Millennium Challenge Account – Bénin II

Monitoring and Evaluation Plan

May 2023

Version 4

95, rue 5.073, Immeuble Kougblénou Zongo Nima
01 B.P. 101 Cotonou, République du Bénin
+229 21 31 82 40 / +229 21 31 81 79 +229 21 31 46 92
info@mcabenin2.bj www.mcabenin2.bj

TABLE OF CONTENTS

PREAMBLE

This Monitoring and Evaluation (M&E) Plan:

- is an extension of the Preliminary M&E Plan included in the Millennium Challenge Compact (Compact) signed on September 9, 2015 between the United States of America, acting through the Millennium Challenge Corporation (MCC), and Benin, acting through its government;
- will support provisions described in the Compact; and
- is governed by and follows the principles stipulated in MCC's *Policy for Monitoring and Evaluation* (MCC M&E Policy).

This M&E Plan is considered a binding document, and failure to comply with its stipulations could result in suspension of disbursements. It may be modified or amended as necessary following the MCC M&E Policy, and if it is consistent with the requirements of the program agreement and any other relevant supplemental legal documents.

LIST OF ACRONYMS

ABERME	Agence Béninoise d'Electrification Rurale
ARE	Autorité de Régulation de l'Electricité
CAMM	Contract Administration Management Manual
CBA	Cost-Benefit Analysis
CCR	Compact Completion Report
CEB	Communauté Electrique du Bénin
CI	Common Indicator
CIF	Compact Implementation Funding
CP	Condition Precedent
CSC	Comité de suivi et de contrôle des contrats
DESE	MCA-Benin II Economics and Monitoring and Evaluation Department
DiD	Difference-in-Differences
DQR	Data Quality Review
EDR	Evaluation Design Report
EIF	Entry into Force
EMC	Evaluation Management Committee
ERR	Economic Rate of Return
ESP	Environmental and Social Performance
FGD	Focus Group Discussion
FY	Fiscal Year
GoB	Government of Benin
GSI	Gender and Social Inclusion
GWH	Gigawatt-hour
HSE	Health, Safety and Environment
HV	High Voltage
IPP	Independent Power Producer
ITS	Interrupted Time Series
ITT	Indicator Tracking Table
KII	Key Informant Interview
KPI	Key Performance Indicator
kV	Kilovolt
kWh	Kilowatt-hour
LV	Low Voltage
M&E	Monitoring and Evaluation
MCA	Millennium Challenge Account
MCC	Millennium Challenge Corporation
MIS	Management Information System
MoE	Ministry of Energy

MVA	Megavolt amperes
MWh	Megawatt-hour
NDCC	National Dispatch and Control Center
NPV	Net present value
OCEF	Off-Grid Clean Energy Facility
OGEAP	Off-Grid Electricity Access Project
POC	Point of Contact
PV	Photovoltaic
QDRP	Quarterly Disbursement Request Package
SCADA	Supervisory Control and Data Acquisition
SBEE	Société Béninoise d'Energie Electrique
SGA	Social and Gender Assessment
SMS	Short Messaging Service
TOR	Terms of Reference
USG	United States Government

INTRODUCTION

This Monitoring and Evaluation Plan (M&E Plan) serves as a detailed framework for assessing progress towards and achievement of the Compact's project objectives. The M&E Plan is used in conjunction with other documents such as work plans, procurement plans, and financial plans to provide oversight for program implementation and to strive to ensure the program is on track to achieving its intended results. The M&E Plan also serves as a communications tool, so that Millennium Challenge Account Benin II (MCA-Benin II) staff and other stakeholders clearly understand the results MCA-Benin II is responsible for achieving.

This M&E Plan provides the following functions:

- *Describes the expected results.* The plan presents the program description, project logics, and economic analysis, including the results that need to be measured under the M&E Plan.
- *Establishes a monitoring framework*. The plan identifies the monitoring and data quality assessment strategies and documents the reporting plan to monitor progress against targets during program implementation.
- *Describes the evaluation plan*. The plan identifies evaluations that will be conducted and presents the plan for each including the evaluation questions, methodologies, and data collection strategies that will be employed.
- *Documents all M&E indicators to measure expected results*. The plan documents all indicators, including their baselines, targets, and data sources to assess program progress, and changes to indicators over time.
- *Includes roles and responsibilities*. The plan includes a description of the roles and responsibilities for the implementation and management of M&E.

Program and Objective Overview

Country Background

Since its transition to democracy in the 1990s, Benin's economic progress has been uneven. Indeed, from 1991 to 2001, average economic growth stood at 4.7% against 3.6% between 2002 and 2011, and 5.6% between 2012 and 2014. It is estimated at around 4% in 2016. and at 5.5% for the year 2017 and 6.5% in 2018. This upward trend in the growth rate observed from 2016 and maintained in 2019, estimated at 6.5%, experienced a strong decrease in 2020 (3.8%) due to the effects of the COVID-19 pandemic. Very resilient, the Beninese economy achieved an estimated growth rate of 7.2% in 2021 with prospects for 5.7% in 2022 and 6,2% in 2023. Benin has experienced high population growth (averaging 3% per annum over the last decade) with an unequal distribution of the benefits which has led to only marginal improvements in the poverty rate (45.9% of Benin's population was considered poor in 2020 compared to 49.7% in 2015, the most recent year for which data are available)[1]

The structure of Benin's economy has not changed significantly since 1990, with an embryonic manufacturing sector and a reliance on agriculture for nearly one-third of GDP. The main area of growth is the service sector, mainly in transportation and logistics, which accounts for 56% of national income. About 95% of the economically active population is employed in the informal sector (which accounts for about 70% of GDP), and Benin's economy remains dependent on Nigeria, its most important trading partner.

Compact Background

Benin was selected as eligible to develop a second compact by MCC's Board of Directors in fiscal year (FY) 2012.[2] A constraints analysis completed in October 2012 found **poor electricity infrastructure and an inadequate business environment** as the binding constraints to growth in Benin.

On September 9, 2015, acting on behalf of the United States Government ("USG"), MCC signed a second Compact with the Government of Benin (the "Government" or "GoB") focused on the electric power sector. The Compact, comprised of a US$375 million grant from the USG and a $28 million matching contribution from the GoB, aims to strengthen Benin's national electricity distribution utility, attract private sector investment, and fund infrastructure investments in electric generation and distribution as well as off-grid electrification for poor and unserved households. The Compact was amended in 2021 to extend its duration by one year and to add $16 million in additional resources to account for the consequences of the COVID-19 pandemic.

[1] World Bank, World Databank, 2015, 2020

[2] In FY 2014, Benin failed the Control of Corruption indicator and the Board limited the resources available to help further develop the compact. Benin passed the FY 2015 scorecard by passing twelve of twenty indicators, including Control of Corruption, and the Board reinstated eligibility and authorized resumption of all compact development activities.

The Compact in its entirety can be found at www.mcc.gov. Annex I to the Compact contains a detailed program description.

The Benin Compact will be implemented for a six-year period and has Entered-Into-Force[3] (EIF) on 22 June 2017. A Millennium Challenge Account entity, Millennium Challenge Account-Benin ("MCA-Benin II" or "MCA"), has been established to implement the Compact program. MCA-Benin II has been established as a legal entity in Benin and is governed by a public-private Board of Directors accountable to the President of the Republic of Benin.

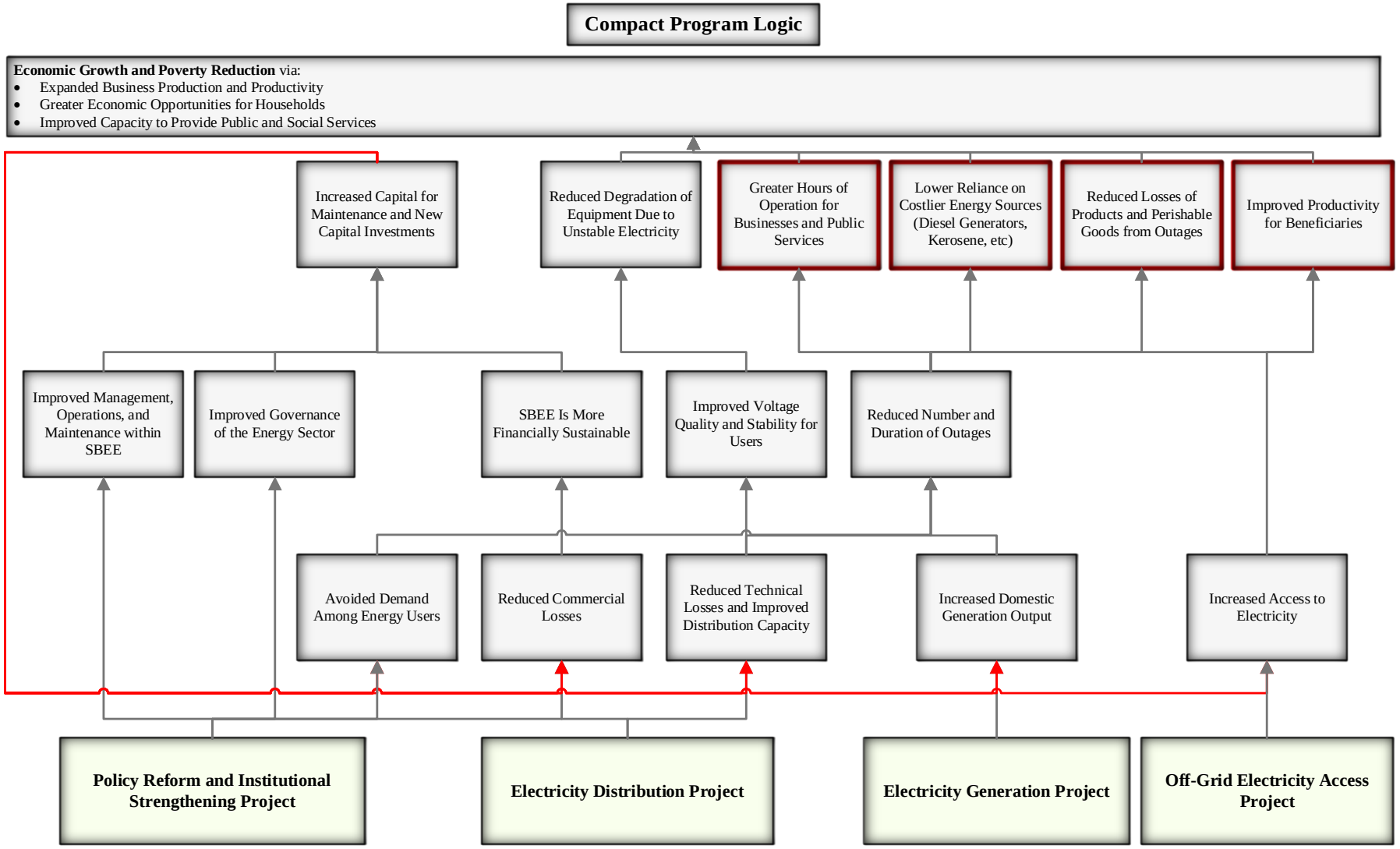
Compact Logic

The objective of the Program ("Program Objective") is to expand business production and productivity, generate greater economic opportunities for households and improve the capacity to provide public and social services by improving the quantity and quality of the supply of electricity. The Program Objective is expected to be achieved through four Projects depicted below.

[3] Entry into force is the start of MCC's Compact effectiveness period.

Compact Program Logic

Below is a Compact-wide program logic. More detailed, project-focused or activity-specific logics are in Annex IV.



NOTE: The results with a red border correspond to the Project Objectives of the generation, distribution, and off-grid projects as defined in Annex I of the Compact. “Reduced Degradation of Equipment Due to Unstable Electricity” is not formally defined as an objective-level result, but it is included in the Program Logic in Annex III of the Compact. The Policy Reform and Institutional Strengthening Project Objective is not explicitly included in this diagram.

Project Descriptions and Logics

Policy Reform and Institutional Strengthening Project Description and Logic

The Objective of the Policy Reform and Institutional Strengthening Project is to strengthen the capacity of the Société Béninoise d'Energie Electrique ("SBEE"), Autorité de Régulation de l'Electricité ("ARE"), and other Government of Benin institutions to improve the governance, management, and operations of the electricity sector ("Policy Reform and Institutional Strengthening Project Objective"). To achieve the Policy Reform and Institutional Strengthening Project Objective, the Compact will support interventions to (A) improve governance in the electricity sector by supporting an independent and professional regulator, reforming tariffs, introducing independent power producers (IPPs) and enhancing energy efficiency; (B) improve management, operations and maintenance within SBEE; and (C) inform and educate the public on tariffs, energy efficiency and other key electricity sector issues.

The *Policy, Regulation, and Institutional Support Activity* aims to improve the overall governance of the electricity sector in Benin by improving regulation, establishing a tariff policy, and providing an institutional framework for IPPs. MCC funding will support:

- Assistance to ARE through operational and capacity building; establishment of regulatory tools, processes, and procedures; preparation and implementation of tariff studies and development of a tariff policy and Tariff Plan to achieve cost-reflective tariffs, encourage private sector investment in power generation and ensure access for the poor;
- Expansion and strengthening of energy efficiency standards and labeling programs in Benin, including the formulation of technical standards, development of a program for product labeling, enhancement of product quality enforcement and testing, introduction of support for public sector procurement of energy efficient goods and industrial energy efficiency;
- Improvement of the environment for IPPs, including by establishing a legal and regulatory framework, standard forms of contract, credit enhancement mechanisms and a competitive solicitation process by means of technical assistance, transaction advisory services and other support; and
- Support of the legal review of the electricity codes (the Benin-Togo and the Benin Electricity Codes) to target necessary revisions and technical analysis of structuring options for Government and SBEE-owned generation assets, including creation of stand-alone generation enterprise.

The *Utility Strengthening Activity* aims to ensure the operational independence of SBEE and improve its core business functions so as to become more financially viable and better able to serve its customers. Together with the sector-wide improvements from the Policy, Regulation, and Institutional Support Activity, the Utility Strengthening Activity is expected to help improve key aspects of SBEE's operations and to result in its ability to better provide power to consumers of all income classes. MCC funding will support:

- A Contract Plan between GoB and SBEE to establish performance targets for the utility and mutual responsibilities of the government and the utility, signed in May 2017;

- A management services contract to improve the utility's performance in the following domains: planning, studies, and projects; technical; commercial; financial management and accounting; human resources; purchases, internal audit, information systems; health, safety, and environment (HSE); communications, and cross-cutting.
- An external contract auditor that will support the *Comité de suivi et de contrôle des contrats* (CSC) in validating a final list of key performance indicators (technical, commercial, human resources, environmental, and other) and monitor performance against the *contrat plan* and the management services contract.
- Improvements to human resources and customer service policies and procedures to ensure a work environment where women and men have equal opportunities to advance professionally.

The *Public Information and Education Activity* aims to inform the public about energy sector policy reforms and to change energy use behavior through information and education about energy efficiency, renewable electricity sources and related topics including tariff changes. To this end, the *Public Information and Education Activity* will create a program to educate customers about energy efficiency and renewable energy for household use. The Public Information and Education Activity will take into account differences in languages, education levels, gender and social groups, and rural and urban contexts and access to information and technology.

Electricity Generation Project Description and Logic

The Objective of the Electricity Generation Project is to: (A) increase the hours of operation for businesses and public and social services; (B) reduce reliance on costlier sources of energy; (C) reduce losses of products and perishable goods; and (D) improve productivity for users of electricity (the "Electricity Generation Project Objective"). To accomplish the Electricity Generation Project Objective, MCC Funding will be used to increase Benin's domestic generation capacity by 50 MW while decreasing its dependence on external imported energy sources specifically by supporting transactions for four IPP photovoltaic plants.

This Project has changed considerably since MCC and the Government of Benin signed the Compact in September 2015. At that time, the Generation Project was comprised of three activities: the Thermal Generation Activity, Photovoltaic ("PV") Generation Activity, and the Hydroelectric Generation Activity.

A. In 2016, MCC removed the Thermal Generation Activity ($12.475 Million) from its investment as a result of the Government of Benin moving forward with the rehabilitation of the three thermal generating units using national funds. Simulations conducted in preparation for the drafting of the Investment Memorandum demonstrated that the planned Thermal Generation Activity increased the ERR from 7.5% to 11.5%.
B. MCC removed the Hydroelectric Generation Activity from the Compact as a result of an MCC feasibility study that identified significant risks. It found that environmental studies alone would take at least two years, which would make it difficult, if not impossible, to complete within the Compact period. The feasibility consultant also anticipated higher than expected costs and an unacceptably low ERR.
C. For the PV Generation Activity, MCC went from a design and build approach to an IPP transaction approach. Discussions with GoB on the change in approach commenced shortly

after compact signing as a way of introducing private sector investment into the power sector and leveraging compact funds. GoB approved the shift and the hiring of the transaction advisor for which the procurement was launched in 2017. The scope of the transaction advisory services, which commenced in mid-2018, includes developing the IPP framework, standard forms of contract (e.g., Power Purchase Agreement, Concession Agreement, Interconnection Agreement), developing the technical and environmental requirements for an IPP transaction, structuring and leading the transaction and assisting GoB through to commercial and financial close with the objective of seeing 50 MW of solar PV plants constructed and commissioned by the compact end date using private sector funding.

The **Photovoltaic ("PV") Generation Activity** aims to address Benin's power supply deficit by providing a renewable source of electricity. MCC funding will be used to fund transaction advisory fees; the cost of land acquisition and resettlement; preliminary environmental studies at the project sites; geotechnical studies and other site investigation work; as well as fees for credit enhancements mechanisms provided by third parties to support the transactions for the following plants.

A. A 10 MW PV power plant at Natitingou;
B. A 10 MW PV power plant at Djougou;
C. A 15 MW PV power plant at Parakou; and
D. A 15 MW PV power plant at Bohicon.

Electricity Distribution Project Description and Logic

The Objective of the **Electricity Distribution Project** is to (A) increase the hours of operation for businesses and public and social services, (B) reduce reliance on costlier sources of energy, (C) reduce losses of products and perishable goods due to outages, and (D) improve productivity for users of electricity (the "Electricity Distribution Project Objective"). To accomplish the Electricity Distribution Project Objective, MCC Funding will be used to modernize Benin's electricity distribution infrastructure to expand grid capacity to accommodate future growth, improve reliability and reduce losses and outages. The Electricity Distribution Project focuses on improving the grid serving Cotonou, and selected regional networks (Bohicon, Parakou, Djougou, Natitingou) as a complement to proposed solar generation investments, as well as on a national level by building a modern distribution dispatch and control center and backup to more effectively manage the network. The Electricity Distribution Project consists of three Activities.

The **Regional Grid Strengthening Activity** will support the replacement of lines, upgrading substations, installation of new switchgear connections and building of new substations for the cities of Bohicon, Natitingou, Parakou and Djougou to support the interconnection of this Compact's investments under the Photovoltaic Generation Activity, to meet demand growth in those regional population centers and reduce technical losses. This will result in:

- Replacement of transformers in and around Natitingou (78); Djougou (50); and Parakou (81);
- Construction of new 58.90 km of 33 kV lines including 44.8 km of underground lines (Djougou, Natitingou and Parakou) and 14.1 km of overhead lines in Parakou.
- Rehabilitation of 836 km of 33kV lines in Djougou, Natitingou and Parakou.

- Construction and extension of substations:
    - Bérecingou: Substation 33kV -- New 33kV building and switchgear.
    - Natitingou Nord: New Substation 33 kV
    - Vèdoko: Station 63/15 kV GIS -- New building and 63kV GIS switchgear
    - Maria Gléta: Station 63 kV AIS -- New control building, complete 63kV switchyard
    - Bohicon: Substation 20 kV -- New building with 20kV switchgear to replace the existing
    - Parakou: Substation 33 kV -- New building and 33kV switchgear

The **Cotonou Grid Strengthening Activity** will both increase the capacity of the Cotonou grid and improve reliability of the network through investments in a variety of priority infrastructure projects, including new lines, switchgears, substations and network extensions.

MCC financing will support the construction of 46.37 kilometers of new 63 kV lines:

- Vèdoko - Gbedjromèdé (5.1 km);
- Gbedjromèdé - Croix-Rouge (5.1 km);
- Croix-Rouge – Cim-Bénin (7.1 km);
- Akpakpa – Cim-Bénin (4.8 km);
- Vèdoko - Fidjrossè (5 km);
- Vèdoko - Cadjehoun (5.1 km);
- Fidjrossè - Cadjehoun (3.6 km);
- Vèdoko - Ancient Pont (7.5 km) and
- Ancient Pont - Akpakpa (3 km)

MCC financing will support the construction of 20 kilometers of new 15 kV lines:

- Gbedjromèdé - Croix-Rouge (5.31 km) and,
- Fidjrossè - Airport (14.7 km)

MCC financing will support the construction and rehabilitation of substations:

- Construction and extension of substations:
    - Gbèdjromèdé: Substation GIS 63/15 kV New
    - Croix-Rouge: Substation GIS 63/15 kV New
    - Cim Benin: Substation GIS 63/15 kV New
    - Fidjrossè: Substation GIS 63/15 kV New
    - Aéroport: Substation GIS 63/15 kV New
    - Ancien Pont: Substation GIS 63 kV -- Existing but completely modified and extended

The **National Electricity Dispatch Activity** will construct a national distribution and control center ("NDCC"), a necessary requirement to accommodate the planned photovoltaic generation and to provide real-time network monitoring, control, and data collection. MCC Funding will support (A) project preparation (site acquisition and/or preparation, permitting, environmental and

social assessment and resettlement action planning and implementation, including compensation and restoration of livelihood (to the extent necessary)); (B) acquisition and installation of master station hardware, software and related services for NDCC; (C) supervisory control and data acquisition ("SCADA") equipment; (D) telecommunication system equipment and installation; (E) new buildings for main and backup NDCC including furnishings; (F) testing and commissioning; (G) spare parts, tools, and training; and (H) engineering design, supervision and warranties. MCC funding also will be used for distribution substation modifications in preparation for connection to the SCADA system. The Activity included the installation of advanced meter infrastructure and automatic meter reading for large customers compatible with the SCADA system, but this component was removed during the design phase.

Off-Grid Electricity Access Project

Two-thirds of Benin's population does not have access to electricity. Many of these people are in rural areas where expansion of the existing grid is unlikely in the near or medium-term. **The Objective of the Off-Grid Electricity Access Project is to increase access to electricity and thereby (A) increase the hours of operation for businesses and public and social services, (B) reduce reliance on costlier sources of energy, (C) reduce losses of products and perishable goods, and (D) improve productivity for users of electricity (the "Off-Grid Electricity Access Project Objective").** To accomplish the Off-Grid Electricity Access Project Objective, MCC funding will provide financing for off-grid electrification, including institutional and household-level solar photovoltaic (PV) systems and mini-grid systems, and energy efficiency activities nationwide through a grant facility, together with necessary funding for policy and institutional strengthening to support the entire off-grid electricity sector in Benin.

The *Enabling Environment for Off-Grid Electricity Activity*: Benin does not have the capital required for a rapid expansion of the nation's electric network. To accelerate the rate of electrification, an enabling environment for off-grid electricity is essential. To that end, MCC Funding will support:

- Design and implementation of a national off-grid electrification framework in form and substance satisfactory to MCC ("*National Framework*"). The National Framework will articulate a model for off-grid electrification to include regulatory and institutional framework, licensing, tariff evaluations, regulations and technical standards. Such model will be designed to ensure minimum technical specifications, quality of service standards, licensing, pricing and contracting arrangements, and consideration of gender and social inclusion needs and concerns; and
- Development of market information, market characterization, outreach to the private sector and sector donors, and community-led engagement on the OCEF (Off-Grid Clean Energy Facility Activity).

The *Off-Grid Clean Energy Facility Activity* will increase access to electricity for the currently unconnected majority of the population in rural and peri-urban areas by reducing or removing initial cost and investment barriers for off-grid electricity service providers. MCC funding will support the establishment of OCEF and grants issued there under in four primary windows:

- Critical public infrastructure to provide stand-alone electricity generation capability ("*Window One*");

- Mini-grids providing electricity generation and distribution for household, commercial, agricultural and industrial use ("*Window Two*");
- Household generation, storage, and productive uses, such as renewable energy source devices for individual families ("*Window Three*"); and
- Energy efficiency measures for buildings, facilities and installations *("Window Four",* and together with Window One, Window Two and Window Three, the "*OCEF Window*").

OCEF will seek to leverage MCC funding through partnerships with private companies, non-governmental organizations, local governments, community-based organizations, municipalities, or other entities that demonstrate viable off-grid, clean energy solutions for Benin.

Projected Economic Benefits

Table 1: Results from Cost-Benefit Analysis (CBA) of Benin II Projects

Project	Original Economic Rate of Return (ERR)	Date Original Economic Rate of Return (ERR) Established	Current Economic Rate of Return (ERR)	Date Current Economic Rate of Return (ERR) Established
Policy Reform and Institutional Strengthening Project	11.5%	April 2015	8.6%	April 2023
Generation Project				
Distribution Project				
Off-Grid Electricity Access Project – Pooled Call 1 Solar Home System Grants	10%	April 2019	17.2%	April 2023
Off-Grid Electricity Access Project – Pooled Call 2 Solar Home System Grants	24%	June 2020		
Off-Grid Electricity Access Project – Pooled Call 2 Mini-Grid Grants	19%	June 2020	13.3%	April 2023

The On-Grid CBA combines the Generation, Distribution, and Policy Reform and Institutional Strengthening Projects to adequately reflect the complementarities among them.

