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Final Report

Benin Policy Reform and Institutional Strengthening Project: Evaluation Design

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LIST OF ACRONYMS

ABERME	Agence Béninoise d'Electrification Rurale et de Maîtrise d'Énergie
AFD	Agence Française de Développement
ANM	Agence Nationale de Normalisation, de Métrologie et du Contrôle de la Qualité
ARE	Autorité de Regulation de l'Electricité
BAI	Bureau d'analyse et d'investigation
CA	Constraints analysis
CBA	Cost-benefit analysis
CEA	Cost-effectiveness analysis
CEB	Communauté Electrique du Bénin
CSC	Comité de Suivi et du Controle
DAEM	Développement d'Accès à l'Energie Modern
DAF	Direction Administrative et Financière
DB	Doing Business
DESE	MCA-Benin II Economics and Monitoring and Evaluation Department
DFIF	Department for International Development
DGDDI	Direction Générale des Douanes et Droits Indirects
DGRE	Direction Générale des Ressources Energetiques
DOC	Drivers of change
EE	Energy efficiency
EIF	Entry into force
ERR	Economic rate of return
ES	Enterprise Survey
EU	European Union
FGD	Focus group discussion
FTP	File transfer protocol
GoB	Government of Benin
GoT	Government of Togo
INSAE	Institut National de la Statistique et de l'Analyse Économique
IPP	Independent power producer
IRB	Institutional Review Board

ITT	Indicator tracking table
KII	Key informant interview
KPI	Key performance indicator
LBNL	Lawrence Berkeley National Laboratory
M&E	Monitoring and evaluation
MCA	Millennium Challenge Account
MC	Management contractor
MCC	Millennium Challenge Corporation
MW	Megawatts
PIEA	Public Information and Education Activity
PNEE	Plateforme Nationale Dédiée aux Normes et de l'Etiquetage Energétique
PPA	Power purchase agreement
PRIS	Policy, Regulation and Institutional Support
PSA	Power Sector Assessment
PTA	Plan de travail annuel
PV	Photovoltaic
SBEE	Société Béninoise d'Energie Electrique
TOR	Terms of references
USAID	U.S. Agency for International Development

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I. INTRODUCTION AND BACKGROUND

A. Country context

Benin has experienced rapid economic growth in recent years (5.6 percent in 2017 and 6 percent in 2018), driven in large part by agricultural production and an expanding service sector. However, the World Bank warns that Benin's economic composition, although dynamic, is vulnerable to external shocks such as climate change and to economic downturns experienced by its trading partners. This vulnerability is evident in the recent economic crisis spurred by the Nigerian president's decision to close the border between the two countries. Moreover, 40 percent of the population still lives below the international poverty line, signaling that recent GDP gains have not been equitably distributed (World Bank 2019b). The Government of Benin (GoB), along with a host of multilateral partners, is working on different ways to restructure its economy and achieve more sustainable and equitable growth.

The Beninese economy's power sector is vulnerable, with systematic weaknesses at every stage of the electricity supply chain. Benin has a total generation capacity of 349 megawatts (MW) (Power Africa, 2018) (ranking 192 out of 198 countries) (World Bank 2016), which is less than half of that required to meet electrification goals (Power Africa 2018). Benin also experiences outages at more than twice the rate of sub-Saharan Africa as a whole. Benin currently has a total electrification rate of only 32 percent, with 1.5 million households unconnected to the grid. A 2016 survey found that 60 percent of Beninese businesses report a lack of reliable electricity as a constraint to their operations (World Bank 2016). Consequently, Benin imports electricity from Nigeria and other neighbors. The Millennium Challenge Corporation (MCC), in a 2012 analysis, identified poor electrical infrastructure as a primary constraint to Benin's economic growth and private investment (MCC 2012). GoB hopes to alleviate these problems by prioritizing the power sector in its "Bénin Révélé" economic action plan (Bénin Révélé 2016).

MCC is partnering with GoB to implement the Benin Power Compact (also known as the Benin II Energy Compact) from 2017 to 2022 in order to address the challenges associated with electricity generation, distribution, and access and to align the various programs supporting the Beninese power sector with GoB priorities. The compact includes four projects: (1) the Electricity Distribution Project, which will renovate the country's electrical grid and construct a national dispatching center; (2) the Electricity Generation Project, which supports entry of private energy producers into the Benin market; (3) the Off-Grid Electricity Project, which supports independent renewable power producers entering the Benin market; and (4) the Policy Reform and Institutional Strengthening Project, which includes support to GoB to revise energy codes and improve the regulatory environment, upgrade the operational and financial functioning of the main electric utility, and encourage the adoption of energy-efficient practices.

In combination, these projects support the compact's chief objectives to modernize Benin's electricity network, strengthen the national electricity distribution utility, expand access to electricity, and improve the quality and reliability of the electricity system. Ultimately, these activities aim to increase business productivity, expand economic opportunity, and upgrade

public services through the improved quality and increased supply of electricity in Benin (MCC 2015b).

MCC has contracted with Mathematica to conduct an evaluation of the Policy Reform and Institutional Strengthening Project (also known as the *Reform Project*), a component of the compact intended to improve government-affiliated institutions involved in Benin's power sector. In particular, the Reform Project aims to strengthen regulation of the power sector, establish cost-effective tariffs, improve functioning of the main electric utility, and provide an institutional framework for independent power producers.

B. Objectives of the report

In the chapters that follow, we provide context for the evaluation of the Policy Reform and Institutional Strengthening Project and describe its planned design in further detail. In Chapter II, we present an overview of the Benin Energy Compact and the Reform Project and assesses the theory of change as specified in MCC's logic model. In Chapter III, we review the existing literature that evaluates the efficacy of the reforms that the project seeks to implement. In Chapter IV, we provide a summary of the evaluability assessment, with the expanded evaluability assessment found in Annex A. We outline in Chapter V the research questions that the evaluation seeks to answer and provide an overview of the quantitative and qualitative evaluation designs and data sources that will enable us to answer the questions. We also describe our approach to data collection and the challenges that could arise for implementation and for the evaluation, including our proposed approach to estimating the economic rate of return. We conclude this chapter with a discussion of administrative issues related to the evaluation.

II. OVERVIEW OF THE REFORM PROJECT AND IMPLEMENTATION PLAN

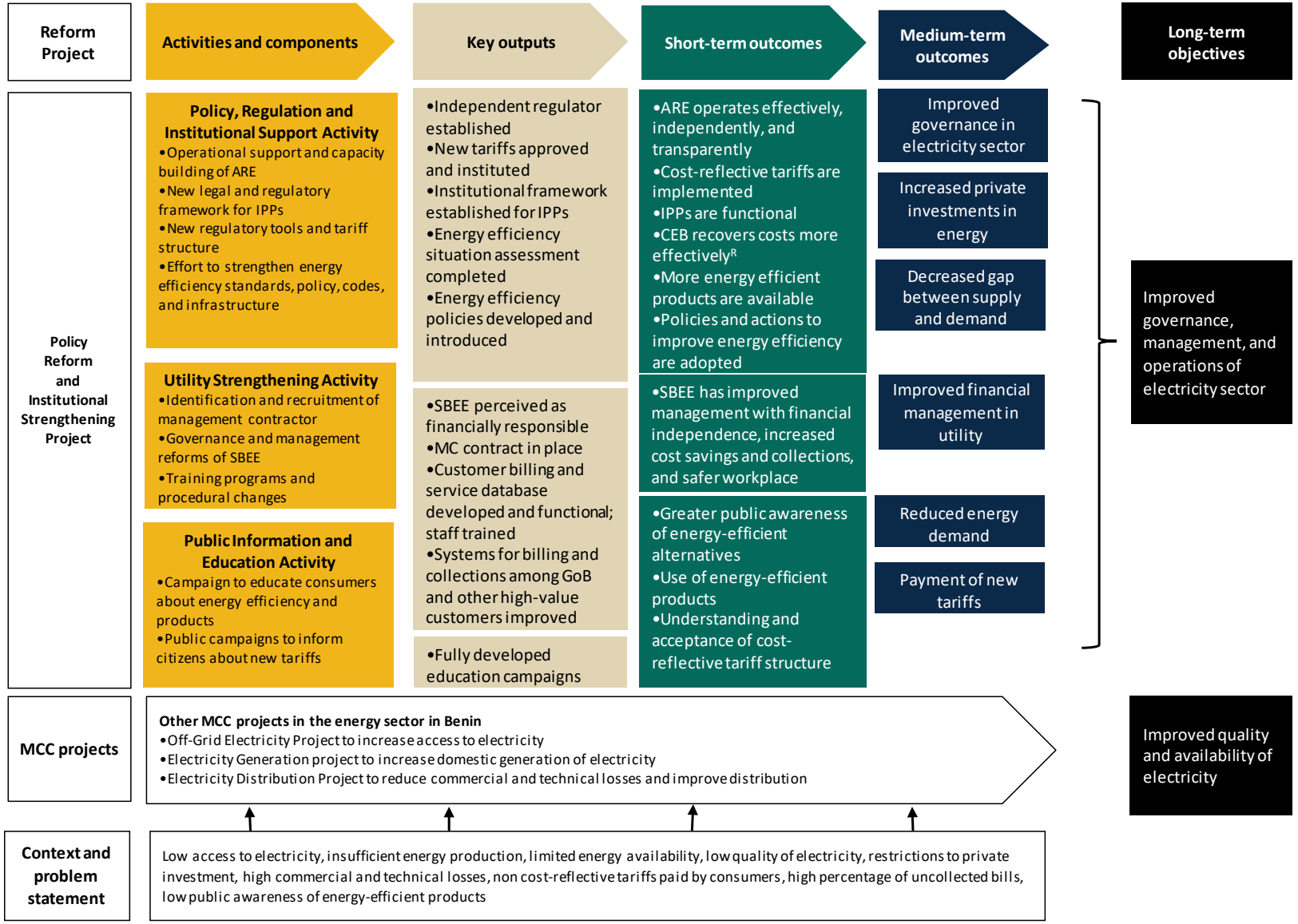
A. Overview of the Reform Project

The Reform Project is a $44 million investment aimed at improving the regulatory environment in Benin's energy sector, upgrading the technical and financial functioning of the main electric utility, creating an environment that encourages private investment in energy, and encouraging energy-efficient practices. The Reform Project complements MCC's investments in electricity generation and distribution that focus on upgrading and replacing lines and substations throughout Benin's major municipalities, constructing new lines and substations, and installing a modern national electricity dispatch center (Distribution Project, approximately $227 million), supporting solar power independent power producers (IPP) (Generation Project, approximately $13 million), and creating an enabling environment for off-grid electricity (Off-Grid Project, approximately $47 million).

The activities planned under the Benin Power Compact are designed to contribute, individually or in combination, to increased economic growth and reduced poverty through the following: (1) expanded business productivity, (2) additional economic opportunities for households, and (3) improved capacity of the GoB to provide public and social services. The MCC Compact's theory of change demonstrates how each of the Benin Power Compact's projects is expected to contribute to the compact's overall goals.

The main objectives of the Reform Project are to improve the governance, management, and operations of Benin's electricity sector by modifying the sector's governing policies and regulatory frameworks and strengthening the capacity of *Société Béninoise d'Energie Electrique* (SBEE), *Autorité de Regulation de l'Electricité* (ARE), and other GoB institutions. In addition, the project is expected to increase energy efficiency and improve the financial stability of the electric utility through increased cost recovery, narrowing the gap between electricity supply and demand. MCC expects these objectives to be met through implementation of the three activities: (1) Policy, Regulation and Institutional Support; (2) Utility Strengthening; and (3) Public Information and Education. In Figure II.1, we illustrate the logic of the compact as a whole.

Figure II.1. Benin II Compact logic model



Note: R indicates the task or item was removed from the logic model.

B. Evolution of the Reform Project

Both the compact as a whole and the Reform Project in particular have undergone modification since the compact's entry into force in 2017. Whereas the initial compact plan called for substantial investment to increase generation capacity, GoB and MCC agreed to reorder priorities and focus investment primarily on improving the electricity distribution network. This reorientation stemmed from (1) GoB's decisions to invest in generation outside the terms of the compact, (2) realization that the Distribution Project's initial design was insufficient to provide adequate distribution capacity beyond 2025, and (3) the joint MCA-MCC decision to pursue solar photo-voltaic projects as IPPs rather than utility assets. Updated forecasts for Benin's electricity demand through 2035 require larger investments to ensure the sustainability of compact-funded infrastructure. The full use and sustainability of the infrastructure investments depends on a strengthened enabling environment for energy—namely, improvements to and reform of the governance, management, operations, and regulatory environment of Benin's electricity sector.

To achieve a stronger and more self-reliant sector electricity sector, MCC designed three activities under the Reform Project that, in combination, will make the energy sector more competitive. These are: (a) the Policy, Regulation and Institutional Support Activity (or the Policy Activity), (b) the Utility Strengthening Activity, and (c) the Public Information and Education Activity. In the next section, we provide an overview of the goals and sub-activities that make up the Policy, Regulation and Institutional Support Activity; in Section C, we outline the Utility Strengthening Activity and, in Section D, the Public Information and Education Activity.

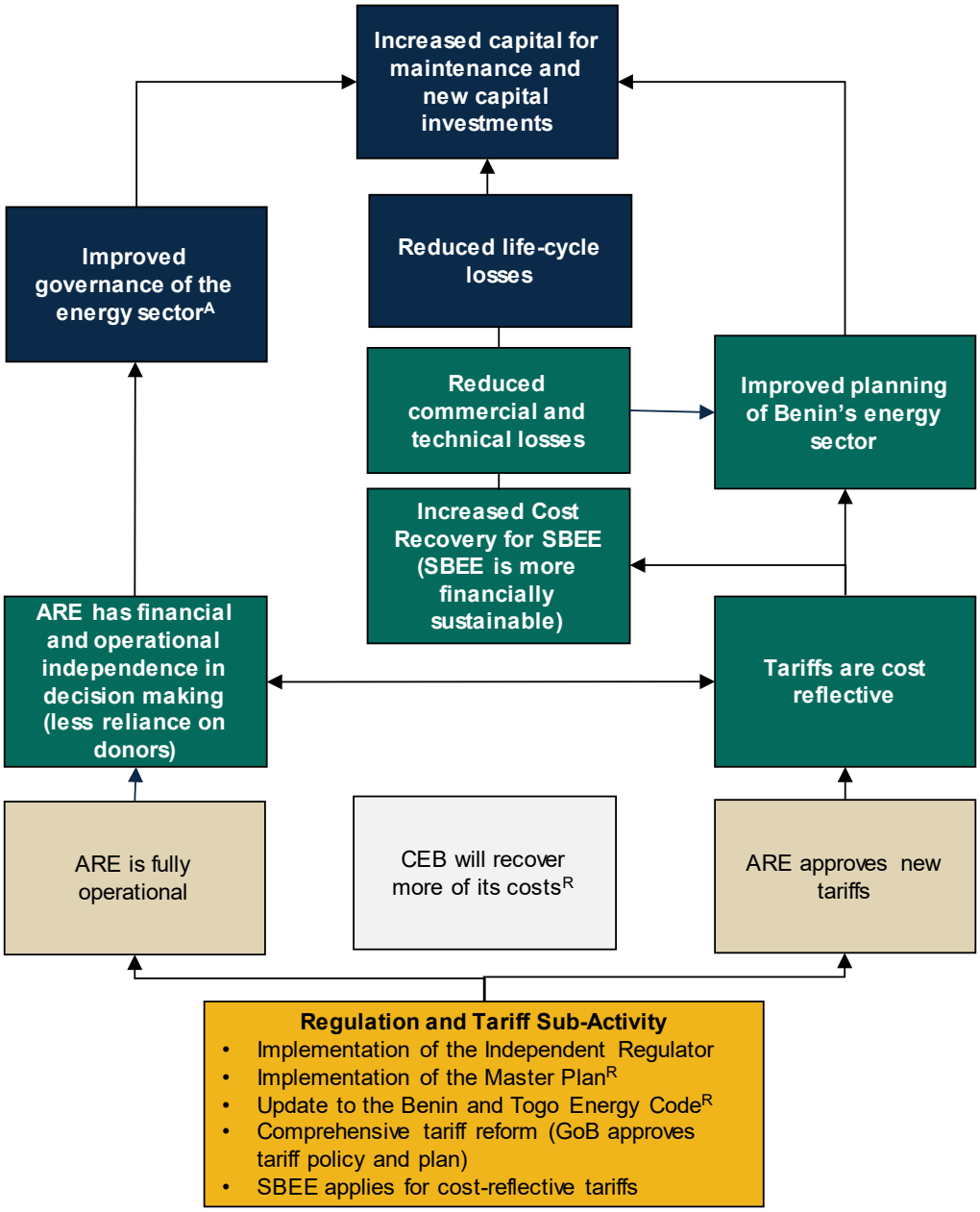
C. Policy, Regulation and Institutional Support Activity (Policy Activity)

The Policy Activity comprises three sub-activities that together aim to improve the energy sector's enabling environment by strengthening regulation, establishing and implementing a cost-reflective tariff policy, and providing institutional frameworks for independent power producers. These sub-activities are the: (1) Regulation and Tariff Sub-Activity, (2) IPP Sub-Activity, and (3) Energy Efficiency Sub-Activity. We discuss the program logic and progress of each of these sub-activities below, starting with the Regulation and Tariff Sub-Activity.

1. Regulation and Tariff Sub-Activity

The Regulation and Tariff Sub-Activity includes implementation of a cost-reflective tariff and capacity building of the ARE. Figure II.2 below presents the logic model for the Regulation and Tariff Sub-Activity.

Figure II.2. PRIS-A Regulation and Tariff Sub-Activity logic model



Note: A indicates the outcome was added to this version of the logic model (not included in earlier versions). R indicates the task or item was removed from the logic model.

Below we summarize the efforts related to tariff reform and then focus on MCC's efforts to strengthen ARE. As part of the efforts to reform Benin's energy sector, MCC supported GoB's prioritization of tariff reforms that better reflect the true cost of energy production and distribution. Given that the design and implementation of a cost-reflective tariff structure are essential for improving the financial health of SBEE, MCC set tariff reform as one of the seven *conditions precedents* that GoB must satisfy in order to receive the full investment. This reform effort would represent Benin's first electricity tariff increase in ten years.

To initiate the Regulation and Tariff Sub-Activity, Millennium Challenge Account Benin (MCA-B) procured the services of Idea Consult International to analyze the current tariff structure and energy market and to propose a more cost-reflective tariff structure. Based on its analysis, the consulting firm laid out a framework for setting tariffs and made recommendations for the tariff structure. After its extensive review of the tariff plan, the Council of Ministers approved the policy and plan in August 2018, two months after it was to have met the condition for the design and implementation of an appropriate tariff structure.

