government-owned or privately-owned.

- Data quality audits and training in proper monitoring practices for sector stakeholders, including NDPC.
- Support for the publication and analysis of performance data for the sector, including NDPC, in order to enhance transparency.

The *Tariff Review and Regulation Activity* sought to strengthen ratemaking and other regulatory processes through:

- Facilitating one or more partnership arrangements with qualified organizations comprised of state, national or international regulatory practitioners and technical experts.
- Various studies to include an updated cost of service study (at the levels of generation, transmission, and distribution), cost of unserved energy study, system losses study, willingness/ability to pay study, cross subsidization/lifeline study, quality of service performance index study, multiple dwelling study, and street lighting levy review.

Project Logic

The GoG embarked on power sector reform to catalyze investment needed to improve utility performance and increase security of supply. Difficulties in sustaining reforms, and the lack of appropriate legal and regulatory mechanisms have led to low levels of investment and inefficient sector performance in Ghana.

MCC expected that the activities would lead to an improved tariff process and outcome, especially movement toward cost-reflective and efficient tariffs. This would, in turn, lead to sustainable expansion of the electricity sector to meet the growing demand. MCC assumed that Generation and sector-wide master plan would be implemented, and key policy/regulations would be implemented and sustained.

The key assumptions and risks that underlay the accomplishment of the theory of change are summarized in the table below. These assumptions and risks are external to the Project.

Summary of Key Assumptions and Risks: Regulatory Strengthening and Capacity Building Project

Project	Assumptions	Risks
Regulatory Strengthening and Capacity Building Project	<ul style="list-style-type: none"> ● Continuous GoG support for reforms ● Financial re-structuring can be done in 5 years ● Generation and Sector wide Master Plan is implemented ● Key policy/regulations will be sustained 	<ul style="list-style-type: none"> ● Stakeholder resistance to changes ● Delays in reforms due to political backlash ● Customer resistance to tariff increases ● Increased load shedding

Access Project Description and Evaluation Cancellation

The Access Project was originally designed to provide safe, quality, and reliable electricity in selected markets and economic enclaves (M&EEs), improve security lighting in markets, and increase new electricity customers by streamlining the process for new connections and

normalizing informal and illegal connections. The infrastructure project focused on upgrading the High Voltage Distribution System (HVDS) and security lighting in dense urban M&EEs and included a customer outreach and service normalization component. The Customer Outreach, Facilitation Assistance for New Connections and Normalization of Services (COFANS) sub-activity was intended to correct the gaps in legal connections including rectifying customer data errors and omissions, to facilitate communication and finance for end-users to upgrade wiring as needed and to increase the utilities' ability to bill and collect revenues from connected customers.

Following MCC's de-obligation of \$190,000,000 of Compact funding noted above, 91 percent of Access Project funds were re-allocated to the EFOT Project, causing uncertainty as to whether the Access Project would be implemented. Although GOG ultimately provided funding for the project, MCC noted that the project scope had changed significantly over time leading to lack of clarity around the original program logic. Given that MCC was no longer directly funding the project, the MCC Evaluation Management Committee determined that the independent evaluation of the Access Project would not go forward and issued a cancellation memo for the evaluation.⁷ Therefore, no further monitoring or reporting of Access Project outcomes are required under this Post-Compact Monitoring & Evaluation Plan.

Energy Efficiency and Demand Side Management (EEDSM) Project Description and Logic

Summary of Project and Activities

The *Constraints Analysis* documented that the demand for electricity was outstripping supply in Ghana, which created a gap in power availability and also undermined the reliability of the system.⁸ Energy efficiency and demand side management represented cost-effective opportunities to bridge this gap. The objective of the *Energy Efficiency and Demand Side Management (EEDSM) Project* was to reduce electricity demand through improved building and appliance energy efficiency standards and codes, to reduce peak load on the network, and to sustain improvements in energy efficiency through the development of technical capacity for energy audits and management as well as public outreach and education. Improved efficiency was in turn, expected to make the same amount of electricity generated available to more consumers, and at a lower cost than by developing additional generation capacity. It was also to help in moving towards the creation of a reserve margin, in terms of generation capacity relative to peak demand. Interventions like the adoption and enforcement of standards and labels for priority equipment (i.e., items factoring into peak demand), coupled with the installation of test facilities for energy efficient appliances was to help reduce peak load while also reducing the energy consumption and therefore costs customers incur with the use of these appliances.

In addition, because government agencies account for a significant portion of electricity demand in Ghana, the Project was to relieve some burden on ECG by reducing the demand from government facilities via energy efficiency retrofits. Installation and/or replacement of streetlights with LED technology was to reduce the lighting load and by extension the evening peak load on the grid. Finally, this Project was to achieve and sustain these results by establishing training centers to train energy auditors to conduct regular audits of public buildings, by developing and disseminating education tools to be incorporated at educational institutions, and by conducting

⁷ See <https://data.mcc.gov/evaluations/index.php/catalog/249>

⁸ This constraint is from 2014. Currently, as of 2019, Ghana has a surplus of power supply.

public outreach on energy efficiency. The Energy Efficiency and Demand Side Management Project was organized into four Activities, each described below.

Development and Enforcement of Standards and Labels Activity: Energy efficiency standards and labelling was developed to provide information on the energy efficiency performance of selected energy consuming appliances and products available on the market, and to ensure minimum efficiency standards for products on the market. In addition, the standards and labelling that do exist prior to this Compact could benefit greatly from technical updates and enforcement support. The uptake of more efficient appliances and equipment was to reduce consumer utility bills and thereby save them money in the long run. It was also expected to help reduce peak demand, or at least mitigate growth in peak demand.

Improved Energy Auditing Activity: MiDA consultants provided capacity building to energy management professionals for energy auditing to ensure that a core of qualified and certified professionals are available in the Ghanaian market who can assist industrial and commercial customers in implementing cost-effective energy savings measures such as building retrofits. The capacity building was complemented by investments in training centers and the provision of mobile test labs. This Activity also included demonstration audits to stimulate the market and strengthen energy service companies that will effectively promote energy efficiency retrofits in Government facilities.

Education and Public Information Activity: Public education and information activities were to help inform customers regarding the benefits and trade-offs of higher efficiency appliances and equipment. This Activity potentially included direct public education interventions targeting high energy peak load consumers, and developed an energy efficiency and conservation component to integrate into the school curriculum at the Pre-Tertiary school levels.

Demand Side Management Infrastructure Activity: This Activity was to support:

- Pilot tests and demonstrations of distributed applications (photovoltaic back-up power, solar powered street lighting) focused on Government electricity customers to reduce electricity consumption in Government facilities. (Dropped due to lack of funding and over-capacity of the generation sector.)
- Conversion of conventional streetlights to LED streetlights in ECG target regions.