The Off-Grid Electricity Access Project ERRs were calculated for each individual grant on receipt of grant proposals under the off-grid facility. For each proposal call, the pooled ERR for approved grants with similar program logics (e.g., solar home systems, solar mini-grids, etc.) will be required to exceed 10%.

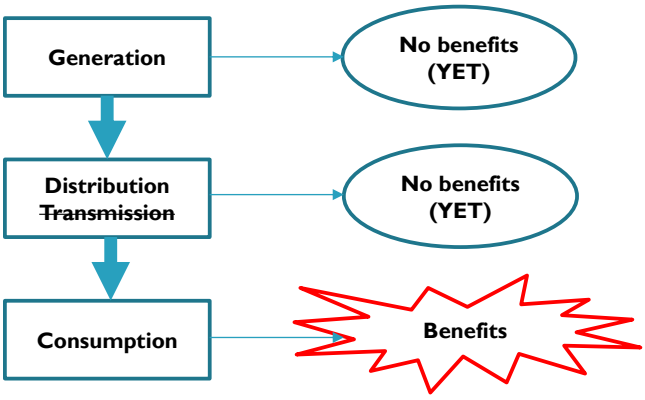
Benin Power Compact Economic Analysis

The Benin II on-grid cost-benefit analysis model forecasts the discounted stream of benefits resulting from increased energy consumption and reduced utility cost per unit of energy served

resulting from compact activities. In particular, increased load carrying capacity and reduced technical losses on the distribution network, and increased generation supply are expected to increase energy served to consumers and to reduce the cost to the utility per kWh served. Due to strong complementarities between the on-grid activities, the on-grid ERR was calculated taking into account all Benin II Compact costs and benefits, except for those of the Off-Grid Electricity Access Project, which are analyzed separately. Costs for engineering design and construction are obtained from feasibility studies, while administrative and M&E costs are an MCC estimation.

Benefits are modelled starting with forecast energy sources (including those financed by the compact), which are tracked through the distribution system. The delivery of these sources to consumers is constrained both by technical losses and the load carrying capacity of the network. Finally, consumption is constrained by forecast consumer demand. Increased energy consumption is valued in dollar terms by the price differential between what consumers are willing to pay and the actual cost of delivering the energy. Willingness to pay was calculated using a nationwide survey conducted by Benin's national statistics agency in partnership with MCC. The cost to the utility of delivering energy is based on the compact supported tariff study analysis.

The figure below summarizes how increased energy consumption benefits are captured in the benefit-cost analysis model. The figure shows that both improved distribution and new generation are expected to increase energy availability. The benefits accrue only if the energy is consumed.



Additional details on the Benin Power Compact Economic Methodology are found in Annex V.

The Off-gird project, *OGEAP*, ERRs were separately calculated for each OCEF grant proposal. For each proposal call, the pooled ERR for approved proposals with similar program logics (e.g. all stand-alone solar system proposals, all solar mini-grid proposals, etc) was required to exceed 10%. The primary benefit streams were 1) cost savings from substituting stand-alone solar system energy sources for more expensive energy sources consumed without the project, and 2) consumer surplus resulting from increased consumption as a result of the availability of lower-cost solar system energy. Substitution was assumed to occur for energy sources primarily used for lighting but not for energy sources primarily used for cooking, consistent with observed effects in the literature. The Enabling Environment for Off-Grid Electricity Activity is considered a necessary precondition for these benefits to occur.

Projected Program Beneficiaries

According to MCC's Guidelines for Economic and Beneficiary Analysis, beneficiaries are individuals expected to experience better standards of living due to Compact activities increasing their real incomes. The CBA for proposed projects details benefit streams through which beneficiaries are expected to experience increased income.

The expected participants for the Compact are presented in the table below.

Projected Program Participants

Project	Program Participant Definition	Est. Number of Program Participants[4]
Policy Reform and Institutional Strengthening	SBEE staff, ARE staff, line ministries staff, IPPs and NGOs in the sector that have participated in project-funded trainings or implementation of the reforms	2404
Generation	Stakeholders (local, national or international) involved in the Generation activities	325
Distribution	Stakeholders (local, national or international) involved in the Distribution activities	2000
Off-Grid Electricity Access	ABERME staff, line ministries staff, NGOs, project developers that have participated in project-funded trainings or implementation of the OCEF	584

[4] These figures are based on existing data from SBEE, Ministry of Energy and GOPA's reports. They have been validated by respective sector leads. However, they are likely to change as implementation progresses.

Projected Program Beneficiaries (as of April 2023)

Project	Program Beneficiary Definition	Est. Number of Beneficiaries	Present Value (PV) of Benefits[5]	Net Present Value (NPV)[6]
Generation Project	Number of individuals in households and owners of commercial enterprises[7] connected to the grid during the 20-year analysis period.	10,600,000	$241,900,000	-$30,900,000
Distribution Project				
Policy Reform and Institutional Strengthening Project				
Off-Grid Electricity Access Project – Pooled Call 1 Solar Home System Grants	Number of individuals in households and owners of commercial enterprises obtaining a solar home system as a result of the grants in year 20.	200,000	38,900,000	$6,000,000
Off-Grid Electricity Access Project – Pooled Call 2 Solar Home System Grants				
Off-Grid Electricity Access Project – Pooled Call 2 Mini-Grid Grants	Number of individuals in households and owners of commercial enterprises obtaining a mini-grid connection as a result of the grants in year 20.	200,000	$79,600,000	$10,700,000
Overall Compact		11,000,000	$360,400,000	-$14,200,200

[5] The Present Value (PV) of Benefits is the sum of all projected benefits accruing over the life of the project (20 years in this case), evaluated at a 10% discount rate.

[6] The NPV illustrates the net benefits, which subtract the discounted costs from the discounted benefits. MCC cost-benefit analyses report two main summary statistics: the economic rate of return (ERR) and NPV. These provide a more complete picture and allow for comparison across projects.

[7] Commercial enterprises include formal and informal businesses. For both informal and formal businesses, only the owner is counted as a beneficiary. Where available information signals that the owner of a business has already been counted as a beneficiary at the household level, to avoid double counting, s/he is removed from the category of business owner beneficiary.

Summary of Monitoring Strategy

The program will be monitored systematically through indicators and progress will be reported regularly during implementation. Monitoring data will be analyzed to allow managers of MCA-Benin II and MCC to make programmatic adjustments as necessary with a view towards improving the overall implementation and results of the program.

An indicator is mapped to each result in the project logic diagram to track the project logic over time. MCC M&E distinguishes between four indicator levels: outcome, output, process, and risk/assumption. They are defined below:

Outcome Indicator - An indicator that measures a targeted result of an intervention's outputs. Often many outcome indicators are not monitored during the life of the program, but rather are reported through evaluations after the program is complete.

Output Indicator - An indicator that measures the goods or services produced as the direct result of the expenditure of program funds.

Process Indicator - An indicator that measures progress toward the completion of an activity, a step toward the achievement of project outputs and serves as a way to ensure the work plan is proceeding on time.

Risk/Assumption Indicator – An indicator that measures a risk or assumption in the project logic.

To ensure that the program is on track to meet its objectives, the indicators will be measured against established baselines and targets, derived from ex-ante cost-benefit analysis, other types of analysis, and project design documents. The baseline is the value of an indicator prior to a development intervention, against which progress can be assessed or comparisons made. The target is the expected value for a particular indicator at a particular time and reflects the underlying assumptions made in project design about what the project will likely achieve.

MCC uses common indicators to consistently measure progress across programs in key sectors and report those results to internal and external stakeholders. MCC's relevant common indicators are included in this M&E Plan.

The Indicator Documentation Table defines each indicator by project and can be found in Annex I. Baselines and targets for each indicator are defined in Annex II.

The MCA-Benin II Economics and Monitoring and Evaluation Department (DESE) shall consult and assist implementing entities in setting up their data collection plan and reporting templates to report on the relevant indicators included in this plan.
, the second in December 2021.one is has contracted with Société de Développement International,

Standard Reporting Requirements

Reporting to MCC: Quarterly Disbursement Request Package
Performance reports serve as a vehicle by which the MCA Management informs MCC of implementation progress and on-going revisions to Project work plans. Currently, MCC requires that MCA submit a Quarterly Disbursement Request Package (QDRP) each quarter. The QDRP must contain an updated ITT and a narrative report. MCA Benin II has not submitted an ITT narrative report since Q13 (July 2020 - Sept 2020) with agreement of MCC. A complete ITT presents the preceding quarters' indicator actuals and current quarter indicator progress against targets set forth in this M&E Plan. The ITT is the source for MCC's internal and external reporting on indicator progress.

Additional guidance on reporting is contained in MCC's *Guidance on Quarterly MCA Disbursement Request and Reporting Package*.

Reporting to MCA and Local Stakeholders

Even though the QDRP is required to be sent to MCC, MCAs use also these reports and the data included in them to assess progress and performance internally. The M&E teams attempt to align MCC and MCA reporting so that data is used to inform decision-making at both levels

Data Quality Reviews

As a data-driven agency, MCC is committed to ensuring all data used in the development, implementation, and evaluation of a project are of good quality. Data quality is essential for maintaining a high level of confidence in MCC's decision making as well as for transparent reporting of MCC's results.

Data quality is the primary responsibility of the MCA-Benin II staff, led by the M&E Director. The M&E Unit, other MCA staff, as appropriate, and implementing entities should regularly check data quality. The M&E Unit should verify that all reported data has appropriate source documentation and that calculations have been done correctly. The MCA-Benin II Economics and Monitoring and Evaluation Department (DESE) will conduct field visits on a regular basis or whenever requested by MCC, to review the quality of the data gathered through this M&E Plan. MCA-Benin II may hire individual data quality monitors to monitor data collection and quality, as needed.

In addition to regular data quality checks by MCA staff, independent Data Quality Reviews (DQRs) will be conducted in accordance with the requirements of the MCC M&E Policy.

The objectives of DQRs are to assess the extent to which data meets the standards defined in the MCC M&E Policy in the areas of validity, reliability, timeliness, precision and integrity. DQRs will be used to verify the consistency and quality of data over time across implementing agencies and other reporting institutions. DQRs will also serve to identify where the highest level of data quality is not possible, given the realities of data collection.

The particular objectives for the DQRs will include identification of the following parameters: i) what proportion of the data has quality problems (completeness, conformity, consistency, accuracy, duplication, integrity); ii) which of the records in the dataset are of unacceptably low quality; iii) what are the most predominant data quality problems within each indicator; iv) what are the main reasons behind low quality; and v) what steps can be taken to improve data quality.

MCA-Benin II will contract an independent data quality reviewer in compliance with the MCC Program Procurement Guidelines and the Procurement Operations Manual. A first data quality review was conducted in 2017 and a second in 2021.

EVALUATION COMPONENT

Summary of Evaluation Strategy

While good program monitoring is necessary for program management, it is not sufficient for assessing whether the expected results of an intervention are achieved. Therefore, MCC and MCA-Benin II will use evaluation to 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. If the MCA-Benin II wishes to engage an evaluator, the engagement will be subject to the prior written approval of MCC. Contract terms must ensure non-biased results and the publication of results.

MCC and MCA-Benin II are 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.

MCA-Benin II 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 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.

Other evaluation studies that complement the independent evaluations described above may be undertaken by MCC or MCA M&E or others.

Below is a table with some of the key indicators to be measured through independent evaluations. The PRIS Project is excluded from this table, because the data for most of that project's objective-level indicators will be derived from administrative source.

Results Statement	Indicator level	Indicator name [8]	CI Code	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information/comments
Objectives for the Generation and Distribution Projects										
Reduced Degradation of Equipment Due to Unstable Electricity[9]	Outcome	Occurrence of equipment and appliance failure	NA	Average number of equipment or appliance failures occurring as a result of poor electricity	Number	Region Sex	In-person and high-frequency mobile phone surveys of businesses	Mathematica	Three (3) rounds of in-person data collection Thirteen (13) rounds of phone survey	
		Average cost of replacing or repairing defective equipment/appliances	NA	Sum of costs to replace or repair damaged equipment / Total occurrences of equipment or appliance failures	Local currency	Region Sex	In-person and high-frequency mobile phone surveys of businesses	Mathematica	Same as above	
Greater Hours of Operation for Business and Public Services		Weekly hours business is open	NA	Number of hours in a week that a business is open	Hours	Firm Size, Region Sex	In-person and high-frequency mobile phone surveys of businesses	Mathematica	Same as above	Public services are not included in the quantitative surveys. The effect on public services will be assessed qualitatively.
		Outages during business hours	NA	Average number of outages occurring during business hours	Hours	Firm Size Region Sex	In-person and high-frequency mobile phone surveys of businesses	Mathematica	Same as above	

[8] Baselines and Targets for this indicator will be determined and included in later versions of the Plan

[9] While included in the Compact, this outcome is not formally part of the Project Objective. It is closely related to the Objective on "Reduced Losses of Products and Perishable Goods".

Results Statement	Indicator level	Indicator name[8]	CI Code	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information/comments
Lower Reliance on Costlier Energy Sources		Share of costlier energy sources in total energy consumption	NA	Amount of energy consumed from generators, candles, kerosene, biomass, or other energy sources as percentage of total energy consumption	Percentage	Region, Firm size, Sex	In-person and high-frequency mobile phone surveys of businesses and households	Mathematica	Same as above	
		Financial share of costlier energy sources in total energy consumption	NA	Cost of energy consumed from generators, candles, kerosene, biomass, or other energy sources as percentage of total cost of energy consumption	Percentage	Region, Firm size, Sex	In-person and high-frequency mobile phone surveys of businesses and households	Mathematica	Same as above	
Reduced Losses of Products and Perishable Goods		Revenue lost from stopped production	NA	Average value of revenue lost due to electricity outages and poor electricity quality as percentage of total sales value	Percentage	Region, Firm size Sex	In-person and high-frequency mobile phone surveys of businesses	Mathematica	Same as above	
		Cost of restarting production	NA	Average cost of restarting production when production is stopped because of outages or poor electricity quality	Local currency	Region, Firm size Sex	In-person and high-frequency mobile phone surveys of businesses	Mathematica	Same as above	
		Cost of spoilage (destruction of raw materials)	NA	1. Average cost of spoilage of perishable goods as a result of outages or poor electricity quality 2. Average cost of spoilage of production batches as a result of outages or poor electricity quality	Local Currency	Region, Firm size Sex	In-person and high-frequency mobile phone surveys of businesses and households	Mathematica	Same as above	
Increased Productivity for All Users		Business profit	NA	Profits in the past 30 days as reported by businesses	Percentage	Region, Firm size Sex	In-person and high-frequency mobile phone surveys of businesses	Mathematica	Same as above	

Results Statement	Indicator level	Indicator name[8]	CI Code	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information/comments
Evaluation Level Results and Indicators for the Off-Grid Energy Access Project[10]										
Increased use of off-grid electricity **Objective - Level**	Outcome	New connections	N/A	**Surveys**: share of households with access to minigrid connections **Grantee data**: # of SHS sold and number of minigrid customers/population	Fraction (or share)	Consumer type	Surveys and grantee data	Social Impact	Baseline and endline	This result also has a corresponding monitoring indicator in Annexes 1 + 2 which will be collected through the ITT
		Electricity consumption per month	N/A	1. **Surveys:** kW-hr electricity consumed per household with access to minigrid connections share w/minigrid connections 2. Estimate of SHS consumption * # of SHS sold (**grantee data**)	Kilowatt hours	Consumer type	Surveys and grantee data	Social Impact	Baseline and endline	

[10] These evaluation indicators will be updated during the upcoming evaluation design report modification.

Results Statement	Indicator level	Indicator name [8]	CI Code	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information/comments
Increased Adoption of Electrical Appliances		Ownership and use (frequency/duration) of appliances and machines, timing of purchases	NA	1. Share of hhs/firms owning electric appliances/machines 2. hrs/wk of hhs/firms using electric appliances/machines	Fraction (or share); Total # appliances per hh/firm	Consumer type	Surveys	Social Impact	Baseline and endline	*Appliance list*: HH: light bulbs, radio, television, phone, computer, other Firm: light bulbs, phone, refrigerator/freezer, computer, hair styling, power tools, iron, audio-visual equipment, other
		Access to different modern energy services (e.g., lighting, refrigeration)	NA	Share of hhs/firms using electricity for energy services	Fraction (or share)	Consumer type	Surveys	Social Impact	Baseline and endline	*Services list*: Lighting, cooking, cooling, communications, entertainment, production, other
		Consumer surplus from appliance ownership	NA	**Calculated** from purchase price vs. ownership rate data among connected hhs	CFA Francs	Consumer type	Surveys	Social Impact	Baseline and endline	Calculation based on extrapolation of demand data w/linear demand assumption
Increased Hours of Operation of Businesses and Public and Social Services **Objective - Level**		Weekly hours businesses and public services are open	NA	# hours in a week that businesses / public services are open	Hours/wk	Establish-ment type	Surveys	Social Impact	Baseline and endline	*Public services list*: Schools, health clinics, religious institutions, community centers

Results Statement	Indicator level	Indicator name [8]	CI Code	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information/comments
										Firm types: Shops, agro processing, manufacturing, services
		Households using public services	NA	Share of hhs using public services	Fraction (or share)	Service type	Surveys	Social Impact	Baseline and endline	*Public services list*: Schools, health clinics, religious institutions, community centers
		Quality of public services	NA	Rating of public services	Likert scale	Service type	Surveys	Social Impact	Baseline and endline	Scale: 1-very poor, 2-mediocre, 3-satisfactory, 4-good, 5-excellent
Reduced Reliance on Costlier Sources of Energy **Objective - Level**		Other fuel and energy-related (equipment, battery, collection time) costs per month	NA	Spending on energy sources that are not electricity	CFA Francs/ month	Consumer type	Surveys	Social Impact	Baseline and endline	Energy sources include alternative fuels (e.g., firewood, diesel), batteries, self-generation equipment (e.g., generators)
Improved Productivity for Users of Electricity **Objective - Level**		Time savings and changes in time allocation and timing across activities, especially for productive use per week	NA	Time allocated to different activities	mins/day	HH Head and spouse (Household only)	Surveys	Social Impact	Baseline and endline	*Activity types:* Rest; leisure; domestic labor; income generation; other From time use module
Reduced Losses of Products and Perishable Goods **Objective - Level**		Value of lost perishables per month	NA	Losses/waste	CFA Francs/ month	Consumer type	Surveys	Social Impact	Baseline and endline	
Increased Welfare for Businesses and Households		Average Household Expenditures related to air pollution per month	NA	Consumption	CFA Francs/ month	N.A. (Household only)	Surveys	Social Impact	Baseline and endline	From consumption module of hh survey
		Revenue and/or net income per month	NA	1. HH/Firms: Revenue 2. HH/Firms: Income	CFA Francs/ month	Consumer type	Surveys	Social Impact	Baseline and endline	From output and revenues module of firm survey, from household roster

Results Statement	Indicator level	Indicator name [8]	CI Code	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information/comments
										and household businesses modules of hh survey
		Number of firms in community	N/A	# of firms per minigrid community	CFA Francs	Type of firm	Surveys and grantee data	Social Impact	Baseline and endline	*Firm types*: Shops, agro processing, manufacturing, services From community surveys
		Non-fuel cost savings per month	NA	Costs of firms per minigrid community (endline – baseline)	CFA Francs	N.A. (Firm only)	Surveys	Social Impact	Baseline and endline	From costs module of firm survey

Special Studies

Either MCC or the Government may request special studies or ad hoc evaluations of Projects, Activities, or the Program as a whole prior to the expiration of the Compact Term.

Examples of such special studies include:

- A staff survey of the *Société Béninoise d'Energie Electrique* (SBEE) will be conducted to provide an overview of SBEE staff perceptions to inform the work of the SBEE Management Services Contractor.
- A gender audit of SBEE has been undertaken to assess equal opportunities and access in human resources and customer service practices.
- An SBEE customer satisfaction study;
- ImplementationA survey of GoB implementing entities satisfaction survey. and stakeholder organizations.
- A survey of the public and private sector entities benefiting from the energy efficiency audits.

Specific Independent Evaluation Plans

Summary of Specific Independent Evaluation Plans

The following table summarizes specific evaluation plans.

Evaluation Name	Evaluation Type	Evaluator	Primary/ Secondary Methodology	Final Report Date
Policy Reform and Institutional Strengthening Evaluation	Performance Evaluation	Mathematica	Pre-post, mixed methods performance evaluation grounded in political economy, which relies heavily on project monitoring data and key informant interviews (KIIs).	Late 2025
On-Grid Generation and Distribution Evaluation	Performance and Impact	Mathematica	Interrupted time-series (ITS) approach, quantitative pre-post, and qualitative performance evaluation.	Sept 2026
Off-Grid Evaluation	Performance and impact evaluation	Social Impact	Pre-post performance evaluation on assessing implementation and market effects; Impact evaluation with a DiD (difference-in-differences) identification strategy, centered on a collection of mini-grid investments, and an quantitative ex-post evaluation of solar home systems grants	April 2026

Policy Reform and Institutional Strengthening Evaluation

The Policy Reform and Institutional Strengthening evaluation aims to assess the extent to which the project has met its desired goals (as well as any unanticipated consequences). The evaluation design report is saved here: https://data.mcc.gov/evaluations/index.php/catalog/262.

Evaluation Methodology Description

Mathematica is implementing a mixed method pre-post performance evaluation to assess the Reform Project's implementation, that is, whether the program was implemented as planned, how well the activities and sub-activities were integrated, and what facilitated or inhibited implementation of the project. The evaluation use also a combination of quantitative and qualitative data to assess outcomes of the project, focusing on whether, how and why activities and sub-activities achieved objectives. The table below lists the key outcome(s), methodology, and data source for each evaluation question. An asterisk (*) denotes outcomes that will not be reported in the interim report.