The Compact specifies the outside date for the GoB's compliance with the conditions precedent (CPs) to the On-Grid Tranche is 30 months after EIF (December 22, 2019). If the tariffs are not implemented by that date, GoB will forfeit $80 million of grid-tranche financing (mostly intended for the Distribution Project). In 2019, however, GoB officials raised concerns that the tariff plan may not reflect current conditions. Therefore, in summer 2019, MCA asked Idea Consult to review and revise the proposed tariff schedule, taking into account changes in the sector, such as Communauté Électique du Bénin's (CEB) changed role and updated SBEE costs and revenue. As of the writing of this report, GoB remains committed in principle to implementing the tariff reform. It is not clear whether SBEE will explicitly inform customers of impending increases prior to the introduction of the new tariffs.

According to document reviews and conversations with stakeholders in Benin, the process for increasing the approved tariffs will unfold as presented in Figure II.3.

Figure II.3. Process to implement tariff reform in Benin

Below, we summarize the objectives and planned interventions for each sub-activity under the Policy Activity. For each sub-activity, we also note the status of implementation at the time of

this report (August 2019) and document as appropriate the reason for any deviation from the original plan.

The multistep process is complex and requires SBEE to effect and communicate tariff changes at headquarters and to the regional levels and to implement the changes for both traditional post-paid and newer prepaid meters. It is unclear how quickly customers will see tariff increases in their utility bills. Nonetheless, GoB, MCA, and other key stakeholders working in Benin's energy sector are confident that the tariff increases will take effect by the MCC-imposed deadline and will therefore comply with the compact *condition precedent*. In Table II.1, we present the perceived incentives and disincentives for GoB stakeholders' implementation of the tariff reform. The list in the table is not exhaustive and reflects the results of key stakeholder meetings during the evaluation team's inception trip and the results of a review of compact documents.

Table II.1. Incentives and disincentives to implementing tariff reform

Incentives to implement the tariff adjustments	Disincentives to implement tariff adjustments
• Interest in retaining/fear of losing $80 million in MCC financing to upgrade infrastructure under the Distribution Project • Motivation to stabilize and improve SBEE to become financially viable through cost-recovery–level tariffs	• Concerns about possible civil unrest in response to customers' payment of higher tariffs for a public good perceived as a poor quality service. Any improvements to service delivery created through the compact will likely become evident after implementation of the tariff reform. • GoB's sensitivities to political backlash sharpened as a result of recent political unrest associated with Benin's April 2019 parliamentary elections and news of unrest in other countries sparked by tariff increases in various sectors.
• Interest in remaining a close ally of MCC, particularly because of the possibility of a future regional compact	• Competing hypothesis that a focus on decreased commercial losses and increased collections could narrow the gap between SBEE costs and revenue in the period before service improvements, could reduce fuel costs, and could extend access from MCC investments and improve the balance sheet.

In Table II.2, we summarize the planned tasks for the Tariff task of the Regulation and Tariff Sub-activity at inception as well as progress to date.

Table II.2. Objectives of the Tariff tasks of the Regulation and Tariff Sub-Activity

Objective	Planned tasks at inception	Tasks to date
Reform energy tariffs in Benin to contribute to a more financially sustainable utility company	1. Conduct financial review of current costs 2. Conduct several tariff studies (including cost of service study and projection of revenue requirements) 3. Develop a tariff plan 4. Publicize plan and raise awareness 5. Implement tariff plan by June 2018	• Tariff studies completed in 2017 • Tariff law advanced through approval process and approved in August 2018 but not implemented • New tariff studies to update tariff schedule underway in summer 2019 • MCC expects implementation in fall 2019 but no later than December 2019 • MCA-B providing support to Ministry of Energy to ensure better understanding of implications of implementing tariff plan • Communication plan developed, but no awareness or publicity plans launched to date

ARE mandate

- Oversee any regulation related to the energy sector
- Conduct financial audits of the sector
- Regulate quality of energy supply
- Defend the interests of consumers
- Approve electricity purchase power agreements (PPAs)

The second objective of the Regulation and Tariff Sub-Activity is to improve the regulatory environment. In response to the need to reform the energy sector and build investors' confidence in Benin's energy enabling environment, GoB established ARE on March 27, 2007, as the official independent regulator under the new Electricity Code of Benin (law 2006-16) (ARE). However, the law did not lead to the immediate establishment of ARE; consequently a 2014 decree articulated ARE's objectives and mission. Despite significant efforts to create an independent regulator, including the appointment of 9 commissioners and the subsequent establishment of an executive secretariat comprising about seven technical staff and the assertion by current staff that ARE does, in fact, operate independently, key informants have noted that ARE will be truly independent only once it becomes financially independent and no longer relies on funds from donor organizations and the GoB. ARE's future funding is not yet fully determined, but the current proposal calls for two sources of funding: fees paid by IPPs from their sales of electricity to SBEE and a small levy per KwH sold by SBEE to its customers (0.5 or 0.75 percent). Through the establishment and operationalization of ARE, the energy sector would operate under an independent regulator authorized to approve tariffs, licenses, and concessions.

To establish a functioning independent regulator, MCC originally planned to provide broad support that would include the review of relevant decrees and other regulatory frameworks to ensure that ARE has the technical and economic powers to act as an independent regulator; assistance in developing ARE's physical infrastructure; help in recruiting well-qualified staff; and a roadmap for the first three years of ARE implementation. Once the compact took effect, MCC realized that the European Union (EU) was already providing substantial regulatory and capacity-building support to ARE (such as funding an embedded advisor); therefore, MCC

decided to focus most of its support for ARE on investing in physical infrastructure by providing ARE with its own building and procuring a vehicle for its use. MCC is providing additional support to ARE in the form of studies and training to help ARE advocate for reforms in the energy sector. In Table II.3, we provide a summary of the tasks under the Regulation Sub-Activity.

The Master Plan and Updating of Energy Code task supports technical assistance to conduct a variety of policy reviews. Under the sub-activity, MCA-B contracted with an expert to review and provide suggested revisions to the Benin-Togo and Benin Electricity codes; to provide analytic support for development of an electric generation company in Benin; and to develop a network code. Many of these studies have been completed, but action on the new generation company (Genco) is not expected until the end of the management contractor's term.

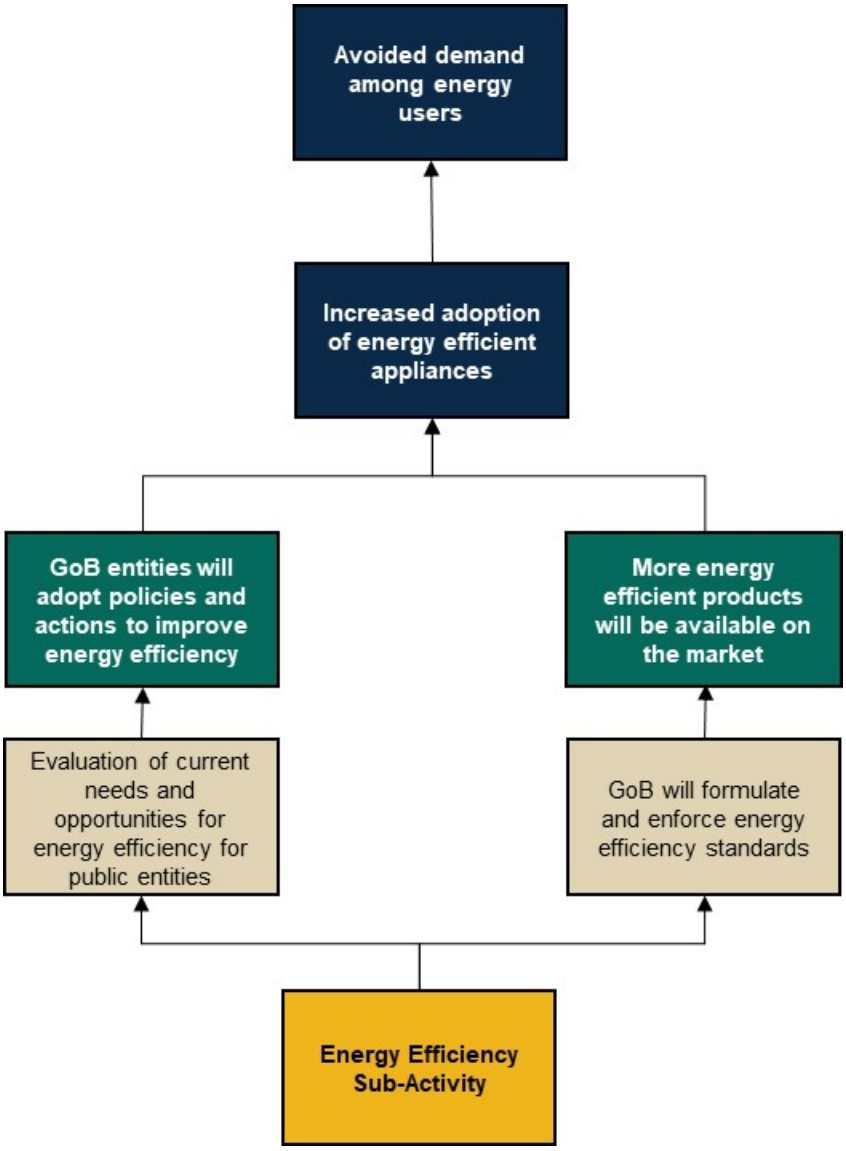
Table II.3. Objectives and activities of the Regulation tasks under the Regulation and Tariff Sub-Activity

Objective	Planned tasks	Tasks to date
Implement an independent regulator (ARE)	• Review and revise electricity codes • Set up the regulatory body (budget, office space, resources) • Recruit professional and administrative staff • Provide technical assistance and capacity building for staff • Construction of a building to house ARE	• Provide ad hoc support through studies and technical assistance • Procured vehicles • Provide much of remaining support under auspices of the World Bank and EU

2. Energy Efficiency Sub-Activity

To reduce the current energy demand on an already strained grid, the Energy Efficiency Sub-Activity aims to increase the use of energy-efficient appliances by creating regulatory tools and practices to allow the government and businesses to comply with national and international standards (such as ISO50001). This sub-activity involves three main components: (1) raising awareness about energy efficiency, such as establishing norms for energy efficiency and labeling energy-efficient appliances; (2) supporting administrative and industrial entities with energy efficiency audits; and (3) developing and delivering communications focused on energy efficiency. Specifically, the sub-activity will set minimum energy performance standards for three types of appliances: light bulbs, air conditioners, and refrigerators; develop information labels to be adhered to energy-efficient appliances; create enforcement standards and product testing facilities; assist public and private entities interested in becoming more energy-efficient; and launch education campaigns to raise awareness of the benefits of acquiring energy-efficient appliances. This sub-activity is also expected to include efforts to encourage female entrepreneurs to enter the energy efficiency market, but implementation plans are not yet final (Figure II.4).

Figure II.4. PRIS-A Energy Efficiency Sub-Activity logic model



To start implementing the Energy Efficiency Sub-Activity, MCC has been supporting GoB to ensure that legal decrees are aligned with the objectives of energy efficiency norms. A decree currently in force articulates energy-efficient norms for light bulbs and air conditioners, but not for refrigerators. In addition, MCC is funding the creation of two laboratories to test the energy efficiency of refrigerators and light bulbs and might fund a third laboratory to test air conditioners. The laboratories will test imported appliances to ensure compliance with the new energy efficiency standards. Compliant appliances will then feature the appropriate label. The *Agence Béninoise d'Electrification Rurale et de Maîtrise d'Énergie* (ABERME) will be the entity responsible for energy efficiency labeling. To oversee the labeling component, ABERME will require importers to secure a sample of the products for testing. The test results will be submitted to ABERME to authorize the appliance for sale in one of several categories. Once the categorization is complete, ABERME will share the information with the customs authority within the Ministry of Finance. To support the customs authority with this effort, MCA-B is

funding the creation of an IT system called Plateforme Nationale Dédiée aux Normes et de l'Etiquetage Energétique (PNEE) that will interface with the existing customs management system to manage data on energy-efficient imports and help the customs authority regulate appliance imports. The system is currently in the design phase, with introduction scheduled for June 2020. Support to suppliers entering the energy-efficient appliance market in the form of subsidies is under consideration. The Energy Efficiency Sub-Activity will also support energy audits of 20 public sector buildings and 10 industrial companies to identify possible sources of energy waste and find ways to promote energy-efficient practices. The public buildings will receive energy plans and assistance for implementing the plans. The private entities will receive energy plans. In addition, as part of the Off-Grid Project under the compact, entities may apply for competitive grants to support upgrades. A parallel communications campaign to raise awareness of the benefits of energy-efficient appliances is under development as of the date of this report. In Table II.4, we summarize the planned tasks and the progress to date under the Energy Efficiency Sub-activity.

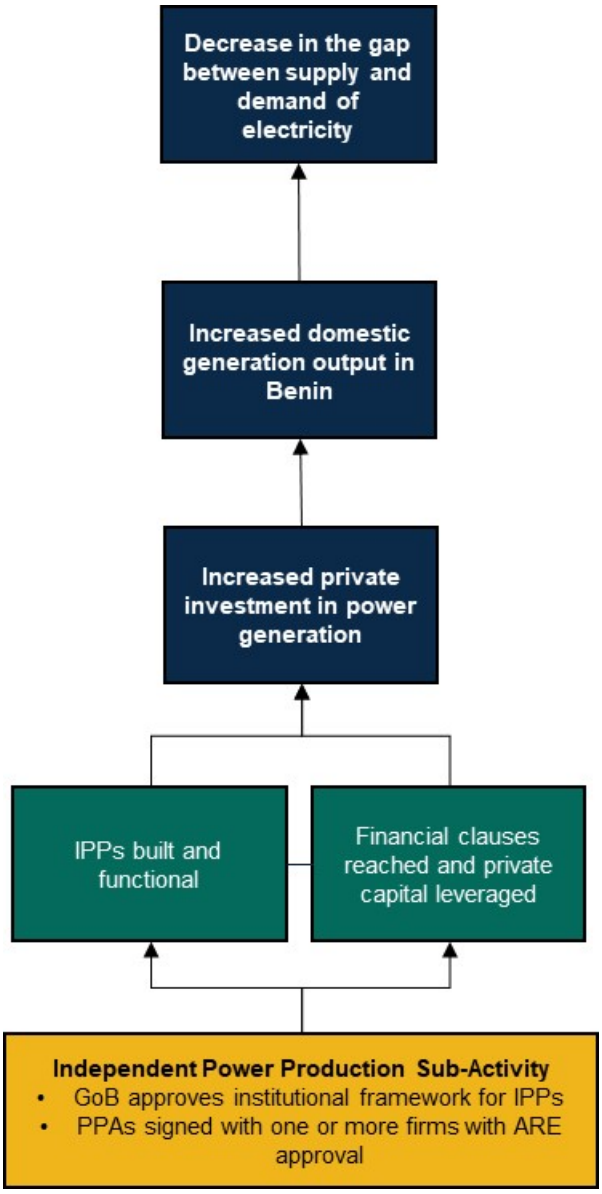
Table II.4. Objectives and tasks of the Energy Efficiency Sub-Activity

Objective	Planned tasks	Tasks to date
Expand and strengthen energy efficiency standards and labeling	• Develop technical standards • Approve and implement energy efficiency regulation • Develop and launch product labeling program • Develop an energy efficiency laboratory • Test and enforce program • Launch public information campaigns	• Energy efficiency decree not yet implemented (plan to include it in the revised electricity code) • Energy efficiency laboratories in design phase • No communication activities launched to date, but a communications consultant is designing a plan

3. Independent Power Producer (IPP) Sub-Activity

Before inception of the compact, Benin lacked a clear and transparent framework for public-private participation in the energy sector. In parallel with reform of the tariff structure, the IPP Sub-Activity aims to create the enabling conditions to attract IPP investment in Benin's power sector, leading to increased domestic generation output (Figure II.5). IPPs considering a substantial investment in any country seek well-defined institutional frameworks, transparent procurement processes, and clear guidelines (in addition to political security and stability). MCC commissioned an IPP framework for GoB's consideration and adoption. A consortium led by Ernst & Young developed the IPP framework with input from GoB and has recommended the eventual IPP competitive selection process. Ernst & Young will provide transaction advisory services to cover structuring and will lead transactions through to contract award between GoB and an IPP. On July 29, 2019, Benin's Council of Ministers officially approved the IPP framework, which calls for transparent and competitive future energy concessions. The framework has clarified some of the perceived risks and unknowns of investing in Benin, though political risk remains. Satisfying the terms of the framework was one of the *conditions precedents* for the $80 million "on-grid" tranche that Benin expects to receive under the compact.

Figure II.5. PRIS-A IPP Sub-Activity logic model



With the IPP framework in place, MCA engaged a transaction advisor (Ernst & Young) to structure contracts for 50 MW of installed capacity of solar photovoltaic plants. Two 15 MW plants are planned for Parakou and Bohicon and two 10 MW plants are planned for Djougou and Natitingou. Government officials have travelled abroad to market the investment opportunities and disseminate the prequalifications document. GoB received prequalification submissions from 33 firms, yet it is unclear how the recent elections have affected investors' perceptions of risk of investing in Benin. In Table II.5, we provide a summary of the IPP Sub-activity.