Project Logic

The expected output from the four EEDSM Project interventions included increased public education, information and awareness about performance and benefits of energy efficient equipment and measures, outreach to educational institutions, importers and retailers of electrical appliances, etc. Other outputs are efficiency ratings, labels, and standards for major energy-consuming equipment established and enforced through legislative instruments made official; and market monitoring enhanced and product certification process improved. Finally, the EEDSM activities was to facilitate national capacity building on energy auditing, institutionalize industrial and commercial energy efficiency audits, expand the training and certification of energy efficiency (EE) auditors and managers, and upgrade government buildings with energy efficient retrofits. The project was to also ensure closer collaboration between energy efficiency auditors and energy efficiency manufacturers.

The increase in public education, information and awareness about performance and benefits of energy efficient equipment and measures was expected to make the public better informed on energy efficiency and empowered to reduce energy consumption in the short term. Within the same timeframe, the standards and labels and enforcement of major energy-using equipment will improve the demand profile and reduce the demand growth rate, especially at peak periods. Again, in the short term, the replacement of HPS lamps of streetlights with more efficient LED lamps and/or better street lighting technology was to also reduce the lighting load of the country, and further shave the peak load on the grid.

In the medium term, a more enlightened public on EEDSM was to enable the country’s generation capacity to transcend meeting demand to ensure adequate reserve margin. As more private, industrial and government institutions internalize the practice of energy auditing to their buildings, we expect to experience efficient use of installed capacity and cause reduction of greenhouse gas emissions (GHG) in the medium term. Finally, in the medium term, the reduction in the lighting load is expected to minimize unplanned outages at both transmission and distribution levels and increase access and consumption of electric power for new customers, thereby reducing customer reliance on diesel generators.

In the long term, the medium-term outcomes are expected to contribute in diverse ways to decreased household and business energy basket expenditures and thus business losses, increase value-added production, increase business investments, wage employment and incomes.

The underlying key assumptions and risks of the accomplishments of the theory of change summarized in the program logic are shown in the table below.

Summary of Key Assumptions and Risks: Energy Efficiency and Demand Side Management Project:

Project	Assumptions	Risks
Energy Efficiency and Demand Side Management Project	<ul style="list-style-type: none"> ● Training program can be implemented within 5-years ● Consumer behavior changes. ● Technology affordable and available on the market ● Rate of demand growth is 6% annually ● Effective enforcement of standards and labels requirements ● Willingness and ability of consumers to purchase efficient appliances ● Generation and sector-wide master plan implemented and key policy/regulations from Compact sustainably implemented 	<ul style="list-style-type: none"> ● Import restrictions due to inflation and fiscal position ● Circulation of inefficient household appliances

3.4 Projected Economic Benefits

The economic model quantifies the expected economic benefits of each project compared to its costs, providing a single metric of the investment. The economic benefits of the investment are based on the reduction of electricity disruptions, while the costs are the Compact funds. To estimate these benefits, the ERR analysis calculated average economic opportunity costs of electricity disruptions. This calculation is derived by estimating losses in value added due to the costs of own generation of electricity and losses of value added due to the temporary cessation of economic activity. The midpoint ERRs for each project are presented in the table below.

Economic Rate of Return Analysis

Project	Current Economic Rate of Return (ERR)	Date Current Economic Rate of Return (ERR) Established
ECG Financial and Operational Turnaround Project	9% ⁹	October 2020
Regulatory Strengthening and Capacity Building Project (costs incorporated in ECG calculations)	Not Applicable (wrapped into the ECG ERR)	Not Applicable
Access Project	Not Applicable ¹⁰	Not Applicable
Energy Efficiency and Demand Side Management Project	27%	August 2014

3.4.1 Economic Analysis of ECG Financial and Operational Turnaround Project¹¹

The original economic analysis estimated the benefits of reducing service disruptions attributable to network deficiencies by considering key factors affecting the level of downstream subsystem outages and centered on transforming ECG into the type of utility that could reliably provide quality service to current and future customers. With the GOG’s decision in October 2019 to terminate the PSP component of the project, and subsequent de-scoping of various activities, an economic re-assessment of the EFOT Project was undertaken, focusing primarily on the plausible impacts of the remaining infrastructure components. The revised model calculates average economic opportunity costs of electricity disruptions by estimating losses in value added due to the costs of own generation of electricity, and losses of value added due to the temporary cessation of economic activity. The analysis considers two types of benefits: the loss of value added through self-generation (incremental cost of doing business and incremental capture of household income using the cost of self-generation as a proxy) and impacts on the growth of regional GDP. The analysis allows unmet electricity demand to curtail economic growth.

⁹ The ERR was re-estimated in 2020 to reflect the result of the de-scoped investments and the collapse of the PSP concession. The analysis considered the state of the world both with and without the Covid-19 pandemic. In the absence of Covid-19, the ERR would have been 12 percent.

¹⁰ The Access Project did not have an ERR at Compact signing and was designed during the first 2 years of Compact implementation.

¹¹ Information presented are extracts from the Ghana II Economic Assessment: Guide to the Analysis and Work Files, which was prepared by MCC. This also applies to the sections on the Power Generation Sector Improvement Project (PGSIP) and the Energy Efficiency and Demand Side Management Project.

3.4.2 Economic Analysis of Regulatory Strengthening and Capacity Building Project

The beneficiaries were incorporated in the ECG Financial and Operational Turnaround Projects.

3.4.3 Economic Analysis of Access Project

The Access Project did not have to meet an economic threshold as a requirement for funding.

3.4.4 Economic Analysis of Energy Efficiency and Demand Side Management Project

The analysis of EEDSM interventions considered the average of future outcomes in the presence of low and high reserve margins. The energy efficiency interventions realize their economic benefits through the private purchase of appliances over time that conform to standards that are defined for 20 electrical appliances by a technical committee hosted by the Ghana Standards Authority (GSA).

3.5 Projected Program Beneficiaries

According to the MCC “Guidelines for Economic and Beneficiary Analysis”, beneficiaries of projects are considered individuals that are expected to experience better standards of living due to Compact activities aimed to increase their real incomes. The economic rate of return analysis for proposed projects gives details on benefit streams through which beneficiaries should experience increased income.

A general overview of the span of program benefits across the population of Ghana, used for Compact justification to MCC’s Investment Committee, is presented in the table below.

3.5.1 Projected Program Beneficiaries

Each Project of the Compact is intended to further poverty reduction through economic growth. The expected beneficiaries, and the estimated numbers for each Project are presented in the table below.