Evaluation questions

Project Wide

Evaluation Question	Key Outcome	Methodology	Data Source
Q.A.1. What is the fidelity and degree of program implementation? In the event of deviations from the original design (e.g., in terms of objectives, activities, or beneficiaries), why did they occur and what were the implications for overall outcomes and intended results? What were the barriers and facilitators to implementation?		Comparison of implementation goals versus results, using political economy lens to explain deviations	• Desk review • KIIs • Focus group discussions
Q.A.2. Were the sub-activities timed and sequenced in such a manner to facilitate the achievement of expected results?		Synthesis of stakeholder perceptions	• Desk review • KIIs

Energy Efficiency Sub-Activity

Evaluation Question	Key Outcome	Methodology	Data Source
Q.B.1. To what extent has the Government of Benin adopted and implemented policies	Degree of adoption of key energy efficiency policies and actions	Descriptive analysis	• KIIs • Document reviews Administrative data

and actions to improve energy efficiency?			
Q.B.2. To what extent were new or strengthened standards and labeling for energy efficiency implemented during the Compact?	Degree of implementation of new/strengthened standards and labels	Descriptive analysis	• KIIs • Document reviews Administrative data
Q.B.3. To what extent have retailers begun selling energy-efficient labeled merchandise? Has the proportion of energy efficient vs. non-energy efficient products on the market changed in terms of availability and sales?	Sales of energy-efficient–labeled appliances*	• Pre-post analysis Qualitative outcomes analysis	• Survey of appliance sellers • Observations at major retailers • KIIs Administrative data

Independent Power Producer Sub-Activity

Evaluation Question	Key Outcome	Methodology	Data Source
Q.C.1. To what extent were new policies and frameworks for IPPs implemented?	• Degree of implementation of IPP framework	• Qualitative descriptive analysis	• Document review • KIIs
Q.C.2. Have any IPP transactions reached financial close?	• Number and characteristics of IPPs reaching financial close	• Mixed-methods descriptive analysis	• Document review • KIIs
Q.C.3. How much private investment is there in IPP power generation in Benin?	• Value of private investment	• Quantitative descriptive analysis	• Administrative data • KIIs
Q. C.4. What percentage of Benin's electricity consumption is produced by IPPs?	• IPP production of energy*	• Pre-Post outcomes analysis of trend in IPP- generated electricity	• Administrative data from MCA/SBEE
Q.C.5. What percentage of Benin's electricity consumption is produced from clean energy sources?	• Clean energy production of energy*	• Pre-Post outcomes analysis of trend in clean energy generation	• Administrative data from MCA/SBEE
Q.C.6. Are the PPAs and associated agreements in place being respected? Is the utility paying the IPPs on time? Have any government guarantees	• PPA adherence* • Guarantee call-up	• Qualitative analysis of stakeholder accounts	• Administrative data from ARE • KIIs

been drawn on as a result of non-payment? Are there any arbitrations or legal proceedings between the parties to an IPP transaction?			
Q.C.7. Do IPPs perceive the regulatory framework as credible and transparent?	• Perceived credibility and transparency of the framework	• Qualitative descriptive analysis of stakeholder perceptions	• KIIs

Regulation and Tariff Policy Sub-Activity

Evaluation Question	Key Outcome	Methodology	Data Source
Q.D.1. To what extent has the new tariff policy been implemented? To what extent do electricity tariffs in Benin reflect the cost of service?	• Degree to which tariffs are cost-reflective	• Qualitative analysis with a political economy lens • SBEE financial analysis	• Document review • KII • Administrative data
Q.D.2. Has the sector regulator assumed its mandated role in setting and adjusting tariffs?	• Extent to which ARE sets and adjusts tariffs	• Qualitative analysis	• KII
Q.D.3. What is the level of public acceptance of the new tariffs among the different categories of households, businesses, and public services? Have consumers changed their consumption of electricity after new tariffs went into effect?	• Payment of electricity bills	• Pre-post analysis of consumption • Qualitative descriptive analysis	• Administrative data • Telephone surveys • Press review
Q.D.4. Are the structures and procedures in place to allow recurring adjustments to the tariff, such that it will be able to remain cost-reflective into the future?	• Tariff-setting tool in use, data available for input to tariff -setting tool	• Qualitative sustainability analysis	• Document review • Administrative data • KIIs
Q.D.5. How has the new tariff structure	• SBEE solvency	• Pre-post analysis	• Administrative data • Document review

affected SBEE's balance sheet, income statement, and cash flow statement?		• Qualitative contribution analysis	
Q.D.6. How much infrastructure improvement (including network expansion, maintenance improvement, new capital investments, and staff training) was financed by increased cash flow, if any?	• Increased capital for utility maintenance and new capital investments	• Pre-post outcomes analysis of trend in SBEE infrastructure expenditures • Qualitative contribution analysis	• Administrative data • KIIs • Document review
Q.D.7. Was the tariff adjustment tool used to change tariffs? If not, what drove tariff changes?	• Use of tariff-setting tool	• Qualitative descriptive analysis with a political economy lens	• Document review • KIIs
Q.D.8. To what extent has the Grid Code been implemented?	• Degree of Grid Code implementation	• Qualitative analysis of stakeholder perceptions	• Document review • KIIs
Q.D.9. To what extent is ARE operational? Does ARE have the resources necessary to successfully carry out its mandate?	• ARE technical, financial, and operational capacity	• Qualitative analysis of stakeholder perceptions	• Document review • KIIs
Q.D.10. To what extent has ARE been able to make major decisions independently from the Government?	• ARE political independence	• Qualitative analysis of stakeholder perceptions	• Document review • KIIs

Utility Strengthening Activity

Evaluation Question	Key Outcome	Methodology	Data Source
Q.E.1. To what extent have GoB and SBEE abided by the terms of the approved *contrat-plan* since its adoption?	• Implementation of *contrat-plan* outputs and outcomes	• Qualitative analysis of stakeholder perspectives • Quantitative descriptive analysis of contract outputs	• Document review • Administrative data • KII
Q.E.2. Has the management contractor been able	• Management contractor tenure and contract compliance*	• Qualitative descriptive analysis	• Document review • Administrative data • KII

to meet its commitments under the management contract?			• Focus groups
Q.E.3a. What performance improvements have been achieved during the term of the management contractor? **Q.E.3b.** How has the management contractor performed against the KPIs in the management contract? **Q.E.3c.** Has the management contractor provided training and capacity building to the local management of SBEE?	• Management contractor performance*	• Qualitative descriptive analysis	• Document review • Administrative data • KII
Q.E.4. What are the perceptions (by GoB, SBEE employees and other stakeholders) of the performance of the management services contractor?	• GoB and SBEE satisfaction with management contractor	• Mixed-methods descriptive analysis	• KII • Case study data collection • FGS • Telephone or SMS survey
Q.E.5. How do independent power producers (IPPs) perceive SBEE's ability to meet its obligations under PPAs?	• Private sector investment in energy*	• Qualitative descriptive study with a political economy lens	• Document review • KIIs
Q.E.6. Did SBEE's cost recovery and financial health improve?	• Utility balance sheet	• Pre-post analysis	• Administrative data
Q.E.7. To what extent has SBEE customer satisfaction	• Staff and customer satisfaction with billing and payment	• Pre-post analysis	• Administrative data • Surveys • Telephone surveys

improved with respect to the availability of electricity, the resolution of technical and non-technical problems, the billing and payment process, and overall customer service?			
Q.E.8. Did SBEE improve its bill collection and reduce its overall commercial losses?	• Commercial losses • Collection rate	• Pre-post analysis	• Administrative data
Q.E.9. To what extent has labor productivity increased at the utility?	• Change in staff qualifications, gender, retention	• Pre-post analysis	• Administrative data
Q.E.10. EQ.E.10. Did the technical assistance from the MC to SBEE lead to improved operation and maintenance practices?	• Changes in maintenance practices	• Qualitative analysis of stakeholder perceptions	• Document review • KIIs • Case study data collection
Q.E.11. Does SBEE have the capacity to continue operating and maintaining infrastructure (both MCC and non- MCC funded) at the level introduced by the management contractor?	• SBEE technical, financial, and operational capacity*	• Qualitative sustainability analysis	• Document review • KIIs • Case study data collection
Q.E.12. In what other ways have SBEE managem ent practices changed? Are these changes associated with more efficient operations?	• Efficiency of SBEE management practices*	• Qualitative descriptive study	• Document review • KIIs

Public Information and Education Activity

Evaluation Question	Key Outcome	Methodology	Data Source
Q.F.1. To what extent were the communications campaigns implemented? Did the audience understand the campaigns' content as intended? Did audience perceptions change?	• Audience understanding of campaign messages and content, change in beliefs or perception	• Qualitative analysis of stakeholder perceptions and knowledge	• Document review • Rapid-feedback focus groups

Data Sources

The table below summarizes the planned quantitative data collection to support the Benin Policy Reform and Institutional Strengthening evaluation. This table combines primary and secondary data sources.

Survey Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
Survey of business selling appliances (energy efficiency)	Quantitative	Businesses	20-30	3	NA	Baseline: Early 2020 Interim: Late 2022 Endline: Mid-2024
SBEE customers (telephone)	Quantitative	SBEE customers	1000 hh, 500 firms	2	NA	Baseline: Early 2020 Endline: Mid-2024
SBEE employees (telephone)	Quantitative	SBEE employees	400-600	2	NA	Baseline: Early 2020 Endline: Mid-2024
Key informant interviews	Qualitative	MCC/MCA staff	10-12	3	NA	Baseline: Early 2020 Interim: Late 2022
		ABERME, customs, and energy assoc. representatives	5			

Survey Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
		Social Impact off-grid evaluation team	1			Endline: Mid-2024
		IPP representatives	5-7			
		MCC communications specialist	1			
		Energy code consultant	1			
		ARE staff and ARE donors	7-9			
		Contrat-plan consultant, SBEE technical staff, MoE representatives	6-9			
		Management contractor, auditor, MCA, GoB	10-12			
		SBEE directors	5-8			
		AFD, EU	2			
		Communications consultant (IdeaConsult)	1			
		EE audit recipients	3-5			
Focus group discussions	Qualitative	Female business owners, SBEE customers	7-10	2	NA	Baseline: Early 2020 Endline: Mid-2024
		SBEE staff	4-6	1	NA	Endline: Mid-2024
		Communication campaigns audience	7-10	3	NA	Baseline: Early 2020 Endline: Mid-2024

Note: The evaluation design report does not specify the exposure period.

The evaluation also use administrative data including from the following sources:

- National platform for EE norms and labeling (Plateforme Nationale Dédiée aux Normes et de l'Etiquetage Energétique)
- EE audit consumption data

- IPP generation data
- SBEE revenue and expenditures
- Transaction advisor (Nodalis)
- Management contractor
- Gopa infrastructure consultant

Finally, the evaluation's data collection includes project document review, a media review, and direct observations at business selling EE appliances.

On-Grid Generation and Distribution Evaluation

The On-Grid evaluation aims to assess the extent to which the Electricity Generation and Electricity Distribution Projects have met their desired goals (as well as any unanticipated consequences). The evaluation design report is saved here: https://data.mcc.gov/evaluations/index.php/catalog/214.

As a reminder, the Objective of both these projects is: (A) increase the hours of operation for businesses and public and social services; (B) reduce reliance on costlier sources of energy; (C) reduce losses of products and perishable goods; and (D) improve productivity for users of electricity. The evaluation will measure these objective-level results, although they do not have targets nor were they modeled in the cost-benefit analysis. Also, the evaluation does not include 'social services' in its quantitative survey sample.

Evaluation Methodology Description

The independent evaluator has designed a mixed-methods evaluation of the Electricity Generation and Distribution Projects to answer the evaluation questions listed below. As detailed in the Evaluation Design Overview table below, several of the the evaluation questions can be answered through rigorous impact evaluations, whereas the evaluation will address others through performance evaluations incorporating both quantitative and qualitative data. Two of the quantitative impact evaluations will estimate impacts of the Electricity Generation and Distribution Projects—separately and in combination—on (1) grid-level outcomes, such as electricity supply, reliability, and quality; and (2) end-user outcomes, such as the energy expenditures of firms and households. To estimate the impacts on electricity supply, reliability, and quality, the independent evaluator will implement ITS (Interrupted Time-Series) analyses of high-frequency data collected from grid monitors and smart meters placed systematically in the electricity network. To estimate the impacts on outcomes for small, medium, and large businesses, and households, the independent evaluator will implement ITS analyses using high-frequency data obtained from periodic mobile phone surveys. The independent evaluator will complement the ITS analyses with a quantitative performance evaluation (a pre-post analysis) that uses survey data to study how grid-level and beneficiary outcomes change over time.

Evaluation questions

The table below lists the key outcomes, methodology, and data source for each evaluation question. Questions 9, 10, and 11 marked with a "+" relate to the Objective-level results.

Evaluation Question	Key Outcomes/Themes	Methodology	Data Source
Q1. Did the project design change, and how well were the activities implemented?	• Project design and changes over time • Implementation plan and changes over time • Implementation successes and challenges • Complementarity of Electricity Generation and Distribution Projects	• Qualitative performance evaluation	• Review of project documents • Interviews with MCA-Benin staff, SBEE staff, Ministry of Energy staff, and project engineers • Site visits
Q2. How sustainable are MCC's investments?	• Perceptions of sustainability • Maintenance of infrastructure • Usage and maintenance of grid-monitoring equipment	• Qualitative performance evaluation	• Review of project documents • Interviews with MCA-Benin staff, SBEE staff, Ministry of Energy staff, project engineers, and members of the Energy Sector Donor Roundtable • Site visits
Q3. How have outside factors influenced the project?	• Availability of energy imports • Completion of North-South 161-kV line • Role of CEB • Other government/donor energy investments • Increases in domestic energy demand	• Qualitative performance evaluation	• Review of project documents • Interviews with SBEE staff, Ministry of Energy staff, and members of Energy Sector Donor Roundtable
Q4. What is the ex-post ERR of MCC's investments?	• Impacts on beneficiary outcomes • Final project costs	• Quantitative impact analyses • Quantitative performance evaluation • Qualitative performance evaluation	• High-frequency measurement of grid outcomes • Surveys of households and businesses • Review of project documents
Q5. What are the lessons learned?	• Design and implementation plans, changes, successes, and challenges • Impacts on beneficiary outcomes	• Synthesis of evaluation analyses	• Mathematica evaluation analyses • Review of compact closeout documents • Interviews with stakeholders

Evaluation Question	Key Outcomes/Themes	Methodology	Data Source
	• Impacts on grid-level outcomes		
Q6. Did the project narrow the supply-demand gap?	• Domestic energy generation capacity and output • Demand for electricity	• Quantitative impact analyses • Qualitative performance evaluation	• High-frequency measurement of grid outcomes • Review of SBEE data
Q7. How did the project impact electricity reliability, quality, and technical losses?	• Outage frequency and duration • Measures of electricity quality • Technical losses	• Quantitative impact analyses • Qualitative performance evaluation	• High-frequency measurement of grid outcomes • Review of SBEE data
Q8. How did the response time to technical problems change?	• Duration of outages caused by technical problems • Response time to business and household service calls	• Quantitative impact analyses • Qualitative performance evaluation	• High-frequency measurement of grid outcomes • High-frequency mobile phone surveys of businesses • Review of SBEE data • FGDs with households • Interviews with businesses
Q9. What are the impacts of the projects on business outcomes? +	• Time use/hours of operation/work disruptions • Energy sources • Investment in and degradation of electrical equipment • Losses of products and perishable goods • Productivity/revenue	• Quantitative impact analyses • Quantitative performance evaluation • Qualitative performance evaluation	• High-frequency mobile phone surveys of businesses • Surveys of businesses • Interviews with businesses
Q10. What are the impacts of the project on household outcomes? +	• Productivity • Time use • Energy sources • Investment in and degradation of appliances • Losses of products and perishable goods	• Quantitative impact analyses • Quantitative performance evaluation • Qualitative performance evaluation	• High-frequency mobile phone surveys with households • Surveys of households • FGDs with households
Q11. To what extent did the outcomes for public/social services (for example, health facilities, schools) change after the	• Hours of operation • Usage of electrical equipment • Investment in and degradation of equipment	• Qualitative performance evaluation	• Interviews with public institutions

Evaluation Question	Key Outcomes/Themes	Methodology	Data Source
projects were implemented? +	• Perception of electricity reliability and quality • Perception of electricity as constraint		
Q12. What are the impacts of new connections on household and small business outcomes?	• Energy use and electricity consumption • Adult and child time use (households) • Employment, Income Generating Activities, income, consumption (households) • Time use and hours of operation (businesses) • Investment in electrical equipment • Productivity and revenue • Decision to connect and constraints to connecting • Expected and realized benefits of connecting	• Quantitative impact analyses • Qualitative performance evaluation	• Surveys of households and small businesses in the household • FGDs with households

Mathematica will supplement the quantitative impact and performance evaluations with a qualitative performance evaluation, which will include an implementation analysis and a qualitative evaluation of outcomes. This evaluation will use data from document reviews, interviews, and focus group discussions (FGDs) to generate findings on the implementation and sustainability of the Electricity Generation and Distribution Projects, and will provide additional context through which to understand the findings on beneficiary outcomes.

Data Sources

Primary Data Collection

Survey Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
Grid Monitor Data	Quantitative	Infeed and arrival distribution lines	80	Continuous	Periodic data collection ending after 24-36 months of exposure	2018-2024
Smart Meter Data	Quantitative	Residential low voltage customers	290	Continuous	Periodic data collection ending after 24-36 months of exposure	2018-2024
		Professional low voltage customers	145		Periodic data collection ending after 24-36 months of exposure	2018-2024
		Medium voltage customers	45		Periodic data collection ending after 24-36 months of exposure	2018-2024
ITS mobile phone surveys	Quantitative	Households and businesses connected to the grid	1,150 electrified businesses (750 small and 400 medium and large 1,500 electrified households	Thirteen. Every four months	Periodic data collection ending after 24-36 months of exposure	2018-2024
Pre-post business and household surveys	Quantitative	Households and businesses connected to the grid	300 small businesses and 300 households	3	Interim: 24-36 months Final: 36-60 months	Baseline (2019) Interim (late 2024) Final (late 2026)
Interviews	Qualitative	MCA-Benin and MCC staff	4-8	3	Interim: 12 – 36 months Final: 36-60 months	Baseline (2019) Interim (late 2023) Final (late 2026)
		SBEE management and engineering staff, DGE, and ARE	8–10	3		
		SBEE line workers and customer service	4-6	3		

		Engineers and contractors from the implementing agencies	4-6	3		
		Local community leaders, local officials, and/or representatives from energy associations	8-12	3		
		Male and female owners, managers, and representatives of small, medium, and large businesses	12-15	3		
		Director and managers from schools, health clinics, and other public institutions	8-12	3		
Focus group discussion	Qualitative	Primary male and female household members	8–12	3		

Off-Grid Electricity Access Evaluation

In September 2018, MCC contracted Social Impact to conduct an independent evaluation of the Off-Grid Electricity Access Project. The Evaluation Management Committee approved a first version of the evaluation design report (EDR) in March 2019. The EDR is posted on MCC's evaluation catalogue here: https://data.mcc.gov/evaluations/index.php/catalog/241. In consultation with MCC, MCA, and stakeholders, the independent evaluator will revise the design report according to implementation progress, particularly in relation to the facility's second call for proposals.

Evaluation Methodology Description

The evaluation of OGEAP will have two main components. The first of these is a performance evaluation of the Enabling Environment Activity and the OCEF grant facility (as a facility or mechanism, rather than looking at results of individual grants). The second component will be a quantitative impact evaluation, which includes a DiD (difference-in-differences) identification strategy, centered on a collection of mini-grid investments, and an quantitative ex-post evaluation of solar home systems. Given a reduction in mini-grid locations under the Project, the DiD incorporates several analyses that vary in terms of trade-offs between internal validity (the use of matched treatment and comparison sites) and statistical power as outlined in the Evaluation Design Report. The questions guiding both of these evaluations were revised during the inception phase though discussions with MCC, MCA, and other stakeholders.

Off-Grid Enabling Environment and OCEF Grant Facility

Evaluation Question	Key Outcomes	Methodology	Data Source
Q1. Was the OCEF grant facility designed and implemented in a way that encouraged high-quality proposals and projects?	• Implementation fidelity • Design relevance	• Qualitative pre-post performance evaluation	• Desk Review • KIIs • Applicant Survey
Q2. To what extent has the regulatory framework for off-grid energy been implemented?	• Implementation fidelity • Capacity of key stakeholders relevant to implementation roles • Perception of level of implementation of framework among private sector firms	• Qualitative pre-post performance evaluation	• Desk Review • KIIs • Applicant Survey
Q3. To what extent did OGEAP encourage additional	• Level of investment in the off-grid sector • Perception of the role of OGEAP in	• Qualitative pre-post performance evalaution	• Desk Review • KIIs • Applicant survey

investment in the sector in Benin?	encouraging that investment		

Off-Grid Investments

Evaluation Question	Key Outcomes	Methodology	Data Source
Q1. What were the impacts of the investments on end users?			
A) Did they increase access to and consumption of energy? Was connection status and consumption sustained over time?	• # New connections, by technology (including generation and storage capacity); working connections	• Quantitative matching with difference-in-differences impact evaluation	• Grantee data (and Applicant Survey); field audits by engineer
	• Electricity consumption (kW-hour/connection-month) over time, if metered	• Quantitative matching with difference-in-differences impact evaluation	• Grantee data; *household* & *firm surveys*
B) Did they affect expenditures on energy?	• Connection costs (CFA/connection); expenditure (CFA/connection-month); default rates on contracts over time (%)	• Quantitative matching with difference-in-differences impact evaluation	• Grantee data (and Applicant Survey); *household* & *firm surveys*
	• Other fuel and energy-related (equipment, battery, collection time) costs (CFA/month)	• Quantitative matching with difference-in-differences impact evaluation	• Household & firm surveys
C) Did they increase appliance ownership?	• Purchase (0/1) and spending (CFA) for promotional appliances	• Quantitative matching with difference-in-differences impact evaluation	• Grantee data, if applicable
	• Ownership and use (frequency/duration) of appliances and machines, timing of purchases	• Quantitative matching with difference-in-differences impact evaluation	• Household & firm surveys
	• Access to different modern energy services (e.g., lighting, refrigeration)	• Quantitative matching with difference-in-	• Household & firm surveys

Evaluation Question	Key Outcomes	Methodology	Data Source
		differences impact evaluation	
	• Consumer surplus from appliance ownership (CFA)	• Quantitative matching with difference-in-differences impact evaluation	• Household surveys
D) Did they increase the hours of operation and coverage of businesses and public services?	• Hours of operation of public services / businesses (hours/week)	• Quantitative matching with difference-in-differences impact evaluation	• Community & firm surveys
	• Household use of public services (0/1), and frequency of use	• Quantitative matching with difference-in-differences impact evaluation	• Household surveys
	• Perceptions of quality of local public services and business offerings (Likert-scale)	• Quantitative matching with difference-in-differences impact evaluation and Qualitative pre-post performance evalaution	• Community & household surveys
E) Did they increase revenue generation, net income, consumption of perishables, and/or productivity?	• Time savings (hours/week) and changes in time allocation and timing across activities, especially for productive use (e.g., study, paid work, domestic work)	• Quantitative matching with difference-in-differences impact evaluation	• Household surveys
	• Incidence of air pollution-related illness (cases/household; 7-day recall); and expenditures (CFA/household-month)	• Quantitative matching with difference-in-differences impact evaluation	• Household surveys
	• Revenue and/or net income (CFA/month)	• Quantitative matching with difference-in-	• Household & firm surveys

Evaluation Question	Key Outcomes	Methodology	Data Source
		differences impact evaluation	
	• Non-fuel cost savings (CFA/month)	• Quantitative matching with difference-in-differences impact evaluation	• Household & firm surveys
	• Value of lost perishables (CFA/month)	• Quantitative matching with difference-in-differences impact evaluation	• Household & firm surveys
	• # and types of firms	• Quantitative matching with difference-in-differences impact evaluation and Qualitative pre-post performance evalaution	• Grantee data; Community surveys
Q2. What was the distribution of those impacts? Were the above impacts distributed differently across key population sub-groups, namely gender, age, or income groups?	• All above measures, disaggregated by sex (male/female), age group (<18 years; 18-30; >30 years), level of education (none, primary only, secondary or greater), and income (poverty status) or occupation (unemployed, agriculture, or non-agriculture)	• Quantitative matching with difference-in-differences impact evaluation	• Sources listed above for all outcomes
Q3. How did impacts vary according to the exposure period?	• All above measures, analysed using an econometric model that accounts for the duration of exposure	• Quantitative matching with difference-in-differences impact evaluation	• Sources listed above for all outcomes
Q4. What factors drive or constrain adoption of new technologies related to off-grid energy (both connections and	• All outcomes under evaluation questions 1a-c, but particularly adoption of connections and of appliances/energy services	• Quantitative matching with difference-in-differences impact evaluation	• Sources listed above for all outcomes 1a-c

Evaluation Question	Key Outcomes	Methodology	Data Source
equipment, appliances or energy services)?			
Q5. Via what mechanisms did revenue generation or productivity increase? (i.e., for what types of activities/ businesses did energy stimulate investment and growth?)	• All outcomes under 1d-e, disaggregated by business/service type	• Quantitative matching with difference-in-differences impact evaluation	• Sources listed above for outcomes under 1d-e
Q6. Can the OCEF-supported investments be considered cost-beneficial or cost-effective, relative to alternatives?	• Valuation of impact measures (demand; valuation of public services)	• Quantitative matching with difference-in-differences impact evaluation	• Household & firm surveys
	• Cost of interventions	• Quantitative matching with difference-in-differences impact evaluation	• Grantee data (and Applicant Survey)

Data Sources
Primary Data Collection

Survey Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection[11]
Applicant Surveys	Quantitative	Private sector off-grid energy firms	60	3	36	Round 1 (Baseline): 2020 Round 2 (Early Results): 2023 Round 3 (Endline): 2025
Grantee Reporting Data	Quantitative	Grantee	20	Ongoing	36	Throughout evaluation
Beneficiary Surveys – Mini-Grids	Quantitative	Households	Baseline: T: 1044, C: 1476	2	24 - 36	

[11] To be changed in the modified evaluation design report.

			Endline: T: 1080, C: 1230			Round 1: N/A Round 2 (Baseline): 2022-2023 Round 3 (Endline): 2025
		Village Enterprises	Baseline: T: 290, C: 410 Endline: T: 300, C: 328			
		Communities	T: 60 C: 41			
Beneficiary Surveys – Solar Home Systems	Quantitative	Households and Firms	500	1	36-48	Round 3 (Endline only): 2025
Interviews	Qualitative	MCC Staff	5	3	36	Round 1 (Baseline): 2020 Round 2 (Early Results): 2023 Round 3 (Endline): 2025 (limited sample)
		MCA Benin Staff	3			
		Implementer	3			
		Private Sector	10			
		Government of Benin	6			
		Other Donors	5			

Summary of Activities or Sub-Activities without Evaluations

The Women's Economic Empowerment Activity will not be evaluated. This Activity does not support the achievement of the Project Objective.