Table II.5. Objectives and tasks of the IPP Sub-activity

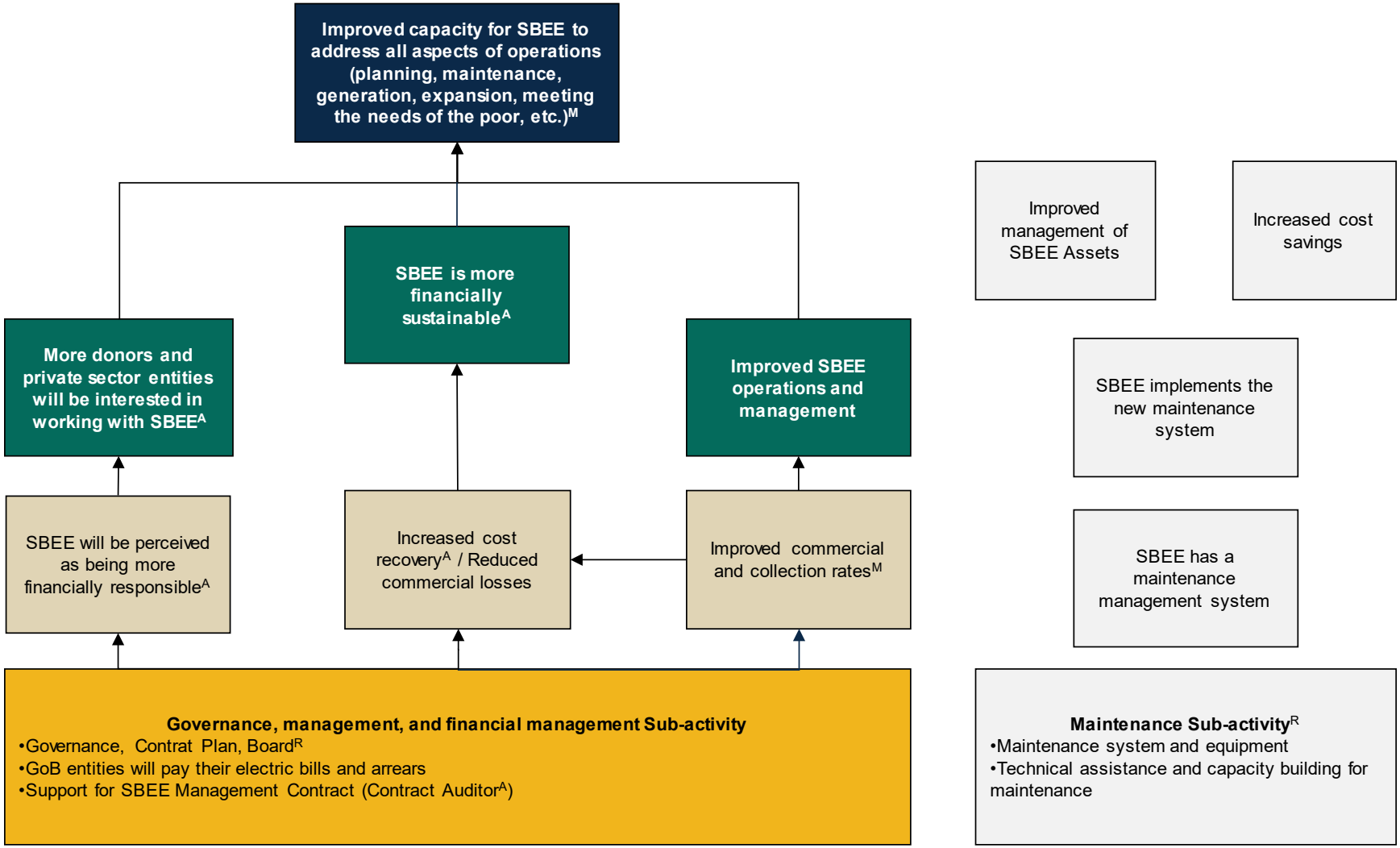
Objective	Planned tasks	Tasks to date
Create environment to foster more IPPs	• Review and update energy codes* • Support legislation and decrees covering IPPs* • Finalize concessions and PPAs* • Study and outline options for IPP • Develop IPP framework • Design competitive IPP solicitation process* • Provide transaction advisory services and TA	• IPP studies completed • Terms of IPP framework satisfied • IPP transaction advisory services now ongoing for four solar photovoltaic plants

*These tasks are either underway, or we do not have updated information on their status.

D. Utility Strengthening Activity

SBEE is the primary energy utility company in Benin. As a state-owned enterprise, SBEE has operated as an extension of GoB and engaged in little independent decision making. However, a healthy enabling environment for energy depends on a utility company run on commercial principles and able to make independent organizational, financial, operational, and human resources decisions (Victor and Heller 2009). Therefore, the original intent of the Utility Strengthening Activity was to create a more independent and corporate-like organization in order to ensure the enterprise's financial viability, to create efficiencies, to improve customer service, and to update the company's infrastructure with respect to SBEE's day-to-day management and improved electrical distribution and connection to the grid. The activity originally incorporated two sub-activities: (1) the Governance, Management, and Financial Management Sub-Activity and (2) the Maintenance Sub-Activity. In Figure II.6, we illustrate how MCC expects the sub-activities to contribute to the goal of strengthening SBEE.

Figure II.6. Utility Strengthening Activity logic model



Note: M indicates that wording for this outcome was slightly revised. A indicates that the outcome was added to this version of the logic model (not included in earlier versions). R indicates that the task or item was removed from the logic model.

Given that the success of the Benin Energy Compact as a whole depends on SBEE's financial viability, MCC set several "*conditions precedents*" to lay the groundwork to strengthen SBEE. First, GoB was required to sign a *contrat-plan*, an agreement between GoB and SBEE modeled after French contract law that is often used for utilities. The *contrat-plan* includes agreements on SBEE's strategic focus, an action plan for improving performance, an articulation of the relationship between GoB and SBEE, and details on performance obligations to ensure SBEE's continuous improvement. To ensure achievement of the performance targets of the *contrat-plan*, the director general provides goals specific to each sector director that must be met within the calendar quarter. Employee performance measures include accomplishment of these objectives. The *contrat-plan* also requires public entities in arrears on their utility payments to install prepaid meters. In accordance with MCC requirements, a new board of directors was convened including members with technical qualifications to provide additional oversight.

GoB agreed to the terms of the *contrat-plan* on May 4, 2017, and the first agreement is currently in place covering the period between January 2017 and December 2019. After the first year of the *contrat-plan,* progress was reviewed to ensure that SBEE was meeting its obligations (we do not have access to the review). At the time of writing this report, the GoB was in the process of confirming a second three-year plan to take effect after the expiration of the first. Even though the *contrat-plan* represented a large deviation from the status quo in the relationship between GoB and SBEE, Benin's president requested more widespread reform of the energy sector and suggested that MCC fund a management contractor to spearhead SBEE's transformation.

Goal of transaction advisor for the management contract

1. Define objectives, scope, and authority
2. Define staffing requirements
3. Articulate and set performance targets, and how they should be measured
4. Develop capacity- building plan
5. Define duration and structure of contract

A utility management contractor is not a service provider but rather a company tasked with temporarily (for a length of time typically between three and five years) taking over management and operations of the utility in order to catalyze its commercial viability. As part of its mandate, the management contractor (MC) typically puts in place senior staff to implement a roadmap for financial viability and operational improvements. A management contractor is responsible for the reorganization, modernization, and competency upgrades needed to make the utility competitive and financially sound. However, a management contractor does not provide the financing needed to implement the changes (Nodalis Conseil 2017). For SBEE, MCA hired a transaction advisor to create the roadmap for the management contract, to outline the general scope of the management contractor's responsibilities, and to set out the steps needed to identify a management contractor (see text box).

Under the management contract, the MC will lead SBEE for four years and provide the following staff:

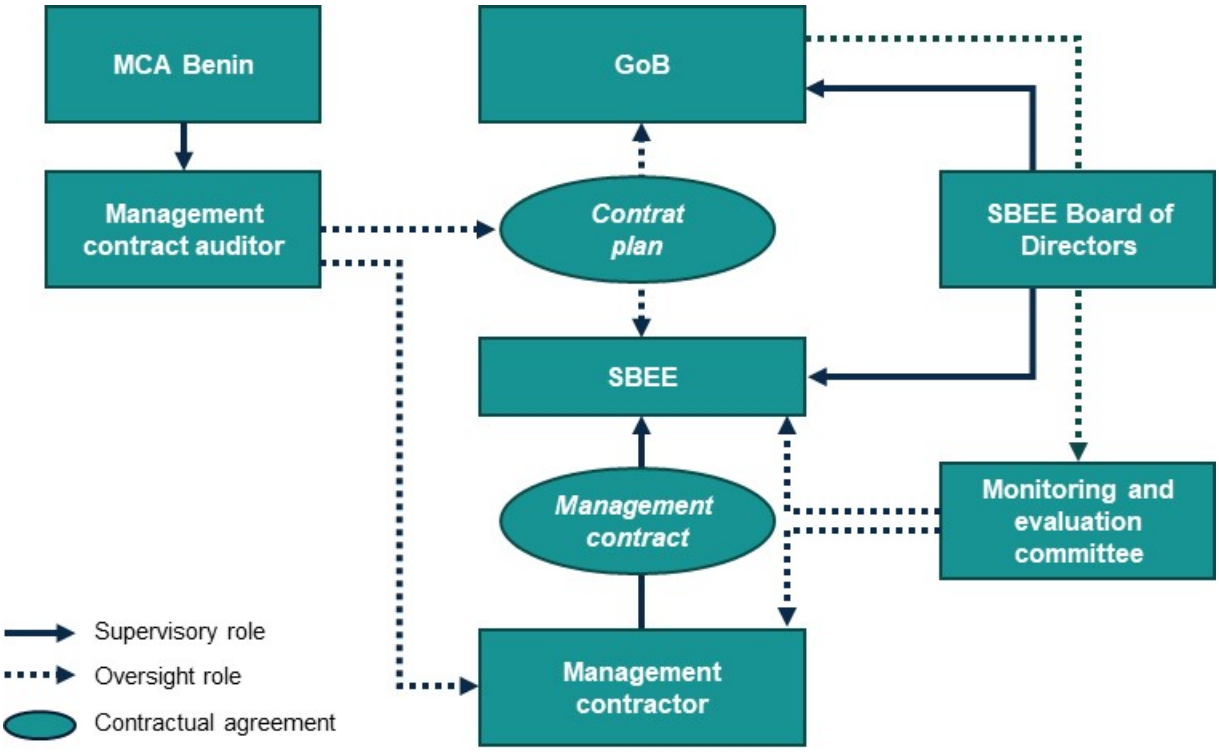
- Director general
- Director for studies, development, and projects
- Finance and administration director
- Commercial director
- Technical director for production, transport, and distribution of energy
- Human resources director
- Procurement director
- Internal auditor

In addition to overhauling the existing management structure, the MC will lead all aspects of SBEE's reforms such as the development of new human resources guidelines and practices (including practices related to workplace safety, sexual harassment, and employee morale); the development of new studies; and upgraded new information systems to improve inventory tracking, procurement, bill collection, and customer service.

Management contracts are typically structured in a way that links payment to performance. In the case of SBEE, the management contractor's compensation will be based on (1) the cost of hired in-house staff (directors); (2) the submission of deliverables based on specific technical assistance; and (3) the achievement of specific performance measures/indicators.

To verify that the MC is making progress, MCC recruited a management contract auditor to review all MC reports and conduct periodic spot checks to validate progress; review plans and budgets developed by the MC; and serve as an independent arbiter in the event that problems arise between the MC and SBEE. The MC auditor is also responsible for ensuring that both SBEE and GoB comply with the *contrat-plan*. The auditor falls under the purview of ARE and the *Comité de Suivi et du Controle* (CSC), which is made up of representatives from the Office of the President, Ministry of Energy, Ministry of Finance, and MCA-Benin II. The CSC is responsible for overseeing any contracts resulting from regulatory changes (MCC-Auditor TOR). As part of its mandate, the CSC is responsible for reviewing and revising (as needed) the key performance indicators included in the *contrat-plan* and the MC contracts. These indicators include technical performance indicators, including measures of power service, durability, cost, and consumption; commercial performance indicators, such as number of subscribers, claims, and frauds; human resources performance indicators related to staff training and gender and social inclusion; environmental, hygiene, and security performance indicators; and other indicators, including investment monitoring measures and inventory trackers. In Figure II.7, we provide an overview of the relationship between the main actors and contractual agreements that are at the core of the Utility Strengthening Activity.

Figure II.7. Stakeholders and contractual relationships for the Utility Strengthening Activity



Note: Adapted from Nodalis Conseil report.

In Table II.6, we provide an overview of the objectives and high-level tasks planned for the Utility Strengthening Activity. As of the writing of the report, MCC and MCA were in negotiations with the MC, although the management contractor will likely begin its work no later than fall 2019.

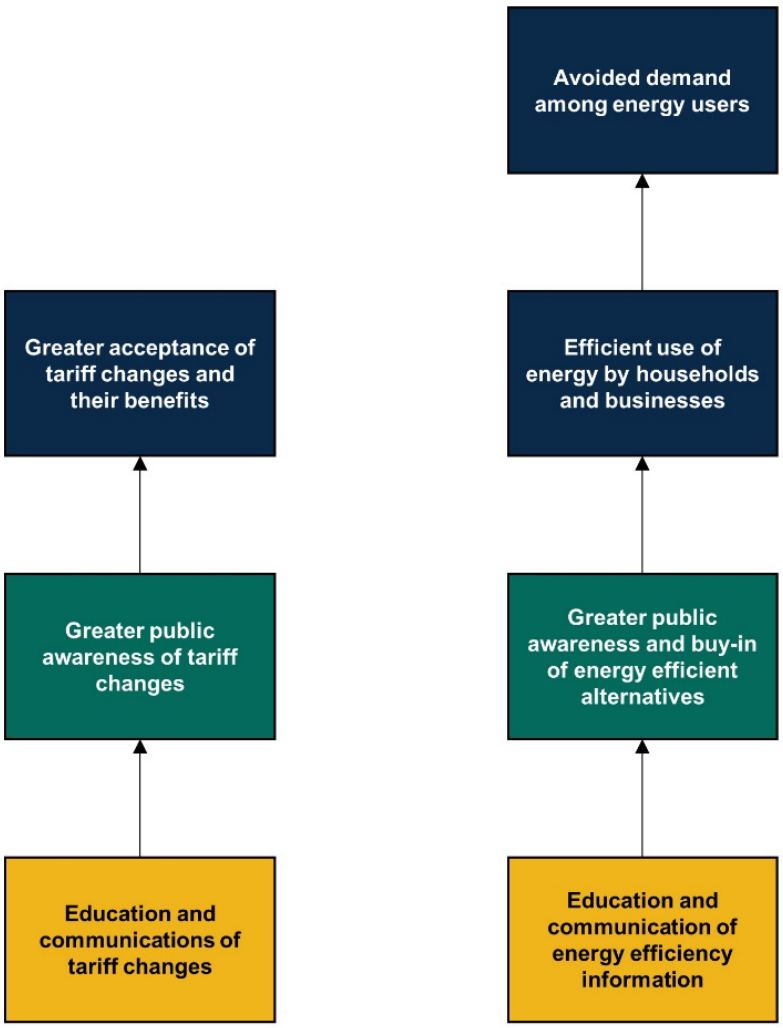
Table II.6. Objectives and tasks of the Utility Strengthening Activity

Objective	Planned tasks	Tasks to date
Improve SBEE's governance, management, and financial capacity	• Performing reconciliation exercises and financial analyses • Improve customer management, acquire new servers, and create SBEE email network • Support SBEE in recovering amounts due from government and public bodies • Implement a network optical fiber system for data transmission	• MC now assuming many of the originally planned tasks based on a Ministry of Energy request. The two sub-activities now under purview of the management contractor.

E. Public Information and Education Activity

MCC designed the Public Information and Education Activity to provide key stakeholders and project participants with the information and education needed to support the intended reforms. The aim of the activity is to provide communication support for the Tariff and Energy Efficiency sub-activities, both of which require considerable public support if they are to succeed. Most of the sub-activities profiled above specify their own communication plans, and SBEE operates with its own communications team. As of writing of this report, however, the Public Information and Education Activity lacks clear leadership and a defined vision. Even though a communications strategy for MCA-B is now in place, it focuses on communicating achievements of the compact rather than on the design of communications or behavior change campaigns targeted at encouraging the adoption or acceptance of new practices and reforms. MCA-B is currently contracting with a consultant to review existing communication activities and develop a plan for the Public Information and Education Activity. In Figure II.8, we present the activity's expected outcomes.

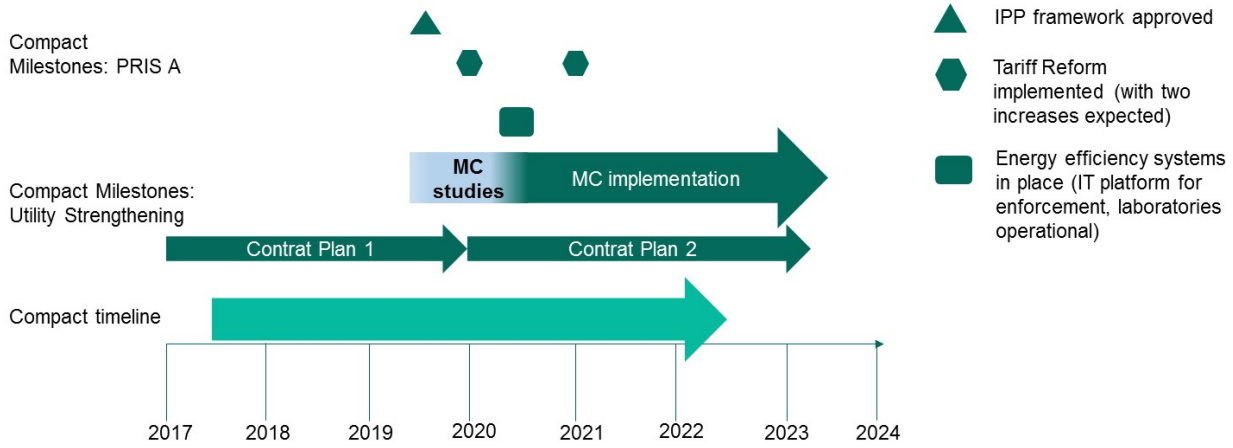
Figure II.8. Public Information and Education Activity logic model



F. Implementation plan

In Figure II.9, we depict some of the projected major milestones of the Reform Project as a whole as extrapolated from meetings with stakeholders and some compact reports.

Figure II.9. Major Reform Project milestones



G. Project participants

Given the multipronged approach of the Reform Project, the project will work with a variety of stakeholders from the public, private, and civil society sectors. Understanding the role, mandate, and interests of each of the main stakeholders is critical to any reform project. In Table II.7, we describe the stakeholders involved in the project and their roles.