Projected Program Beneficiaries

Project	Program Beneficiary Definition	Est. Number of Beneficiaries	Present Value (PV) of Benefits ¹²	Net Present Value (NPV) ¹³
ECG Financial and Operational Turnaround Project	Consumers of electricity engaged in productive activity in the ECG Target Regions (Accra East and Accra West)	Approximately 5 million at compact closing; Approximately 7.6 million by 2037 (2.3% annual urban population growth)	USD 174 million	USD 25 million
Regulatory Strengthening and Capacity Building Project (beneficiaries incorporated in ECG Financial and Operational Turnaround Projects)	The beneficiaries were the customers of ECG.	Approximately 5 million at compact closing; Approximately 7.6 million by 2037 (2.3% annual urban population growth)	N/A	N/A
Access Project	MSMEs in the 10 Markets and Economic Enclaves in Accra and Tamale	N/A	N/A	N/A
Energy Efficiency and Demand Side Management Project	All electricity consumers in Ghana	19.6 million	278.2	USD 95.8 million

3.5.2 Beneficiary Analysis

There is a very high level of overlap (in some cases complete overlap) of beneficiaries of the respective projects. The primary beneficiaries of the ECG Financial and Operational Turnaround Project are consumers of electricity engaged in productive activity in the ECG Target Regions. These regions generate over 22 percent of the gross domestic product (GDP) of Ghana and represent more than 23 percent of ECG’s total customers. The proposed interventions are expected to reduce losses in added value in terms of lost income to the owners of businesses (or owner-operators as the case may be for informal activities) and wages because of service disruptions. All the beneficiaries of the ECG Financial and Operational Turnaround Project are also captured as beneficiaries of the Regulatory Strengthening and Capacity Building, and the Energy Efficiency and Demand Side Management Projects.

The beneficiaries of the Regulatory Strengthening and Capacity Building Project were the customers of ECG.

¹² The PV of benefits are the “estimated discounted increase in income over the life of the project or the “beneficiary income gain.”

¹³ The NPV illustrates the net benefits, which subtract the discounted costs from the discounted benefits. Cost-benefit analysis produces two main outputs: the ERR and NPV. This provides a more complete picture and allows for comparison at this level across projects.

Reducing energy waste will benefit all electricity consumers in Ghana, as it will make more electricity available at a cost far below that of new generation capacity. Individual activities will target retail consumers, industry, and Government agencies:

- (i) The Development and Enforcement of Standards and Labels Activity will impact all consumers who use household and other appliances as its implementation occurs at the national level;
- (ii) The Improved Energy Auditing Activity is geared toward industrial and commercial customers, but Government agencies may also show interest in participating;
- (iii) The Education and Public Information Activity is meant to reach the general public. Target beneficiaries include high energy peak consumers, students and industrial and commercial actors.

The Demand Side Management Infrastructure Activity will impact a combination of the general public (through LED street lighting) and Government agencies.

4. EVALUATION ACTIVITIES

4.1 Summary of Evaluation Strategy

While good program monitoring is necessary for program management and was a key focus during implementation of the Ghana Power Compact, it is not sufficient for assessing ultimate results. Therefore, MCC uses evaluation as complementary tool to better understand the effectiveness of its programs. As defined in the MCC M&E Policy, evaluation is the objective, systematic assessment of a program's design, implementation and results.

The Policy indicates that every Project in a Compact must undergo a comprehensive evaluation (impact and/or performance) that is designed and implemented by independent, third-party evaluators hired by MCC.

MCC is committed to ensuring that the independent evaluations are as rigorous as warranted in order to understand the causal impacts of the program on the expected outcomes and to assess cost effectiveness. The next section on Specific Independent Evaluation Plans will describe the purpose, methodology, timeline, and the process for data collection and analysis for each independent evaluation.

For each independent evaluation, the GoG designated lead institution and relevant stakeholders are expected to review and provide feedback to independent evaluators on the evaluation design reports, evaluation materials (including questionnaires), baseline report (if applicable), and any interim/final reports in order to ensure proposed evaluation activities are feasible and relevant, and final evaluation products are technically and factually accurate. MCC's evaluation review process will follow the guidelines outlined in the MCC M&E Policy. The results of all evaluations will be made publicly available in accordance with the MCC M&E Policy.

4.2 Specific Independent Evaluation Plans

MCC contracted an Independent Evaluator, Mathematica, to evaluate the Compact's three active projects as well as the performance of the compact overall. The evaluations will assess project and compact implementation, the extent to which outcomes were achieved, and sustainability of outcomes beyond the life of the Compact. MCC commissioned the University of California-Berkeley to rigorously evaluate the impact of line bifurcation investments under the Technical Loss Reduction Activity on outages and voltage quality using an impact evaluation methodology and the GridWatch sensor technology.

Mathematica will employ performance evaluation designs to answer the evaluation questions for each project and the compact overall. Although the performance evaluations will not allow attribution of observed outcomes to the projects or the compact, they will provide a description of what happened and why, including challenges, successes, and lessons learned. The EFOT and EEDSM Project evaluations will employ a pre-post design, whereas the Regulatory Project evaluation will only use one round of data collection (interim), as no future effects are anticipated. Changes to the compact activities have resulted in changes to the evaluation questions and evaluation designs during the implementation phase. The updated compact-level and project-level evaluation questions below reflect the revised expectations given the termination of the PSP concession and subsequent de-scoping of some compact activities.

Table 1. Summary of Specific Independent Evaluations

Evaluation Name	Evaluation Type	Evaluator	Primary/ Secondary Methodology	Final Report Date
Compact-wide Evaluation	Performance	Mathematica	Pre-post comparison using administrative, survey, and qualitative data	December 2024
ECG Financial and Operational Turnaround Project (EFOT)	Performance	Mathematica	Pre-post comparison using administrative, survey, and qualitative data	December 2024
Regulatory Strengthening and Capacity Building Project (Regulatory)	Performance	Mathematica	Pre-post comparison using qualitative data	February 2022
Energy Efficiency and Demand Side Management Project (EEDSM)	Performance	Mathematica	Pre-post comparison using administrative, survey and qualitative data	December 2024
GridWatch Evaluation	Impact	UC Berkley	Regression discontinuity design using observational SAIDI and SAIFI data	February 2024

4.2.1 Ghana II Compact-wide Performance Evaluation

Evaluation Questions

1. What is the estimated economic impact of the Ghana power compact?
2. What were the political economy factors that influenced the process and outcomes of introducing regulatory and utility reform?

Evaluation Methodology Description

The overall compact-level evaluation will synthesize information from across the three project evaluations to estimate the overall economic impact of the Ghana power compact, including the Economic Rate of Return (ERR). This evaluation will also include a political economy analysis (PEA) that will examine how political economy factors influenced regulatory and utility reform and lessons that can be applied to other power sector interventions.