IMPLEMENTATION AND MANAGEMENT OF M&E

Responsibilities

The MCA-Benin II Monitoring and Evaluation Division is composed of a Director who will have the key responsibility of leading and managing all M&E/Econ activities; and two staff members who will support the Director in performing the M&E/Econ activities. Additionally, the division hire short-term support on an as needed basis. The division carry out, or hire contractors to complete the following and other related activities:

- Direct implementation of all activities laid out in the M&E Plan and ensure all requirements of the M&E Plan are met by MCA;
- As the champion of results-based management, the M&E Unit will take steps to foster a results oriented culture throughout MCA and its implementing partners – this includes making sure that M&E information is used by the MCA management and project teams to improve Compact performance (feedback loop).
- Ensure that the M&E Plan is modified and updated as improved information becomes available;
- Oversee development and execution of an M&E system (including data-collection, data-analysis and reporting systems) integrated with the MCC Management Information System (MIS);
- Elaborate and document M&E Policies, Procedures and Processes in a guidance document to be used by all MCA-Benin II staff and project implementers;
- Communicate the M&E Plan and explain the M&E system to all key stakeholders involved in the Compact, particularly project implementers, to ensure a common understanding by all. This could take the form of orientation and capacity building sessions and could focus on issues such as:
    - Explaining indicator definitions, data collection methods and timing/frequency of data collection and reporting,
    - Data quality controls and verification procedures, and
    - Impact evaluation questions and methodology.
- Develop and use a documentation system to ensure that key M&E actions, processes and deliverables are systematically recorded. This may be accomplished either as part of the M&E information system or independently. The documentation may encompass the following elements:
    - Indicators and material evidence for reported values
    - M&E Plan versions
    - Reporting manuals and templates
    - Key M&E deliverables including Terms of References (TORs), contracts/agreements, data collection instruments, reports/analyses, etc.;

- Develop, with the Communication Unit, Environmental and Social Performance (ESP) officers, and Gender and Social Inclusion (GSI) unit, and implement a systematic results dissemination approach that draws on verified ITT data;
- Organize and oversee regular independent data quality reviews on a periodic basis to assess the quality of data reported to MCA;
- Participate in project monitoring through site visits, review of project reports and analysis of performance monitoring and other data;
- Update the M&E work plan periodically;
- Manage the M&E budget efficiently;
- Contribute to the design of the evaluation strategy;
- Collaborate with the procurement team to prepare the TOR, and participate in the proposal evaluation as part of the procurement process.
- Responsible for the effective contract administration of the resulting M&E contracts in accordance with the MCA-Benin Contract Administration Management Manual (CAMM);
- Ensure that data collection mechanisms are designed to collect data disaggregated by sex and other social inclusion dimensions, as applicable and practical, and that the findings are presented at the appropriately disaggregated level; and
- Ensure data collection, storage, and dissemination activities maximize protection of confidentiality of survey respondents' personally identifiable information. This may require:
    - Facilitating local Institutional Review Board clearance for data collection
    - Using lock and key cabinets for paper files,
    - Using secure file transfer systems,
    - Encrypting data files,
    - Employing password protection on data systems and data encryption,
    - Requiring signed acknowledgements of roles and responsibilities,
    - Requiring relevant stakeholders to sign non-disclosure agreements, and
    - Incorporating data protection standards into the organization's records management procedures, or if necessary, developing a records management procedures that includes such standards.

The M&E Director will be a part of MCA-Benin II's internal Management Unit, composed from MCA leadership, Project Directors, and other Directors. Collaboration with the procurement team will be very important to prepare the TORs in a timely manner to assist the Procurement Directorate in conducting timely procurement of M&E related contracts as well as ensuring that other implementation contracts contain necessary data reporting provisions.

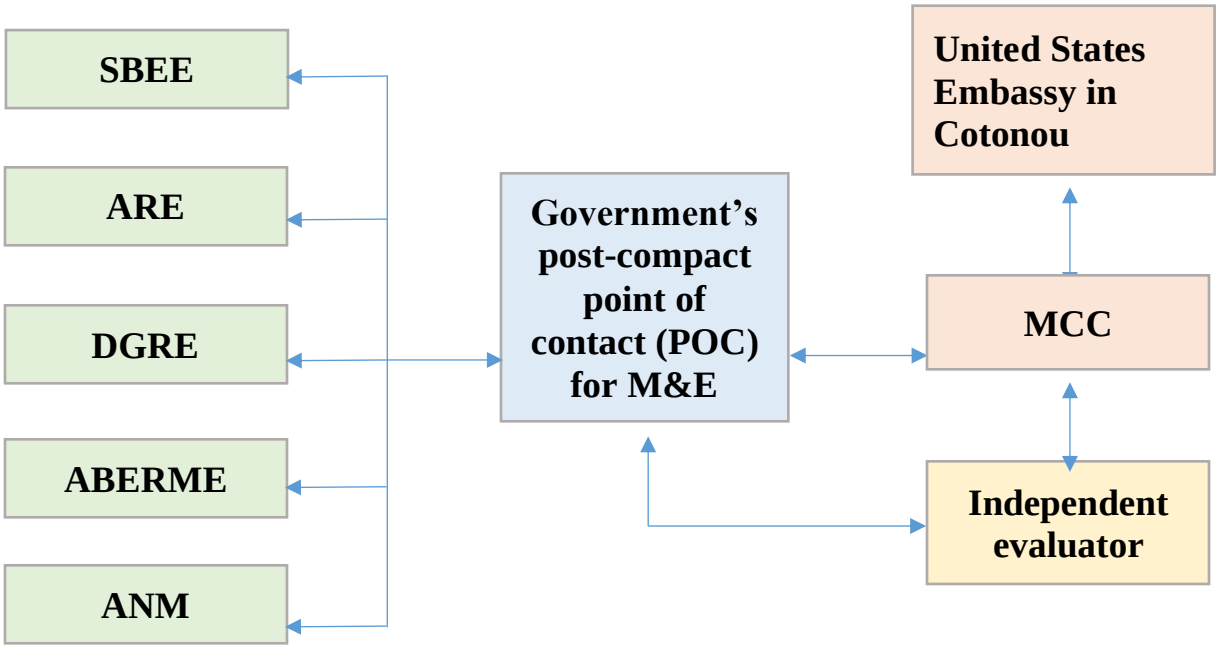
Seminars, workshops, elaboration and distribution and dissemination of M&E materials shall be conducted in close cooperation with the MCA Communications Unit.

Post-Compact Management of M&E

In accordance with program closure guidelines, Benin's government will ensure the management of post-compact monitoring and evaluation activities. MCA-Benin II has identified a post-compact point of contact (POC) within the GoB who will coordinate with Program Implementing Entities (IAEs) focal points to ensure monitoring data is submitted to MCC and the independent evaluators

post-compact in a timely manner. The POC will also coordinate the review of evaluation reports that are delivered post compact ensuring that the relevant project stakeholders provide feedback.

The graphic below illustrates how the post-compact focal point will coordinate amongst IAE focal points, MCC, and the independent evaluators.



MCA Data Management System for Monitoring and Evaluation

All MCAs must use the MCC MIS for reporting the QDRP (including the ITT) to MCC. In addition, an MCA may decide to develop its own MIS for M&E to collect data from implementers. However, any MIS development must be coordinated closely with both the MCC MIS and the MCA MIS initiatives.

Review and Revision of the M&E Plan

The M&E Plan is designed to evolve over time, to ensure the plan remains up to date and consistent with design documents and project work plans, and to incorporate lessons learned for improved performance monitoring and measurement. The M&E Plan must be kept as current as possible, including conducting revisions as needed and feasible. At a minimum, one comprehensive review of the M&E Plan, with related updates and revisions, must take place during the life of the program. M&E Plans must be reviewed and amended, if appropriate, after a modification to the program's

scope has been approved by MCC. MCC may withhold disbursements of program funding if the M&E Plan is not being kept up to date.

MCC M&E distinguishes between major and minor changes to the M&E Plan (i.e., modifications) and major and minor M&E Plan revisions. Major modifications are limited to changes to the project logics, baselines, targets, and indicator definitions, adding new indicators and retiring existing indicators. All other modifications are considered minor. Those major modifications, as well as a justification for why the change was made (for changes to indicators only), must be documented in Annex III of this M&E Plan. This Annex summarizes all major modifications between program signing and the current version of the M&E Plan. Minor modifications are not required to be tracked in Annex III.

The revision and approval process will follow the guidelines outlined in the MCC M&E Policy.

M&E BUDGET

The budget for the implementation of the proposed M&E activities for the five-year term of the Compact is US$ 5.25 million. This was decreased to $3,040,277 in April 2020, because the MCA/M&E budget included funding for survey data collection that ended up being supported by M&E due diligence funds. The M&E budget slightly increased to $3,890,277 in August 2021 when the Compact was extended by one year. Both changes were done as part of larger Compact modifications. The M&E budget does not include the M&E staff in the MCA Management Unit whose salaries and field trips are included in the administrative budget of the Compact. The budget should not exceed the total amount over the program duration, but the distribution of funding between line items is adjusted according to the results of the M&E Plan's reviews or quarterly if needed.

While the resources for the carrying-out of surveys are allocated by MCA- Benin II from the Compact funds, the evaluation design and analysis is to be funded directly by MCC. The estimated budget of MCC-contracted independent evaluations is $7 million, which includes data collection costs.
The below table reflects the total amount to be executed by the end of the compact (July, 2023)

M&E Budget	**609 g and CIF**	**Compact**	**Total**
M&E Training		$ 63 070.27	$63,070.27
Performance Indicator Monitoring: Data Collection, Compiling and Analysis	$ 620,119.00	$ 2,151,457.72	$2,771,576.72
M&E Studies and Surveys		$ 578,965.31	$578,965.31
Communication		$ 70,832.86	$70,832.86
Miscellaneous		$ 326,312.20	$326 312.20
Total	**$ 620,119.00**	**$ 3,190,638.36**	**$ 3 810,757.36**

M&E Focal Points

Implementing entities responsible for providing data to the MCA-Benin II will assign M&E focal points to participate in M&E activities. These focal points will come from the following institutions:

Implementers

- SBEE (Commercial, Generation, Distribution, and Research Departments)
- Beninese Agency for Rural Electrification and Energy Control (ABERME)
- Energy Regulator (ARE);)
- ANM (Agence Nationale de Normalisation, de Métrologie et du Contrôle Qualité).

Non-Governmental Organization

- Consumer Defense League of Benin
- Professional Associate for Renewable Energy Specialists (AISER Benin)
- African Women Entrepreneurship Program (AWEP)
- National Confederation of Artisans of Benin (CNAB)
- National Association of Communes in Benin (ANCB)

Private Sector

- Counsel of Private Investors (CIPB)
- National Council of Management
- Chamber of Commerce and Industry of Benin (CCIB)

Public Sector

- General Directorate of Energy Ressources, Director of Studies, Statistics and Planning
- Statistics Department/DPP. Ministry of Industry, Commerce, and Artisanry
- Statistics Department/DPP. Ministry of Energy.

Cross-Cutting Ministries

- General Directorate of Economic (DGE) at the Ministry of the Economy and Finance
- General Directorate of Evaluation and de l'Observatoire de Changement Social (DGEOCS)
- National Institute of Statistics and Demography (INStaD (INSAE)

ANNEX I: INDICATOR DOCUMENTATION TABLE

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Policy Reform and Institutional Strengthening (Project-Wide)										
Increased Capital for Utility Maintenance and New Capital Investments		Outcome	SBEE investments in new infrastructure	Total amount invested by SBEE in infrastructure using its own funds	CFA Francs	None	SBEE's Financial and Administrative Division	SBEE	Annual	Actuals correspond to "apport creation" of "immobilisations corporelles" in SBEE's financial statements. "Immobilisation corporelles" is comprised of "Terrains hors immeuble de placement », « Batiments hors immeubles de placement », « Amenagements, agencements, et installations », and « Materiel, mobilier, et actifs biologiques ».
		Outcome	SBEE investments in maintaining infrastructure	Total amount invested by SBEE in infrastructure maintenance using its own funds	CFA Francs	None	SBEE's Financial and Administrative Division	SBEE	Annual	Actuals correspond to "Entretien reparration equipment" in SBEE's financial balance sheet.
Policy, Regulation, and Institutional Support Activity										
Increased Adoption of Energy Efficient Appliances and Measures		Outcome	Adoption rate for energy efficient appliances	Proportion of consumers (households and businesses) that are willing to pay for at least one EE appliance.	Percentage	Customer class (Households, Businesses); Sex (Female, Male); and Business Type (Formal; Informal)	Survey	DESE/MCA Benin II	Other	This survey is held twice during the duration of the compact.: The first on 2020 and the second on 2023. Average is not a type of disaggregation; As the sample included

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
										households and businesses, the average is the global value for this indicator which is calculated with household and businesses values considering their respective weights
		Outcome	Amount invested in energy efficiency measures	Amount invested in energy efficiency measures by public entities and industrial companies benefiting from MCA-funded energy efficiency audits	CFA Francs	Funding source (MCA-Benin II; Other sources)	Benefiting entities	MCA Benin II	Annual	Yearly targets to be provided considering industrial companies that benefited EE audits
Increased Domestic Generation Output in Benin		Outcome	Total generation output	Combined generation output from existing and new projects in the country	Megawatt hours	Renewable energy type (PV, Hydro, Thermal)	DGRE data collection sheet	DGRE	Annual	This indicator considers all types of generation outputs regardless of funding sources and energy types
Increased Private Investment in Power Generation		Outcome	Amount invested in IPPs' projects	Total amount of debt and equity provided for IPP projects	US dollars	None	ARE	ARE	Annual	
Increased Cost Recovery for SBEE	P-24	Outcome	Operating cost-recovery ratio	Total revenue collected / Total operating cost. Total operating cost is defined as operating expenses plus depreciation.	Percentage	Input	SBEE/DAF's Monthly Operating Accounts	SBEE	Quarterly	
	P-24.1	Outcome	Total revenue collected	The total revenue collected by the utility in a given period.	US dollars					
	P-24.2	Outcome	Total operating cost	Operating expenses plus depreciation.	US dollars					

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Tariffs will be cost reflective		Outcome	Cost-reflective tariff regime	Average tariff per kilowatt-hour / Average revenue requirement per kilowatt-hour of electricity supplied to customers	Percentage	Client type (Post-payment LV, Post-payment MV, Pre-payment LV), Input	SBEE	ARE	Annual	
		Outcome	Average cost per kwh supplied	Average cost per kwh supplied	CFA Francs	Client type (Post-payment LV, Post-payment MV, Pre-payment LV), Input	Quarterly Report/MHI Gd'Or and Smart Vend	SBEE Sales division	Annual	Management contractor indicator code: C16
		Outcome	Average cost per kwh invoiced	Average cost per kwh invoiced	CFA Francs	Client type (Post-payment LV, Post-payment MV, Pre-payment LV), Input	Quarterly Report/MHI Gd'Or and Smart Vend	SBEE Sales division	Annual	Management contractor indicator code: C11
ARE approves new tariffs		Outcome	Approval of cost-reflective tariffs	Date on which ARE approves electricity tariff application	Date	None	ARE Notice	ARE	Once	
ARE has financial and operational independence in decision making		Outcome	Financial self-reliance of ARE	Amount of ARE revenue from fees (0.5% of SBEE's revenue) and file examination fees divided by the total budget (sums of fees, examination fees and allocated budget)	Percentage	None	ARE's accounting system.	ARE	Annual	
The sector regulator (ARE) is fully operational		Outcome	Number of notices provided by ARE in a given year	Number of notices provided by ARE in a given year	Number	None	Copies of ARE notices	ARE	Annua1	
GOB entities will adopt policies and actions to improve		Outcome	Energy efficiency standards formulated and enforced	Date of adoption of energy efficiency standards by GoB	Date	None	Decree of adoption and application of energy efficiency standards	DGRE	Once	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
energy efficiency										
GOB entities will adopt policies and actions to improve energy efficiency		Outcome	Energy efficiency labels adopted	Number of energy efficiency labels (standards) passed and adopted by GoB	Number	N/A	Decree of adoption of energy efficiency labels	DGRE	Annual	
Financial close reached and private capital leveraged	-	Outcome	Generation capacity reached financial close	Number of MW from Compact-supported transactions for which all 'project and financing agreements have been signed, all conditions on those agreements have been met, and the private party can start drawing down the financing to start work on the project'	Megawatts	None	Signed project and financing agreements	Ministry of Energy ARE	Annual	The definition of financial close is provided by the Public-Private Partnership Knowledge Lab. The indicator corresponds to a Power Africa indicator.
IPPs Solar Power Plant built and functional		Outcome	Capacity installed by IPPs	Total MW installed by IPPs	Megawatts	Funding source (MCA-Benin II; Other sources)	ARE Data collection sheet	ARE	Annual	
		Outcome	Generation from new IPPs	Total megawatt hours generated in a calendar year from the new IPPs under the Compact's IPP sub-activity	Megawatt hours	None	ARE Data collection sheet	ARE	Annual	
PPAs signed with one or more firms		Outcome	PPAs signed	Number of PPAs signed and approved by ARE with support from MCC	Number	None	ARE	ARE	Annual	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
with ARE approval										
GoB approves institutional framework for IPPs		Outcome	Approval of IPP institutional framework	Date of approval for IPP institutional framework	Date	None	ARE	DGRE	Once	
GoB approves Tariff Policy and Tariff Plan		Outcome	Approval of Tariff Policy and Tariff Plan	Date of Tariff Policy and Tariff Plan approval by the government	Date	None	ARE, Ministry of Energy	Ministry of Energy	Once	
SBEE applies for cost-reflective tariffs		Output	Proposal of cost-reflective tariffs	Date on which the utility submits cost-reflective tariff application to ARE	Date	None	Cost-reflective tariffs proposal of SBEE	SBEE	Once	
The sector regulator (ARE) is fully operational		Output	Percentage of job positions filled in ARE	Number of individuals on ARE's payroll divided by the total number of positions in the official organizational chart	Percentage	None	ARE Data collection sheet	ARE	Annual	
Implementation of the Independent regulator		Output	ARE headquarters are built and in service	Date at which ARE headquarters is constructed and IT and office equipment is installed	Date	None	Building and equipment acceptance report	MCA	Once	
The sector regulator (ARE) is fully operational		Output	ARE staff trained on tariff regime	Number of ARE staff who have attended at least one training session on tariff regime	Number	None	ARE Data collection sheet	ARE	Annual	None
Evaluation of Current		Output	Number of public entities and	Number of public entities and	Number		Report of SGS Sénégal SA	Groupement SGS Sénégal SA	Once	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Needs & Opportunities for Energy Efficiency for Public Entities and Industrial Companies			industrial companies audited	industrial companies benefiting from an MCA-funded energy efficiency audit		Customer class (Industrial; Public entities)				
Code for low and medium voltage electricity grid developed		Output	Grid Code developed	Date at which the sector regulator (ARE) approves the medium and low voltage grid codes	Date	None	ARE official Notice of approval	ARE	Once	Grid code development was not initially considered by the Compact, but was found to be necessary for the IPP sub-activity.
Update to the Benin-Togo Energy Code		Output	Energy code updated	Date of approval of the updated Code by both governments (GoB and GoT)	Date	None	Ministry of Energy	DGRE	Once	
Implementation of the Master Plan		Output	Master plan adopted	Date of adoption of the Master Plan of the Energy Sub-Sector by the government	Date	None	Ministry of Energy	DGRE	Once	
GoB approves Tariff Policy and Tariff Plan		Process	Validation and adoption of tariff study report	Date of adoption of the final tariff study report	Date	None	MCA Benin II	MCA Benin II	Once	
Utility Strengthening Activity										
Service quality for electricity consumers sustainably improved		Outcome	Continuity of service indicator (apart from external cause)	(Number of minutes in a year) x (Undistributed energy) / (Total energy delivered to the Grid)	Minutes	None	SYSTEM | Collection of information related to the energy delivered to the grid ; MANUAL | Non-Distributed Energy Calculation	SBEE/DT	Quarterly	Indicator used to calculate variable compensation Management contractor's KPI: Reference T1

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Government net arrears to SBEE reduced		Outcome	Government net arrears to SBEE	Amount of the GoB debt to SBEE	CFA Francs	None	Arrears payment report	MCA Benin II	Quarterly	Identify the raw data that goes into the calculation of the indicator (debt and receivable to release the balance) This indicator only looks at GoB debt to SBEE, and not the money that SBEE owes to CEB and GoB. In 2018, SBEE owed almost twice as much to the government than the government did to SBEE.
SBEE Employee competencies improved		Outcome	Training hours per staff	Number of training hours provided by group x number training participants / total number of SBEE personnel	Hours	Sex (Female; Male)	Quarterly Report/MHI	SBEE/HR/Audit Department	Quarterly	Management contractor's KPI: Reference H1
Improved collection rate		Outcome	Recovery rate per billing session (month M) and by category of consumers on date M+6	Total amount recovered for the month M+6 / Total amount of invoices for the month M and debts over 6 months.	Percentage	Consumer type (Low voltage, Medium voltage) Public entities	Quarterly Report/MHI Gd'Or and Smart Vend	SBEE Sales division or Internal Audit Department	Quarterly	This indicator's parent reflects the previous M&E plan's "Rate of monthly bill collection" indicator defined as the "Average rate of monthly bill collection over the past three months". The data for the disaggregated categories (MV, LV, and public clients) relates to MHI's key performance indicator C7. Data for those three indicators are derived from the

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
										contract auditor reports.
		Outcome	On-time collection rate for low voltage private customers	Amount collected from bills of low voltage private customers / amount of bills issued during the same period for the same customer class	Percentage	None	Quarterly Report/MHI Gd'Or and Smart Vend	SBEE Sales division or Internal Audit Department	Quarterly	Indicator used to calculate variable compensation Management contractor's KPI: Reference C8
		Outcome	On-time collection rate for medium voltage private customers	Amount collected from bills of medium voltage private customers / amount of bills issued during the same period for the same customer class	Percentage	None	Quarterly Report/MHI Gd'Or and Smart Vend	SBEE Sales division or Internal Audit Department	Quarterly	Indicator used to calculate variable compensation Management contractor's KPI: Reference C9
		Outcome	On-time collection rate for public sector customers	Amount collected from bills of public customers / amount of bills issued during the same period for the same customer class	Percentage	None	Quarterly Report/MHI Gd'Or and Smart Vend	SBEE Sales division or Internal Audit Department	Quarterly	Indicator used to calculate variable compensation Management contractor's KPI: Reference C10
Customer service improved		Outcome	Average time for consumers troubleshooting	Average time between a customer communicates a technical complaint and the problem is resolved	Hours	SBEE Regions (DRL1; DRL2; DRA; DRO/PDRZ/C;DRM/C; DRB/A;DRA/D)	Quarterly Report/MHI	SBEE	Quarterly	Management contractor's KPI: Reference T8
		Outcome	Quotation issuance for new connection	Average number of days between a customer's request for a new	Days	SBEE Regions (DRL1; DRL2; DRA; DRO/PDRZ/C;DRM/C	Survey	INSTaD	Annual	Data to be collected through survey by SBEE.