Table II.7. Key stakeholders in the Reform Project

Stakeholder name	Overall mandate	Role in the Reform Project
Office of the President	Oversees all reforms and ensures their alignment with GoB mission	Main partner in reform of energy sector
Bureau d'Analyse et d'Investigation (BAI)	Analytic arm of Office of the President	Provides technical and analytic support to Office of the President in decision making; informal decision maker
Ministry of Energy	Implements energy reforms envisioned by Office of the President	Recipient of capacity-building support; key partner in reform
Ministry of Planning and Development	Coordinates development interventions and validates implementation strategies for energy reform activities	Leads Conseil d'Administration that oversees reforms at SBEE and in energy sector
Ministry of Economy and Finance	Finalizes contracts and financing in energy sector and contributes to reform activity planning and implementation	Finalizes contracts in energy sector

Table II.7 (*continued*)

Stakeholder name	Overall mandate	Role in the Reform Project
ARE	Regulates the energy sector	Provides independent reviews of energy sector reforms; recipient of capacity-building support
SBEE	National utility company in charge of import, production, sale, and distribution of electricity to customers	Major recipient of support through management contract
CEB (*Communauté Electrique du Bénin)*	International organization co-owned by governments of Benin and Togo; mandate limited to energy transmission and legacy generation assets, with SBEE now taking over as primary importer	Stakeholder in energy sector; limited political control
IPPs	Provides investment to upgrade Benin's energy infrastructure (primarily around photovoltaic) and improve generation capacity	Beneficiaries of improved enabling environment aimed at reducing investor risk and of SBEE's improved financial condition
Agence Béninoise d'Electrification Rurale et de Maîtrise d'Énergie (ABERME)	Key entity responsible for enforcing energy efficiency standards for light bulbs, air conditioners, and refrigerators	Beneficiary of new investments to promote energy efficiency review of imports
Unions Syntra (Syndicat des travailleurs de la SBEE) Synit (Syndicat indépendant travailleurs de la SBEE) Syno (Syndicat national des ouvriers) Syme (Syndicat des métiers de l'énergie)	Represent the interests of key stakeholders among the public and among staff within the utility	Plays a role in catalyzing or inhibiting institutional reforms depending on their power and influence
Electricity consumers	Hold GoB accountable for power sector reform through democratic measures	Benefits from increased availability and reliability of electricity and from education on energy efficiency best practices
Donors (World Bank, AFD)	Support development, reduce global poverty	Support various complementary projects that contribute to energy sector goals
MCA	Support the implementation of the Benin II Compact	Manages and oversees all aspects of compact implementation
MCC	Support development, reduce global poverty	Funds the MCA, provides high-level supervision of compact implementation
Cellule D'appui Aux Partenariats Public-privé	Support the development and implementation of public-private partnerships in Benin	Responsible for approving any new public-private partnerships such as IPPs
Unité Chargée de la Politique de Développement des Energies Renouvelables	Develop renewable energy sources for Benin	Oversee the development of renewable energy projects

Table II.7 (*continued*)

Stakeholder name	Overall mandate	Role in the Reform Project
Direction Nationale de Contrôle des Marchés Publics	Oversee procurement for the GoB	Responsible for approving any new infrastructure projects such as solar generation plants and energy efficiency testing labs

H. Summary of cost and benefit analysis and beneficiary analysis

The economic rate of return (ERR) is a summary statistic reflecting the economic merits of an investment. Conceptually, it is the discount rate at which the benefits of an intervention are exactly equal to its costs. The higher benefits are relative to costs, the higher is the ERR. MCC did not estimate the ERR individually for the various components of the Reform Project, though project-level ex-ante ERRs were completed for the Electricity Distribution and Electricity Generation projects. Section F of Chapter V provides a description of our planned approach to the Reform Project's cost-benefit analysis, which will answer the following evaluation question: Do the benefits of the Reform Project outweigh its costs for society as a whole?

III. LITERATURE REVIEW

In this chapter, we give an overview of the academic literature on power sector reform, with an emphasis on the causal mechanisms outlined in the MCC Benin Power Compact's logic models. We start with the "textbook model" of power reform and explain the particular relevance of the political economy in understanding reform processes. Next, we examine evidence on the promotion of energy-efficient products and practices. We then look at institutional support for utilities (including the use of management contracts). We conclude with a short analysis of gaps in the literature and the potential contributions of the proposed evaluation.

A. The `Textbook Model' of regulatory reform

Until the 1990s, most countries operated state-run power companies that were solely responsible for the generation, transmission, and delivery of electricity to their citizens. Policy makers operated under the assumption that a government monopoly is the most appropriate model for delivering a public good in a sector with high barriers to entry. The perceived success of market-oriented power sector reforms in the United Kingdom under the Thatcher Administration, however, introduced the possibility of effective private management in the provision of electricity. A new conventional wisdom developed around the principles of privatization, competition, and depoliticization of the power sector; multilaterals such as the World Bank vigorously promoted such an approach (Lee and Usman 2018).

The reforms planned under the Benin Power Compact largely adhere to the "textbook model" described by Victor and Heller. Since the 1990s, many of the largest developing economies have relied on that model (Victor and Heller 2009), which addresses the competing interests of politicians, private firms, and the public through the unbundling, privatization, and regulation of electricity markets. Many of the countries that have implemented some form of the textbook model in the past three decades have experienced widely varying results. Much of the recent literature on power sector reform focuses on explaining the source of this variation (Bacon 2018).

Victor and Heller enumerate four key elements of their textbook model for power sector reform: unbundling (separating the functions of electricity generation, transmission, and distribution), privatization, creation of an independent regulator, and the facilitation of competitive markets (Victor and Heller 2009). Many empirical studies have applied regression analysis to examine the effects of these elements individually and in various combinations (Bacon 2018). However, more recent work highlights the need for strong institutions as a prerequisite for achieving sustainable power sector reform. Consequently, Lee and Usman expand Victor and Heller's formulation with three additional elements: effective legislation to support reform, the commercialization of utilities, and the implementation of efficient pricing schemes (Lee and Usman 2018).

Table III.1. The standard textbook model for electricity reform

Standard textbook model for electricity sector reform	
1. Unbundle	Separate generation, transmission, distribution, and marketing of electricity
2. Privatize	Sell those parts of the system amenable to competition to multiple private firms
3. Create regulatory institutions	Set up independent regulators to oversee market conduct in the competitive industry and to regulate the monopoly-prone parts of the system
4. Create markets	Allow markets to function for parts of the system that are amenable to competition

Source: (Victor and Heller 2009).

The role of institutions in power sector reform becomes most evident in the context of the linkages between system-level outputs (often measured in generation capacity, labor productivity, transmission and distribution losses, and institutional efficiency) and household outcomes, such as electricity access and poverty reduction. Studies indicate that the textbook model may be an effective template for increasing important outcomes; however, such improvements rarely translate into welfare at the household level except when reforms explicitly address the political and institutional forces that prevent household access to electricity (Jamasb et al. 2015). Most notably, rural electrification is generally inefficient and can reduce profit margins for power companies. Thus, reforms that address only market-related factors (e.g., utility privatization) often fail to increase access (Lee and Usman 2018). In fact, some have even suggested that foreign aid might hinder rural electrification efforts (Trotter 2016).

B. IPPs

The Benin Power Compact aims to create a favorable environment for the addition of IPPs to the existing grid. IPPs are private firms that generate electricity and sell it in bulk at a fixed price, usually defined by a purchase power agreement (PPA). PPA can last for 15 to 30 years and guarantee a steady stream of revenue to the venture. IPPs are an attractive reform option for many developing countries because they promise to boost generation capacity while offering foreign entities an investment opportunity, thereby raising outside capital to meet electricity production goals. IPPs also offer a potential alternative to the more politically difficult task of privatizing a state-owned utility (Victor and Heller 2009). In 2017, Eberhard et al. estimated that 151 IPPs were operating in sub-Saharan Africa, accounting for a combined $30 billion investment capable of generating 12 gigawatts of electricity (Eberhard et al. 2016).

Countries such as Benin that perceive an urgent need for increased power generation capacity most commonly turn to IPPs. Nagayama finds that IPPs, when paired with an effective regulator, can reduce the cost of electricity (Nagayama 2010). However, Erdogdu qualifies this finding by noting that industrial clients appear to capture the entirety of cost savings produced by the introduction of IPPs (Erdogdu 2011), probably because industrial clients consume enough electricity to negotiate directly with an IPP. Price aside, research suggests that the generation capacity added by IPPs will not necessarily result in long-term improvements to the performance of Benin's power sector, let alone in a social benefit to Benin's citizens (Jamasb et al. 2015). Eberhard et al. observe that an IPP's financial viability is inextricable from the financial viability

of its primary off-taker (often the state-owned utility). Therefore, it is difficult for IPPs to succeed unless their establishment is part of a larger reform package that guarantees a market for their product. The authors also highlight the role of a country's planning and contracting capabilities in determining IPPs' success (Eberhard et al. 2016).

IPPs' inability to deliver cost savings to everyday consumers is explained in part by the "obsolescing" nature of PPA contracts between a government and investors, wherein the government realizes the entire benefit of the investment upfront while investors must wait years or even decades to recoup their expenditures. Once a power project is operational, the government has little incentive to honor the preferential pricing set out in the PPA. Consequently, investors usually demand generous terms as well as institutional oversight, such as an independent regulator, to ensure that their investment will pay off. The perpetual threat of renegotiation drives up transaction costs and ultimately eats into other cost savings that might accrue to the utility (Woodhouse 2006). Zelner et al. suggest that renegotiation is significantly more likely when the general public has an unfavorable review of the role of private enterprise. Thus, public sentiment may aid or exacerbate a country's ability to attract investment (Zelner et al. 2009). These findings by Woodhouse and Zelner et al. underscore the need for statutory provisions to formalize the IPP negotiation process under a comprehensive framework.

Several authors note that problems sometimes arise with IPPs when PPAs are signed before other reforms are instituted (Lee and Usman 2018). As a major stakeholder in the reform process, an IPP may oppose (whether implicitly or explicitly) reform efforts that threaten its profit margin, most commonly when reforms introduce competition to the power market. Woodhouse notes that the misalignment of incentives between the private and public sectors can necessitate a renegotiation of PPAs that are more favorable to existing IPPs as a precondition for market reform, as occurred in the Philippines in the early 2000s (Woodhouse 2006). Consequently, he stresses caution as governments negotiate and manage IPP contracts. Competitive bidding and transparent selection processes are considered best practices for IPP negotiations (Eberhard et al. 2016; Lee and Usman 2016).

C. Energy efficiency

Across sub-Saharan Africa, the growth in demand for electricity is far outpacing the growth in supply. To address this gap comprehensively, the Benin Power Compact seeks to supplement supply-side initiatives such as the introduction of IPPs with features designed to reduce the quantity of electricity required to meet consumers' functional needs. The United Nations has estimated that electricity consumption in developing countries will more than double by 2030, highlighting the need for proactive measures to increase energy efficiency (United for Efficiency 2017). Through two main components, GoB is working to curb electricity demand by restricting the types of appliances acceptable for import (refrigerators, air conditioners, and light bulbs) and by changing the behavior of energy consumers.

1. Appliance standards

Rates of appliance ownership are still relatively low across sub-Saharan Africa, but conditions may change in the near future. Researchers project that many African countries will experience a five-fold increase in refrigerator ownership by 2030 (Steiner 2014). Refrigerators currently account for 10 percent of global electricity consumption and present a clear target for efficiency efforts. Air conditioners, lighting, and electric motors also account for significant portions of global electricity consumption (United for Efficiency 2017). Appliance standards aim to eliminate low-efficiency units from the marketplace by controlling the specifications of imports. In particular, today's standards prevent developed countries from the dumping of second-hand appliances. In the case of refrigerators, energy efficiency standards have resulted in a 4 percent per unit reduction in electricity consumption every year since 1990 (Van Buskirk et al. 2014). Lighting standards that target incandescent lamps have also proven effective at lowering electricity demand in Ghana and elsewhere (Kumi 2017).

2. Consumer behavior

Consumer behavior is another limiting reagent to efficiency efforts, as new consumers might be unable to take effective steps to reduce personal energy consumption. Yet, appliance labeling is an important mechanism through which a government can modify its population's energy consumption. Banerjee and Solomon describe a three-part causal chain linking energy efficiency labels to energy savings: awareness (do consumers know about their country's energy efficiency program?), understanding (do consumers make the connection among the label, the desired action, and the potential environmental and personal financial benefits?), and behavior (do consumers act on their understanding—that is, do they purchase the more energy-efficient appliance?). However, supply-side difficulties are also a factor in that an effective labeling program requires manufactures to submit their goods to testing and certification (Banerjee and Solomon 2003).

The Lawrence Berkeley National Laboratory (LBNL) advises that the effectiveness of energy labeling hinges on a government's commitment to supporting labeling policies with supplementary programs. LBNL cites information campaigns and financial incentives as complementary activities with the potential to reduce household electricity consumption. Banerjee and Solomon find that simple "seal of approval"–style labels are more effective than labels that impart complex information or statistics (LBNL 2015). Newell and Siikmaki find that U.S. consumers are most likely to respond to energy labeling that includes a simple presentation of energy-related cost savings (Newell and Siikmaki 2013).

Karatasou et al. reviewed the literature on behavior change as it pertains to residential energy consumption, concluding that behavior change interventions can lead to large energy savings. However, they stress that the complexity of human behavior complicates the evaluation of these efforts. They suggest the conceptualization of behavior change mechanisms not just through individual actors but also through entire communities, citing technology and culture as important determinants of energy consumption behavior (Karatasou et al. 2014).

D. Institutional support

1. Management contracts

Poor performance has plagued state-owned utilities across the world, and the *Société Béninoise de l'Energie Electrique* (SBEE) is no exception. The textbook model of power sector reform prescribes privatization as a remedy to low-functioning utilities, but full-scale privatization is often politically infeasible and/or cost-prohibitive. Management contracts are a more limited form of private sector participation that introduce a measure of accountability to certain key functions of a utility even as ownership remains in public hands (Eberhard 2011). Many management contracts include provisions for bonus payments contingent on the contractor's achievement of certain performance targets. In theory, MCs allow a government to enjoy the operational benefits associated with privatization while avoiding the political backlash that often accompanies the surrender of a public asset. The Benin Power Compact provides for a third-party contractor to assume responsibility for management of SBEE's day-to-day operations. Cameroon, Côte d'Ivoire, Togo, Gabon, Gambia, Guinea, and Liberia have all signed forms of management contracts in recent years. Although donors often specify MCs as prerequisites in aid packages, the evidence is mixed regarding the role played by management contracts in sustainable power sector reform (Bacon 2018).

USAID provides seven conditions to ensure the success of power utility management contracts based on a review of the experiences of Georgia, Kenya, Tanzania, Haiti, and Liberia. These are: consistent government support for the management contractor, effective transition planning for the post-contract period, vesting complete authority in the management contractor, adequate financing, streamlined reporting requirements, identification of a baseline to benchmark performance improvements, and the establishment of a clear framework for political, communication, stakeholder, and donor support. They warn that failure to properly implement any one of these conditions can jeopardize the reform process (Wood 2018).

The World Bank identified 17 management contracts with power utilities in 15 sub-Saharan Africa countries signed before 2011, of which 8 were renewed after the expiration of their initial terms. It appears that some early successes with management contracts in Namibia and Tanzania may have set donor expectations too high and tainted subsequent experiences. Unsurprisingly, the World Bank concludes that management contracts are most likely to succeed when accompanied by large investments in other types of reform aimed at institutional strengthening. Risk factors include external shocks that raise the cost of energy and, notably, the presence of IPPs that can raise the operating cost of the utility through expensive PPAs (Eberhard et al. 2011).

The World Bank describes four hidden costs experienced by power utilities in Africa: underpricing, transmission and distribution losses, bill collection losses, and overstaffing. The World Bank further reports that management contracts can be an effective means for remedying problems in the last three categories, although performance increases in these areas are generally not sufficient to attract outside investment; moreover, they are not predictive of further reform (Eberhard 2011). Proponents of utility management contracts point to impressive gains in labor

productivity after private management takes over, but some evidence suggests that these gains result more from labor reductions than from productivity increases. Opponents of management contracts argue that the reported improvements reflect the unusual firing privileges afforded to contractors. They contend that the previous government-employed managers might have achieved the same performance targets at a lower cost if they had simply wielded greater authority to fire unproductive employees.

At the same time, positive impacts for electricity consumers in markets with utilities under management contracts have been lukewarm at best. The World Bank notes modest and gradual improvements in the quantity, quality, and price of service in the 15 African countries that implemented management contracts. Gassner et al. use a regression model to examine the effects of management contracts (alongside other forms of private sector participation) in 71 developing countries and find no significant effects across eight indicators, including access, sales, and distribution losses (Gassner et al. 2009).

2. Independent regulation

GoB recently established ARE to act as an independent regulator for the power sector. Independent regulation is a well-studied class of reform, but the findings remain inconclusive on the impact of independent regulation on sector performance and end-user well-being (Bacon 2018). Some studies suggest that the chief benefit of an independent regulator is not the improvement of sector performance but rather certainty that the economic surplus created by other reforms (e.g., privatization, unbundling) reaches end-users and does not solely benefit investors and commercial clients (Jamasb et al. 2015).

Stern and Cubbin find that the establishment of an independent regulator is associated with a 15 to 25 percent increase in power generation over a 10-year period and suggest a handful of mechanisms through which regulators increase a local utility's operational efficiency. They speculate that these results obtain when increased operational efficiency leads to increased investment in power generation. Ba and Gasmi's findings echo Stern and Cubbin's findings, with the additional assertion that an independent regulator can increase access to electricity (Stern and Cubbin 2006). Jamasb et al. highlight the role of quality regulation in translating improved sector performance due to privatization into increased electricity access; however, they also warn of "perversely motivated" regulators that may compromise end-user outcomes (Jamasb et al. 2015). Nagayama finds that a regulator, in combination with IPPs, can lead to reduced transmission and delivery losses and increased generation but has no effect independent of private sector participation (Nagayama 2010). The lack of consensus in the literature may reflect heterogeneity in the quality of regulation, the level of independence from political actors and processes, and the degree of authority across regulatory agencies. Consequently, Bacon suggests that empirical studies should attempt to model types of regulation rather than the mere presence of a regulator (Bacon 2018).

E. Literature gaps

As noted by Bacon, cross-country empirical analyses of power sector reform tend to model certain types of reform with binary indicators. Although expedient from the standpoint of the

analyst, such an approach leads researchers to lump together reform efforts of a general character that are dramatically different in their respective implementation. It is unreasonable to expect that given a type of reform (e.g., the introduction of an independent regulator) will succeed uniformly across the board regardless of how it is implemented. To gain a more nuanced picture of how to institute reforms effectively, analyses need to differentiate between the scale and scope of reform efforts; that is, analyses must consider the extent to which reforms are implemented and enforced in a given country while focusing on a more granular classification of interventions than just an on-off variable (Bacon 2018).

Lee and Usman call for a greater emphasis on the political economy when analyzing power reform efforts; they are particularly interested in analyses that seek to understand how the agendas and means of influence of various actors can affect country-level outcomes. They observe that the provision of electricity is heavily politicized in many developing countries; consequently, the fates of reform efforts are as much a function of the motives and interests of those who wield political capital as a function of the purely economic forces that researchers more commonly measure and analyze. Moreover, Lee and Usman note that, even though reform policies have led to improved sector performance under certain circumstances, the policies rarely result in positive end-user impacts except when enabled by strong institutions. Some evidence suggests that strong institutions might prevent commercial clients and investors from capturing the benefits of increased power generation, but the mechanisms have not been sufficiently investigated. All of this speaks to the need to incorporate more insights and techniques from political economy into the existing empirical literature (Lee and Usman 2018).

The literature adequately represents most of the reform efforts included in the Benin Power Compact. The only exception is power utility management contracts, which are often lumped together with other types of private sector participation. More than half of the contracts identified by the World Bank either were not completed or were not renewed past their original terms, but there is only limited insight into the reasons that management contracts often do not evolve into sustainable partnerships. Management contracts present a unique set of political challenges to the governments that implement them, and the experiences of these governments demand a detailed political economy analysis.

The evaluation of the Benin Power Compact will generate new evidence to assess the efficacy of a variety of power sector reforms, including management contracts, private sector participation, and energy efficiency measures. By starting with extremely low generation capacity, Benin is providing a test case for theories about the political economy forces balancing the need for increased generation against long-term reform objectives (especially access to electricity). The evaluation will provide new evidence for the ongoing debate over the use of management contractors to improve the performance of a public utility. In addition, we will seek to understand the effects of IPPs not just in terms of sector performance but also as a fixture in Benin's larger political economy. Finally, we will study the application of appliance standards and labeling to reduce household energy consumption. Overall, we will contribute to the small but essential body of literature that views a familiar set of power sector reforms through the lens of political economy. Moreover, we will contribute a detailed analysis of reform in a sub-Saharan African county, in a region that is relatively underrepresented in the existing literature.