Data Sources

The evaluation will rely on primary and secondary quantitative and qualitative data sources. Secondary data will include longitudinal administrative data provided by the power utility and implementation records. Primary data will include a baseline household and enterprise survey and longitudinal electricity sensor data collected through GridWatch devices developed by engineers at UC-Berkley. MiDA commissioned NORC to conduct the household and enterprise survey at baseline, which was originally planned as a face-to-face survey but was transformed into a phone survey due to the coronavirus pandemic. Data from the GridWatch sensor devices will supplement

the household and enterprise survey data, providing reliable measurement of outage and voltage fluctuations longitudinally (from 2021 to 2023) in a subset of ECG districts.

Table 2. Evaluation Primary Data Sources

Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
Household/Enterprise Survey	Quantitative	Households and enterprises in program areas	414 households and 2,321 enterprises	1	N/A - baseline only	Baseline: Dec. 2020
GW Sensor Device Data	Quantitative	Distribution transformers in program areas	1,100	continuous	TBD	2021-2023 (continuous)
KIIs	Qualitative	Electricity stakeholders	~ 25	2	24 months	Baseline: Jun-Aug 2021 Endline: Jan-May 2024

4.2.2 ECG Financial and Operational Turnaround Project (EFOT)

The EFOT evaluation design report, produced by Mathematica, is available here: <https://data.mcc.gov/evaluations/index.php/catalog/250>. The evaluation covers the remaining activities supported under the project, including the PSP Activity, Modernizing Utility Operations, the Commercial Loss Reduction Activity, and the Technical Loss Reduction Activity. Evaluation questions fall into three broad categories: project objectives, implementation, and sustainability of the project.

Evaluation Questions

Project objective questions:

1. To what extent did the activities improve operational efficiency and the cost of distributing power? Is it possible to identify which interventions are the most effective?
2. Did technical and commercial losses, power quality, and reliability improve? Do stakeholders perceive that these changes resulted from compact interventions versus other investments or policy changes?

Implementation questions:

3. Were project activities implemented as designed? How did implementation (in terms of objectives, activities, and beneficiaries) deviate from the original logic driving the investment, and why? Where were the implementation successes and challenges? How did changes in implementation affect project performance? What were the implementation successes and challenges? Did the PSP transaction reach financial close by the required deadline (end of Year 2 of the Compact)? Was a qualified firm identified, recruited, and brought on board who could improve ECG’s financial and operational performance by end of Year 2? What are the lessons learned from the process?
4. How did the new management information systems and the other foundational investments affect the operational efficiency and cost of distributing power for the utility?

Sustainability questions:

5. Were improvements in project outcomes sustained after the end of the compact? What sustainability planning was done during implementation, and why? What are the critical institutional factors that affected their sustainability?
6. Did the financial health of the utility stabilize over the life of the compact and after the compact was finished? Were improvements driven primarily by tariff increases or by other project activities? If there are no improvements or the improvements are minimal, why?

Evaluation Methodology Description

The EFOT project evaluation was originally designed to measure household- and enterprise-level economic outcomes as well as grid-level outcomes related to operational efficiency, commercial performance, and technical losses. Considering the implementation changes, this evaluation was redesigned to focus on grid-level outcomes only since MCC no longer expects to observe changes in household- and enterprise-level outcomes in the evaluation timeframe. As such, the redesigned evaluation will focus on measuring changes in quality and reliability of electricity (ex. outages and voltage fluctuation) over the life of the compact and in the years following compact close as well as any improvements in operational efficiency and commercial performance of the utility following MCC investments.

Data Sources

The evaluation will rely on primary and secondary quantitative and qualitative data sources. Secondary data will include longitudinal administrative data provided by the power utility and implementation records. Primary data will include a baseline household and enterprise survey and longitudinal electricity sensor data collected through GridWatch devices developed by engineers at UC-Berkley. MiDA commissioned NORC to conduct the household and enterprise survey at baseline, which was originally planned as a face-to-face survey but was transformed into a phone survey due to the coronavirus pandemic. Data from the GridWatch sensor devices will supplement the household and enterprise survey data, providing reliable measurement of outage and voltage fluctuations longitudinally (from 2021 to 2023) in a subset of ECG districts.

Table 3. Evaluation Primary Data Sources

Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
Household/Enterprise Survey	Quantitative	Households and enterprises in program areas in greater Accra	414 households and 2,321 enterprises	1	N/A - baseline only	Baseline: Dec. 2020
GW Sensor Device Data	Quantitative	Distribution transformers in program areas	933	continuous	TBD	2021-2023 (continuous)
KIIs	Qualitative	Electricity stakeholders	~ 25	2	24 months	Baseline: Jun-Aug 2021 Endline: Jan-May 2024

4.2.3 Regulatory Strengthening and Capacity Building Project (Regulatory)

The Regulatory Strengthening evaluation design report, produced by Mathematica, is available here: <https://data.mcc.gov/evaluations/index.php/catalog/252>. The performance evaluation of the Regulatory Project will focus on assessing the project's implementation, progress toward achieving outcomes, and its longer-term sustainability, including the existence of a cost-reflective tariff and greater access to power for the poor.

Evaluation Questions

Project objectives questions:

1. Did the project result in cost-reflective tariffs or tariffs that were on track to be cost-reflective by the end of the compact (cost-reflective means tariffs that tracked inflation, sector costs, macroeconomic performance, and exchange rates)?
2. To what extent were tariff changes driven by reforms to the tariff structure and methodology versus other factors (such as inflation, macroeconomic performance, exchange rates)?
3. Did "hidden costs" drop when project activities were implemented? If so, to what extent can this be attributed to the project activities?
4. Did the project contribute to improve tariff targeting and greater access to power for the poor? How were the benefits distributed among the different stakeholders?

Implementation questions:

5. Were project activities implemented as designed? How did implementation (in terms of objectives, activities, and beneficiaries) deviate from the original logic driving the investment, and why? Where were the implementation successes and challenges? How did changes in implementation affect project performance?
6. Does the regulator have the data necessary to measure sector performance? If yes, do those data influence their decisions and how they implement the tariff formula?

Sustainability questions:

7. Were improvements in project outcomes sustained after the end of the compact? What sustainability planning was done during implementation, and why? What are the critical institutional factors that affected their sustainability?

Evaluation Methodology Description

The Regulatory project evaluation assesses the extent to which reforms to the tariff structure have taken place over the life of the compact and the extent to which project activities have contributed to these changes. Administrative data and qualitative data will be utilized to answer these evaluation questions in an interim report.

Data Sources

The evaluation will rely on primary and secondary quantitative and qualitative data sources. Secondary data will include longitudinal administrative data provided by the regulatory bodies and implementation records. Primary data will include key informant interviews conducted from June through August 2021.