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
				connection and the issuance of a quotation		; DRB/A;DRA/D)				**Details on calculation method included in the INStaD~~INSAE~~ baseline study report.**
		Outcome	Time to connect	Average number of days between payment of the quoted amount and the date the connection is effective	Days	SBEE Regions (DRL1; DRL2; DRA; DRO/P DRZ/C;DRM/C ; DRB/A;DRA/D)	Survey	INSTaD	Annual	Data to be collected through survey by SBEE.
Customer satisfaction improved		Outcome	Customer satisfaction index	Rating of customer service (technical and non-technical) by SBEE customer[12]s	Percentage	Customer class (Households; Businesses)	Surveys	INSTaD	Other	Management contractor's KPI: Reference C15 Frequency of reporting: twice
Employee satisfaction improved		Outcome	SBEE staff satisfaction index	Average of responses to question (a) + average of responses to question (b) / 2 * 10.Question (a): On a scale of 0 to 10, how satisfied are you with your working conditions (office, environment, hygiene/health, and	Percentage	Sex (Female; Male)	Surveys	INSTaD	Other	Frequency of reporting: twice

[12] The value of this indicator is estimated by the overall household and business satisfaction rate after highlighting their degree of satisfaction with the various SBEE 'services (technical and non-technical)

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
				security). Question (b): On a scale of 0 to 10, to what extent does your work meet your expectations?						
Operational performance improved		Outcome	Efficiency of the electrical distribution network	The difference between the quantity of electricity injected into the network and billed compared to the quantity injected into the network.	Percentage	None	Quarterly Report/MHI	SBEE	Quarterly	Management contractor's KPI: Reference C1
Improved operational efficiency and productivity		Outcome	Labor productivity	Number of SBEE employees / 1000 customers	Percentage	None	Quarterly Report/MHI	SBEE/Internal Audit Department	Annual	Management contractor's KPI: Reference C14
Procurement processes improved	-	Outcome	Digitized stock	Gap between value of stock in MIS and value of the physical stock	Percentage	None	Quarterly Report/MHI	SBEE	Annual	Reference A1 The difference is calculated by product. The rate is calculated with the absolute value of the differences per product divided by the value of the digitized stock following the inventory and after logical corrections.
SBEE has a PTA and a budget in accordance with the *Contrat Plan*		Outcome	PTA adoption according to *Contrat Plan*	Number of annual work plans adopted by SBEE's board of directors aligned per the *Contrat Plan* management	Number	None	SBEE	SBEE	Annual	
		Outcome	Budget adoption in accordance with *Contrat Plan*	Number of annual budgets adopted by SBEE's board of directors aligned per the *Contrat Plan*	Number	None	SBEE	SBEE	Annual	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
		Outcome	Budget execution in accordance with *Contract Plan*	Proportion of budget spent in accordance with *Contrat Plan*	Percentage	None	SBEE	SBEE (DAF Office)	Annual	
Support for SBEE Management Contract		Outcome	SBEE staff trained	Total number of SBEE staff trained in accordance with Management Contract	Number	Sex	SBEE	SBEE	Quarterly	
Pre-paid meters installed in public and private entities		Outcome	Transition to pre-paid metering system	Number of customers with pre-paid meters installed / Total number of customers	Percentage	None	Quarterly Report/MHI Gd'Or and Smart Vend	SBEE Sales division	Annual	Management contractor's KPI: Reference:C5
Installation of pre-paid meters in public administration buildings		Outcome	Number of prepaid meters installed in public entities.	Number of prepayment meters installed in public entities.	Number	None	Raport de Suivi des CP	MCA Bénin II	Annual	
SBEE has a maintenance management system		Outcome	Maintenance system installation	Date on which the new system management is created and launched	Date	None	SBEE	SBEE	Once	MCC is no longer funding the maintenance management system. However, M&E is still tracking these results due to their importance in the project logic.
SBEE Implements New Maintenance System		Outcome	Maintenance system equipment	Percent SBEE regions with fully equipped maintenance tools	Percentage	None	SBEE	SBEE	Annual	
Network made sustainable and reliable		Outcome	Number of outages observed at the substation HTA	Total number of outages observed at the substation HTA	Number	None	SBEE	SBEE	Quarterly	Reference T3
Network made sustainable and reliable		Outcome	Duration of outages observed at the substation HTA	Total hours of outages observed at the substation HTA	Hours	None	SBEE	SBEE	Quarterly	Reference T4

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Network made sustainable and reliable		Outcome	Percentage of overloaded distribution stations	Number of overloaded distribution stations/total distribution stations	Percentage	None	SBEE	SBEE	Quarterly	Reference T6
Transactions Advisor competitively recruited		Output	Transactions Advisor installed	Date of installation of the Transactions Advisor	Date	None	Notice to proceed	MCA Bénin II	Once	
Management contractor competitively recruited		Process	Management contract signed	Date at which the management contractor is signed by all relevant parties	Date	None	Management contract	MCA-Benin II	Once	
Public Information and Education Activity										
Greater Acceptance of Tariff Changes and Their Benefits		Outcome	Tariff acceptance rate	Total number of respondents who (1) state being aware of the tariff change, (2) think at least one aspect of electricity service is affected by the tariff change, and (3) think the service provided is worth the additional cost divided by the total number of respondents for whom (1) and (2) is true. Survey results were extrapolated and represent national-level estimates.	Percentage	Consumer class (Residential; Commercial; Industrial). Sex (Male; Female) for Residential only	Surveys	INSTaD	Other	Frequency of reporting: twice
Greater Public Awareness of Tariff Changes		Outcome	Tariff awareness rate	Percentage of survey respondents who responded 'yes' to the question: "Are you aware of SBEE's new rates?"	Percentage	Consumer class (Residential; Commercial; Industrial). Sex (Male; Female) for Residential only	Surveys	MCA Benin II	Other	Frequency of reporting: twice

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
N/A		Output	Awareness campaigns held on tariffs	Total number of awareness campaigns held on tariff changes	Number	None	SBEE	SBEE, DGE, MCA Benin II	Quarterly	
N/A		Output	Awareness campaigns held on energy efficiency	Total number of awareness campaigns held on efficient use of energy by households	Number	N/A	DGRE	DGE, MCA Benin II	Quarterly	

Electricity Generation and Distribution Projects

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Electricity Generation and Distribution Projects - Outcomes										
Reduced number and duration of outages		Outcome	System Average Interruption Duration Index (SAIDI)	Sum of durations, in customer-hours, of sampled customer interruptions in a quarter / Total number of sampled customers connected to network in the same quarter.	Hours	None	Smart meter data platform	SBEE Technical Directorate	Quarterly	SBEE does not currently measure SAIDI and SAIFI. MCC is funding the installation of grid monitors and smart meters to be able to measure these indicators.
		Outcome	System Average Interruption Frequency Index (SAIFI)	Sum of sampled customer-interruptions in a quarter / Total number of sampled customers connected to network in the same quarter.	Rate	None	Smart meter data platform	SBEE Technical Directorate	Quarterly	SBEE does not currently measure SAIDI and SAIFI. MCC is funding the installation of grid monitors and smart meters to be able to measure these indicators.
Decreased Gap between supply and demand	P-15	Outcome	Total electricity supply	Total electricity, in megawatt hours, produced or imported in a year.	Megawatt hours	Electricity supply source : Domestic (Independent	CEB, SBEE, IPP	DGRE	Annual	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
						Power Producer; SBEE production, Government owned) and Imports.				
	P-23	Outcome	Total electricity sold	The total megawatt hours of electricity sales to all customer types.	Megawatt hours	Customer class: Residential, Businesses, (commercial and industrial), Other	CEB, SBEE, IPP	DGRE	Quarterly	Disaggregation Other covers: Public Lighting, SBEE and SONEB staff consumption
		Outcome	Total additional energy consumption from Grid Strengthening Activity	Total sum of the energy supplied by the new substations constructed and rehabilitated minus the maximum amount of energy transmitted by the substations before the works.	Megawatt hours	None	Targets are from emails with the economist based on the latest CBA models	MCC Economics Team	Quarterly	Does not include any additional energy or other benefits resulting from the NDCC.
		Outcome	Total electricity demand	Actual demand (consumption) + demand from connected customers who are not served (through load shedding, for instance)	Megawatt hours	None	CEB, SBEE, IPP	DGRE	Annual	Source *Contrat Plan*, Revised values derived from the provisional report of the National Electrification Strategy
Reduced technical losses	P-19	Outcome	Distribution system losses	1 – [Total megawatt hours billed / Total megawatt hours received from transmission]	Percentage	None	SBEE, CEB	SBEE	Quarterly	Cost benefit analysis data

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Improved Voltage Quality and Stability for Users		Outcome	Distribution network voltage	Percentage of time that the voltage on the network is ±10 % 220 V	Percentage	None	SBEE, CEB	SBEE	Quarterly	
Electricity Generation and Distribution Projects - Outputs										
Improved grid capacity	P-11	Output	Distribution substation capacity added	The total added substation capacity, measured in megavolt amperes that is energized, commissioned, and accompanied by a test report and supervising engineer's certification resulting from new construction or refurbishment of existing substations supported by MCC.	Megavolt ampere	EGP Activity (Regional activity; Cotonou Activity)	MCA Benin II	MCA Benin II (Distribution Project)	Once	
Switchgears and sub-station capacity added		Output	Number of switchgear stations and substations built	Number of switchgear stations and substations built with MCC project funds	Number	EGP Activity (Regional activity; Cotonou Activity)	Minutes of final reception of the stations/substations built	MCA Benin II (Distribution Project)	Once	
		Output	Number of switchgear stations and substations rehabilitated	Number of switchgear stations and substations rehabilitated	Number	By EGP activity (Cotonou activity; Regional activity)	Minutes of final reception of the stations/substations rehabilitated	MCA Benin II (Distribution Project)	Once	
Construction and rehabilitation of distribution network	P-10	Output	Kilometers of distribution lines upgraded or built.	The sum of linear kilometers of new, reconstructed, rehabilitated, or upgraded distribution lines that have been energized, tested and commissioned with MCC support	Kilometers	Voltage level (63Kv; 33Kv; 15Kv) and EGP activity (Cotonou activity; Regional activity)	Monthly report of PMC	MCA Benin II (Distribution Project)	Quarterly	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Dispatch center constructed		Output	National Dispatch Control Center constructed	Provisional acceptance of construction is received according to contractual specifications	Date	None	Minutes of final reception of the building of the NDCC	MCA Benin II SBEE	Once	Specific technical requirements of NDCC will be detailed in the contract for the NDCC. Final acceptance is expected one year after provisional acceptance.
Dispatch center constructed		Output	National Dispatch Control Center is equipped with furniture and office supplies	Final acceptance of equipment is received according to contractual specifications	Date	None	Minutes of final reception of the office equipment and furniture of the NDCC building	MCA Benin II SBEE	Once	
SCADA and NDCC systems installed		Output	Telecommunication system equipment installed	All telecommunication system equipment installed according to contractual specifications	Date	None	Minutes of final reception of the Telecom equipment installed	MCA Benin II SBEE	Once	
		Output	Supervisory control data acquisition (SCADA) equipment installed	SCADA installed according to contractual specifications	Date	None	Minutes of final reception of the SCADA equipment installed	MCA Benin II SBEE	Once	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
		Output	Substations connected to SCADA/NDCC	Actual number of existing and new substations connected to the SCADA/NDCC before the end of the Compact	Number	None	MCA Benin II SBEE	MCA Benin II SBEE	Quarterly	
		Output	Back-up National Dispatch Control Center constructed	Provisional acceptance of construction is received according to contractual specifications	Date	None	Minutes of final reception of the BUNDCC building	MCA Benin II SBEE	Once	
		Output	Individuals trained in the NDCC system	Number of individuals participating in at least one training session	Number	Sex (Male/Female)	MCA Benin II SBEE	MCA Benin II SBEE	Quarterly	
Automated meter reading (AMR) technology is installed and functional		Output	Number of AMR devices installed	Number of AMR technology meters installed through MCC funding	Number	Meter type (Grid monitor/Smart meters)	MCA Benin II	MCA Benin II SBEE	Annual	
Electricity Generation and Distribution Projects - Process										
N/A (Process indicator)		Process	Kilometers of distribution line installed	The sum of linear kilometers of new, reconstructed, rehabilitated, or upgraded distribution lines that have been installed but have not been commissioned with MCC support.	Kilometers	Types of lines (63Kv; 33Kv; 15Kv) and EGP Activity (Cotonou activity; Regional activity)	Monthly report of PMC	MCA Benin II (Distribution Project)	Quarterly	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
		Process	Value of signed power infrastructure feasibility and design contracts	The value of all signed feasibility, design, and environmental impact assessment contracts, including resettlement action plans, for power infrastructure investments using 609(g) and compact funds.	US dollars	None	SAP	MCA Benin II's DAF	Quarterly	None
		Process	Percent disbursed of power infrastructure feasibility and design contracts	The total amount of all signed feasibility, design, and environmental impact assessment contracts, including resettlement action plans, for power infrastructure disbursed divided by the total current value of signed contracts	Percentage	Input	SAP	MCA Benin II's DAF	Quarterly	
		Process	Value disbursed of power infrastructure feasibility and design contracts	The amount disbursed of all signed feasibility, design, and environmental impact assessment contracts, including resettlement action plans, for power infrastructure using 609(g) and compact funds.	US dollars	None	SAP	MCA Benin II's DAF	Quarterly	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
		Process	Value of signed power infrastructure construction contracts	The value of all signed construction contracts for power infrastructure investments using compact funds	US dollars	None	SAP	MCA Benin II's DAF	Quarterly	
N/A (Process indicator)		Process	Percent disbursed of power infrastructure constructure contracts	The total amount of all signed construction contracts for power infrastructure investments disbursed divided by the total current value of all signed contracts.	Percentage	Input	SAP	MCA Benin II's DAF	Quarterly	
		Process	Value disbursed of power infrastructure construction contracts	The amount disbursed of all signed construction contracts for power infrastructure investments using compact funds.	US dollars	None	SAP	MCA Benin II's DAF	Quarterly	
	P-5	Process	Temporary employment generated in power infrastructure construction	The number of people temporarily employed or contracted by MCA-contracted construction companies to work on construction of new power infrastructure or reconstruction, rehabilitation, or upgrading of existing power infrastructure.	Number	Sex (Female/Male); Labor source (Foreign/Local); Skill level (Skilled/Semi-skilled/Un-skilled)	SAP	MCA Benin II's DAF	Quarterly	

Off-Grid Energy Access Project

Off-Grid Energy Access Project (Project-Wide)

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Increased Use of Off-Grid Electricity		Outcome	Off-grid electricity consumption	Total number of kWh consumed by off-grid electricity clients	Kilowatt Hour	Sex (Male; Female)	NIRAS Data Collection Sheet	NIRAS	Quarterly	Only the mini-grid beneficiaries' consumption will be measured due to the infeasibility of collecting data on the other off-grid energy products, including solar home kits.
Increased Market for Off-Grid Electricity Solutions		Outcome	Number of jobs created	Total number of jobs created in off-grid electricity solutions as a result of MCC investment	Number	OCEF Windows (Window 1, Window 2, Window 3, Window 4)	NIRAS Data collection sheet	NIRAS/Promoters	Quarterly	Due to challenges measuring temporary employment, ITT data for this indicator is considered an estimate.
Off-Grid Clean Energy Activity										
Increased access to off-grid energy solutions for households, businesses and public services		Outcome	Access to off-grid electricity	Number of households, businesses, and public sector entities having purchased or acquired an off-grid electricity product or connection from an OCEF-funded project	Number	Sex (Male; Female) Consumer class (Households, Businesses, Public Entities)	NIRAS Data Collection Sheet	NIRAS	Quarterly	This indicator measures new products and connections rather than total population with access due to the infeasibility of measuring the latter.
		Output	Off-grid capacity	Total Megawatts of installed off-grid generation capacity in the country through MCC funding	Megawatts	None	Windows 2& 3 / NIRAS Data Collection Sheet	NIRAS	Quarterly	This indicator measures combined installed mini-grid and solar home kit capacity.
Off-grid sector companies receive co-financing to introduce or expand their products and		Output	Number of OCEF-funded projects	Total number of projects funded by OCEF. A project can include multiple organizations	Number	OCEF Windows (Window 1, Window 2, Window 3, Window 4)	OCEF Co-financing agreements	MCA Benin II, NIRAS	Quarterly	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
services in Benin										
		Output	OCEF amount disbursed	Amount of funds disbursed from facility manager to OCEF Projects	US dollars	OCEF Windows (Window 1, Window 2, Window 3, Window 4)	MCA Benin II/DAF, NIRAS Data Collection Sheet	MCA Benin II, NIRAS	Quarterly	
		Output	Project promoter amount disbursed	Total amount that OCEF project promoters have spent in support of the OCEF-funded projects	US dollars	OCEF Windows (Window 1, Window 2, Window 3, Window 4)	MCA Benin II, NIRAS Data Collection Sheet	MCA Benin II, NIRAS	Quarterly	There is unfortunately no means to verify the quality of the data provided by the promoters on this indicator
N/A (Process indicator)		Process	OCEF amount committed	Total OCEF contribution committed amount as written in co-finance agreements	US dollars	OCEF Windows (Window 1, Window 2, Window 3, Window 4)	MCA Benin II/DAF, NIRAS Data Collection Sheet	MCA Benin II, NIRAS	Quarterly	
		Process	Project promoter amount committed	Total amount that OCEF project promoters have committed to spending on the OCEF-funded projects	US dollars	OCEF Windows (Window 1, Window 2, Window 3, Window 4)	MCA Benin II, NIRAS Data Collection Sheet	MCA Benin II, NIRAS	Quarterly	
Enabling Environment for Off-Grid Electricity										
Increased capability of Government of Benin to facilitate entry of off-grid energy companies		Outcome	Government staff working in off-grid energy sector	Number of ARE, ABERME, and ANM staff members or consultants whose job description or de facto job function includes review of	Number	GoB Agency (ARE, ABERME, and ANM)	ARE, ABERME and ANM Data Collection Sheets	ARE, ABERME, and ANM	Annual	

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
				off-grid electrification projects						
		Outcome	Number of ABERME final notices on off-grid proposals	Number of ABERME decisions (approval or rejection) of reviewed proposals for off-grid electricity projects.	Number	None	ABERME Data Collection Sheet	ABERME	Annual	**Please note** that the definitive final notice comes from ARE, not ABERME. Following this, ABERME signs the operating agreement with the promotor.
The Government of Benin adopts the off-grid electrification framework (policy, master plan, and regulatory framework)		Outcome	Adoption of off-grid framework	Date at which the Government of Benin adopts the off-grid electrification framework, which includes the policy, master plan, and regulatory framework	Date	None	Decree by the Secretary General of the Government	MCA	Once	

ANNEX II: TABLE OF INDICATOR BASELINES AND TARGETS

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Policy Reform and Institutional Strengthening (Project-Wide)													
Outcome	SBEE investments in new infrastructure	None	CFA Francs	Level (Cumulative)	25,963,000,000	2017	75,000,000,000	147,000,000,000	100,000,000,000	46,501,888,000	233,103,627,000	250,306,418,000	Target data source : *Contrat Plan* p.18 and et plan d'Affaire SBEE p.33 et 34 and Rapport Trimestriel MHI T2 2021, p.89 Baseline data source : Rapport de collecte des données de référence p.30
Outcome	SBEE investments in maintaining infrastructure	None	CFA Francs	Level (Cumulative)	127,098,000	2017	NA	133,050,000	69,940,000	57,650,000	NA	NA	Target source : SBEE's budget. The other targets will be provided as soon as the SBEE develops its equipment maintenance plan
Policy, Regulation, and Institutional Support Activity													
Outcome	Adoption rate for energy efficient appliances	Average	Percentage	Level	30.55%	2020	NA	NA	NA	NA	NA	50%	Target source: Discussion with MCA Project
		Households	Percentage	Level	27.7%	2020	NA	NA	NA	NA	NA	50%	
		Households - Male	Percentage	Level	30.2%	2020	NA	NA	NA	NA	NA	50%	
		Households - Female	Percentage	Level	19.3%	2020	NA	NA	NA	NA	NA	50%	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
		Businesses	Percentage	Level	36.1%	2020	NA	NA	NA	NA	NA	50%	
		Businesses - Formal	Percentage	Level	58.2%	2020	NA	NA	NA	NA	NA	50%	
		Businesses - Informal	Percentage	Level	34.1%	2020	NA	NA	NA	NA	NA	50%	
		Public entities	Percentage	Level	NA	NA	NA	NA	NA	NA	NA	50%	The baseline survey did not include "public entities" in its sample. There is no current plan to include "public entities" in future surveys.
Outcome	Amount invested in energy efficiency measures	Total	CFA Francs	Cumulative	0	2019	NA	NA	NA	NA	NA	NA	MCA/M&E has not been able to obtain targets from the energy efficiency consultant.
		MCA-Benin II	CFA Francs	Cumulative	0	2019	NA	NA	NA	NA	NA	NA	
		Other sources	CFA Francs	Cumulative	0	2019	NA	NA	NA	NA	NA	NA	
Outcome	Total generation output	Total	Mega watt hours	Level (Cumulative)	329,416.4	2016	NA	NA	646,350.00	1,061,090.00	1,411,750.00	1,475,010.00	Target Source: DGRE
		(PV)	Mega watt hours	Level (Cumulative)	5,334.6	2016	NA	NA	7,520.00	7,430.00	7,430.00	44,470.00	
		(Hydro)	Mega watt hours	Level (Cumulative)	1,125.3	2016	NA	NA	118,210.00	71,930.00	87,260.00	87,260.00	
		(Thermal)	Mega watt hours	Level (Cumulative)	322,956.5	2016	NA	NA	520,620.00	981,730.00	1,317,060.00	1,343,280.00	
Outcome	Amount invested in IPPs' projects	None	US dollars	Cumulative	0	2019	0	0	0	50,000,000	50,000,000	50,000,000	Target source: 2019 Compact modification CBA

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Outcome	Operating cost- recovery ratio	None	Percentage	Level (Cumulative)			152%	173%	274%	170%	111%	NA	Targets values obtained from SBEE Budget. The increase observed in year 3 is due to public subside. SBEE has not provided targets for year 6.
	Total revenue collected		US dollars	Level (Cumulative)			455,000	505,000	821,000	502,000	342,000	NA	
	Total operating cost		US dollars	Level (Cumulative)			299,000	293,000	300,000	295,000	307,000	NA	
Outcome	Cost-reflective tariff regime	All	Percentage	Level	NA	NA	NA	NA	NA	NA	NA	NA	SBEE has yet to provide reliable and validated estimate of the Average cost per kilowatt-hour of electricity supplied to customers. But it plans to determine the indicator target.
		Post-payment LV	Percentage	Level	NA	NA	NA	NA	NA	NA	NA	NA	
		Post-payment MV	Percentage	Level	NA	NA	NA	NA	NA	NA	NA	NA	
		Pre-payment LV	Percentage	Level	NA	NA	NA	NA	NA	NA	NA	NA	
Outcome	Average cost per kwh Supplied	All	CFA Francs	Level	NA	NA	NA	NA	NA	NA	NA	NA	This indicator also informs the result improved financial sustainability.
		Post-Payment LV	CFA Francs	Level	NA	NA	NA	NA	NA	NA	NA	NA	
		Post-payment MV	CFA Francs	Level	NA	NA	NA	NA	NA	NA	NA	NA	
		Pre-payment LV	CFA Francs	Level	NA	NA	NA	NA	NA	NA	NA	NA	
Outcome		All	CFA Francs	Level	112.33	2020	NA	NA	NA	NA	NA	NA	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
	Average cost per kwh invoiced	Post-Payment LV	CFA Francs	Level	122	2020	NA	NA	NA	NA	NA	NA	Source of Baseline: MHI KPIs
		Post-payment MV	CFA Francs	Level	104	2020	NA	NA	NA	NA	NA	NA	
		Pre-payment LV	CFA Francs	Level	111	2020	NA	NA	NA	NA	NA	NA	
Outcome	Approval of cost-reflective tariffs	None	Date	Date				24-Aug-18					Data on approval of cost reflective tariff is collected every two years according to tariff reform cycle.
Outcome	Financial self-reliance of ARE	None	Percentage	Level	0	2018	NA	NA	65%	67%	61%	61%	Source of 2019, 2020, and 2021 targets: ARE's 2019-2021 three-year investment and financing Plan
Outcome	Number of notices provided by ARE in a given year	None	Number	Level	12	2016	NA	NA	NA	NA	NA	NA	Data source: are.bj/avis-2016 We don't think targets will be set, but we generally expect an increase over time as ARE becomes more active in the sector.
Outcome	Energy efficiency standards formulated and enforced	None	Date	Date				18-May-19					

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Outcome	Energy efficiency labels adopted	None	Number	Cumulative	0	2019	NA	NA	NA	NA	3	3	
Outcome	Generation capacity reached financial close	None	Mega watts	Cumulative	0	2017	0	0	0	50	50	50	Targets are based on information presented to MCC's investment management committee for the March 2019 modification to the Compact.
Outcome	Capacity installed by IPPs	Total	Mega watts	Cumulative	0	2017	0	0	0	50	50	80	Targets are based on information presented to MCC's investment management committee for the March 2019 modification to the Compact.
		MCA-Benin II	Mega watts	Cumulative	0	2017	0	0	0	50	50	50	
		Other sources	Mega watts	Cumulative	0	2017	NA	NA	NA	NA	NA	30	Source: MHI's Q6 report, which lists future IPPs.
Outcome	Generation from new IPPs	None	Mega watt hours	Cumulative	0	2017	0	0	0	0	87,600	87,600	Target source: CBA report
Outcome	PPAs signed	None	Number	Cumulative	0	2020	NA	NA	NA	NA	1	1	
Outcome	Approval of IPP institutional framework	None	Date	Date				17-Jul-18					