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IV. SUMMARY OF EVALUABILITY ASSESSMENT

Before developing the evaluation design, the evaluation team interviewed key stakeholders from MCC, MCA-B, SBEE, and GoB ministries involved in the design and implementation of the Policy Reform and Institutional Strengthening Project. The team also reviewed foundational compact and project documents to conduct the evaluability assessment included in Annex A. The evaluability report presents Mathematica's assessment of the Reform Project's problem diagnostic and program logic, risks and assumptions, beneficiaries, and metrics for measuring results. By using MCC's evaluability tool, this assessment reviews and critiques existing project documentation in order to determine whether the project is evaluable according to MCC's definition; that is, whether evidence supports the problem identification and diagnostic; whether the project objectives and theory of change are clear; whether the project's design for addressing the problem is evidence-based; whether assumptions and risks are clearly specified; whether corresponding mitigation strategies have been determined; and whether the documentation identifies clear metrics for feasibly measuring outputs and outcomes linked to the theory of change. Our assessment found the following:

1. Problem Definition and Diagnostic

The energy sector is not Benin's only barrier to economic growth. Quantitative evidence presented in the Constraints Analysis and the Power Sector Assessment Report support MCC's understanding of the challenges facing Benin's energy sector, confirming that poor quality electricity is a major barrier to economic development in Benin. However, compact documents do not present evidence to justify the compact's exclusive focus on the energy sector. On the contrary, the Constraints Analysis identified factors in the agriculture sector as major barriers to economic growth, including insufficient diversification of crops, poor enforcement of land ownership rights, low availability of trained personnel, and insufficient feeder roads, among others. Electricity supply was identified as a constraint for the agricultural industry in particular, but not necessarily for the agricultural sector as a whole. Another major gap is the aggregation rather than disaggregation of technical and commercial losses in the electricity system. Confounding these two types of information makes it impossible to determine whether Compact resources are properly allocated to the areas where SBEE needs more support. For example, if technical losses account for too large a proportion of total losses, more resources should be allocated to technical assistance than to financial management.

2. Objectives and Logic Model

The logic models and timeline are logical and supported by assumptions, but they do not align with recent compact changes. Overall, the links among activities, outputs, and beneficiary outcomes expected from the Reform Project activities are logical and based on assumptions that are, for the most part, supported by evidence. However, the logic models had not been updated in accordance with recent changes, and compact documentation did not provide a clear timeline for expected results. We have updated the logic models and timeline based on our document review and meetings with MCC (Section II).

3. Assumptions and Risks

Mitigation strategies and technical assistance might not be enough to change behaviors. MCC has carefully considered risks to implementation and come up with strategies in response, but some of those strategies might not do enough to overcome the risks. For example, communication campaigns might not do enough to garner support for tariff reforms if the proposed changes cause or exacerbate financial hardship for consumers. In addition, better governability of the power sector still might not attract investment from reputable firms in light of other well-documented hurdles to conducting business in Benin. Finally, technical assistance and capacity development might fall short in driving behavior change among key actors if those actors are unlikely to realize personal gains from improving their practices.

4. Project Beneficiaries

More detail is needed about the demographics of household and firm beneficiaries. MCC provides a definition of potential project beneficiaries, but there should be more detail about the distribution of impacts by categories that are relevant to compact objectives, such as the household head's gender, households' urban versus rural status, and the expected count or characteristics of firms that would benefit from the reforms.

5. Monitoring and Measurement

Plans for measuring outputs and outcomes appear sufficient if secondary data are available. Overall, monitoring and evaluation indicators are well defined, and data sources are clearly identified. If secondary data are accessible, Mathematica will be able to measure beneficiary outcomes described in the program logic model by using monitoring data as well as primary data collected through surveys and qualitative methods.

These findings suggest that the Reform Project is evaluable. The full evaluability assessment appears in Annex A.

V. EVALUATION DESIGN

A. Evaluation design overview

We propose a mixed methods performance evaluation for the Reform Project, which concentrates on answering a unique set of research questions for each of the seven[1] sub-activities under the project's three activities. MCC proposed an initial set of 87 research questions across the sub-activities. These research questions covered the domains of implementation, outcomes and sustainability. As described in the evaluability assessment in Annex A, we propose a reduction in the number of research questions based on the following criteria: (1) the opportunity to learn about institutional reforms, (2) links to the logic model, (3) the relative cost and/or availability of data, and (4) the ability to detect outcomes within the evaluation's timeline. To prioritize the research questions, we scored each question across these dimensions, dropped the questions that scored the lowest, and adapted some questions to be more pertinent to the evaluation. Annex A lists all questions and our ultimate recommendation on their inclusion in the evaluation.

In Table V.1, we present our high-level approach to the performance evaluation of the Reform Project. Across activities and sub-activities, we will assess **implementation** using a mixed-methods approach grounded in political economy, which will rely heavily on project monitoring data and key informant interviews and will include focus groups where appropriate. We will also conduct various analyses of each sub-activity's **outcomes** to assess achievement of outcomes as expressed in the logic model and to assess trends in key outcomes. For the outcome analysis and for sustainability analyses of specific sub-activities, we will use administrative and survey data and corroborate our findings through qualitative methods.

[1] As originally designed, the Reform Project included seven sub-activities. Tasks originally under the Maintenance Sub-Activity within the Institutional Strengthening Activity now will be carried out by, (a) the management contractor (within the Governance, Management and Financial Management Sub-Activity), (b) infrastructure construction firms working under the Distribution Project and, (c) Agence France du Developpement (AFD) as part of its project developing an asset management system for SBEE.

Table V.1. Activities, proposed approaches, and data sources

Activity and sub-activity	Type of Analysis	Proposed approaches	Data sources
All activities and sub-activities	Implementation	Mixed-methods assessment of implementation fidelity with a political economy lens	Key informant interviews (KIIs), focus group discussions, program monitoring data, media reports and administrative data
Policy, Regulation and Institutional Support Activity			
Energy Efficiency Sub-Activity	Outcome	Pre-post analysis of trends in energy efficiency adoption using quantitative and qualitative methods	Administrative data from SBEE and ministries implementing reforms; KIIs with MCC/MCA staff, GoB officials, and public and private firms receiving energy audits; data and reports from independent evaluator of Off-Grid Project; focus groups with consumers; mobile surveys of SBEE customers and staff; surveys of appliance retailers
Independent Power Producer (IPP) Sub-Activity	Outcome	Pre-post analysis of trends in IPP production, assessment of IPP investments	KIIs with MCC/MCA staff and IPP principals, ARE technical staff, SBEE data, E & Y reports
Regulation and Tariff Policy Sub-Activity	Outcome	Qualitative analysis with a political economy lens	KIIS with MCC/MCA and ARE staff, SBEE, MA implementation teams, press review, MCA communications, BAI
Utility Strengthening Activity			
Governance, Management and Financial Management Sub-Activity	Outcome	Pre-post analysis of trends and analysis of changes using quantitative descriptive and qualitative methods	SBEE data on billing and cost recovery; staffing and maintenance practices and costs; KPIs from management contractor, KIIs with MCC/MCA staff, management contractor and SBEE personnel
Maintenance Sub-Activity	Outcome and Sustainability	Mixed-method review of training, use of maintenance and asset management systems	KPI data from management contractor, document review of maintenance practices and costs, KIIs with MCC/MCA, SBEE maintenance and regional technical staff
Public Information and Education Activity (PIEA)			
Education and Communication of Tariff Changes Sub-Activity	Outcome	Analysis of changes in knowledge, attitudes and/or practices using quantitative and qualitative methods	KIIs with MCC/MCA staff and key consumer group leaders; media reports; surveys; rapid focus groups with consumers
Education and Communication of Energy Efficiency Information Sub-Activity	Outcome	Analysis of changes in knowledge, attitudes and/or practices using quantitative and qualitative methods	KIIs with MCC/MCA staff and public and private firms receiving energy audits; reviews of media reports; surveys on energy efficiency adoption; focus groups with consumers

The remainder of this chapter describes our proposed evaluation designs for each of the seven sub-activities, including our proposed analytical methods, data types, and data sources. Section B describes our approach to assessing the implementation of the project. We will conduct this implementation assessment at the sub-activity level. Sections D through F outline our approach to evaluating the outcomes and sustainability of each of the projects' sub-activities. Section G discusses our proposed evaluation of the project's economic impact and cost effectiveness, including a cost-benefit analysis (CBA).

B. Implementation analysis of the Reform Project

1. Overarching research questions and approach

We will carry out an implementation analysis to evaluate whether Reform project activities were implemented as planned, and to document instances and reasons for deviations from the original design. We will focus on identifying barriers and facilitators to implementation, and documenting lessons learned with a view to informing other investments in policy reform and institutional strengthening. Because the Policy Reform Project encompasses multiple activities and sub-activities designed to create complementary benefits, our implementation analysis will also explore the extent to which activities were coordinated and interacted with each other, as well as how the sequence of activities helped (or hindered) the achievement of expected results. The implementation analysis will also properly contextualize the outcome analyses to reflect only those activities that actually were implemented.

To carry out our implementation analysis, we will first carefully review the logic model for each activity and sub-activity, to develop a flowchart or process map demonstrating the order and interconnection of tasks within and across sub-activities. We will draw on information from project plans, regulatory documents (for sub-activities that require passage of reforms) and project reports to construct the process maps. We will vet these process maps with key implementers and project stakeholders. For each process map we will assess the degree to which each step was implemented, identify any reasons for changes in implementation, and determine key facilitators or barriers to progress. We will use **a political economy analysis lens** to assess barriers and facilitators to the accomplishment of each step (see text box below).

Political economy analysis

Practitioners and researchers use political economy analysis to determine the underlying reasons for a lack of progress on important social or reform issues—such as alleviating poverty. For example, the Department for International Development's (DFID) drivers of change (DOC) framework (Warrener 2004) conceptualizes "the interplay of economic, social and political factors that support or impede" poverty reduction (OECD DAC 2005). The approach is generally qualitative and does not feature a standardized template for conducting a full political economy analysis; rather, it lays out a simple three-part conceptual model of structures, individual agents, and mediating institutions that could propel or inhibit social change related to a particular issue. Using a DOC framework, for example, practitioners may find that the elite's capture of certain government institutions in combination with a lack of leadership on the part of nationally elected leaders are two key factors that inhibit additional investment in secondary education in a developing country.

In their focus on power structures and mediating institutions, political economy analyses often assess the formal and informal roles of each stakeholder or relevant institution, the extent to which power is vested in each entity, any corruption or rent-seeking behaviors, prevailing ideologies and values, the decision-making processes, critical bottlenecks to implementation, and the likely "winners" and "losers" relative to substantive reforms. Given that reforms are rarely apolitical and often lead to a reallocation of resources or redistribution of benefits, some stakeholders expect gains from reforms while others expect losses, and these expectations may influence their actions and behavior ex ante

For the Reform Project evaluation, we will not conduct a discrete political economy analysis. Rather, we will use our understanding of the political economy of institutional reform as an analytic lens through which we will assess key questions focused on implementation, results, and sustainability. We will identify and assess barriers and constraints to successful implementation as well as the political, institutional, and economic factors that inhibit results and the prospects for sustained benefits following the compact period. Political economy dynamics might be of particular relevance to tariff reforms, regulatory independence, and the management contract in view of the range of conflicting incentives perceived by various stakeholders. We will also use a political economy lens to assess the extent to which changes occurred within SBEE, thereby allowing us to document which entities within (and outside) SBEE played a key role in facilitating or hindering institutional change.

Our implementation analysis will draw on a variety of sources, such as project documentation, quantitative administrative data, KIIs, and FGDs with beneficiaries. Table V.2 lists the overarching research questions our implementation analysis will address, along with the data sources we will rely on. In addition to the questions listed in the table, we will use the implementation analysis to support our outcomes analysis to understand why outcomes may have differed from targets specified during the project design phase.

Table V.2. Overall implementation research questions, methods, data source, and timing

Research question	Proposed approach	Data source	Projected timing
RQ.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	• All rounds
RQ.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	• All rounds

2. Data sources

The implementation analysis of the Reform Project will rely primarily on data produced by MCA-B, implementers, and SBEE enriched by the perceptions of stakeholders involved in the implementation of the Project. We will start with a **desk review** of Benin's existing energy laws and policies, implementation plans, organizational charts of the agencies involved in implementation, consultant and implementer terms of reference, and original monitoring and Evaluation (M & E) plans. We will then review updated work plans, press reports and project deliverables to document changes in implementation. These will include reports and plans from the implementers of each sub-activity under the Reform Project and from the management contractor under the Utility Strengthening Activity, a review of other donor activity as reported in the press and donor coordination meetings (which are attended by MCA-B), data from the Indicator Tracking Table (ITT), and other relevant sources that clarify the contexts in which project implementation should be interpreted. Our desk review with help inform our selection of KII participants as well as our guiding questions for our qualitative protocols.

We will carry out frequent qualitative data collection to obtain granular information on the barriers and facilitators to the implementation of activities and sub-activities. We will also use many of these data sources for the outcome and sustainability analyses described in Section C. We will carry out the following:

- Semiannual **KIIs** with stakeholders expected to play a role in implementing the activities under the Policy Reform Project. Stakeholders include officials from MCA, the Ministry of Energy, SBEE and other GoB agencies, implementers and beneficiaries of the projects. We will use the interview results to assess the achievement of key implementation benchmarks, such as the promulgation of new IPP frameworks and new cost-recovery tariff schedules. We will work to understand the barriers and incentives faced by each key actor in the energy

sector and government as well as the power dynamics and relationships among them, disentangling how each actor expedites or impedes changes in the sector.

- **Focus group discussions** with SBEE staff and customers as well as with energy efficiency consumers. Focus groups will allow us to understand how communication around key implementation events, such as tariff reform, billing changes and enforcement of the energy code take place and are received by consumers. The timing of key implementation events will determine the frequency and composition of focus groups. Typically, we will schedule focus groups almost immediately after implementation events in order to capture respondents' perceptions, creating a type of social barometer mechanism that will guide the political economy analysis (for details on our focus group discussions please see Section G).

Table V.3 lists respondents for implementation KIIs or FGDs for each sub-activity.

Table V.3. Qualitative data sources by activity and sub-activity for the implementation analysis

Name of activity and sub-activity	Key informants	Focus group discussions
Regulation and Tariff Sub-activity	Representatives from: MCA, ARE, BAI, Office of the President, Ministry of Energy, Ministry of Planning, Ministry of Finance, French Development Agency, SBEE, Idea Consult	SBEE customers from two to four areas of Cotonou and from three to six other regions with SBEE service SBEE customer service agents*
Energy Efficiency Sub-Activity	Representatives from : MCA, Ministry of Energy, Agence Nationale de Normalisation, de Métrologie et du Contrôle de la Qualité (ANM), Customs Authority, Verification Labs, appliance sellers, donor agencies	n.a.
Independent Power Producer Sub-Activity	Representatives from: MCA, BAI, Office of the President, Ministry of Energy, Ministry of Planning, IPPs, Ernst & Young	n.a.
Utility Strengthening Activity	Representatives from MCA, SBEE, ARE, BAI, Office of the President, Ministry of Energy, Ministry of Planning, Ministry of Finance, Management Contractor, Management contract auditor, Comité de Suivi et du Contrôle, MC Auditor, World Bank, French Development Agency	SBEE customers from two to four areas of Cotonou and from three to six other regions with SBEE service SBEE staff* Female SBEE staff*

* If respondents are reluctant to participate in focus groups, we will revert to KIIs.

n.a. = not applicable.

3. Analytic approach

Once we collect program documents (as they become available), we will organize and categorize the material by source, topic and date and link them to the appropriate sub-activity, task and research question. We will conduct a content analysis to identify themes within the materials, focusing on topics related to the evaluation questions, such as successes and challenges with project implementation. We will also document any themes emerging from the review that warrant further exploration in KIIs or FGDs.

Our approach to analyzing the data collected through interviews and FGDs begins with steps similar to the document coding. We will rely on thematic framing and triangulation and will unfold in four steps (Creswell 2009): (1) raw data review and management, (2) initial coding, (3) detailed coding, and (4) data interpretation and writing.

1. In the first step, we will read the transcripts provided by a data collection firm and group the transcripts according to data method and source (for instance, FGDs with SBEE customers).
2. In the second step, we will read through the transcripts several times to develop a holistic sense of the data and then will further develop the coding scheme, which is a set of themes encountered in the transcripts from the KIIs and FGDs mapped to the research questions, theory of change, and political economy dimensions (for example, initial themes might include "implementation challenges" and "changes from design").
3. In the third step, we will refine the coding scheme and use qualitative data analysis software to code the transcripts according to key themes. We will review, organize, and analyze the codes produced by the software, identifying themes that not only relate to the theory of change and the evaluation questions but that also reflect the perspective of several respondents. We will then compare themes and codes by respondent type and location to identify consistent and different themes across respondent groups.
4. In the fourth step, we will triangulate the findings from the KIIs, FGDs, and other data sources, facilitating the identification of new trends and relationships, confirming patterns or findings, and detecting discrepancies or disparate experiences. A coding hierarchy will guide the process of triangulating findings across data sources and types. For example, when investigating if implementation unfolded according to plan, we will triangulate information from interviews with MCA-B staff and FGDs and from the results of our document review. If we find significant inconsistencies, we may request additional interviews to clarify findings.

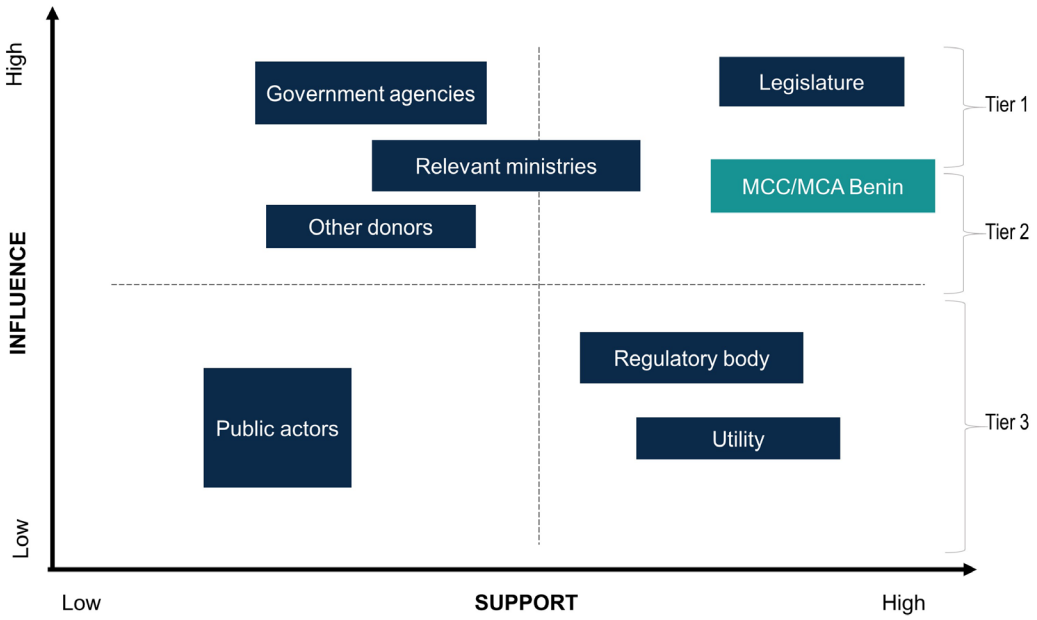
To assess barriers and facilitators to implementation (RQ.A.1), we will construct and periodically update a map of the political economy of regulatory reform in Benin. The mapping will provide the analytic lens through which we will address the most pertinent research questions related to implementation, results, and sustainability. The exercise involves gathering, organizing, and assessing information along the following four dimensions:[2]

[2] These dimensions are based on a draft MCC political economy toolkit document presented to Mathematica in May 2018.