Table 4. Evaluation Primary Data Sources

Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
KIIs	Qualitative	Electricity stakeholders	~ 25	1	24 months	Jun-Aug 2021

4.2.4 Energy Efficiency and Demand Side Management Project (EEDSM)

The EEDSM evaluation design report, produced by Mathematica, is available here: <https://data.mcc.gov/evaluations/index.php/catalog/251>. The evaluation will cover each of the four interventions under the project: Development and Enforcement of Standards and Labels Activity, the Improved Energy Auditing Activity, the Education and Public Information Activity, and the Demand Side Management Activity.

Evaluation Questions

Project objective questions:

1. Have the EEDSM interventions changed consumption of electricity by individual customers?
2. Did the availability and purchases of more energy-efficient appliances increase when standards were implemented? To what extent can these changes be attributed to the new standards?
3. To what extent has the R2RRs intervention affected electricity use and bill payment rates?

Implementation questions:

4. Were project activities implemented as designed? How did implementation (in terms of objectives, activities, and beneficiaries) deviate from the original logic driving the investment, and why? What were the implementation successes and challenges? How did changes in implementation affect project performance?

Sustainability questions:

5. Were improvements in project outcomes sustained after the end of the compact? What sustainability planning was done during implementation, and why? What are the critical institutional factors that affected their sustainability?

Evaluation Methodology Description

The EEDSM project evaluation will examine whether project activities have changed consumption of energy by individual customers. Survey data from baseline and endline will measure changes in household energy consumption over the life of the Compact and in the years following compact close.

Data Sources

The evaluation will rely on primary and secondary quantitative and qualitative data sources. Secondary data will include longitudinal administrative data provided by the power utility and implementation records. Primary data will include a baseline household and enterprise survey. MiDA commissioned NORC to conduct the household and enterprise survey at baseline, which was originally planned as a face-to-face survey but was transformed into a phone survey due to the coronavirus pandemic.

Table 5. Evaluation Primary Data Sources

Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
Household/Enterprise Survey	Quantitative	Households and enterprises in program areas in greater Accra	414 households and 2,321 enterprises	1	N/A - baseline only	Baseline: Dec. 2020
KIIs	Qualitative	Electricity stakeholders	~ 25	2	24 months	Baseline: Jun-Aug 2021 Endline: Jan-May 2024

4.2.5 Line Bifurcation Evaluation (“GridWatch”)

The Line Bifurcation evaluation design report, produced by UC Berkeley, is available here: <https://data.mcc.gov/evaluations/index.php/catalog/266>. The evaluation will contribute to addressing primary compact-level outcomes through a rigorous analysis of impacts in selected areas of Accra targeted by line bifurcation upgrades, by answering evaluation questions specified below.

Evaluation Questions

1. What is the impact of the infrastructure investments of the ECG Project on the reliability of power in areas of Accra targeted by the line bifurcation and network upgrades?
2. Did the infrastructure improvements result in increased power available to customers, reduce the frequency and duration of outages, and improved voltage stability?
3. What are the economic and socio-economic benefits of access to reliable power on customers, including households and enterprises? How are these benefits distributed?
4. How long does it take households and business to make lumpy investments in power consuming technology when the reliability of the grid improves?
5. What is the Project’s overall impact on the profitability and productivity of enterprises? What are the mechanisms or channels through which these impacts occur?
6. To what extent do small, medium, and large firms respond to more reliable, accessible, and/or higher quality power by:
 - a. Expanding or intensifying production?
 - b. Expanding employment?
 - c. Investing in expanded plant or other fixed assets and/or different production technologies reliant on electricity?

Evaluation Methodology Description

The Line Bifurcation Evaluation will employ a regression discontinuity, difference-in-difference methodology to compare customers who have their low-voltage distribution lines upgraded with

the injection of distribution transformers with other customers who are within a very similar distance from an existing transformer (approx. 500 meters), and are therefore very similar in characteristics to those who might otherwise have been eligible and selected for similar upgrades to the local LV network. Data on outage frequency, duration and voltage fluctuations will be collected continuously throughout compact implementation and endline, while survey data will be collected on socioeconomic outcomes at both baseline and endline.

Data Sources

The evaluation will rely on two primary data sources. UC Berkeley has designed and deployed the Gridwatch suite of technologies within 3 districts of Accra that were targeted for line bifurcation upgrades. Gridwatch sensors will collect real-time, longitudinal data on the time, location, scope, duration, and frequency of outages and voltage fluctuations on the electrical grid. This will be complemented with survey data collected at the household and firm level to measure the socioeconomic benefits of a reduction in outages and an increase in voltage quality as experienced by end-users.

Table 6. Evaluation Primary Data Sources

Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
Household/Enterprise Survey	Quantitative	Households and enterprises in Achimota, Kaneshie, Dansoman Districts	1,000 households 1,000 enterprises	2	1 year	Baseline completed June 2021
GW Sensor Device Data	Quantitative	Distribution Transformers in Treatment/Control sites	542	Continuous	1 year	June 2018 – Dec 2023

4.3 Summary of Activities or Sub-Activities without Evaluations

The Access Project will not be evaluated since MCC is no longer investing in these activities, which were subsequently taken over by GoG.

5. IMPLEMENTATION AND MANAGEMENT OF M&E

5.1 Responsibilities

The GoG lead institution, with financial support from GoG and technical support from MCC, will be responsible for supporting this Post Compact M&E Plan, including liaising with other GoG entities, including power utility companies (ECG and GRIDCo) regulatory agencies (EC, GSA and PURC), and the Ministry of Energy, which has oversight responsibility over the power sector. The MCC focal point for Ghana Power Compact M&E will provide technical assistance to the Post Compact M&E team at the GoG designated lead institution, to facilitate the implementation of specific activities in accordance with existing procedures. The designated entity is expected to conduct the following functions:

- Serve as the primary point of contact for any questions from MCC, IEs, evaluators, or other parties regarding data supplied by IEs of the Ghana Compact, including helping to facilitate access to such data, if necessary;
- Communicating with focal persons at the IEs who provide data for the ongoing evaluation and to review and validate data submitted;
- Obtaining letters of support from GoG for primary data collection activities, as necessary;
- Disseminating information and results related to program performance and impact in order to ensure transparency through the website and/or any other medium;
- Facilitating participation in M&E activities and attracting the interest of different stakeholders directly or indirectly involved in the conduct of activities and the success of the Compact;
- Facilitating the work of independent evaluation teams, particularly through mission planning support by ensuring the availability of stakeholders for key informant interviews, supporting qualitative and quantitative data collection efforts to be undertaken by the independent evaluators;
- Review and revise the Post Compact M&E Plan as necessary in close consultation with MCC M&E;
- Review and provide an official response to each evaluation; help to coordinate the review of evaluation reports by other government agencies as necessary;
- Identify opportunities to apply the learning from the evaluations to project design and implementation;
- Maintain stable communications with MCC on topics pertaining to the evaluation of projects implemented by MiDA; and
- Serve as a point of contact for any inquiries regarding Compact projects and activities implemented.