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Outcome	Approval of Tariff Policy and Tariff Plan	None	Date	Date				27-Jul-18					
Output	Proposal of cost-reflective tariffs	None	Date	Date			NA	NA	NA	NA	NA	NA	SBEE does not provide targets for this indicator.
Output	Percentage of job positions filled in ARE	None	Percentage	Level			NA	NA	79.49%	92.31%	100%	100%	Target source: ARE's 2019-2021 three years investment and financing Plan
Output	ARE headquarters are built and in service	None	Date	Date						11-May-21			See Page 9 of the independent evaluation baseline report on how MCC's planned support changed to focus on the construction of the ARE building in light of the EU's support to ARE.
Output	ARE staff trained on tariff regime	None	Number	Cumulative	0	NA	NA	NA	NA	NA	NA	NA	MCA/ARE/consultant not having targets.
Output	Number of public entities and industrial	Total	Number	Cumulative	0	2018	0	0	30	30	30	30	Target Source: Energy efficiency audit
		Public entities	Number	Cumulative	0	2018	0	0	20	20	20	20	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
	companies audited	Industrial	Number	Cumulative	0	2018	0	0	10	10	10	10	consultant's inception report
Output	Grid Code developed	None	Date	Date					30-Oct-19				Target based on grid consultant's deliverables schedule
Output	Energy code updated	None	Date	Date					22-Jun-20				
Output	Master plan adopted	None	Date	Date			22-Jun-17						
Process	Validation and adoption of tariff study report	None	Date	Date			28-Feb-18						
Utility Strengthening Activity													
Outcome	Continuity of service indicator (apart from external cause)	None	Minutes	Level (Cumulative)	5,388	2020	NA	NA	NA	3,232.8	2,155.2	1,077.6	Target source: Baseline and target from 'Protocole de mesure des indicateurs de performance et la fixation des valeurs initiales '
Outcome	Government net arrears to SBEE	None	CFA Francs	Level	12,393,977,405	2018	NA	NA	NA	NA	NA	NA	Baseline source: MCA CP Report Q16 SBEE and the project are unable to provide target
Outcome	Training hours per staff	All	Hours	Level (Cumulative)	3.6	2020	NA	NA	NA	NA	NA	23	Baseline and target source: MHI KPIs
		Female	Hours	Level (Cumulative)	NA	NA	NA	NA	NA	NA	NA	NA	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
		Male	Hours	Level (Cumulative)	NA	NA	NA	NA	NA	NA	NA	NA	
Outcome	Recovery rate per billing session (month M) and by category of consumers on date M+6	All	Percentage	Level	63%	2020	NA	NA	NA	85%	NA	99.33%	Baseline and target source: MHI KPI. Targets are not available for all years.
		Low Voltage	Percentage	Level	80%	2020	NA	NA	NA	NA	NA	98%	
		Medium Voltage	Percentage	Level	74%	2020	NA	NA	NA	90%	96%	100%	
		Public entities	Percentage	Level	35%	2020	NA	NA	NA	80%	NA	100%	
Outcome	On-time collection rate for low voltage private customers	None	Percentage	Level	61%	2020	NA	NA	NA	75%	80%	90%	Baseline and target source: MHI KPI. Targets are not available for all years.
Outcome	On-time collection rate for medium voltage private customers	None	Percentage	Level	56%	2020	NA	NA	NA	80%	95%	100%	Baseline and target source: MHI KPI. Targets are not available for all years.
Outcome	On-time collection rate for public sector customers	None	Percentage	Level	23%	2020	NA	NA	NA	80%	95%	100%	Baseline and target source: MHI KPI. Targets are not available for all years.
Outcome	Average time for consumers troubleshooting	Overall	Hours	Level	4.8	2020	NA	NA	NA	NA	NA	NA	
		DRL1	Hours	Level	0	2020	NA	NA	NA	NA	NA	NA	
		DRL2	Hours	Level	0	2020	NA	NA	NA	NA	NA	NA	
		DRA	Hours	Level	2.4	2020	NA	NA	NA	NA	NA	NA	
		DRO/P	Hours	Level	0	2020	NA	NA	NA	NA	NA	NA	
		DRZ/C	Hours	Level	2.4	2020	NA	NA	NA	NA	NA	NA	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
		DRM/C	Hours	Level	0	2020	NA	NA	NA	NA	NA	NA	
		DRB/A	Hours	Level	4.8	2020	NA	NA	NA	NA	NA	NA	
		DRA/D	Hours	Level	33.6	2020	NA	NA	NA	NA	NA	NA	
Outcome	Quotation issuance for new connection	Overall	Days	Level	8.3	2017	NA	NA	NA	NA	NA	NA	SBEE has not established targets for this indicator.
		DRL1	Days	Level	4.3	2017	NA	NA	NA	NA	NA	NA	
		DRL2	Days	Level	4.4	2017	NA	NA	NA	NA	NA	NA	
		DRA	Days	Level	11.1	2017	NA	NA	NA	NA	NA	NA	
		DRO/P	Days	Level	9.2	2017	NA	NA	NA	NA	NA	NA	
		DRZ/C	Days	Level	5.8	2017	NA	NA	NA	NA	NA	NA	
		DRM/C	Days	Level	6.9	2017	NA	NA	NA	NA	NA	NA	
		DRB/A	Days	Level	8.8	2017	NA	NA	NA	NA	NA	NA	
		DRA/D	Days	Level	11.9	2017	NA	NA	NA	NA	NA	NA	
Outcome	Time to connect	Overall	Days	Level	34.2	2017	NA	NA	NA	NA	NA	NA	SBEE has not established targets for this indicator.
		DRL1	Days	Level	18.7	2017	NA	NA	NA	NA	NA	NA	
		DRL2	Days	Level	29.7	2017	NA	NA	NA	NA	NA	NA	
		DRA	Days	Level	26.9	2017	NA	NA	NA	NA	NA	NA	
		DRO/P	Days	Level	27.5	2017	NA	NA	NA	NA	NA	NA	
		DRZ/C	Days	Level	74.5	2017	NA	NA	NA	NA	NA	NA	
		DRM/C	Days	Level	33.5	2017	NA	NA	NA	NA	NA	NA	
		DRB/A	Days	Level	47.6	2017	NA	NA	NA	NA	NA	NA	
		DRA/D	Days	Level	42.8	2017	NA	NA	NA	NA	NA	NA	
Outcome	Customer satisfaction index	All	Percentage	Level	50.42%	2020	NA	NA	NA	NA	NA	71.69%	
		Households	Percentage	Level	47.1%	2020	NA	NA	NA	NA	NA	70%	
		Businesses	Percentage	Level	56.9%	2020	NA	NA	NA	NA	NA	75%	
Outcome	SBEE staff satisfaction index	All	Percentage	Level	62.2	2018	NA	NA	NA	NA	NA	NA	SBEE has not established targets for this indicator.
		(Male)	Percentage	Level	60.5	2018	NA	NA	NA	NA	NA	NA	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
		(Female)	Percentage	Level	61.8	2018	NA	NA	NA	NA	NA	NA	
Outcome	Efficiency of the electrical distribution network	None	Percentage	Level	76	2021	NA	NA	NA	80	83	85	Baseline and target source: MHI KPI. Targets are not available for all years.
Outcome	Labor productivity	None	Percentage	Level	2.5%	2020	NA	NA	NA	2.4%	2.2%	2%	Baseline and target source: MHI KPI. Targets are not available for all years.
Outcome	Digitized stock	None	Percentage	Level	28%	NA	NA	NA	NA	NA	NA	0.05%	Baseline and target source: MHI KPI. Targets are not available for all years.
Outcome	PTA adoption according to *Contrat Plan*	None	Number	Level	0	2017	0	1	1	1	1	1	According to OHADA, budget and PTA must be adopted no later than December 31st of each year.
Outcome	Budget adoption in accordance with *Contrat Plan*	None	Number	Level	0	2017	0	1	1	1	1	1	According to OHADA, budget and PTA must be adopted no later than December, 31st of each year.
Outcome	Budget execution in accordance with *Contrat Plan*	None	Percentage	Level	0	2017	NA	NA	NA	NA	NA	NA	SBEE does not provide targets for this indicator.

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Outcome	SBEE staff trained	All	Number	Cumulative	0	2019	NA	NA	NA	NA	NA	NA	MCA does not have targets for this indicator
		(Male)	Number	Cumulative	0	2019	NA	NA	NA	NA	NA	NA	
		(Female)	Number	Cumulative	0	2019	NA	NA	NA	NA	NA	NA	
Outcome	Transition to pre-paid metering system	None	Percentage	Level	43%	2021	NA	NA	NA	60%	80%	90%	Source of baseline and target: MHI KPIs. Targets for all years are not available.
Outcome	Number of prepaid meters installed in public entities	None	Number	Cumulative	0	2017	5,700	NA	NA	NA	NA	NA	SBEE has not provided targets. MHI plan to estimate the number of meters.
Outcome	Maintenance system installation	None	Date	Date				13-Mar-19					
Outcome	Maintenance system equipment	None	Percentage	Level			NA	NA	NA	NA	NA	NA	SBEE does not provide targets for this indicator.
Outcome	Number of outages observed at the substation HTA	None	Number	Level (cumulative)	NA	NA	NA	NA	NA	NA	NA	NA	SBEE does not provide targets for this indicator.
Outcome	Duration of outages observed at the substation HTA	None	Hours	Level (cumulative)	NA	NA	NA	NA	NA	NA	NA	NA	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Outcome	Percentage of overloaded distribution stations	None	Percentage	Level (cumulative)	3.74	2020	NA	NA	NA	NA	3	1	
Output	Transactions advisor installed	None	Date	Date			4-Dec-17						
Process	Management contract signed	None	Date	Date			31-Mar-18						Source of the target date is the February 14, 2017 implementation letter related to modification of the Utility Strengthening Activity.
Public Information and Education Activity													
Outcome	Tariff acceptance rate	All	Percentage	Level	25.29	2020	NA	NA	NA	NA	NA	NA	
		(Residential)	Percentage	Level	25.3	2020	NA	NA	NA	NA	NA	NA	
		(Female)	Percentage	Level	24.8	2020	NA	NA	NA	NA	NA	NA	
		(Male)	Percentage	Level	25.4	2020	NA	NA	NA	NA	NA	NA	
		(Commercial)	Percentage	Level	21.4	2020	NA	NA	NA	NA	NA	NA	
		(Industrial)	Percentage	Level	21.4	2020	NA	NA	NA	NA	NA	NA	
Outcome	Tariff awareness rate	All	Percentage	Level	1.61	2020	NA	NA	NA	NA	NA	NA	MCA has not provided targets.
		(Residential)	Percentage	Level	1.6	2020	NA	NA	NA	NA	NA	NA	
		(Female)	Percentage	Level	1.3	2020	NA	NA	NA	NA	NA	NA	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
		(Male)	Percentage	Level	1.7	2020	NA	NA	NA	NA	NA	NA	
		(Commercial)	Percentage	Level	3.3	2020	NA	NA	NA	NA	NA	NA	
		(Industrial)	Percentage	Level	5.9	2020	NA	NA	NA	NA	NA	NA	
Output	Awareness campaigns held on tariffs	None	Number	Cumulative	0	2018	NA	10	11	11	NA	19	Date source: Exchange with Project and DCRP
Output	Awareness campaigns held on energy efficiency	None	Number	Cumulative	0	2018	NA	NA	0	2	NA	8	Date source: Exchange with Project and DCRP

Electricity Generation and Distribution Projects

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Electricity Generation and Distribution Projects - Outcomes													

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Outcome	System Average Interruption Duration Index (SAIDI)	None	Hours	Level	18.27	2021	NA	NA	NA	NA	NA	NA	Data source: the smart meters platform - (AM Afrique as vendor). Baseline data is calculated to the first three months after the smarts meters platform go live.
Outcome	System Average Interruption Frequency Index (SAIFI)	None	Rate	Level	21.34	2021	NA	NA	NA	NA	NA	NA	Data source: the smart meters platform - (AM Afrique as vendor). Baseline data is calculated to the first three months after the smarts meters platform go live.
Outcome	Total electricity supply	**Total**	Mega watt hours	Level (Cumulative)	1,378,377.1	2015	1,307,268	1,386,704	1,468,847	NA	NA	NA	Data source: DGRE statistics; Targets values are not aligned with the cost-benefit analysis model. DGRE will provide targets for Year 4 to 6 and disaggregation value.
		(Domestic)	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	
		(Independent Power Producer)	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	
		(SBEE production)	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	
		(Government-owned)	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
		(Imports)	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	
Outcome	Total electricity sold	Total	Mega watt hours	Level (Cumulative)	988,000.8	2015	1,076,695.01	1,145,025.54	1,123,292.08	1,196,789.31	1,160,098.10	NA	Data source: SBEE budget. SBEE will provide targets for Year 4 to 6 and disaggregation value.
		Residential	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	
		Businesses	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	
		(Commerical)	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	
		(Industrial)	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	
		Other	Mega watt hours	Level (Cumulative)			NA	NA	NA	NA	NA	NA	
Outcome	Total additional energy consumption from Grid Strengthening Activity	None	Mega watt hours	Level (Cumulative)	0	2020	0	0	0	46,235	74,884	151,766	Targets are from emails with the economist based on the latest CBA models
Outcome	Total electricity demand	None	Mega watt hours	Level	1,233,272	2016	1,307,268	1,468,847	1,401,890	1,549,740	11,741,470	1,902,220	Source: *Contrat Plan*, Revised values derived from the provisional report of the National Electrification

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Outcome	Distribution system losses	None	Percentage	Level	18.8%	2018	18.8%	19.7%	20.5%	21.4%	15.4%	15.7%	Targets are from emails with the economist based on the latest CBA models. These differ from the management contractor's targets for network performance included for the PRIS project.
Outcome	Distribution network voltage	None	Percentage	Level			NA	NA	NA	NA	NA	NA	
Electricity Generation and Distribution Projects - Outputs													
Output	Distribution substation capacity added	Total	Megavolt ampere	Cumulative	0	2017	0	0	0	0	1,088.5	NA	The end of compact target revised in 2021 reflects amounts in the awarded construction contracts.
		(Regional activity)	Megavolt ampere	Cumulative	0	2017	0	0	0	0	521.5	NA	The end of compact target revised in 2021 reflects amounts in the awarded construction contracts.
		(Cotonou activity)	Megavolt ampere	Cumulative	0	2017	0	0	0	0	567	NA	The end of compact target revised in 2021 reflects amounts in the awarded construction contracts.

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Output	Number of switchgear stations and substations built	Total	Number	Cumulative	0	2017	NA	NA	NA	NA	NA	12	The end of compact target revised in 2021 reflects amounts in the awarded construction contracts. Annual targets based on the Project Management Consultant's work plan are still pending.
		(Regional Activity)	Number	Cumulative	0	2017	NA	NA	NA	NA	NA	6	Bérecingou : Substation 33kV -- New 33kV building and switchgear. Natitingou Nord : New Substation 33 kV Vèdoko : Station 63/15 kV GIS -- New building and 63kV GIS switchgear Maria Gléta : Station 63 kV AIS -- New control building, complete 63kV switchyard Bohicon : Substation 20 kV -- New building with 20kV switchgear to replace the

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
													existing Parakou : Substation 33 kV -- New building and 33kV switchgear
		(Cotonou Activity)	Number	Cumulative	0	2017	NA	NA	NA	NA	NA	6	Gbèdjromèdé : Substation GIS 63/15 kV New Croix-Rouge : Substation GIS 63/15 kV New CIM Bénin : Substation GIS 63/15 kV New Fidjrossè : Substation GIS 63/15 kV New Aéroport : Substation GIS 63/15 kV New Ancien pont : Substation GIS 63 kV -- Existing but completely modified nand extended
Output	Number of switchgear stations and substations rehabilitated	Total	Number	Cumulative	0	2017	NA	NA	NA	NA	NA	12	The end of compact target revised in 2021 reflects amounts in the awarded construction contracts. Annual targets

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
													based on the Project Management Consultant's work plan are still pending.
		(Regional Activity)	Number	Cumulative	0	2017	NA	NA	NA	NA	NA	7	Bérecingou : Extension with one 161kV line feeder Djougou : Extension ot 161kV with three line feeders and extension with new cells at 33kV Bohicon : Extension with 161kV transformer Vèdoko : Extension with new 161-63kV and 161-15kV transformers Maria Gleta : Extension at 161kV -- New transformers 161-63kV to feed the new 63kV switchyad Seme: Extension Tannzoun: Extension

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
		(Cotonou Activity)	Number	Cumulative	0	2017	NA	NA	NA	NA	NA	5	Akpakpa : Rehabilitation of the station 63/15 kV AIS -- Extension with two 63kV line feeders Godomey : Rehabilitation of the Substation for the dispatching SCADA/DMS Carrefour 3 Banques : Rehabilitation of the Substation for the dispatching SCADA/DMS Allada : Rehabilitation of the Substation for the dispatching SCADA/DMS Lokossa : Rehabilitation of the Substation for the dispatching SCADA/DMS
Output	Kilometers of distribution lines upgraded or built	Total	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	961.2	2021 revised targets reflect the construction contracts.
		(63kV)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	46.3	Lot B: 5.1+5.1+7.1+4.8 = 22.1 Lot C: 5+5.1+3.6+7.5+3=24.2

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
													Lot B + Lot C = 46.3 Lot D cancelled for budgetary reasons: 18.9 + 14.1
		(33kV)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	894.9	Underground: 12.6+27.2+5=44.8 Upgrade: 196+384+256=836 Aerial: 14.1 Total: 894.90
		(15kV)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	20	Lot B: 4.7+0.6km = 5.3 Lot C: 2.7+12km = 14.7 Total = 20
		(Regional)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	894.9	
		(Cotonou)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	66.3	
Output	National Dispatch Control Center constructed	None	Date	Date						16-Feb-21			
Output	National Dispatch Control Center is equipped with furniture and office supplies	None	Date	Date							22-Jun-22		Target source: Current end date of General Electric's contract for the NDCC IT system.

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Output	Telecommunication system equipment installed	None	Date	Date						20-Jan-21			
Output	Supervisory control data acquisition (SCADA) equipment installed	None	Date	Date						16-Feb-21			
Output	Substations connected to SCADA/NDCC	None	Number	Cumulative	0	2017	0	0	0	0	0	55	
Output	Back-up National Dispatch Control Center constructed	None	Date	Date						12-Jan-21			
Output	Individuals trained in the NDCC system	Total	Number	Cumulative	0	2018	0	NA	NA	NA	NA	30	The 15 on-the-job trainees (OJTs) to which must be added the estimate of the SBEE staff having to work at the level of the stations connected to Dispatching.
		(Male)	Number	Cumulative	0	2018	0	NA	NA	NA	NA	NA	
		(Female)	Number	Cumulative	0	2018	0	NA	NA	NA	NA	NA	
Output	Number of AMR devices installed	Total	Number	Cumulative	0	2020	NA	NA	560	560	560	NA	-
		(Grid monitors)	Number	Cumulative	0	2020	NA	NA	80	80	80	NA	
		(Smart meters)	Number	Cumulative	0	2020	NA	NA	480	480	480	NA	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Electricity Generation and Distribution Projects - Process													
Process	Kilometers of distribution line installed	Total	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	961.2	This indicator is added to record effort done by MCA-Benin II for building distribution lines. It is distinct from common indicator P-10, which only counts lines as being completed when they are commissioned and energized.
		(63kV)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	46.3	
		(33kV)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	894.9	
		(15kV)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	20	
		(Regional)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	894.9	
		(Cotonou)	Kilometers	Cumulative	0	2017	NA	NA	NA	NA	NA	66.3	
Process	Value of signed power infrastructure feasibility and design contracts	None	US dollars	Cumulative	0	2015	NA	NA	NA	NA	NA	25,111,271.6	Targets for this indicator are provided by MCA-Benin II
Process	Percent disbursed of power infrastructure feasibility and design contracts	None	Percentage	Level	0	2015	NA	NA	NA	65%	70%	100%	-
Process	Value disbursed of power infrastructure feasibility and design contracts	None	US dollars	Cumulative	0	2015	NA	NA	NA	NA	NA	NA	

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Process	Value of signed power infrastructure construction contracts	None	US dollars	Cumulative	0	2015	NA	NA	NA	NA	NA	192,667,545.64	-
Process	Percent disbursed of power infrastructure construction contracts	None	Percentage	Level	0	2015	NA	NA	NA	35%	50%	100%	-
Process	Value disbursed of power infrastructure construction contracts	None	US dollars	Cumulative	0	2015	NA	NA	NA	NA	NA	192,667,545.64	This indicator is not linked to the project logic result. It's a process indicator.
Process	Temporary employment generated in power infrastructure construction	Total	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Male)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Female)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Local)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Foreign)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Skilled)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Semi-skilled)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Un-skilled)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	

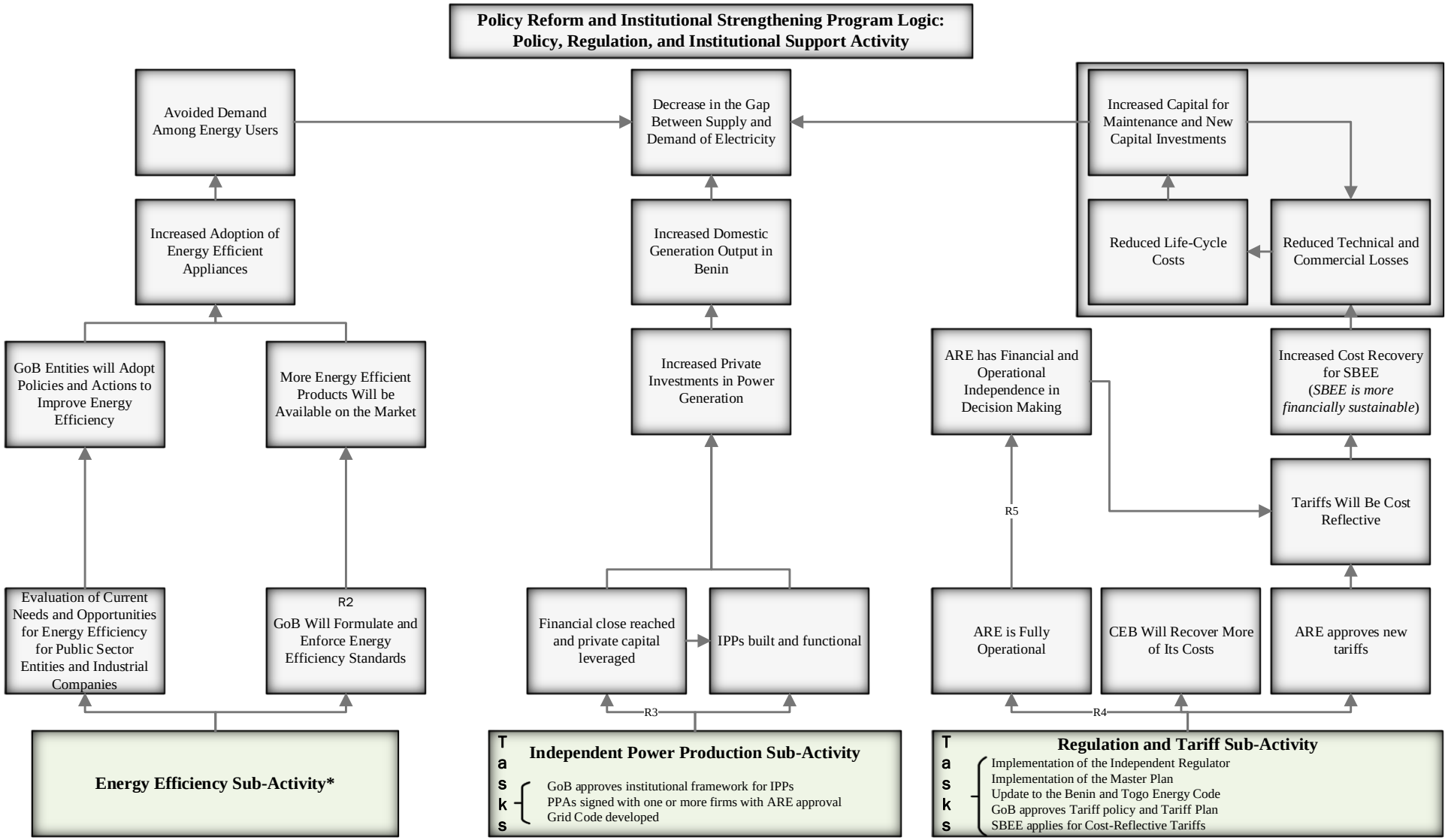
Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
Off-Grid Energy Access Project (Project-Wide)													
Outcome	Off-grid electricity consumption	Total	Kilowatt hours	Cumulative	0	2019	0	0	0	55,089	532,301	771,104	Target source: CBA models. Targets reflect onlymini-grid connection (window two) beneficiaries, due to the infeasibility of measuring solar home system (window three) electricity consumption.
		Male	Kilowatt hours	Cumulative	0	2019	0	0	NA	NA	NA	NA	
		Female	Kilowatt hours	Cumulative	0	2019	0	0	NA	NA	NA	NA	
Outcome	Number of jobs created	Total	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	Targets unavailable.
		(Window 1)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Window 2)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Window 3)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Window 4)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
Off-Grid Clean Energy Activity													
Outcome	Access to off-grid electricity	Total	Number	Cumulative			0	0	5,054	17,465	47,976	66,104	Target Source: CBA models. OCEF projects falling under windows one and four were not included in the ERR calculation and have not been included here.
		(Residential)	Number	Cumulative			NA	NA	NA	NA	NA	NA	
		(Male)	Number	Cumulative			NA	NA	NA	NA	NA	NA	
		(Female)	Number	Cumulative			NA	NA	NA	NA	NA	NA	

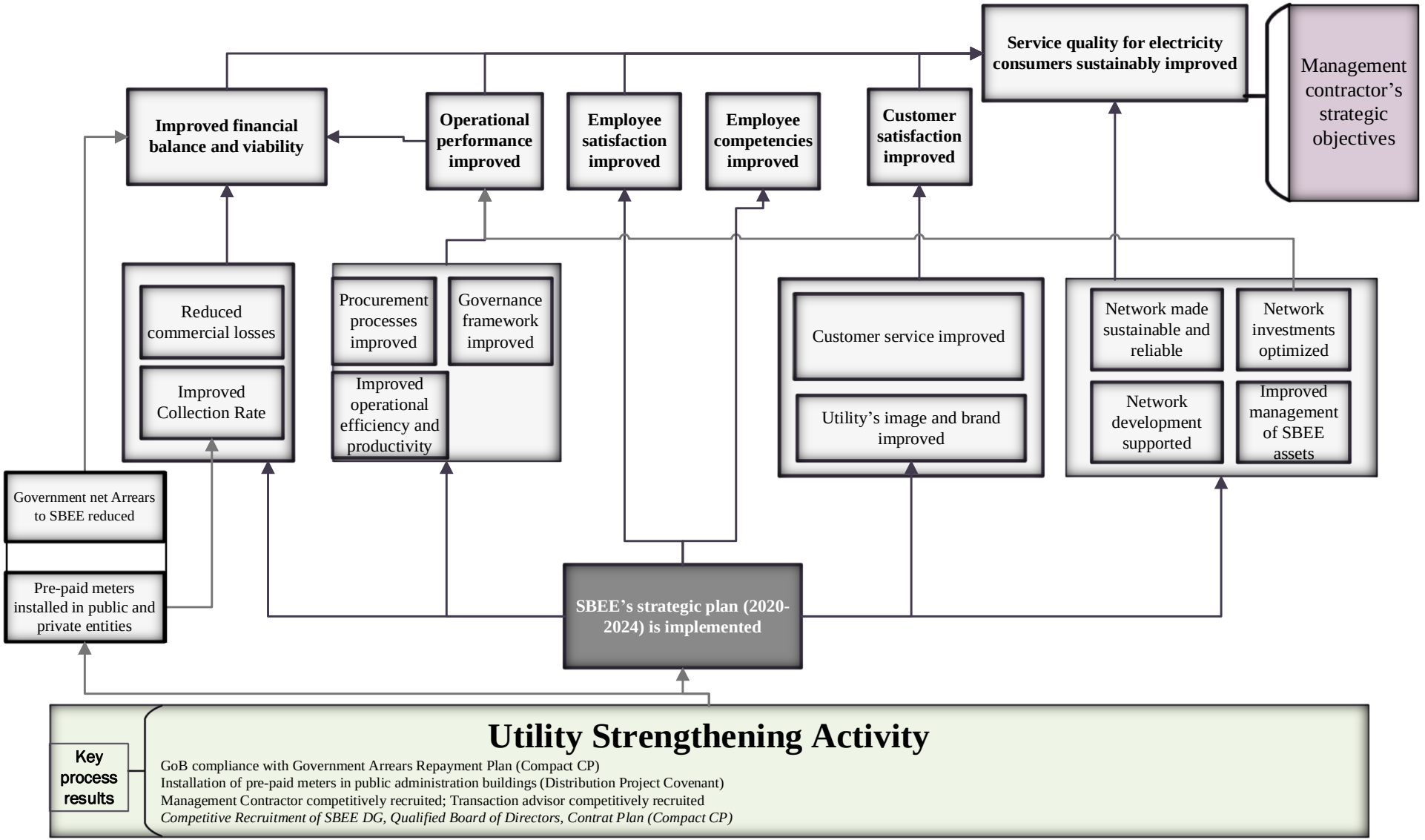
Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
		(Commercial)	Number	Cumulative			NA	NA	NA	NA	NA	NA	
		(Public Entities)	Number	Cumulative			NA	NA	NA	NA	NA	NA	
Output	Off-grid capacity	None	Mega watts	Cumulative	0	2018	0	0	0	1	12	13	Target Source: CBA models (for window three) and promotor business plans (for window two). OCEF projects falling under windows one and four were not included in the ERR analysis and have not been included here.
Output	Number of OCEF-funded projects	Total	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	16	Target Source: co-financing agreements.
		(Window 1)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	2	
		(Window 2)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	8	
		(Window 3)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	5	
		(Window 4)	Number	Cumulative	0	2018	NA	NA	NA	NA	NA	1	
Output	OCEF amount disbursed	Total	US dollars	Cumulative	0	2018	NA	NA	160,409	4,110,492.3	22,409,652.35	31,533,515	Target Source: DAF/MCA-Bénin II.
		(Window 1)	US dollars	Cumulative	0	2018	NA	NA	0	388,618	936,296	1,208,568.00	
		(Window 2)	US dollars	Cumulative	0	2018	NA	NA	0	1,595,805.3	17,022,929.6	24,630,785	
		(Window 3)	US dollars	Cumulative	0	2018	NA	NA	160,409	1,926,088	3,650,503.75	4,694,258	