- **Actors and interests.** This dimension includes the key organizational and individual stakeholders in the realm of regulatory reform—including the Ministry of Energy, other partner ministries, ARE, the Office of the President, BAI, parliament, SBEE staff and leaders, private sector organizations, and unions, among others—as well as the primary interests of each party with respect to reform. In addition, if feasible, we will document the extent to which each party has advocated for its interests and positions to date and achieved success through advocacy. We will assess the costs and benefits—social, economic, political—that apply for key stakeholders. Various costs and benefits, real or perceived, influence stakeholder support for or resistance to reforms. The relevant literature suggests that public actors—such as partner ministries—are more likely to advocate for technically sound reforms that advance the public interest, whereas political actors have a dominant interest in advancing (and taking credit for) highly visible reforms, particularly in election years (Shapiro and Borie-Holtz).
- **Power structures and accountability.** This dimension includes the formal and informal power structure with respect to the Office of the President, ARE, and partner ministries and how the power structure manifests itself in reform efforts. It requires an understanding of how these actors share authority, decision-making power, and leadership, particularly with respect to the legislative approval of key regulatory reforms. It also requires an understanding of how accountability functions (or does not function) within the system, especially with respect to stakeholders' implementation and oversight responsibilities in a climate of regulatory reform, and how power relations shape institutional and personal incentives.
- **Political and social tensions.** This dimension includes any long-standing political or social conflicts or tensions related to regulatory reform. As Benin is apparently subject to an increasingly authoritarian environment (e.g., exclusion of opposition political parties from parliament, curtailed media freedom, and so forth), political economy dynamics could undermine or accelerate reform efforts. In addition, unions or other organizations representing beneficiary interests could become a force in delaying or even halting reforms.
- **Institutions and rules.** This dimension includes the legal and bureaucratic framework that guides actors in the development, adoption, and implementation of regulatory reforms, including any official or unofficial "rules of the game" and how the rules are enforced. It is important to determine if any actors receive preferential treatment with respect to the rules of the game or if any rules of the game contradict other rules.

Using the above dimensions, we will map the stakeholders associated with each sub-activity according to their power or influence to effect change as well as their support for change. We will also group stakeholders into power tiers, if feasible, to enhance our interpretation of implementation barriers and facilitators. Figure V.1 illustrates this mapping exercise.

Figure V.1. Influence and support matrix for political economy analysis



The application of political economy analysis for the duration of the evaluation presents a valuable learning opportunity for institutional reform. Most political economy analysis is based on one round of data collection (typically pre- or post-reform). For this evaluation, we will collect data and perform analyses before, during, and after reform implementation as well as rapidly after key reform events. This approach, which may be termed a dynamic political economy analysis, allows the evaluation to map changes in key actors' influence over and support for policies over time to more clearly identify barriers to and facilitators for institutional change.

C. Evaluation of the PRIS Activity

The PRIS Activity includes three distinct sub-activities:

1. Energy Efficiency Sub-Activity
2. Independent Power Producer (IPP) Sub-Activity
3. Regulation and Tariff Policy Sub-Activity

Each of these sub-activities involves distinct but related tasks. For each sub-activity, we will perform a mixed-methods performance evaluation that uses qualitative and quantitative research methods to assess the sub-activities' outputs, outcomes and the sustainability of the outcomes. We describe our evaluation approach for the three sub-activities below.

1. Energy Efficiency Sub-Activity

We will use a mix of qualitative and quantitative research methods to assess the Energy Efficiency Sub-Activity's key outcomes. We outline our evaluation approach in Table V.4. We will assess the specific regulatory standards and labeling outputs of this sub-activity and measure changes in the availability and sale of energy-efficient products in the Benin market.

Table V.4. Research questions, methods, data sources, and key outcomes for Energy Efficiency Sub-Activity

Research question	Evaluation method	Data sources	Key outcome metrics
RQ.B.1. To what extent has the Government of Benin adopted and implemented policies and actions to improve energy efficiency?	• Descriptive analysis	• KIIs • Document reviews • Administrative data	Degree of adoption of key energy efficiency policies and actions
RQ.B.2. To what extent were new or strengthened standards and labeling for energy efficiency implemented during the Compact?	• Descriptive analysis	• KIIs • Document reviews • Administrative data	Degree of implementation of new/strengthened standards and labels
RQ.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?	• Pre-post analysis • Qualitative outcomes analysis	• Survey of appliance sellers • Observations at major retailers • KII • Administrative data	Sales of energy-efficient–labeled appliances*
RQ.B.4. Have the recipients of energy efficiency audits changed their consumption?	• Descriptive analysis	• KIIs • Administrative data	KWh saved

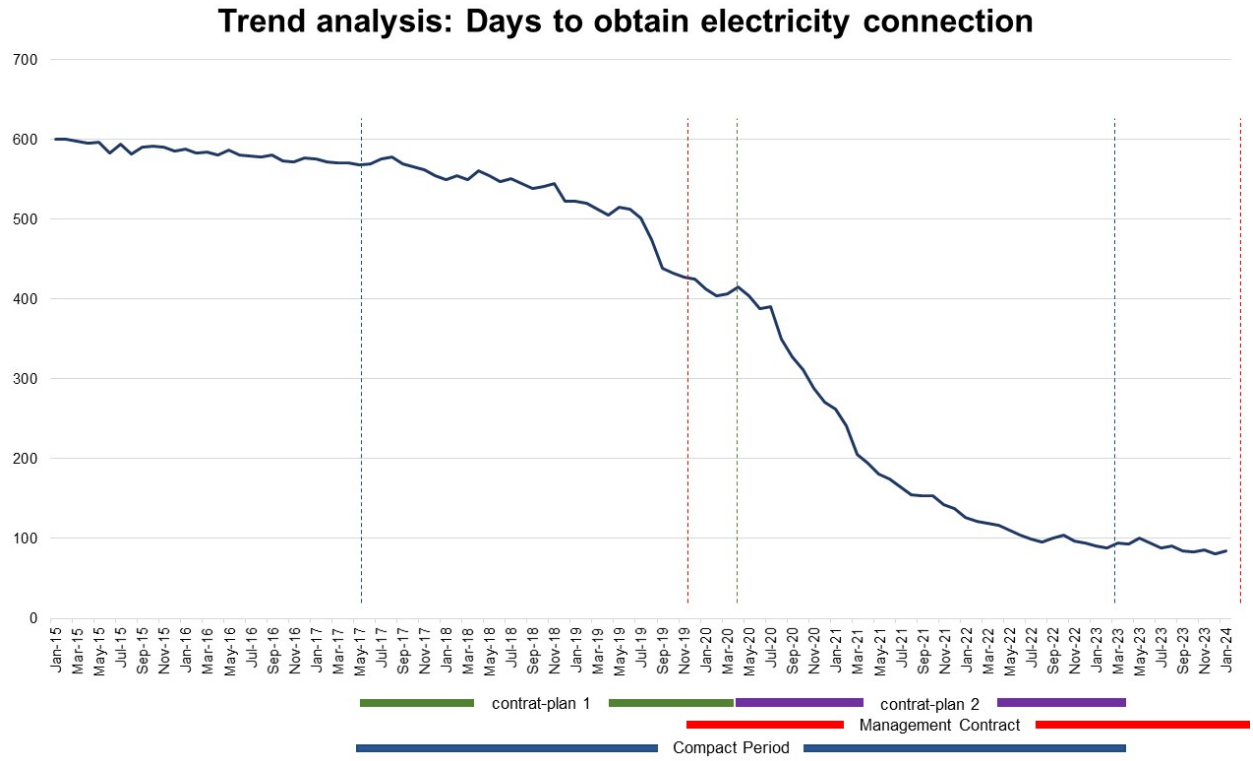
*denotes outcomes that will not be reported in the interim report.

Our performance evaluation of the Energy Efficiency Sub-Activity will use several evaluation methods to assess the extent to which GoB promulgated energy efficiency policies, adopted energy efficiency standards, and experienced an increase in sales of energy-efficient appliances in the wake of these changes. We will use **descriptive analysis** to characterize achievements in the introduction of energy-efficient appliances in Benin and to assess the magnitude of any deviations from the plan. We will first review all project documentation, such as any consultant reports from AETS Consultants, work plans, MCA-B monitoring data, and, if available, PNEE administrative documentation. Once we have reviewed and analyzed the data, we will interview representatives from ABERME, the customs authority within the Ministry of Finance, importers, and energy associations to determine whether GoB introduced policies, standards, and tools as expected.

Once the descriptive analysis has helped us assess the tasks implemented under the EE Sub-Activity, we will use a combination of quantitative and qualitative methods to assess outcomes,

namely, whether retailers increased their sales of energy-efficient appliances following implementation of the standards and labeling requirements (RQ.B.3). Because we cannot identify a valid comparison group to conduct an impact analysis, we propose to conduct a **pre-post analysis** of how the sale of energy-efficient appliances changed with the introduction of standards and labeling requirements (expected in 2020). Our pre-post analysis will examine the trend in sales with data points measured at several different points in time. We will use the Benin Infrastructure evaluation's recently completed survey of businesses in Benin to draw a sample of firms selling appliances to include in qualitative interviews about their sales of energy efficient appliances over time and to observe whether labelled energy efficient products are available in stores.[3] To verify the trends observed in the business data, we will analyze import trends, drawing on administrative data collected and stored in the new PNEE import system used by the Customs Authority. We will complement the trend analyses with a **qualitative outcomes analysis** to examine the factors that facilitated or hindered the availability of energy-efficient appliances in Benin. Given that both the PNEE system and new testing laboratories will not begin operations until mid-2020, we plan to collect data from late 2020 through 2024.

Figure V.2. Example of trend analysis



[3] Forty-eight appliance retailers and wholesalers participated in the baseline survey for the Infrastructure evaluation including nineteen medium to large businesses. While the sample frame for the infrastructure survey differs somewhat from the population expected to benefit from the Reform Project, we will construct a sample of different sized businesses with a range of geographic coverage and types of stock.

2. Independent Power Producer Sub-Activity

The growth and sustainability of Benin's energy sector depends, in part, on increased generation capacity. Therefore, a central feature of the Benin Power Compact is fostering an environment conducive to investment in the energy sector, with a focus on independent power producers. The IPP Sub-Activity aims to establish regulations to support investment and to increase investors' confidence in the business environment in Benin. To evaluate the IPP Sub-Activity, we will use both quantitative and qualitative methods to assess outcomes and the sustainability of the sub-activity. In Table V.5., we summarize our proposed approaches by research question.

Table V.5. Research questions, methods, data sources, and key outcomes for the IPP Sub-Activity

Research question	Methodology	Data sources	Key outcome metrics
RQ.C.1. To what extent were new policies and frameworks for IPPs implemented?	Qualitative descriptive analysis	• Document review • KIIs	Degree of implementation of IPP framework
RQ.C.2. Have any IPP transactions reached financial close?	Mixed-methods descriptive analysis	• Document review • KIIs	Number and characteristics of IPPs reaching financial close
RQ.C.3. How much private investment is there in IPP power generation in Benin?	Quantitative descriptive analysis	• Administrative data • KIIs	Value of private investment
RQ. C.4. What percentage of Benin's electricity consumption is produced by IPPs?	Pre-Post outcomes analysis of trend in IPP- generated electricity	• Administrative data from MCA/SBEE	IPP production of energy*
RQ. C.5. What percentage of Benin's electricity consumption is produced from clean energy sources?	Pre-Post outcomes analysis of trend in clean energy generation	• Administrative data from MCA/SBEE	Clean energy production of energy*
RQ.C.6. Are the PPAs and associated agreements in place being respected? Is the utility paying the IPPs on time? Have any government guarantees been drawn on as a result of non-payment? Are there any arbitrations or legal proceedings between the parties to an IPP transaction?	Qualitative analysis of stakeholder accounts	• Administrative data from ARE • KIIs	PPA adherence* Guarantee call-up
RQ.C.7. Do IPPs perceive the regulatory framework as credible and transparent?	Qualitative descriptive analysis of stakeholder perceptions	• KIIs	Perceived credibility and transparency of the framework

*denotes outcomes that will not be reported in the interim report.

To begin our analysis, we will follow steps similar to those described in the implementation analysis section above. That is, we will perform a desk review of project documents related to the IPP Sub-Activity to understand IPPs' perceptions of the Benin market and will review reports and analyses carried out by MCA-IPP consultant, Ernst & Young (E & Y). Once we complete a systematic review of available documentation, we will interview E &Y staff, the consultant engaged in overseeing E &Y's work, IPP leaders or management representatives, GoB officials who oversaw development of the IPP framework, and Ministry of Finance staff to understand the incentives and disincentives to developing an IPP framework.

We will use administrative data and interviews with ARE and GOB officials to carry out a **qualitative descriptive study** to determine if IPPs have reached financial close (RQ.C.2) and, using a political economy lens, we will identify barriers and facilitators to reaching financial close. To assess IPPs' perceptions of the Benin regulatory environment and IPP framework (RQ.C.7), we will conduct KIIs with IPP principals and ARE technical staff. To adequately address these questions, we will seek out a broad sample of IPPs including at least two that won the bid, at least two that were pre-qualified and bid but lost the bid, at least two that were pre-qualified but declined to bid, and potentially two that requested pre-qualification materials but did not submit packages for consideration.

A simple **pre-post** outcomes (trend) analysis using ARE administrative data will allow us to track changes in private investment in IPP power generation (RQ.C.3. Data from SBEE or DGRE will be used to determine the proportion of total electricity consumed in Benin that is generated by IPPs (RQ.C.4), and the proportion of total electricity generated from clean energy sources (RQ.C.5). Even though trend analyses cannot support causal claims, they can indicate whether outcomes of interest are tracking in the intended direction. We will use data—where available and appropriate— from the independent evaluation of the Off-Grid Project to assess whether PRIS activities have incentivized private sector participation. We will integrate findings from our qualitative research (from RQ.C.7, for instance) to help explain the mechanisms by which key events have spurred or influenced trends or why we observe lags or limited changes in response to key events. We will also examine qualitative data as part of our **qualitative outcomes analysis** to determine if power purchase agreements (PPAs) are in place and if SBEE is paying the IPPs on time (RQ.C.6). Meetings with principals of IPPs, supplemented by SBEE administrative data, will be instrumental in answering questions about IPPs and PPAs.

3. Regulation and Tariff Policy Sub-Activity

To assess outcomes of the Tariff Policy Sub-Activity, we will use a combination of quantitative and qualitative methods. In Table V.6, we summarize the proposed approaches by research question.

Table V.6. Research questions, methodology, data sources, and key outcomes for Tariff Policy Sub-Activity

Research question	Methodology	Data collection	Key outcome metrics
RQ.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?	Qualitative analysis with a political economy lens SBEE financial analysis	• Document review • KII • Administrative data	Degree to which tariffs are cost-reflective
RQ.D.2. Has the sector regulator assumed its mandated role in setting and adjusting tariffs?	Qualitative analysis	• KII	Extent to which ARE sets and adjusts tariffs
RQ.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?	Pre-post analysis of consumption Qualitative descriptive analysis	• Administrative data • Telephone surveys • Rapid focus groups • Press review	Payment of electricity bills
RQ.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?	Qualitative sustainability analysis	• Document review • Administrative data • KIIs	Tariff-setting tool in use, data available for input to tariff -setting tool
RQ.D.5. How has the new tariff structure affected SBEE's balance sheet, income statement, and cash flow statement?	Pre-post analysis Qualitative contribution analysis	• Administrative data • Document review	SBEE solvency
RQ.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?	Pre-post outcomes analysis of trend in SBEE infrastructure expenditures Qualitative contribution analysis	• Administrative data • KIIs • Document review	Increased capital for utility maintenance and new capital investments
RQ.D.7. Was the tariff adjustment tool used to change tariffs? If not, what drove tariff changes?	Qualitative descriptive analysis with a political economy lens	• Document review • KIIs	Use of tariff-setting tool
RQ.D.8. To what extent has the Grid Code been implemented?	Qualitative analysis of stakeholder perceptions	• Document review • KIIs	Degree of Grid Code implementation
RQ.D.9. To what extent is ARE operational? Does ARE have the resources necessary to successfully carry out its mandate?	Qualitative analysis of stakeholder perceptions	• Document review • KIIs	ARE technical, financial, and operational capacity

Table V.6 (*continued*)

Research question	Methodology	Data collection	Key outcome metrics
RQ.D.10. To what extent has ARE been able to make major decisions independently from the Government?	Qualitative analysis of stakeholder perceptions	• Document review • KIIs	ARE political independence

We will begin the evaluation of the Tariff Sub-Activity with a qualitative **descriptive analysis with a political economy lens** to assess the extent to which the tariff policy gained approval and was implemented (RQ. D.1) and the extent to which ARE assumed its mandated role (RQ.D.2). We will first conduct a desk review of project reports and MCA updates supplemented by a review of relevant newspaper articles featuring government and regulator statements about tariffs, timing of changes to the tariffs, and stakeholders' perception of the tariffs. We will rely on our local research coordinator's review of press and social media as well as MCC's press clippings and our Google alerts for timely media updates on tariff reform. We will use political economy analysis, as described earlier, to identify the barriers and facilitators to tariff reform.

To understand public perceptions about tariff reform (RQ.D.3) and to gauge, to a limited extent, the effect of tariff reform on consumers' ability to pay the new tariffs, we will review SBEE bill payment and involuntary disconnection data to assess changes in bill payment and "cut-offs" by tariff category before and after each tariff increase. For this **pre-post analysis** of changes in electricity use and in perceptions of the tariffs, we will conduct telephone surveys of SBEE customers and firms (for detail on our approach to phone surveys, please see Section X). To do so in a cost-effective manner, we will leverage the quarterly telephone surveys to be conducted under the Benin Infrastructure Evaluation from late 2019 through 2022, allowing us to capture perceptions about the tariffs before and after implementation. If we are unable to conduct the telephone surveys before implementation of the tariff, we will adapt questions to ask retrospectively about perceptions of the tariff. We will collect perceptions about tariffs before the (planned) second round of tariff increases in 2020.