On the other hand, MCC responsibilities post Compact will include:

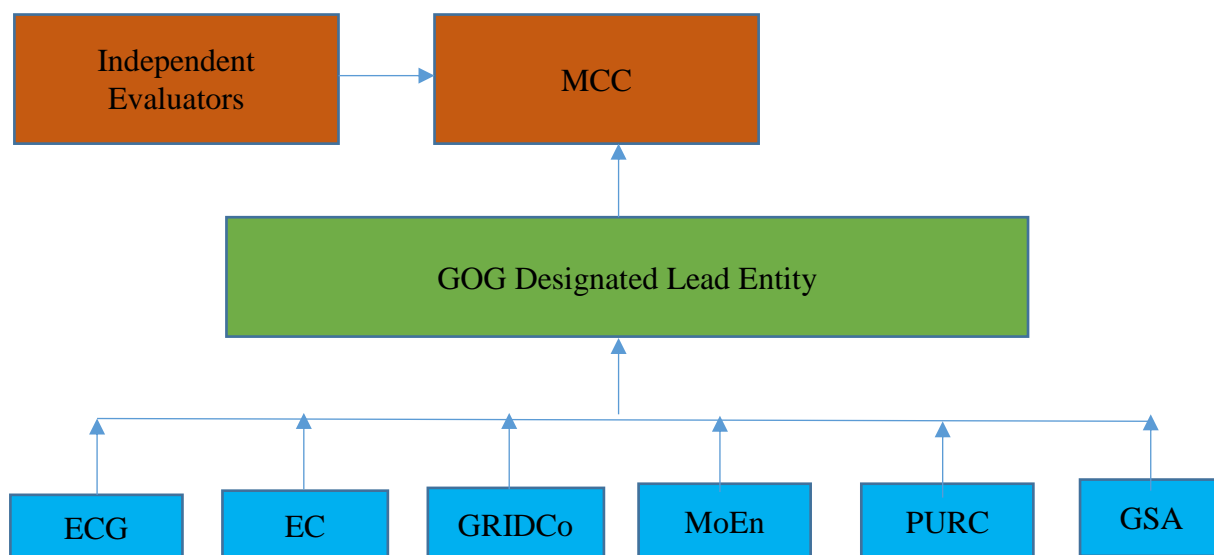
- Contract and manage independent evaluators;
- Contract post compact data collection for evaluations; and
- Ensure evaluators conduct stakeholder review and dissemination of evaluation reports.

Additional M&E functions may be assumed by the designated entity depending on needs and requirements of MCC.

5.2 Institutional Arrangement and Information Flow Post-Compact

As described above, while the lead entity will ultimately be responsible for liaising with multiple IEs, especially IEs that provided the same data during the Compact Implementation period and are familiar with the reporting procedures between them and MiDA. The figure below illustrates the reporting channels for the Post-Compact period.

Post-Compact M&E Institutional Arrangement



5.2.1 Designated GoG Entity

The designated GoG entity Point of Contact (POC) will continue supporting M&E of the Compact investments after Compact closure. The Head of the M&E of the designated entity (or his/her representative) will coordinate M&E requirements during Post Compact on behalf of the entity. In particular, the POC will be responsible for liaising with the IEs mentioned under 4.1 above on providing administrative data required by the independent evaluators. The designated entity will work closely with relevant IEs, Independent Evaluators and MCC on key steps needed to enable a rigorous evaluation based upon the agreed evaluation design and approach.

5.2.2 Electricity Company of Ghana (ECG)

The ECG is a key beneficiary of the Ghana Power Compact investments in electricity infrastructure. ECG is also a major supplier of data for ITT reporting at the outcome level and will therefore continue to be a major provider of outcome level data during the post compact period. The newly created M&E Directorate, carved out of the Corporate Planning Directorate, was responsible for collating, reviewing, verifying and validating data (from all other ECG Directorates) and reporting to MiDA during the compact implementation period. It is expected the M&E Directorate will continue to play this role in the post compact period. The post-compact responsibilities for ECG include:

- Providing continuous assistance and advice to the designated entity in all aspects related to Post Compact M&E of the EFOT Project;
- Monitoring and maintaining the ECG MIS system, to ensure that the EFOT Project-related data are up-to-date;

- Ensuring completeness, accuracy, and integrity of data compiled from within ECG before submitting data to the designated entity;
- Submitting EFOT Project-related data to the designated entity, as requested;
- Supporting the designated entity with dissemination of information, organization (if applicable) of presentations of the results of evaluations and publication on relevant websites, such as those for the designated entity; and
- Serve as a point of contact for inquiries regarding the Compact, especially the EFOT Project-related activities and sub-activities implemented.

5.2.3 Energy Commission (EC)

For the EC, the Strategic Planning and Policy Division (SPPD) of Planning and Development shall support the Commission’s Statistician (from the Electricity Market Oversight Panel [EMOP]) to coordinate Post-Compact M&E activities on behalf of the Commission. In particular, the EC will be responsible for submission of Post-Compact related data on generation capacity and electricity supplied in Ghana, and other EEDSM Project-related data on legislative instruments (LIs) passed to ensure compliance to appliance standards and labels developed, to the M&E Division of the designated entity. The EC will also collaborate with the M&E Division of the designated entity, Independent Evaluators and MCC on key steps needed to enable a rigorous evaluation based upon the agreed evaluation design and approach. Specifically, post-compact responsibilities for the EC includes:

- Identifying a focal person to provide continuous assistance and advice to the designated entity in all aspects related to Post Compact M&E of Compact Projects.
- Coordination of technical M&E aspects with entities responsible for providing primary data, as requested;
- Monitoring and maintaining the reporting system, to ensure that generation related and electricity supply data to be reported are up-to-date;
- Ensuring completeness, accuracy, and integrity of data compiled from power producers (government and private) and from within the Commission before submitting data to the designated entity;
- Submitting generation and electricity supply related data to the designated entity, including relevant data on the EEDSM Project, as requested;
- Supporting the designated entity with dissemination of information, organization (if applicable) of presentations of the results of evaluations and publication on relevant websites, such as those for the designated entity; and
- Serve as a point of contact for inquiries regarding the Power Compact, especially the EEDSM Project-related activities and sub-activities implemented.