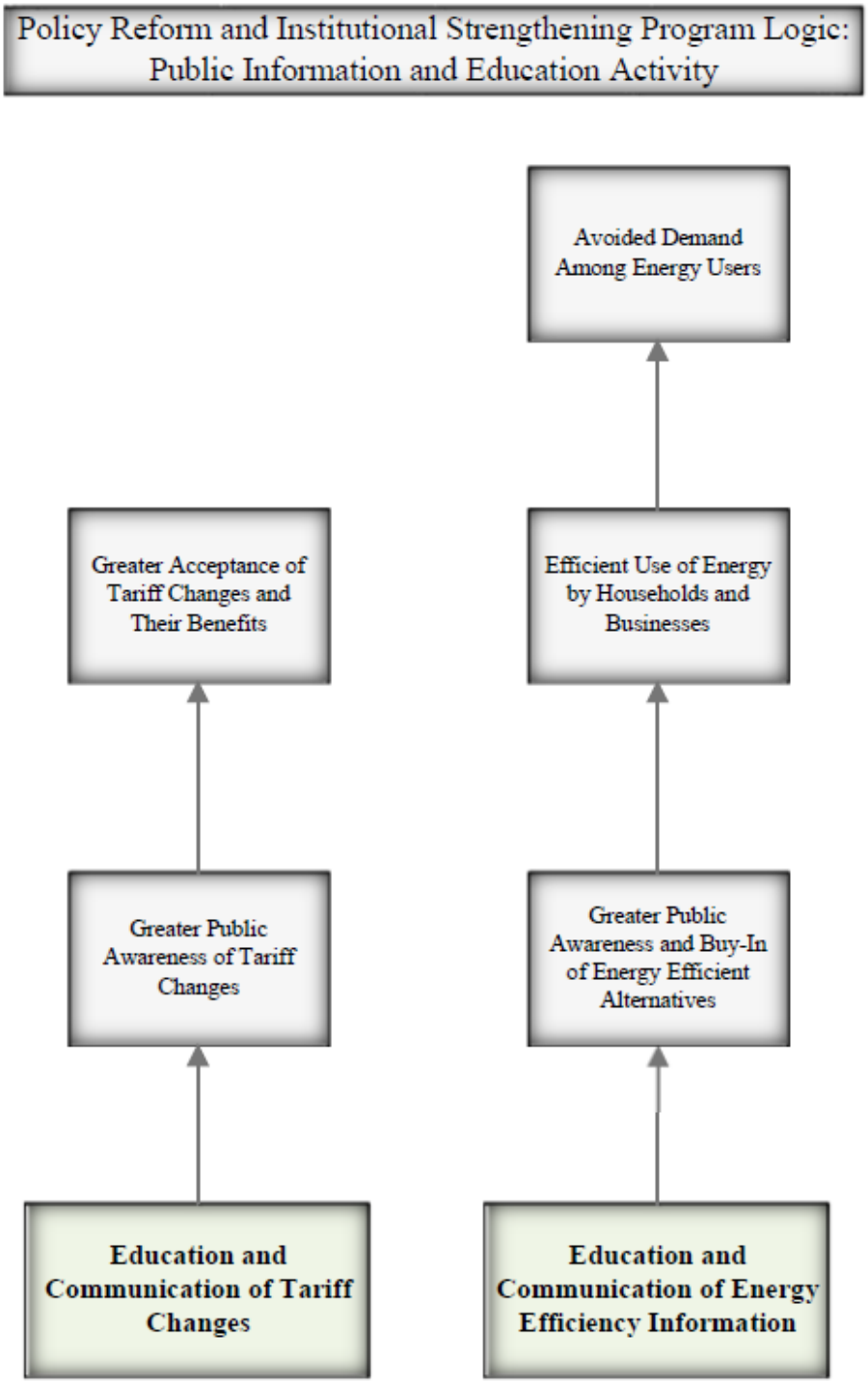
Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
		(Window 4)	US dollars	Cumulative	0	2018	NA	NA	0	199,981	799,923	999,904	
Output	Project promoter amount disbursed	Total	US dollars	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	Targets unavailable.
		(Window 1)	US dollars	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Window 2)	US dollars	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Window 3)	US dollars	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
		(Window 4)	US dollars	Cumulative	0	2018	NA	NA	NA	NA	NA	NA	
Process	OCEF amount committed	Total	US dollars	Cumulative	0	2018	0	0	20,894,813	31,533,515	31,533,515	31,533,515	Target Source: co-financing agreements.
		(Window 1)	US dollars	Cumulative	0	2018	NA	NA	1,208,568	1,208,568	1,208,568	1,208,568	
		(Window 2)	US dollars	Cumulative	0	2018	NA	NA	13,992,083	24,630,785	24,630,785	24,630,785	
		(Window 3)	US dollars	Cumulative	0	2018	NA	NA	4,694,258	4,694,258	4,694,258	4,694,258	
		(Window 4)	US dollars	Cumulative	0	2018	NA	NA	999,904	999,904	999,904	999,904	
Process	Project promoter amount committed	Total	US dollars	Cumulative	0	2018	NA	NA	46,768,217	46,768,217	46,768,217	46,768,217	Target Source: co-financing agreements Year 4. Whileas 46 768 217 was initially expected; BBOXX Distribution Energy Service Company (DESCO) dropped out of OCEF on August 20, 2020.
		(Window 1)	US dollars	Cumulative	0	2018	NA	NA	1,178,116	1,178,116	1,178,116	1,178,116	
		(Window 2)	US dollars	Cumulative	0	2018	NA	NA	36,816,817	36,816,817	36,816,817	36,816,817	
		(Window 3)	US dollars	Cumulative	0	2018	NA	NA	6,898,334	6,898,334	6,898,334	6,898,334	
		(Window 4)	US dollars	Cumulative	0	2018	NA	NA	1,874,950	1,874,950	1,874,950	1,874,950	
Enabling Environment for Off-Grid Electricity													
Outcome	Government staff working	Total	Number	Cumulative	0	2015	NA	NA	NA	NA	NA	NA	Targets unavailable.

Indicator Level	Indicator Name	Disaggregation	Unit of Measure	Indicator Classification	Baseline	Baseline year	2017-2018 Year 1	2018-2019 Year 2	2019-2020 Year 3	2020-2021 Year 4	2021-2022 Year 5	2022-2023 Year 6	Comments
	in off-grid energy sector	(ARE)	Number	Cumulative	0	2015	NA	NA	NA	NA	NA	NA	
		(ABERME)	Number	Cumulative	0	2015	NA	NA	NA	NA	NA	NA	
		(ANM)	Number	Cumulative	0	2015	NA	NA	NA	NA	NA	NA	
Outcome	Number of ABERME final notices on off-grid proposals	None	Number	Cumulative	0	2015	NA	NA	NA	NA	NA	NA	Targets unavailable.
Outcome	Adoption of off-grid framework	None	Date	Date			25-Jun-18						Target Source: Compact Annual Work Plan, 2018.

ANNEX IV: PROJECT LOGICS




Service quality for electricity consumers sustainably improved
Management contractor's strategic objectives
Improved financial balance and viability
Operational performance improved
Employee satisfaction improved
Employee competencies improved
Customer satisfaction improved
Reduced commercial losses
Improved Collection Rate
Procurement processes improved
Governance framework improved
Improved operational efficiency and productivity
Customer service improved
Utility's image and brand improved
Network made sustainable and reliable
Network investments optimized
Network development supported
Improved management of SBEE assets
Government net Arrears to SBEE reduced
Pre-paid meters installed in public and private entities
SBEE's strategic plan (2020-2024) is implemented
Utility Strengthening Activity
Key process results
GoB compliance with Government Arrears Repayment Plan (Compact CP)
Installation of pre-paid meters in public administration buildings (Distribution Project Covenant)
Management Contractor competitively recruited; Transaction advisor competitively recruited
Competitive Recruitment of SBEE DG, Qualified Board of Directors, Contrat Plan (Compact CP)


Policy Reform and Institutional Strengthening Program Logic: Public Information and Education Activity
Avoided Demand Among Energy Users
Greater Acceptance of Tariff Changes and Their Benefits
Efficient Use of Energy by Households and Businesses
Greater Public Awareness of Tariff Changes
Greater Public Awareness and Buy-In of Energy Efficient Alternatives
Education and Communication of Tariff Changes
Education and Communication of Energy Efficiency Information

Policy Reform and Institutional Strengthening Access Project Assumptions

R2.

1. Assumes that GoB will be able (and willing) to effectively enforce energy efficiency standards, despite porous land borders where smuggling is rife.

R3.

1. Assumes that an improved IPP framework will be sufficient for businesses to overcome other impediments to investing in Benin, particularly the constraints to the overall business environment that were identified in the constraints analysis.
2. Assumes that businesses will have sufficient assurance and trust that SBEE will pay for the electricity they produce.

R4.

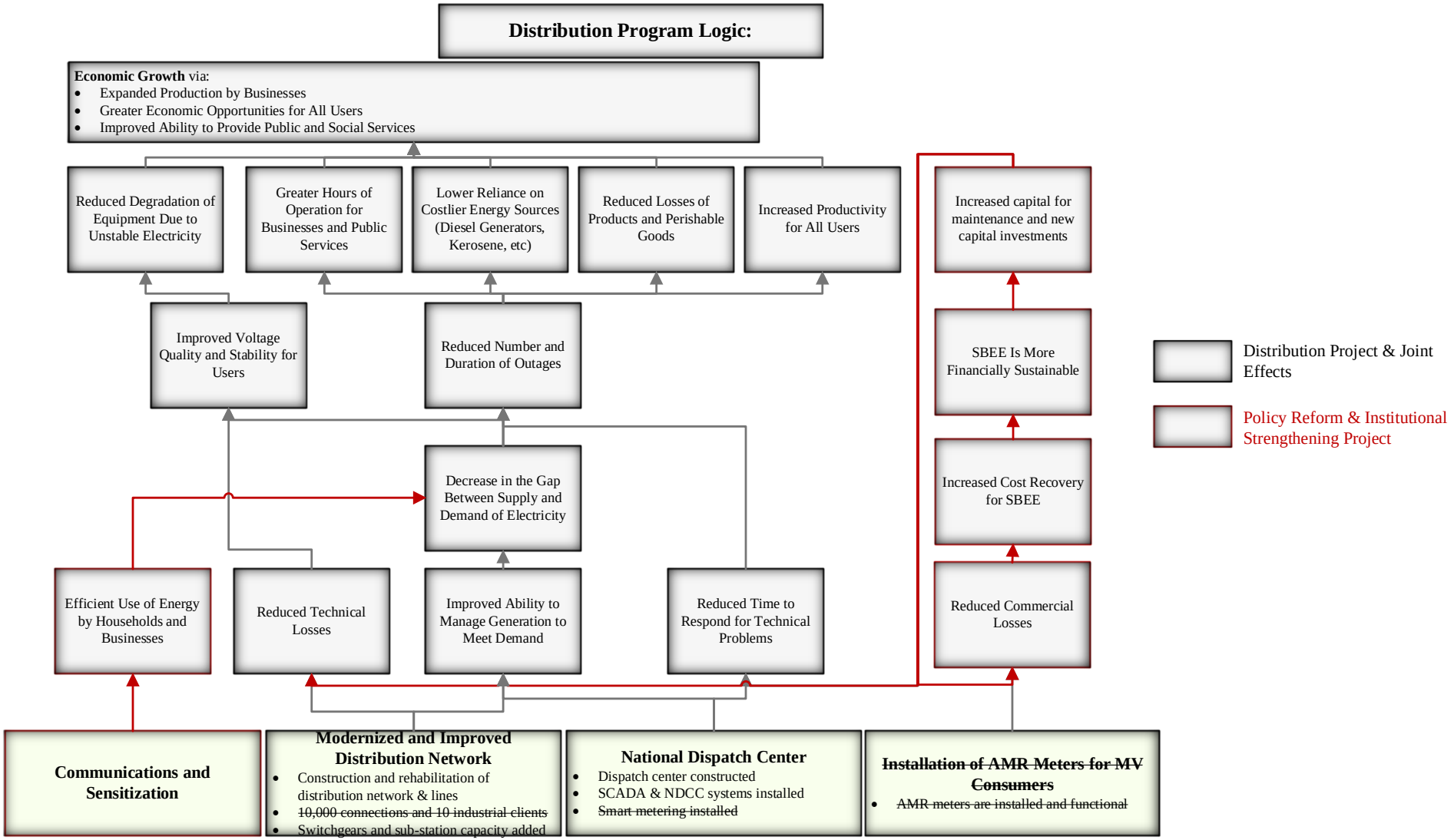
1. Assumes that the regulator will not only be implemented, but will be implemented in a way that maintains its independence from political and outside influence.

R5.

1. Assumes independence in energy sector governance will be not only be necessary, but also sufficient to improve the overall effectiveness of sector governance.

R6.

1. Assumes that all technical assistance and training will be fully implemented within SBEE, such that systems will be maintained and procedures followed even after the end of the compact, despite potential resistance from some actors within SBEE.



NOTE: Crossed out activities/outputs were initially envisioned but dropped during the design phase.

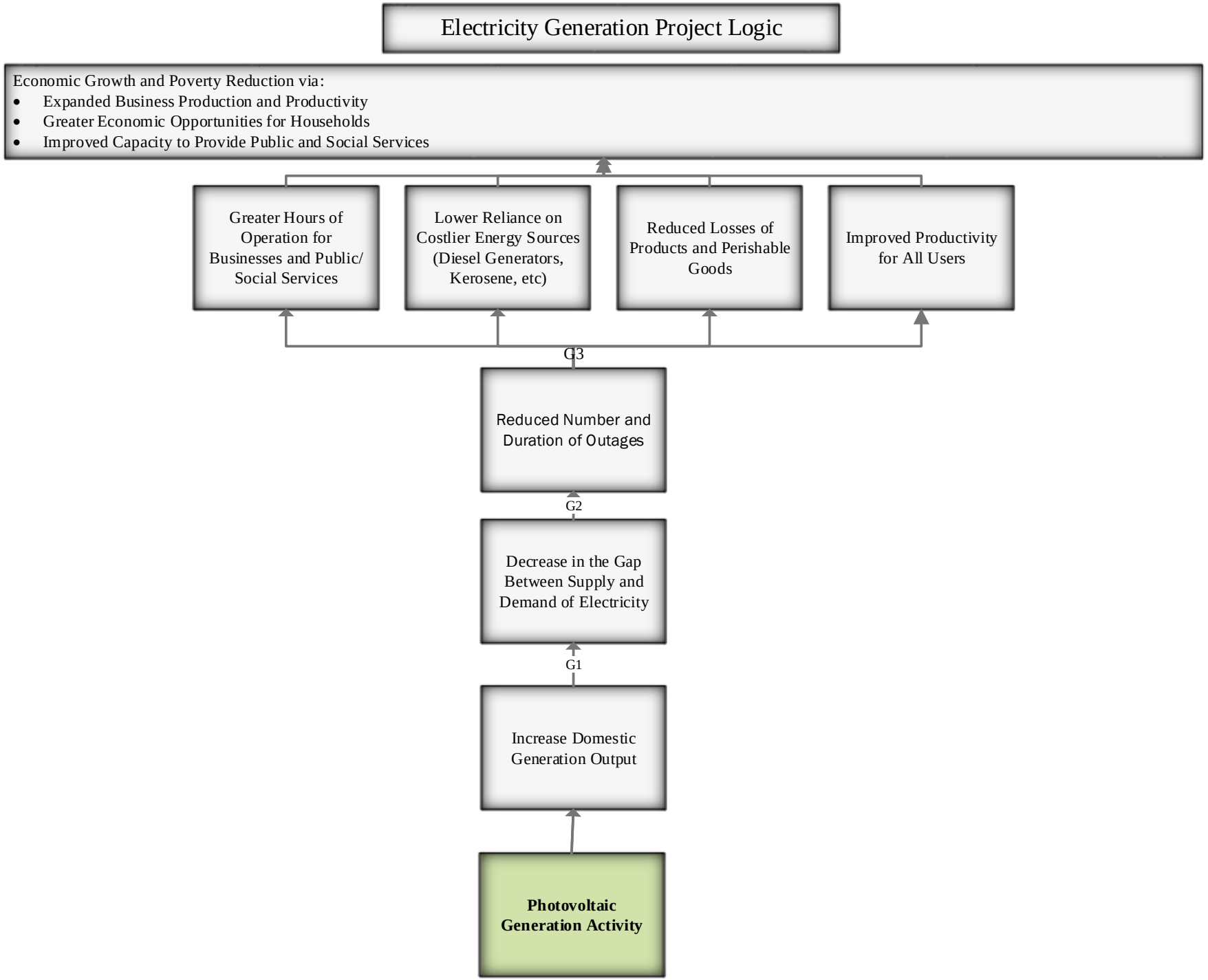
Distribution Project Assumptions

D1. From *Regional Strengthening Activity* AND *Cotonou Grid Strengthening Activity* AND *National Electricity Dispatch Activity* TO *Reduced Technical Losses and Increased Distribution Capacity* AND *Reduced Time of Response for Technical Problems* AND *Improved Ability to Manage Generation to Meet Demand*

1. Assumes that funding for Distribution Project Activities is available in full and on a timely basis.
2. Assumes that MCC-funded infrastructure is of sufficient technical quality to achieve its intended purpose.
3. Assumes that MCC-funded infrastructure will be properly maintained after the compact and that equipment will continue to function for the duration of its expected lifespan.
4. Assumes that tariffs will be cost-reflective prior to the end of the Compact such that MCC-funded infrastructure can be financially sustainable to operate.
5. Assumes that low grid capacity is a major cause of technical losses.
6. Assumes the NDCC will have adequate financial and human resources to fulfill its functions.

D2. From *Reduced Technical Losses and Increased Distribution Capacity* AND *Decrease in the Gap Between Supply and Demand* to *Improved Voltage Quality and Stability for Users AND* Reduced Number and Duration of Outages

1. Assumes that improvements in technical losses, swiftness in responding to technical problems, and increased ability for generation to meet demand will be sufficient to realize appreciable improvements in voltage quality and outages (even with the expected increase in demand and the existence of additional grid problems that MCC will not be addressing).
2. Assumes that the North-South connection being built by the World Bank will be completed prior to completion of MCC-funded investments. Currently, the Northern and Southern regions of the country are only connected by CEB lines traveling through Togo. Thus, in order for MCC investments to have the expected impact on all grid users, such that improvements in one region will benefit users in the other, this connection must be completed.


Electricity Generation Project Logic
Economic Growth and Poverty Reduction via:
• Expanded Business Production and Productivity
• Greater Economic Opportunities for Households
• Improved Capacity to Provide Public and Social Services
Greater Hours of Operation for Businesses and Public/ Social Services
Lower Reliance on Costlier Energy Sources (Diesel Generators, Kerosene, etc)
Reduced Losses of Products and Perishable Goods
Improved Productivity for All Users
G3
Reduced Number and Duration of Outages
G2
Decrease in the Gap Between Supply and Demand of Electricity
G1
Increase Domestic Generation Output
Photovoltaic Generation Activity

Generation Project Assumptions

G1. From *Increasing Domestic Generation Output* to *Decreasing the Gap Between Supply and Demand of Electricity*

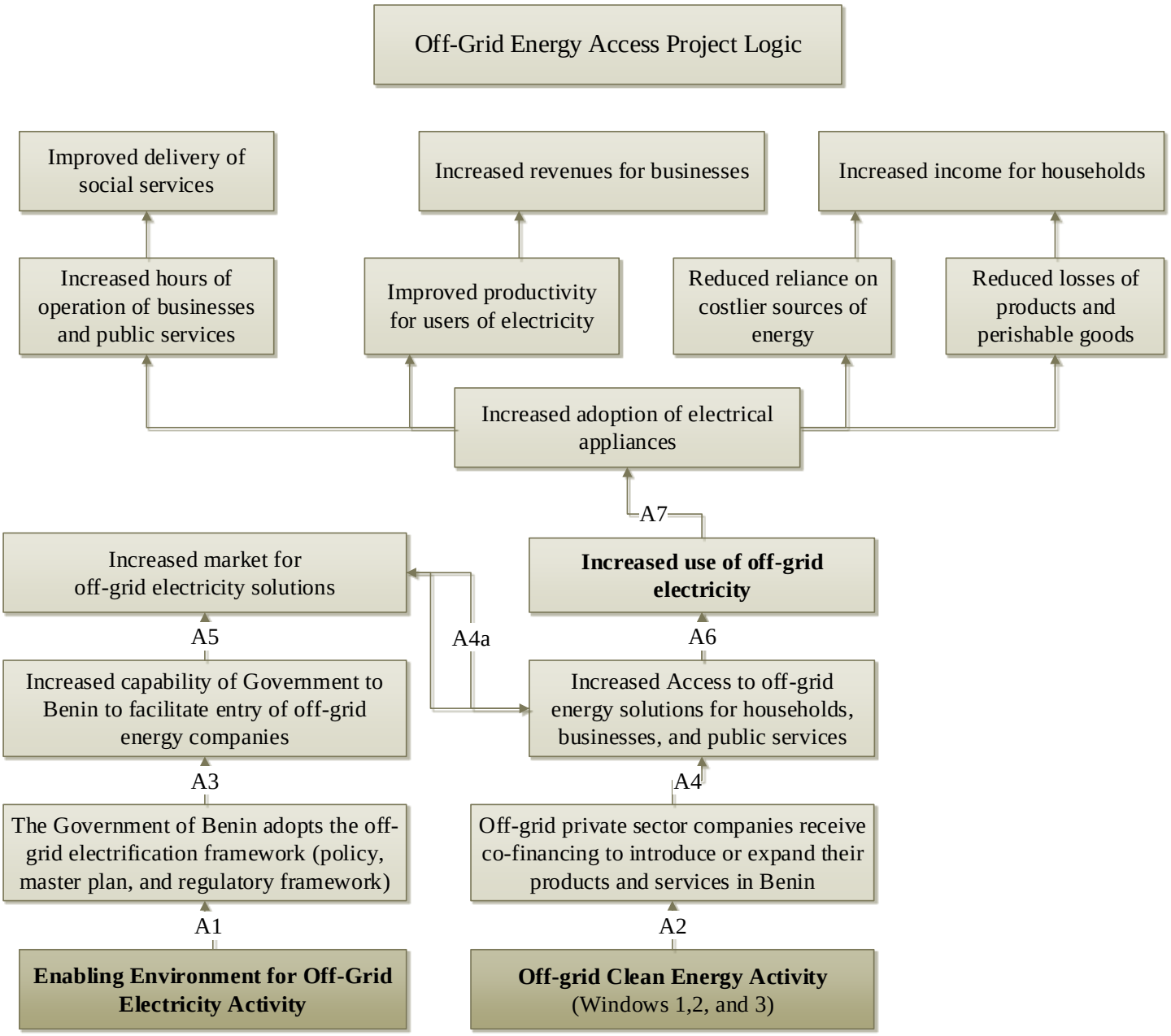
1. Assumes that compact activities (along with activities by other potential investors) will increase domestic generation more than demand will increase, resulting in a net decrease to the gap between supply and demand of electricity.
2. Assumes that energy imports will not decrease significantly.
3. Assumes that other donor or private sector investments in generation assets do not increase significantly.