If piggybacking on the Benin Infrastructure Evaluation's telephone survey proves infeasible or does not coincide with the tariff changes, we will conduct rapid focus groups to understand perceptions of the tariffs and the decision making underlying changes in bill payment or experiences with involuntary cutoffs. The rapid-feedback focus groups will form part of a qualitative descriptive study (see Section G for a description of our rapid focus group methodology). For additional context on consumers' perceptions about the tariffs, we will interview the MCA communications specialist who participates in stakeholder conversations about MCA projects to understand stakeholders' perceptions of tariff implementation.

Mathematica's approach to telephone surveys

Mathematica will design questionnaires suited to a computer-assisted personal interviewing platform accessible by a local data collection firm. Mathematica will:

- Pilot the survey instrument with a variety of businesses and households to ensure that the questions are relevant and may be easily answered. When needed, the survey will be administered in a local language.
- Inform respondents of the telephone survey during the face-to-face survey conducted as part of the evaluation of the Generation and Distribution projects.
- Conduct validity checks by contrasting information elicited from the telephone survey with information provided by the same respondent in the baseline survey. This approach will allow surveyors to identify any out-of-range or inconsistent responses that may require follow-up.
- Conduct "listen-in" observations of telephone interviews.
- Enter responses directly into a computer, with the data uploaded daily to a secure server. Mathematica will conduct frequent consistency checks to identify quickly any data entry discrepancies introduced by data collectors. Data collection supervisors will conduct call backs to 10 to 15 percent of respondents in each round to verify responses.

Financial viability of the utility is a key outcome in the theory of change for the Reform Project. To assess SBEE's cash flow and revenue (RQ.D.5), we will carry out a pre-post analysis using data from SBEE (or the MC or Auditor) to track changes following implementation of the tariff. We will interview SBEE's commercial directorate to understand what portion of changes are due to changes in the tariff versus improvements in collections or other causes. We will collect the data yearly and map any changes to the tariff to changes in SBEE's financial health. We will rely on data from management contractor (verified by the management contract auditor) to help answer research questions D.1, D.3, D.4, D.5, and D.6.

To understand if any increases in cash flow lead to the funding of infrastructure (RQ.D.6), we will carry out a **trend analysis** of SBEE's cash flow and infrastructure expenditures. In order to facilitate this evaluation, we recommend that MCA disaggregate its tracking data on infrastructure expenditures to include network expansion, maintenance, new capital investments, and staff training. We will start collecting such financial data at regular intervals (yearly or quarterly, depending on data availability) as early as 2020 to determine if the years that see an improvement in SBEE's financial health are a precursor to an increase in infrastructure improvements. We will supplement the trend analysis with a **qualitative descriptive study** to understand how SBEE decided or did not decide to use increases in cash flow to fund infrastructure and to disentangle infrastructure improvements funded by donor aid versus improved utility finances. We will interview directors from the divisions of distribution, property, and accounting and finance to get different perspectives within SBEE. We will also interview ARE technical staff and SBEE commercial directorate to determine if SBEE relied on the tariff adjustment tool to modify the tariff and, if not, evaluate what led to tariff changes (RQ.D.7).

As part of the efforts to improve the energy sector's competitiveness and transparency, MCA-B is supporting GoB's update of its energy code. We will answer questions about the updated energy code (RQ.D.8) through a qualitative analysis that applies principles of political economy analysis to understand barriers and facilitators to code implementation. We will start with a review of relevant documentation, such as reports and drafts of the energy code developed by the MCA consultant. Then, we will compare the final proposed version of the energy code to the enacted and implemented version to identify any changes or revisions. Next, to understand how (if) the code changed as it advanced from the design to approval stage, we will conduct interviews with: the consultant engaged to support energy code development; representatives of MCA, ARE, and the Ministry of Energy and other ministries; donors supporting the updated energy code; and members of the National Assembly.

The final task under the Regulation and Tariff Policy Sub-Activity is to support an independent regulator equipped with the infrastructure, operating capital, staff, technical expertise, and decision-making authority needed to foster an improved and independent enabling environment for Benin's energy sector. We will use qualitative methods to assess the extent to which MCA-B support has aided ARE's functionality.

We will use a **qualitative outcomes analysis** to assess ARE's capacity to operate as planned (RQ.D.9). In particular, we will assess ARE across three dimensions: (1) human resource capacity, (2) technical capacity, and (3) financial capacity. We will first carry out a desk review to document ARE's role in implementing the new tariff schedule and energy code and compare what was planned to actual implementation. We will also review any work plans, consultant reports, and other relevant sources of documentation to understand changes from the initial plan. We will interview ARE staff members as well as members of ARE's board to learn how ARE has developed, what obstacles or facilitators it has encountered from the beginning of the compact and how ARE makes decisions (RQ.D.10). We will employ a political economy approach to understand the dynamics between and among the Ministry of Energy, BAI, Ministry of Finance, and the Office of the President to determine if ARE makes truly independent decisions. Finally, because many donors are contributing to ARE's development as an independent regulator, we will interview representatives from the World Bank, French Development Agency, and European Union to gain their perspective on ARE's operational capacity and independence.

D. Evaluation of the Utility Strengthening Activity

We will employ a mixed-methods performance evaluation based on qualitative and quantitative research methods to assess the Utility Strengthening Sub-Activity (Table V.7) and will focus on the activity's outputs, outcomes and sustainability. Even though the activity originally comprised two sub-activities— the Governance, Management, and Finance Sub-Activity and the Maintenance Sub-Activity—we have grouped the research questions together because the management contractor will assume responsibility for much of the activity's implementation as of November 2019. The first nine months of the management contractor's implementation will yield a detailed work plan and strategic plan, perhaps leading to revision of the research

questions and evaluation design once the management contractor's work is fully specified with clear outputs, outcomes, and measures.

Table V.7. Research questions, methods, data sources, and key outcomes for the Utility Strengthening Activity

Research questions	Methodology	Data collection	Key outcome metrics
RQ.E.1. To what extent have GoB and SBEE abided by the terms of the approved *contrat-plan* since its adoption?	Qualitative analysis of stakeholder perspectives Quantitative descriptive analysis of contract outputs	• Document review • Administrative data • KII	Implementation of *contrat-plan* outputs and outcomes
RQ.E.2. Has the management contractor been able to meet its commitments under the management contract?	Qualitative descriptive analysis	• Document review • Administrative data • KII • Focus groups	Management contractor tenure and contract compliance*
RQ.E.3a. What performance improvements have been achieved during the term of the management contractor? RQ.E.3b. How has the management contractor performed against the KPIs in the management contract? RQ.E.3c. Has the management contractor provided training and capacity building to the local management of SBEE?	Qualitative descriptive analysis	• Document review • Administrative data • KII	Management contractor performance*
RQ.E.4. What are the perceptions (by GoB, SBEE employees and other stakeholders) of the performance of the management services contractor?	Mixed-methods descriptive analysis	• KII • FGS • Telephone or SMS survey	GoB and SBEE satisfaction with management contractor
RQ.E.5. How do independent power producers (IPPs) perceive SBEE's ability to meet its obligations under PPAs?	Qualitative descriptive study with a political economy lens	• Document review • KIIs	Private sector investment in energy*
RQ.E.6. Did SBEE's cost recovery and financial health improve?	Pre-post analysis	• Administrative data	Utility balance sheet
RQ.E.7. To what extent did SBEE's billing and payment processes improve from the perspective of its personnel and of its customers?	Pre-post analysis	• Administrative data • Surveys	Staff and customer satisfaction with billing and payment
RQ.E.8. Did SBEE improve its bill collection and reduce its overall commercial losses?	Pre-post analysis	• Administrative data	Commercial losses Collection rate

Table V.7 (*continued*)

Research questions	Methodology	Data collection	Key outcome metrics
RQ.E.9. To what extent has labor productivity increased at the utility?	Pre-post analysis	• Administrative data	Change in staff qualifications, gender, retention
RQ.E.10. Did the technical assistance from the MC to SBEE lead to improved maintenance practices?	Qualitative analysis of stakeholder perceptions	• Document review • KIIs	Changes in maintenance practices
RQ.E.11. Does SBEE have the capacity to continue maintaining infrastructure (both MCC and non-MCC funded)?	Qualitative sustainability analysis	• Document review • KIIs	SBEE technical, financial, and operational capacity*
RQ.E.12. In what other ways have SBEE management practices changed? Are these changes associated with more efficient operations?	Qualitative descriptive study	• Document review • KIIs	Efficiency of SBEE management practices*

*denotes outcomes that will not be reported in the interim report.

SBEE's financial solvency and operational efficiency are instrumental to a healthy energy sector in Benin. To that end, MCC has financed the framework by which SBEE should operate. It funded development of a *contrat-plan* that defines the relationship between GoB and SBEE and sets performance expectations for SBEE. Further, the compact is financing a transaction advisor to aid in hiring a management contractor to lead SBEE operations for four years starting in 2019. MCC will fund only the portion of the management contract that falls before the end date of the compact. To assess outputs and outcomes related to the *contrat-plan* and the management contractor, Mathematica researchers will use a variety of qualitative and quantitative methods.

We will start our evaluation of the Utility Strengthening Activity with a **qualitative outcomes analysis** to determine if the terms of the *contrat-plan* were respected (RQ.E.1). We will review the 2017–2019 *contrat-plan* and the 2020–2022 *contrat-plan* and develop a process map to compare the *contrat-plan*'s initial requirements to final outputs. We will rely on work plans, CODIRs, and other reports from MCA to review what was implemented. We will review the *contrat-plan* and the *Comité de Suivi et du Contrôle's* annual report to assess whether the terms of the *contrat-plan* were followed and supplement this information with key informant interviews with the consultant that designed each *contrat-plan*, SBEE representatives (including technical staff), Ministry of Energy staff, and MCA implementation staff.

We will use a similar methodology to assess whether the management contractor was able to meet its commitments (RQ.E.1 and RQ.E.2). To explain any deviations from the plan and, specifically, to document any barriers or facilitators to the management contractor's efforts to meet its commitments, we will rely on political economy analysis. We will interview the management contractor, management contract auditor, representatives of all SBEE departments, MCA-B staff, and GoB representatives (particularly from BAI, Ministry of Energy, Ministry of Finance, and the Office of the President). We will map these actors according to tiers of

influence and support for the management contractor. We will conduct the analysis shortly after the management contractor is in place and again at endline to assess any changes in support and power dynamics in the compact period. In addition, we will conduct focus group discussions with SBEE staff to understand why the management contractor did (or did not) meet its commitments.

We will also use the interviews and focus groups described above to assess the outcomes achieved by the management contractor (RQ.E.3). In particular, we will assess what performance improvements have taken place, how they compare to the KPIs, and whether the management contractor provided training and capacity building to SBEE. We will perform a comparison of the management contractor's work plan (to be submitted about nine months after contract signature) to the implementation reports submitted by the management contractor during its four year period of performance. We will also interview SBEE staff and staff from the French Development Agency (AFD) and European Union to understand the types of training that they are providing under the Defissol project to ensure we properly attribute training outcomes to the management contractor of these improved maintenance practices (RQ.E.10).

To obtain information on stakeholders' perception of the management contractor's performance, we will conduct a **qualitative descriptive study** (RQ.E.4) based on KIIs with GoB officials, MCA and other donors as well as SBEE staff. We will review the management contractor's accomplishments along several dimensions: human resources (that is, did the staff members recruited and hired by the management contractor meet the requirements of their positions?), technical capacity (that is, was the management contractor's short-term provision of technical expertise appropriate for SBEE's needs?), and overall management acumen (that is, was the management contractor able to manage change effectively within SBEE by articulating a vision and executing that vision?). We will develop our interview protocols to capture observers' perceptions, positive and negative, and to examine why the MC did or did not achieve outcomes. To assess performance against the KPIs (RQ.E.5), we will draw on qualitative information from the stakeholders listed above and also from the data collected by the management contract auditor.

To understand IPP's confidence in SBEE and IPPs' perceptions of SBEE's ability to meet PPA agreements (RQ.E.5), we will review reports produced by E &Y and, if feasible, follow with interviews among IPP managers to understand the perspectives on SBEE.

Finally, we will use qualitative descriptive methods to assess in what other ways SBEE's management practices may have changed, and whether these changes have created any operational efficiencies (RQ.E.12). We will review human resources plans and guidelines and assess how they changed during the management contractor's tenure. We will then compare the plans to rollout and will interview directors of each SBEE division to understand their management practices during and after the management contract. This analysis may also be informed by data from the infrastructure consultant, GOPA.

We will use a **pre-post** approach to assess if (and to what extent) key performance indicators improved under the management contractor (RQ.E.6–10). First we will review the baseline data

collected by the MC transaction advisor (Nodalis) and then collect follow-up data from the management contractor as well validation data from the contract auditor. Next we will use data from the infrastructure consultant, GOPA, to analyze the frequency of blackouts and the magnitude of non-technical losses. In Table V.8, we provide a summary of the key outcome indicators we propose to measure, based on the KPIs included in the MC Terms or Reference and in MCA's planned monitoring data. The management contractor will propose a final set of KPIs in its work plan in 2020; therefore, these indicators may change.

Table V.8. Key outcome indicators for Utility Strengthening Activity outcome analysis

Outcome	Approach	Indicator	Timing of measurement
Financial health	Pre-post	Number of active customers (MC) Number of active customers invoiced (MC) Number of active customers with prepaid meters (MC) Average price of kilowatt hours (kWh) invoiced (MC) Operating cost recovery (MCA-B/SBEE)	Pre: 2018 Post: 2024
Billing and processing	Pre-post	Ratio of unpaid invoices to average invoiced amount (MC) Rate of monthly bill collection (MCA-B/SBEE)	Pre: 2018 Post: 2024
Staffing and management	Pre-post	Number of employees (MC) Number of trained staff (MC) Customer satisfaction index (MCA-B/SBEE) Employee satisfaction index (MCA-B/SBEE) SBEE employee net promoter score (MCA-B/SBEE) Gender equity and promotion	Pre: 2018 Post: 2024
Improved maintenance	Pre-post	Maintenance work orders requested versus completed (emergency and planned) Lag time before repairs completed	Pre: 2016 Post: 2020

To better understand consumer and staff perspectives on changes in SBEE's billing and payment processes we will supplement the secondary data with a telephone survey of consumers (adding questions to the Infrastructure Evaluation survey). We will also conduct a SMS or email survey of approximately 400 SBEE staff members from a range of different positions and across all SBEE offices. The baseline survey for the Infrastructure evaluation included several questions to connected households and businesses on their satisfaction with SBEE service, including the time between a request for maintenance or repair and its completion, thus providing us with true baseline data to answer several questions regarding outcomes of the Utility Strengthening Activity.

About two years after compact close, we will analyze the Utility Strengthening Activity's prospects for the long term through a **qualitative sustainability analysis**. The analysis will help us understand whether SBEE's technical and financial capacity is sufficient for continued investment in ongoing maintenance and asset management practices (RQ.E.11). We will interview SBEE representatives as well as former MCA staff, ARE technical staff, members of the *Comité de Suivi et du Contrôle* and management contractor staff. Our sustainability analysis

will draw on the outcome analyses previously described and will identify key barriers to or facilitators of continued improvement in SBEE's finances, personnel and operations. Using a political economy lens, we will analyze various dimensions of sustainability, including the sustainability of upgraded infrastructure, technical capacities, and SBEE's general financial health. We will also rely on KIIs with SBEE representatives to identify key challenges and barriers to infrastructure sustainability.

E. Evaluation of Public Information and Education Activity

To inform the public of the impending reforms to the energy sector, MCC has designed a complementary activity to the PRIS-A and Utility Strengthening activities. At the time of this report, MCA had developed communications plans focused on some elements of the energy efficiency and tariff reform sub-activities, but it had yet to launch the plan. A new consultant is designing or redesigning some elements the plan for both the tariff reform and energy efficiency communications and education activities. Because the Public Information and Education Activity remains largely undefined, we will revise the research question(s) and refine our evaluation design at a later date. In Table V.9, we list the current research question and our current proposed methodology for answering it.

Table V.9. Research questions, methods, data sources, and key outcomes for the Public Information and Education Activity

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

To answer the above research question, we will carry out a **qualitative analysis** of each communications campaign. We will start by reviewing the plans developed by the consultant(s) for each campaign and compare the plans to what is eventually implemented. We will then review outputs from the communications campaign (radio or television advertisements, print materials, workshop reports). We will conduct KIIs with the MCA communications director as well as with IdeaConsult (the consultant currently engaged to carry out the tariff reform–focused communications campaign) and any other consultant(s) hired to implement the communications plans. During the interviews, we will inquire about the process for developing the messages, GoB's involvement in creating the messages, and efforts to communicate the messages to a wide audience (business leaders, residents of rural areas, SBEE customers and possible future customers, and so forth), thereby permitting us to develop a fuller understanding of the target audience for different messages.

If feasible, we will carry out a **qualitative outcomes analysis** of the eventual implementation by conducting rapid-feedback focus groups. We will organize the focus groups within two weeks of a communications campaign's launch and will draw a sample that is generally representative of the audience MCC plans to target. We may create WhatsApp groups of focus group participants as well as a broader pool of potential focus group participants so that we will be able to ask follow-up questions or obtain rapid perspectives on additional communications campaigns as they are introduced. We will also interview the MCA communications director to obtain her perspective on stakeholder reactions to the campaigns, drawing on her discussions with the WhatsApp groups with which she is currently engaged.

F. Cost-benefit analysis of the PRIS Project

An important analytic component of the Benin PRIS Project evaluation is the assessment of the benefits of project activities relative to their costs. The analysis of post-compact benefits and project costs would address the following evaluation question: Do the benefits of the PRIS project outweigh its costs for society as a whole? The answer to this question can be useful to MCC, GoB, and donors and policymakers as they make decisions about future investments in the reform of energy sector policy.

Given that MCC did not estimate the economic rate of return for the PRIS Project separately,[4] we considered the full range of analytic approaches—cost-effectiveness analysis, cost-benefit analysis, and economic rate of return—for assessing the project's economic returns. Our considerations for assessing the PRIS Project's costs and benefits were guided by MCC guidelines for economic analysis (MCC 2017) as well as by MCC's internal deliberations about the economic analysis of policy and institutional reform programs. Before discussing the details, we provide a brief overview of the three alternative analytic approaches available for assessing the costs and benefits of an intervention.