5.2.4 Ghana Grid Company (GRIDCo)

For GRIDCo, the Operations Planning Department will be the key source of all relevant data related to load shedding and generating plants technical availability. GRIDCo will also collaborate with the designated entity in the implementation of evaluation activities. Where necessary, GRIDCo will work closely with the designated entity, Independent Evaluators and MCC on key steps needed to enable a rigorous evaluation based upon the agreed evaluation design and approach. Specifically, post compact responsibilities for GRIDCo shall include:

- Coordination of technical M&E aspects with entities responsible for providing primary data for indicators as requested;
- Ensuring completeness, accuracy, and integrity of data compiled from within GRIDCo before submitting data to the designated entity;
- Submitting load shedding data to the designated entity, as requested;
- Supporting the designated entity with dissemination of information, organization (if applicable) of presentations of the results of evaluations and publication on relevant websites, such as those for the designated entity; and
- Serve as a point of contact for inquiries regarding the Compact, especially on the Pokuase and Kasoa BSP sub-project activities implemented.

5.2.5 Public Utility and Regulatory Commission (PURC)

PURC will work closely with the M&E Division of the designated entity, Independent Evaluators and MCC on key steps needed to enable a rigorous evaluation based upon the agreed evaluation design and approach. Specifically, post compact responsibilities for PURC shall include:

- Identifying a focal person to provide continuous assistance and advice to the designated entity on all regulatory aspects related to the post compact M&E of Compact Projects;
- Ensuring completeness, accuracy, and integrity of data compiled from within PURC before submitting data to the designated entity;
- Submitting electricity tariff data to the designated entity, including changes over the years with reference to approved 2020 base tariff application;
- Supporting the designated entity with dissemination of information, organization (if applicable) of presentations of the results of evaluations and publication on relevant websites, such as those for the designated entity; and
- Serve as a point of contact for inquiries regarding the Compact Program, especially on Regulatory Strengthening and Capacity Building project and subproject activities implemented.

5.2.6 Ministry of Energy (MoEn)

The MoEn shall be responsible for reporting post compact related data on off-grid, mini-grid and micro-grid. MoEn will work closely with the M&E Division of the designated entity, Independent Evaluators and MCC on key steps needed to enable a rigorous evaluation based upon the agreed evaluation design and approach. Specifically, post compact responsibilities for MoEn shall include:

- Identifying a focal person to provide continuous assistance and advice to the designated entity on all aspects related to Post-Compact M&E of Compact Projects.
- Ensuring completeness, accuracy, and integrity of data compiled from within MoEN before submitting data to the designated entity;
- Supporting the designated entity with dissemination of information, organization (if applicable) of presentations of the results of evaluations and publication on relevant websites, such as those for the designated entity; and
- Serve as a point of contact for inquiries regarding Compact projects and activities implemented.

5.2.7 Ghana Standards Authority (GSA)

The GSA shall be responsible for reporting post compact related data on electrical appliances that are compliant to standards and labels developed for the 21 electrical appliances. GSA will work closely with the M&E Division of the designated entity, Independent Evaluators and MCC on key steps needed to enable a rigorous evaluation based upon the agreed evaluation design and approach. Specifically, post compact responsibilities for GSA shall include:

- Identifying a focal person to provide continuous assistance and advice to the designated entity in all aspects related to Post Compact M&E of Compact Projects.
- Coordination of technical M&E aspects with entities the GSA collaborates with at the various Ports of entry in Ghana responsible for providing primary data for indicators as detailed in this Post Compact M&E Plan;
- Monitoring and maintaining the reporting system, to ensure that data on electrical appliances (entering Ghana) are up-to-date;
- Ensuring completeness, accuracy, and integrity of data compiled from the Ports of entry before submitting data to the designated entity;
- Submitting appliance standards related data to the designated entity;
- Supporting the designated entity with dissemination of information, organization (if applicable) of presentations of the results of evaluations and publication on relevant websites, such as those for the designated entity; and
- Serve as a point of contact for inquiries regarding the Power Compact, especially the appliance standards and labels and AC Test facilities sub-activities implemented under the EEDSM Project.

5.3 Review and Revision of the Post-Compact M&E Plan

All revisions to the plan will be mutually agreed upon by the M&E Division of the designated entity as the designated representative and MCC. Either party may suggest revisions to the plan. Within MCC, revisions to the Post Compact M&E Plan will be shared with the Department of Compact Operations for information and approved by the M&E lead; however, the M&E lead may want to informally consult with sector leads before approving revisions.

6. POST COMPACT M&E BUDGET

Independent evaluations are directly funded by the MCC. MCC will cover the costs for the independent evaluators (University of California-Berkeley and Mathematica) and post compact evaluation-related data collection. The GoG will be responsible for liaising with GoG counterparts to facilitate access to administrative data and organizing workshops for dissemination of evaluation results. The designated entity is expected to dedicate staff time to post compact M&E activities. It will facilitate dissemination of final evaluation findings through presentations and other modalities (e.g., briefs or brochures).

7. OTHER

7.1 Miscellaneous Post-Compact Obligations

As required by Section 3.7(c) of the Compact (which survives the expiration of the Compact pursuant to Section 5.2), the Government, through the designated representative (or otherwise), will continue to permit any authorized MCC representative, the Inspector General, the US Government Accountability Office, any auditor responsible for an audit contemplated by the Compact or conducted in furtherance of the Compact, and any agents or representatives engaged by MCC or the Government to conduct any assessment, review or evaluation of the Compact Program, the opportunity to audit, review, evaluate or inspect activities funded by MCC Funding. Without limiting the foregoing, the Government, through the designated representative (or otherwise), further agrees to cooperate and coordinate with, and provide such documentation as may be requested from time to time, by MCC or any consultants or representatives working for MCC in connection with any of MCC's Post-Compact monitoring and evaluation activities in connection with the Ghana Power Compact Program.

7.2 Schedule of MCC M&E Missions

The MCC M&E Lead will undertake missions to Ghana to participate in dissemination activities of the independent evaluations. Therefore, the timing of MCC M&E missions will coincide with the scheduling of dissemination events by the designated entity.

7.3 Dissemination of Evaluation Results

Mathematica Policy Research is expected to commence the final round of overall evaluation data collection in 2024. Dissemination of evaluation results in-country and at MCC is expected to take place in 2024/2025 following MCC guidelines for dissemination of results. Should this timing shift, we would be in touch with GoG before finalizing any revisions.

The designated entity will coordinate all the dissemination activities in-country. MCC will be publishing final evaluations after the Compact. The Consultants will be expected to conduct evaluation presentations in-country as well as in Washington DC.