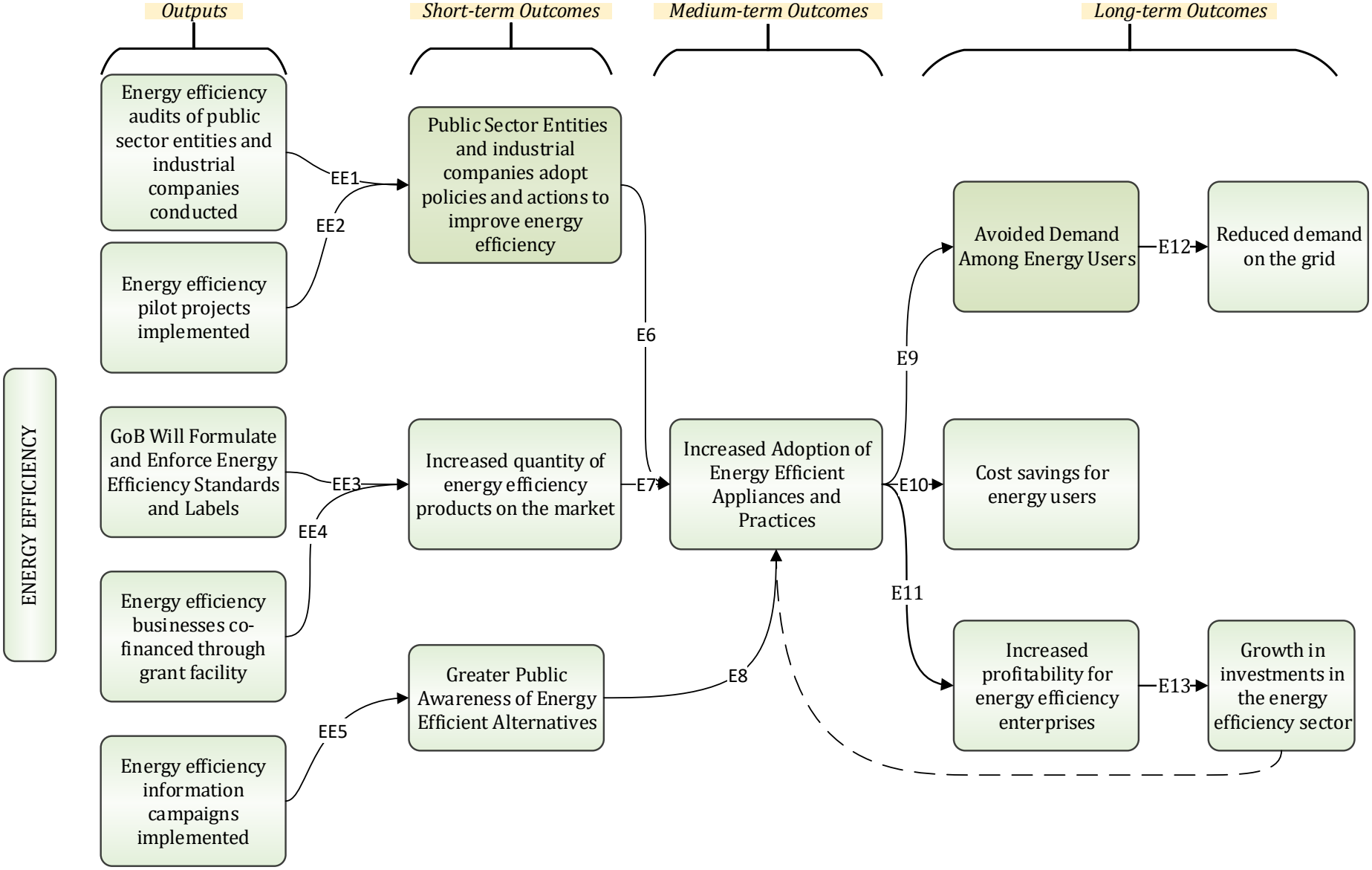
G2. From *Decreasing the Gap Between Supply and Demand of Electricity* and *Reduced Number and Duration of Outages*

1. Assumes that the compact activities will decrease the gap sufficiently to have a positive impact on the number and duration of outages (even when factoring in the expected increase in demand over time)
2. Assumes that one of the primary problems causing outages is the gap between supply and demand of electricity
3. Assumes that the North-South connection being built by the World Bank will be completed prior to completion of MCC-funded investments. Currently, the Northern and Southern regions of the country are only connected by CEB lines traveling through Togo. Thus, in order for MCC investments to have the expected impact on all grid users, such that improvements in one region will benefit users in the other, this connection must be completed. This line is currently under construction and is expected to be completed in 2016.
4. Assumes that the national distribution control center will effectively distribute generation resources on the grid.

G3. From *Reduced Number and Duration of Outages* to *Greater Hours of Operation for Businesses and Public Social Services* AND *Lower Reliance on Costlier Energy Sources (Diesel Generators, Kerosene, etc.)* AND *Reduced Losses of Products and Perishable Goods* AND *Improved Productivity for All Users*.

1. Assumes that, during outages, generators, flashlights, car batteries, kerosene, candles, and other costly energy sources are used purely as backup, and that these will not be needed when the grid power is available (as opposed to units that would still be used even during grid operation)
2. Assumes that the compact activities are able to reduce the frequency and duration of outages to the point that appreciable benefits accrue to beneficiaries.
3. Assumes that Businesses and Social Services are affected by grid-supplied power to the extent that they close or are not fully operational during outages.


Off-Grid Energy Access Project Logic
Improved delivery of social services
Increased revenues for businesses
Increased income for households
Increased hours of operation of businesses and public services
Improved productivity for users of electricity
Reduced reliance on costlier sources of energy
Reduced losses of products and perishable goods
Increased adoption of electrical appliances
A7
Increased market for off-grid electricity solutions
Increased use of off-grid electricity
A5
A4a
A6
Increased capability of Government to Benin to facilitate entry of off-grid energy companies
Increased Access to off-grid energy solutions for households, businesses, and public services
A3
A4
The Government of Benin adopts the off-grid electrification framework (policy, master plan, and regulatory framework)
Off-grid private sector companies receive co-financing to introduce or expand their products and services in Benin
A1
A2
Enabling Environment for Off-Grid Electricity Activity
Off-grid Clean Energy Activity (Windows 1,2, and 3)



Please Note: This model is included to illustrate how the compact's different energy efficiency related outputs lead to the desired outcomes and will not necessarily be tracked by indicators in the indicator tracking table. Certain results are also found in reform project logic models, with corresponding monitoring indicators.

Off-Grid Electricity Access Project Assumptions

A1

There is political will for off-grid electrification in Benin.

A2 and A4

The grant facility manager must select high-quality proposals and effectively oversee implementation. The companies implementing the OCEF-funded projects must remain solvent during the co-financing agreement term. The OCEF-funded projects must implement their projects according to plan and achieve the disbursement milestones as detailed in the individual co-financing agreements. The grant facility manager must review and act upon disbursement requests in a timely manner. More detailed risks and assumptions related to successful implementation of OCEF-funded projects will vary per project. This could include being able to import equipment in a timely manner or having sufficient capacity to serve clients.

A3

ARE and ABERME must actively engage in and lead the process for operationalizing the off-grid electrification framework. They must have the human resources to review and make decisions on off-grid proposals. The technical assistance provided to ARE and ABERME must be high-quality. There is no political interference in ARE and ABERME's key functions of reviewing and approving off-grid electricity projects.

A4a

New customers will upgrade their systems or purchase new off-grid products.

A5

The improved regulatory and institutional frameworks will not only be necessary, but also sufficient for businesses to invest in the sector.

A6 – A7

On the supply-side, the off-grid electricity products must be functional and adapted to local conditions. There are a number of demand-side assumptions. There must be a strong demand for off-grid electricity products in Benin. Potential clients need to be willing and able to pay for off-grid products and electrical appliances, even though off-grid solutions may be more expensive than grid-based electricity. Vendors need to have credibility and targeted customers need to have a positive perception of the products being advertised to them. Those products are superior to those found on the informal market. Prices and payment modalities will be sufficiently attractive to targeted customers.

Program Risks and Mitigation Approaches

Electricity Distribution Project:

1. The principal risk to the sustainability of the Electricity Distribution Project relates to SBEE's ability to plan and implement a comprehensive maintenance regime.

2. This risk will be mitigated through the execution of the Utility Strengthening Activity, which specifically addresses operations and maintenance issues through its interventions, as well as through the Policy, Regulation, and Institutional Support Activity, through its support of tariff reforms that are important to the financing of maintenance and other SBEE operations. Outputs from this intervention include an operations and maintenance management system satisfactory to MCC, addressing, among others, the availability of proper equipment, spare parts, training for SBEE staff and standard operating procedures.

Off-Grid Electricity Access Project

1. The primary risks to the sustainability of the Off-Grid Electricity Access Project are the unclear legal and regulatory framework that leads to limited off-grid investment, the low purchasing power of the majority of households in Benin and the lack of awareness or risk aversion to the adoption of new technologies.
2. The Enabling Environment for Off-Grid Electricity Activity is intended to address this risk. At the individual project level, the sustainability for mini-grids or household solar products will depend on the project developer/sponsor's ability to deliver a quality service for a price that is both affordable and profitable. The Facility Manager will be required to carefully examine the financial and business models for all proposed projects and to select only those that meet established standards established under the OCEF Operations Manual. Another mitigant is through the Public Information and Education Activity under the Policy Reform and Institutional Strengthening Project, which will educate consumers about solar and other technologies for lighting, cooking and other household needs.

ANNEX V: BENIN POWER COMPACT ECONOMIC METHODOLOGY

The Benin II on-grid cost-benefit analysis model forecasts the discounted stream of benefits resulting from increased energy consumption and reduced utility cost per unit of energy served resulting from compact activities. In particular, increased load carrying capacity and reduced technical losses on the distribution network, and increased generation supply are expected to increase energy served to consumers and to reduce the cost to the utility per kWh served. Due to strong complementarities between the on-grid activities, the on-grid ERR was calculated taking into account all Benin II Compact costs and benefits, except for those of the Off-Grid Electricity Access Project, which are analyzed separately.[13] Costs for engineering design and construction have been obtained from feasibility studies, while administrative and M&E costs are an MCC estimation.

Basic Structure of Benefit-Cost Analysis

The ultimate output of the model is a stream of net benefits over time, with costs valued in real economic terms. Net benefits in year *t* are denoted NB_t, with t ranging from 1 to τ, the time horizon. The default time horizon for the model is 20 years from Entry into Force of the Compact, though this can be adjustable to assess sensitivity of economic returns to the time horizon.

Net benefits equal the difference in benefits minus costs resulting from a "with project" scenario and those resulting from a "without project" scenario (counterfactual). If we let B denote benefits, C denote costs, and the subscript m denote project status (m=1 is with project, m=0 is without project), then net benefits in a given year are:

$$NB_t = (B_{t[m=1]} - C_{t[m=1]}) - (B_{t[m=0]} - C_{t[m=0]})$$

The net benefit stream is then summarized in two ways: As the net present value (NPV), and as the economic rate of return (ERR). The NPV is calculated according to the following formula, where δ is the social discount rate (assumed to be 10%):

$$NPV = \sum_{t=1}^{\tau} \frac{1}{(1+\delta)^t} NB_t$$

The ERR is the discount rate at which the NPV equals zero (or, put another way, the discount rate at which discounted costs equal discounted benefits):

$$ERR = \delta \mid \sum_{t=1}^{\tau} \frac{1}{(1+\delta)^t} NB_t = 0$$

In the model, these are calculated using the built-in NPV and IRR functions in Microsoft Excel (the ERR is just an IRR calculated using economic accounting practices). The remainder of this section explains how B and C are calculated, breaking them down into component parts for each project.

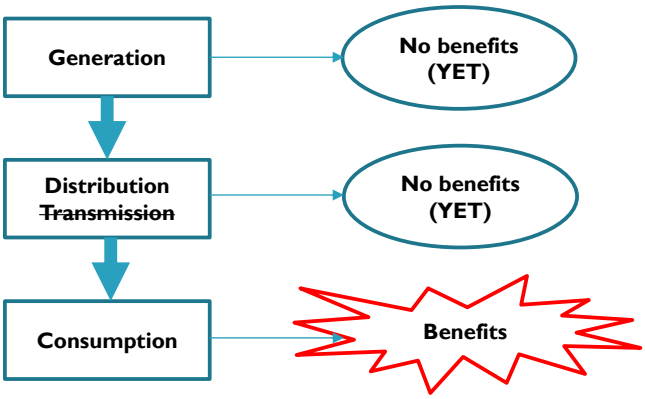
The relationships above define the basic structure of the cost-benefit analysis. The remaining questions are: What are the costs? What are the benefits? As noted above, benefits are captured starting with forecast energy sources

[13] A detailed description of the Off-Grid Energy Access CBA models will be added when the assessment of all grant proposals is complete.

(including those financed by the compact), which are tracked through the distribution system. The delivery of these sources to consumers is constrained both by technical losses, the load carrying capacity of the network, and consumer demand. Increased energy consumption is valued in dollar terms by the price difference between what consumers are willing to pay and the actual cost of delivering the energy. Willingness to pay was calculated using a nationwide survey conducted by Benin's national statistics agency in partnership with MCC. The cost to the utility of delivering energy is based on the compact supported tariff study analysis.

The figure below summarizes how increased energy consumption benefits are captured in the benefit-cost analysis model. The figure shows that both improved distribution and new generation are expected to increase energy availability. The benefits accrue only if the energy is consumed.

Benefits from Increased Energy Consumption



Generation

The flow of energy to be made available from the added generation capacity is calculated as follows:

$$GEG\ (KWh)_{tu} = \sum_{u=1}^{\mu} PG_{tu} * CF_{tu} * 8760 * 1000$$

Where,
$GEG(MW) = Gross\ energy\ Generation$
$t = the\ year\ t$
$u = unit\ u$
$PG_u = Generation\ by\ unit\ u$
$CF_u = Capacity\ factor\ for\ unit\ u$
A capacity factor of 20 percent is applied for the compact supported photovoltaic generation plants.[14]

Distribution

Transmission and distribution technical losses affect the amount of Gross Energy Generation that is available to consumers. The model estimates the reduction in energy available (EA) resulting from technical losses at 3

[14] The net *capacity factor* of a power plant is the ratio of its actual output over a period of time to its potential output if it were possible for it to operate at full nameplate *capacity* continuously over the same period of time.

successive points on the grid: transmission, distribution substations, and distribution feeders. For each year *t* and stage *s*, the flow of energy continuing to the next stage is calculated as follows:

$$EA\ (kWh)_{ts} = EA\ (kWh)_{t(s-1)} * (1 - \mathrm{r}_{ts})$$

$$r = loss\ rate\ (in\ percentage)$$

If the project is implemented as expected, it will reduce the distribution technical loss rate r at the distribution substation and feeder stages. Note that, since (1 - r) is multiplied by energy available at the previous stage, the benefits from technical loss reduction at any given stage depend on the total Gross Energy Generation sent to the grid, as well as the size of technical losses on the grid at prior and subsequent stages. In the context of excess demand on the grid, reduced losses make additional power available to consumers and therefore increase benefits.

An additional benefit of technical loss reduction is a reduction in the utility's generation operations and maintenance cost per kWh delivered to consumers. If the tariff rate is not correspondingly reduced, this cost reduction is an economic gain captured by the utility. For each year *t* and stage *s*, the cost reduction captured by the utility is calculated as follows:

$$CR_{ts} = (\mathrm{r}_{wo\ ts} - \mathrm{r}_{w\ ts}) * \mathrm{GOM\ (USD)}_{wo} * EA(kWh)_{wo\ t(s-1)} * \prod_{i=s+1}^{3} (1 - \mathrm{r}_{wo\ ti})$$

for stages 1 (transmission) and 2 (distribution substations), and

$$CR_{ts} = (\mathrm{r}_{wo\ ts} - \mathrm{r}_{w\ ts}) * \mathrm{GOM\ (USD)}_{wo} * EA(kWh)_{wo\ t(s-1)}$$

for stage 3 (distribution feeders)

Where
CR_{ts} = Total economic gain resulting from reduction in operations and maintenance cost per kWh consumed
$\mathrm{GOM\ (USD)}_{wo}$ = Generation Operations and Maintenance Cost per kWh without the project[15]
$EA(kWh)_{wo\ t(s-1)}$ = Total without project energy available at the prior stage
$\mathrm{r}_{wo\ ts}$ = Technical losses without the project in time *t* at stage *s*
$\mathrm{r}_{w\ ts}$ = Technical losses with the project in time *t* at stage *s*

Consumption

Electricity made available through improved distribution infrastructure and new generation is apportioned among three different consumer categories: consumers connected directly the low voltage (BT) SBEE line, consumers connected to SBEE low voltage (BT) lines through the secondary "spiderweb" market, and consumers directly connected to SBEE medium voltage lines (MT). The share of energy consumed by each consumer category is derived from the Willingness to Pay (WTP) survey.

Total consumption for each period and category is calculated as follows:

[15] Need source for generation operations and maintenance cost per kWh without the project – current assumption is .01 USD per kWh.

$$\text{CONS}\,(KWh)_{tc} = AIC_c * NIC_c$$

Where,
$CONS(KWh)_{tc} = Total\ consumption\ for\ category\ in\ period\ t$
$AIC_c = Annual\ consumption\ in\ category\ c$
$NIC_c = Number\ of\ consumers\ in\ category\ c$
c= $Consumer\ Category$

Each consumer category is assumed to increases consumption proportionately its current consumption level when additional electricity becomes available. Baseline growth in the number of connections is assumed to continue even when increases in the number of consumers are detrimental to the functioning of the overall system when demand exceeds supply. The primary benefit in the model is the incremental energy consumed by each consumer type. The increased consumption is valued in dollar terms by the price differential between what consumers are willing to pay and the actual cost of delivering the energy. The total benefits are the sum of the benefits to the three consumer groups.

The primary benefit in the model is the incremental energy consumed by each consumer type. The increased consumption is valued in dollar terms by the price differential between what consumers are willing to pay and the actual cost of delivering the energy.

The additional consumption for each category in dollar terms is calculated as follow:

$$\text{Net CONS}\,(\$\,US)_{tc} = \text{CONS}\,(KWh)_{tc} * (WTP_c(\frac{CFA}{KWh}) - ET_c\,(\frac{CFA}{KWh})) * \frac{1}{exchrate})$$

Where,
$WTP_c = Category\ c\ consumer\ Willingness\ to\ Pay\ t = Year\ t$
$c = Category\ of\ consumers$
$ET_c = Epected\ cost\ of\ delivering\ energy\ for\ consummers\ category\ c$

Information on WTP values for different categories in the model were obtained from the February 2015 Willingness to Pay (WTP) survey for electricity conducted in Benin. The next section discusses the survey and some of the key results.

Assumptions and Parameters Used in the Model
The willingness to pay values and the expected tariffs used in the model are presented in the table below.

Willingness to Pay Values and Expected Tariffs for Different Categories of Consumers

	Primary Market	Secondary Market	Formal businesses	Benin Market
	FCFA/KWh	FCFA/KWh	FCFA/KWh	FCFA/KWh
Informal Businesses-Low voltage (1)	149	204		152
Households-Low voltage (2)	132	199		139
Average (1) and (2)	136	203		165
Formal Businesses-Medium voltage			190	190
Focus Group Interview	150	250	195	198

Source: Willingness to pay values were obtained from survey.
Expected tariffs were provided from Ministry of Energy.

Other parameters and assumptions are summarized the table below.

Table 61: ERR Assumptions and Parameters

Assumptions and Parameters	Baseline	With MCC project
Exchange Rate (CFA/$ US)	602	602
Normal growth of BT Consumers	4%	4%
Normal growth of LT Consumers	5%	5%
Transmission Losses	5%	5%
Distribution Substation Technical Losses	7.5%	4%
Distribution Feeder Technical Losses	7.5%	4%
Growth of Distribution Technical Losses	7% but losses cannot exceed 18%	.2 percentage points per year after end of rehabilitation work
For each 1 KWh available on the grid[16]	0.78 Kwh is consumed in primary market	0.78 Kwh is consumed in primary market
For each 1 KWh available on the grid	0.22 Kwh is consumed in secondary market	0.22 Kwh is consumed in secondary market

[16] *Based on the WTP survey*

ANNEX VI ACKNOWLEDGEMENT AND ACCEPTANCE OF BENIN'S MONITORING AND EVALUATION PLAN

Acknowledgement and Acceptance
of
Benin's Monitoring and Evaluation Plan

The grant program funded under the Millennium Challenge Compact (Compact)[17] signed on September 09, 2016, between Republic of Benin, acting through the Government of Benin and the United States of America, acting through the Millennium Challenge Corporation (MCC) concluded on June 22, 2023.

The Government recognizes 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 Benin, may not be measurable for several years after the Compact's expiration. As a result, independent evaluations of the program will be ongoing until at least 2026 and require continued support from the Government. The Government has agreed to cooperate with MCC to evaluate progress toward meeting the project objectives after the Compact's expiration. To accomplish this, the Government will perform the post-program activities described for the Government in the *Post-Compact Management of M&E* section of the Monitoring and Evaluation (M&E) Plan developed by MCA-Benin II during the compact term and attached to this Acknowledgement and Acceptance.

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

Signed, this June, **…….** , 2023.

_____
Name: Romuald WADAGNI Abdoulaye BIO TCHANÉ
Title: Senior Minister in charge of Economy and Finance of Benin

ANNEX VII: DATA REQUIREMENTS FOR POST-COMPACT MONITORING AND EVALUATION

Please see Annex 1: Indicator Documentation Table for more information.

Indicator	Frequency of reporting	Responsible Party	Additional information
Policy Reform and Institutional Strengthening Project			
SBEE investments in new infrastructure, SBEE investments in maintaining infrastructure, SBEE operating cost recovery ratio	Annual	DAF/SBEE	
Cost reflective tariff regime	Annual	DAF/SBEE	
Number of notices provided by ARE in a given year	Annual	ARE	
Government net arrears to SBEE	Annual	DAF/SBEE	
Percentage of job positions filled in ARE	Annual	ARE	
Training hours per staff	Quarterly	DRH/SBEE	
Recovery rate per billing session (month M) and by category of consumers on date M+6	Quarterly	DCC/SBEE	All management contractor and contract auditor reports produced after the compact end date should be transmitted to the independent evaluator (Mathematica)
Electricity Distribution Project			
System Average Interruption Duration Index (SAIDI)	Quarterly	DT/SBEE	SBEE will ensure the independent evaluator has access to the smart meter data through 2026 either through direct access to the platform or secure data transfers. In addition to SAIDI and SAIDI, the independent evaluator requires load flow curves, power factor, and electricity consumption.
System Average Interruption Frequency Index (SAIFI)	Quarterly	DT/SBEE	
Total electricity supply	Quarterly	DT/SBEE	
Total electricity sold	Quarterly	DCC/SBEE	
Distribution technical losses	Quarterly	DT/SBEE	Grid monitors will provide data on this indicator

Distribution network voltage			
Distribution system losses	Quarterly	DAF/SBEE	
Off-Grid Electricity Access Project			
Off-grid electricity consumption	Quarterly	ABERME/Project promotors	
Access to off-grid electricity	Quarterly	ABERME/Project promotors	
Off-grid capacity	Quarterly	ABERME/Project promotors	
Government staff working in off-grid energy sector	Quarterly	ABERME, ARE and ANM	

ANNEX VIII – ACTION PLAN FOR DATA QUALITY REVIEW RECOMMENDATIONS.

N°	Recommended Actions	Quarter	Achievements to date
1	Organize mini workshops to revise indicator data collection sheets by clarifying wording, definitions, and calculation methods	First quarter, 2022	Specific training sessions organized for data production chain agents, including from ABERME, SBEE (Human Resources Directorate, Administration and Finance Directorate, Technical Directorate), DGRE and ARE - were used for the revision of the data collection sheets.
2	Determine baselines and targets for indicators.	Fourth quarter, 2022	The definition of MHI's KPIs and the finalization of the RECASEB study produced data that were used to update baseline and target values for certain indicators during the 2nd revision of the M&E Plan.
3	Conduct trainings/refresher sessions on MCC M&E requirements and Summary Data Analysis	First and second quarter, 2022	One (01) training/refresher session was organized for M&E focal points on MCC M&E requirements and summary quality analysis. Specific training sessions were organized for data production chain agents, including from ABERME, SBEE (Human Resources Directorate, Administration and Finance Directorate, Technical Directorate), DGRE and ARE.
4	Hold quarterly data validation meetings	Every quarter	Four (04) data validation meetings with M&E focal points were held in 2022.
5	Conduct quarterly data verification missions in the field	Every quarter of the year 2022	DESE participated in four field visits related to the electricity distribution project and four field visits related to OCEF projects.
6	Conduct Routine Data Quality Reviews (RQDR)	Every quarter of the year 2022	Four quarterly RQDR joint missions (MCA-Benin II-SDI) were carried out in 2022.