ANNEX I: INDICATOR DOCUMENTATION TABLE

Result Statement	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measurement	Disaggregation	Primary Data Source	Responsible Party	Additional Information	Rationale or Justification for Measurement
Increased access to reliable electricity		Outcome	ECG Customers	Number of ECG customers connected to the national network	Number	Tariff Class (Residential/ Commercial/ Industrial)	ECG Monthly Commercial Operations Report	ECG		To measure growth in grid connections and household access to electricity in ECG service area. An individual customer is equivalent to a household or firm.
Load shedding and outages reduced		Outcome	Total System Load Shed	Total megawatt-hours shed in a quarter	Megawatt hours	None	Unserved Load Report	GRIDCo		To measure extent and magnitude of generation shortfalls leading to planned outages. The additional investment in generation at least cost will reduce power outages which will result in reduction in load shedding
	P-17	Outcome	Installed Generation Capacity	Total generation capacity, in megawatts, installed plants can generate within the country	Megawatts	Power generation source (On-grid / Off-grid)	Energy (Supply and Demand) Outlook for Ghana	The Energy Commission and Ministry of Energy		Measures the total installed generation capacity, which relates to the Government's goal to have adequate installed generation capacity to meet demand and reserve margin.
	P-15	Outcome	Total Electricity Supply	Total electricity, in megawatt hours, produced and/or imported in a year.	Megawatt hours	Domestic/Import s; Independent Power Producer / Government-owned	National Energy Statistics	Energy Commission of Ghana		This is to gauge the quantity of power available to meet demand
Distribution system losses reduced	P-19	Outcome	Distribution system losses	1 – [Total megawatt hours billed / Total megawatt hours received from transmission]	Percentage	ECG Service Areas (Accra East, Accra West)	ECG Customer Services Division Performance Report	ECG	Non-existence of boundary metering does not allow disaggregation into Accra East and West	Measures improvements or otherwise of ECG's distribution system losses as a result of Compact interventions
		Outcome	Percentage of pre-payment customers	Number of customers with pre-payment meters divided by Total number of customers with legacy credit meters and with pre-payment meters in the ECG Target Regions	Percentage	1. Tariff Class (Domestic, Commercial);	ECG Customer Services Division Performance Report	ECG		Tracks the percentage of customers with pre-paid meters. Prepaid meters contribute to reducing collection losses and cost of collection, thereby improving ECG's financial health. Prepayment metering system excludes industrial customers
Outage response time improved	P-21	Outcome	System Average Interruption Duration Index (SAIDI)	Sum of durations, in customer-hours, of all customer interruptions in a quarter / Total number of customers connected to the network in the same quarter.	Hours	ECG Service Area (Accra East, Accra West)	Reliability Indices Report	ECG		Measures the average outage duration for each ECG customer. A reduction in SAIDI indicates improvement in ECG's service delivery and increases in reliability of power
Unplanned outages and faults reduced	P-22	Outcome	System Average Interruption Frequency Index (SAIFI)	Sum of customer-interruptions in a quarter / Total number of customers connected to the network in the same quarter.	Rate	ECG Service Area (Accra East, Accra West)	Reliability Indices Report	ECG		Measures the average number of interruptions in electricity supply that each ECG customer experiences. A reduction in SAIFI indicates improvement in

Result Statement	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measurement	Disaggregation	Primary Data Source	Responsible Party	Additional Information	Rationale or Justification for Measurement
										ECG's service delivery and increases in reliability of power
Utility Financial Health Improved	P-23	Outcome	Total electricity sold	The total megawatt hours of electricity sales to all customer types	Megawatt hours	Tariff class (Residential/Commercial/Industrial)	Annual Report & Financial Statement	ECG		Provides an indication of total megawatt hours of electricity sales to all customer types, which should translate into the gross revenue.
	P-13	Outcome	Maintenance expenditure-asset value ratio	Actual maintenance expenditures / Total value of fixed assets	Percentage		Annual Report & Financial Statement	ECG		Provides an indication of whether ECG is able to continue providing services at the same level of performance when assets were acquired, and to maximize returns on investments.
Cost-reflective tariff	P-14	Output	Cost-reflective tariff regime	Average Tariff per kilowatt-hour / Long-run marginal cost per kilowatt-hour of electricity supplied to customers	Percentage	Inputs (Average Tariff per kilowatt-hour, Long-run cost per kilowatt-hour of electricity supplied to customers)	TBD	PURC		Measures utilities' ability to cover expenditures with revenues
Increased energy savings Increased energy savings		Outcome	Energy savings from upgraded streetlights	Total kilowatt hours of energy saved due to new or upgraded street lighting in ECG Target Regions. Energy saved (kW) = Energy demand in kW of existing lamps less new lamps over time.	Kilowatt hours	None	EEDSM Project Report	Energy Commission of Ghana	Clamp meters will be used to measure baseline energy use per streetlight, but energy measuring meter box per road segment may be adopted to do the follow up measurements post construction. Computing this indicator requires setting an adjusted energy baseline to provide a reference point.	A key objective of the Project is to reduce energy consumption. The "street lighting" activity will be relying heavily on the use of energy saving street lamps and appropriate infrastructure for adequate illumination. It is expected that the more the replacement of old streetlight infrastructure and lamps with modern infrastructure and energy-efficient lamps like LEDs, the greater the energy savings made.
		Outcome	Energy savings from "race to retrofit"	Total kilowatt hours of energy saved by the participating institutions in "race to retrofit"	Kilowatt hours	None	EEDSM Project Report	Energy Commission of Ghana	Computing this indicator requires setting an adjusted energy baseline to provide a reference point. The savings may be computed from the difference between average monthly energy consumption for the 12 months preceding the baseline and the average monthly	The "race to retrofit/renewables" activity is targeted at eligible public / government facilities where energy efficiency retrofits will be implemented and result in reduced power consumption.

Result Statement	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measurement	Disaggregation	Primary Data Source	Responsible Party	Additional Information	Rationale or Justification for Measurement
									consumption for the 12 months after the baseline	
Demand profile improved and growth rate reduced		Outcome	Percentage of appliances compliant with standards	Percentage of targeted electrical appliances tested at the points of entry that demonstrate compliance with newly promulgated standards	Percentage	Type of appliance (cooling, heating, lighting, motor)	EEDSM Project Report	Energy Commission of Ghana	The measure applies to products that are declared at the points of entry.	A metric to track compliance at the points of entry will provide proxy indication of market penetration of the energy efficient appliances
		Output	Number of products with LIs on standards passed in Parliament	Number of products whose drafted LIs on standards for electrical appliances are upgraded (for the three existing appliances with standards) or promulgated (for 17 new appliances without standards) by Parliament of Ghana to facilitate mandatory compliance.	Number	None	EEDSM Project Report	Energy Commission of Ghana	The appliances with already existing standards that will receive upgrades are Air conditioners, Refrigerators, CFL bulbs.	The success of this activity will heavily depend on expedited action by Parliamentary Select-Committees on Subsidiary Legislation and Mines & Energy and the Plenary (i.e. House in session) itself, hence very necessary to be proactive with solutions to minimize potential slippages.