- **Cost-effectiveness analysis (CEA).** CEA analysis generates a statistic showing the ratio of the effects of an intervention to the intervention's cost, that is, the cost per unit of effect. For example, if we could identify the PRIS Project's impact on SBEE's ability to serve additional customers, the cost-effectiveness analysis would provide the average costs for the utility's ability to serve an additional customer. The advantage of conducting a CEA is that, relative to the analyses discussed below, CEA requires the fewest assumptions. In particular, for program effects on outcomes that are not directly monetary in nature, the analysis does not require the monetization of the value of the effect. However, it is not possible to sum up various benefits in a single estimate, thereby limiting the analysis to the key outcomes chosen for assessing the intervention's effects.
- **Cost-benefit analysis (CBA).** CBA is a more general analysis option that requires an estimate of the monetary value of the effects of the intervention and of the intervention's

[4] Given strong complementarities, MCC included the full costs of the PRIS Project and portions of its benefits in the original cost-benefit analysis model for the on-grid investments under the Benin Power Compact's Distribution and Generation projects. The estimated economic rate of return for the combined on-grid and PRIS project investments was 12 percent at the time of compact signing.

costs. With CBA, we estimate the intervention's *net benefits* (benefits minus costs) as well as the *benefit-cost ratio* (ratio of the benefits of the intervention to its costs). One advantage of CBA is that it can incorporate the effects of an intervention on a range of outcomes by monetizing the intervention's effects, permitting the comparison of a wide range of programs that affect disparate outcomes (for example, power sector policy reform versus investments in improved health care). Yet, given that research may not offer a way either to measure all effects quantitatively or to monetize all outcomes, some aspects of the effects may require qualitative description (OMB 2003). Another challenge with CBA is that costs and benefits may accrue at different time points, requiring the discounting of the value of money in the future relative to the value of money at the intervention's outset.

- **Economic rate of return (ERR).** ERR is the discount rate at which the benefits of an intervention break even with its costs. The ERR may be viewed as the return on the financial investment required for the intervention. Estimating the ERR is a way to circumvent the challenge of applying a specific rate for discounting the value of money at different time point as required for a CBA. Otherwise, calculation of the ERR of an intervention would require the same costs and benefits measured in monetary value as in a CBA.

We begin the discussion by assessing the appropriateness of conducting a CBA exclusively for the PRIS Project. Even though we conclude that a CBA conducted solely for the PRIS Project without consideration of the other on-grid investments under the Benin Power Compact would not be meaningful, we discuss the approach that we would take and the analytic issues that we would have to address to carry out a CBA for the project if a separate analysis had been appropriate. The discussion allows us to reflect on the project's costs and potential benefits and specify how the major benefits are likely to be joint products of the PRIS Project and other complementary investments in the energy sector.

1. Appropriateness of conducting the cost-benefit analysis separately for the PRIS Project

Because the investments MCC made through the PRIS Project go hand-in-hand with other on-grid energy sector investments through the Distribution and Generation projects under the Benin Power Compact, we do not think that it would be appropriate to carry out a cost-benefit analysis separately for the PRIS Project. MCC's internal guidance on economic analysis of policy and institutional reform programs emphasized the need to consider the separability of policy reform investments and their complementarity with other investments. The guidance further suggests that a separate cost-benefit analysis is meaningful when a policy reform investment has a separable program logic linking inputs to benefit streams. We agree with the MCC's guidance. As it appears from the program logic for the Benin Power Compact, except for some of the direct outputs of the PRIS Project (such as improved governance of the energy sector and management of SBEE), the project's outcomes are not logically separable from the complementary activities under the Distribution and Generation projects (such as commercial and technical loss-reduction tasks and efforts to increase domestic generation capacity). Given the impossibility of distinguishing even the major benefit streams of the PRIS Project from other complementary investments, we do not think it would be worth generating separate net benefit or ERR estimates for the project.

For the same reason, we would not recommend conduct of a cost-effectiveness analysis for the PRIS Project. For all project outcomes for which we could generate cost-effectiveness estimates, complementary investments would affect those outcomes, and we would have to incorporate the costs of those investments into the analysis. That said, we intend to provide outputs from this evaluation to the team conducting the CBA for the infrastructure project. The sharing of outputs between reform and infrastructure will be revisited at a later date given that the requirements of the infrastructure CBA are subject to change.

2. Developing an accounting framework that captures several perspectives

A comprehensive social cost-benefit analysis requires an accounting framework that identifies the key beneficiaries and stakeholders for the project under consideration and provides a structure for capturing the costs and benefits that accrue to those beneficiaries and stakeholders. The different beneficiary perspectives reflected in the framework would permit the determination of whether benefits from one perspective would be considered costs from another perspective. To conduct a CBA of the PRIS Project, we would use a framework that accounts for the consequences of the project activities from five perspectives:

- **SBEE.** As the electricity distribution utility, SBEE would realize most of the direct benefits of the PRIS Project. In particular, SBEE would be the primary beneficiary of the regulatory and tariff reform efforts under the Policy, Regulation and Institutional Support Activity and the Utility Strengthening Activity.
- **GoB.** Given that the PRIS Project aims to create a more robust regulatory framework and a cost-reflective tariff structure, GoB is expected to benefit from a strengthened energy sector as well from reduced fiscal burden to the extent that the project leads to both a reduction in the subsidy for electricity and curtailed need for capital infusion into the utility. To the degree that GoB invests in the energy sector or successfully solicits additional private or donor investments, GoB may also account for some of the related costs.
- **Customers (households and businesses).** The customers directly benefiting from connections to the national grid are expected to benefit from SBEE's improved governance, management, and financial capacity. At the same time, they will bear the costs of higher tariffs.
- **MCC and other donors.** MCC is funding the PRIS Project while other donors are making investments in Benin's power sector that may complement the PRIS Project. For example, the EU is providing substantial regulatory and capacity-building support to ARE, complementing MCC's support to ARE through the Regulation and Tariff Policy sub-activities. The perspective of MCC and other donors would primarily allow the CBA to capture the costs of their investments. Even though no financial benefits from these investments would accrue to MCC and the other donors, project benefits could accrue to them through realization of their stated missions of increasing economic growth and reducing poverty.
- **Society as a whole.** To assess costs and benefits from the perspective of society as a whole, we will aggregate costs and benefits across the first four perspectives above and show the

extent to which the benefits of the PRIS Project offset its costs, regardless of to whom or to what body the benefits accrue.

3. Potential costs and benefits of the PRIS Project by activity

In Table V.10, we summarize several key potential benefits and costs for each activity under the PRIS Project. We could use the findings from the performance evaluations of each of the activities under the PRIS Project, supplemented with external data from other sources, to assign monetary values to benefits and costs that are not directly measured in monetary terms.

Table V.10. Potential costs and benefits of PRIS Project activities

Activity	Sub-activity	Potential costs[a]	Possible benefits
Policy, Regulation and Institutional Support Activity	Regulation and Tariff Policy Sub-Activity	• Costs to SBEE customers reflected in increase in utility bills (reduced consumer surplus) • Cost of possible civil unrest (lost economic productivity, any damages to infrastructure, potential political transition)	• GoB's improved infrastructure for ARE • Financial gains accrue to SBEE • Increased capacity of GoB to model future tariff changes • Long-term benefits: Sustainable investments in the maintenance of distribution infrastructure; improved reliability and quality of electricity supply and consequent increase in consumer surplus
	IPP Sub-Activity	• Costs to private sector businesses that invest in IPPs	• Value added by IPP • Consumer surplus accrues to SBEE customers (households and businesses) from greater amount of electricity consumed • Increased energy generation capacity guarantees future consumer surplus if imports fail to meet growing consumer demand
	Energy Efficiency Sub-Activity	• Costs to consumers for replacing existing appliances with energy- efficient appliances • Cost of enforcing energy efficiency regulations (at customs, point of sale) • Environmental cost of dumping non–energy-efficient appliances	• Energy savings accrue to appliance users (reduced electricity bills for households, businesses, and GoB) • Increased appliance sales spurred by lower cost of appliance use

Table V.10 (*continued*)

Activity	Sub-activity	Potential costs[a]	Possible benefits
Utility Strengthening Activity		• Cost to GoB to support SBEE management services contract during post-compact period • Future costs to SBEE to sustain additional senior leadership positions created under management services contract	• Improved financial health of SBEE from more efficient management, operations, and asset maintenance • Improvements in SBEE's financial health, in turn, leads to reduction in long-run cost-reflective tariffs • Increased consumer surplus accrues to SBEE customers from improved reliability of electricity supply and reduced time for bill payment and filing of complaints
Public Information and Education Activity		• Increased public resistance to tariff increases driven by increased awareness	• Public awareness of tariff reform • Better acceptance of cost-reflective tariffs

[a] The costs of implementing the PRIS Project funded under the compact is not captured here; we will, of course, incorporate those costs in the cost-benefit analysis.

It is worth underscoring that many of the potential improvements in outcomes (that is, potential benefits) identified above will reflect the effects of the PRIS Project in combination with the other on-grid investments under the Benin Power Compact. For example, improvements in SBEE's financial health would be underpinned not only by the increased tariff and management efficiencies expected under the PRIS Project, but also by a reduction in the technical losses resulting from the Distribution Project under the compact. The increase in consumer surplus among SBEE customers expected from activities under the PRIS Project will also reflect improvements in the distribution infrastructure expected under the Distribution Project. It would be difficult, if not impossible, to disentangle the benefit streams of the PRIS Project from the benefits of the other complementary investments that MCC is making in the power sector.[5]

a. Estimating costs and benefits

To estimate the costs of implementing the PRIS Project, we would rely on the funding estimates provided by MCC for implementing each activity and sub-activity. For costs to entities other than MCC, we would rely on additional sources of information as conducting a thorough cost analysis for each element of cost would be beyond the scope of this evaluation. For example, to estimate costs to SBEE customers, we may rely on existing estimates of consumer surplus for grid electricity users from MCC's cost-benefit analysis for other projects under the Benin Power Compact. For costs to other donors performing complementary investments, we would have to gather data from other donors so that we could incorporate those costs as part of the CBA. For estimating costs of the IPP investment or costs of replacing existing appliances with energy-efficient appliances, we would have to rely on appropriate external data, such as the size of the

[5] It might be possible to disentangle the benefits of the energy efficiency sub-activity (under the Policy, Regulation, and Institutional Support Activity) from the benefits of the other investments MCC is making in the power sector. However, given that it is a relatively small component of the PRIS Project, MCC and the evaluation team agreed that conducting a separate CBA for the energy efficiency sub-activity would require investing in a learning exercise that would not be commensurate to the size of the investment in the sub-activity itself.

investments reported by IPPs or the price of appliances as reported in recent surveys (for instance, the survey conducted by Mathematica for the Infrastructure Evaluation projects under the Benin Power Compact).

To estimate benefits, we would rely on the data we gather for the evaluation as well as on our evaluation findings. For example, we expect to gather data on measures of utility performance, which should allow us estimate the financial gains accruing to SBEE from PRIS Project activities. For some other benefits, such as energy savings to appliance users or value added to IPPs, we will use the best available information from appliance sellers and IPPs and apply reasonable assumptions. These additional data would be necessary only for estimating all benefits (and costs), and would not be collected outside the scope of these calculations.

One challenge of estimating the costs and benefits of the PRIS Project is that we lack a rigorous estimate of what the costs and benefits would have been in the absence of the Benin Power Compact. For example, it is difficult to know whether GoB or donors would have supported some of the reform efforts even without the PRIS Project; as a result, it is a challenge to estimate the counterfactual costs and benefits with any certainty. Nonetheless, by following MCC guidance, we would estimate the costs and benefits with and without the project, assuming that similar investments would not have been made without the project.

b. Estimating net benefits

The final step in the CBA is to combine the cost and benefit estimates to derive the net benefits of the PRIS project. Table V.11 shows the framework we would use to carry out the CBA for the project. Panels 1 and 2 show components of benefits and costs of the project, respectively. Entries in columns A–D show whether the project's anticipated effects are expected to be benefits (+), costs (-), or neutral (0) from the various accounting perspectives. The entries in column E show whether the anticipated effects are benefits to society (+), costs to society (-), or transfers that produce no net benefits or costs for society as a whole (0). Panel 3 of Table V.11 provides three statistics from the analysis of costs and benefits of the project: net benefits (benefits minus costs), benefit-cost ratio, and ERR.

A key challenge in accounting for all relevant costs and benefits is that some of the costs and benefits are difficult if not impossible to quantify or monetize, such as costs of any political transition, benefits of public awareness about cost-reflective tariffs, or the benefits of GoB staff's increased capacity to model future tariff changes. Although the cost-benefit analysis will focus on effects on outcomes and costs that can be readily monetized, we will present a qualitative assessment of the contribution of the non-monetized costs and benefits to the overall net benefits (shown in panel 4 of Table V.11). This will give policymakers a sense of how these non-monetized factors add or subtract from the quantitative measure of net benefits.

We could conduct the cost-benefit analysis of the PRIS project as part of the final round of analyses under this evaluation, planned for about a year after the Benin compact ends. The findings would be part of the final evaluation report, which we expect to submit to MCC in December 2023.

Table V.11. Benefits (+) and costs (-) of the PRIS project, by accounting perspective: examples

Elements of benefits and costs	SBEE (A)	GOB (B)	SBEE-customers (C)	MCC and other donors (D)	Society as a whole (E)
Panel 1: Benefits					
Improved physical infrastructure for ARE	0	+	0	0	+
Financial gains to SBEE from higher tariffs	+	0	-	0	?
Long-term increase in consumer surplus from sustainable investments in infrastructure maintenance	0	0	+	0	+
Value added by IPP	?	0	0	0	?
Consumer surplus to SBEE customers from increased consumption of electricity	0	0	+	0	+
Energy savings to appliance users	0	0	+	0	+
Increased appliance sales	0	0	+	0	+
Improved SBEE financial health from efficient management	+	0	0	0	+
Reduction in long-run cost reflective tariffs	-	0	+	0	+
Increased consumer surplus from improved reliability of supply and efficient processes	0	0	+	0	+
Panel 2: Costs					
Project implementation	0	-	0	-	-
Complementary investments	0	-	0	-	-
Consumer replacement of existing appliances	0	0	-	0	-
Enforcing energy efficiency regulations	0	-	0	0	-
Post-compact cost of SBEE management	-	-	0	0	-
Panel 3: Cost-benefit statistics					
Net benefits	?	?	?	?	?
Benefit-cost ratio	?	?	?	?	?

Table V.11 (*continued*)

Elements of benefits and costs	SBEE (A)	GOB (B)	SBEE-customers (C)	MCC and other donors (D)	Society as a whole (E)
ERR	?	?	?	?	?
Panel 4: Qualitative costs and benefits					
Potential cost of political transition	0	?	-	0	-
Benefits and costs of public awareness about tariff reform	0	+	?	0	?
Environmental cost of dumping non-energy–efficient appliances	0	0	0	0	-

Note: The cells in this table show our a priori expectations about the direction of the effects of the PRIS project on benefits and costs from various accounting perspectives. The elements of costs and benefits are ordered roughly in the order we capture them in Table V.10 for each activity under the PRIS project.

4. Analytic issues

a. Comparison of benefits and costs in different time periods

The benefits and costs of the PRIS project will likely reveal themselves at different times, with most of the costs incurred earlier and the benefits realized later. Because a dollar today is worth less than a dollar in the future thanks to inflation, and because investing a dollar today could yield a return in the future, an accurate CBA is tricky to develop.[6] To do the best possible job of developing the CBA, we will make the following two adjustments to the monetary values of costs and benefits of the PRIS project:

To adjust for inflation, we would use a price deflator to convert all benefits and costs into constant dollars. We would rely on a consumer price index or GDP deflator for Benin to convert all monetized values in constant currency values.

To account for the opportunity cost of investing resources in the PRIS project, we plan to follow MCC guidelines and use a 10 percent discount rate to convert all future benefits and costs to their present values. As part of testing the sensitivity of the net benefits estimate to the discount rate, we would also use the real rate of return on 30-year U.S. treasury bonds and the yield rate on the debut six-year bond issued by Benin in 2019 as the discount rate. Note that to avoid making an assumption about a specific discount rate, we could also calculate the ERR as part of the cost-benefit analysis.

[6] Another area of concern might be the currency that costs and benefits accrue in. If various costs and benefits accrue in CFA francs and in U.S. dollars, we will have to account for exchange rate fluctuations over the period under consideration for the analysis.

b. Projection of net benefits beyond the evaluation's observation period

If we were to conduct a cost-benefit analysis for the PRIS project, we would only do so a year after the Benin compact is finished. Following MCC practice, we would project future benefits and costs for up to 20 years from the beginning of the compact. Because the evaluation would provide data for only one year after the project is implemented, we would rely on broad-based assumptions to project future values.

c. Lack of precision in the underlying estimates of some benefits and costs

We would provide benchmark estimates of the benefits and costs of the project, basing them on the most appropriate data and the most appropriate assumptions (in our judgment). However, recognizing the inherent uncertainty in the benefit and cost estimates, we would also conduct sensitivity tests to document how the net benefit estimates are affected by changes in specific underlying cost or benefit estimates and valuation assumptions. Other sensitivity tests we would conduct would include varying the values of key parameters used in the analysis.

G. Approach to data collection

As described in earlier sections, we plan to use both quantitative and qualitative data from a variety of sources to analyze implementation and outcomes for all three activities. In this chapter, we describe the primary data collection, secondary data collection, and our analysis plan.

1. Primary data collection (quantitative and qualitative)

a. Instruments, protocols, and interview guides

We will develop instruments tailored to each individual data collection task and test them thoroughly before deploying them. For KIIs and focus groups, we will use semi-structured instruments that are designed to comprehensively address our research questions while still leaving space for informants to expand our understanding in ways we can't fully predict beforehand. Building on our experience carrying out surveys and qualitative data collection in Benin for the evaluation of the Generation and Distribution Projects, we will partner with local firms to ensure we are properly accounting for the Beninese cultural context.

For survey data, we will develop preliminary questionnaires incorporating best practices from existing surveys and pre-test them to ensure they measure the relevant outcomes. Phone surveys will be administered in the local language when necessary and monitored to ensure their quality. We will conduct validity checks to ensure the consistency of data within and between rounds. All responses will be entered directly into a computer/tablet, and from there immediately uploaded to a secure Mathematica server. We will conduct survey back-checks for 10 percent to 15 percent of any survey sample.

b. Rounds and timing

We will adapt the timing of the various data collection activities to the timeline of the activities they are designed to evaluate. We plan to collect baseline data for most sub-activities in early

2020, but wherever possible, we will align data collection efforts for the Reform evaluation with those being undertaken as part of the Benin Infrastructure evaluation. In particular, we will coordinate efforts with the Infrastructure evaluation to adapt telephone and in-person surveys to ensure there are questions to elicit consumer perceptions of SBEE and, if appropriate, of tariffs. The telephone surveys for the Infrastructure evaluation, which will begin in late 2019, will be conducted quarterly, giving us enough data points for the trend analyses proposed above.

c. Samples

Primary quantitative data for pre-post analyses will come from surveys of households and businesses that are being carried out for the evaluation of the MCC-funded infrastructure projects. The infrastructure baseline survey has been conducted in about 1,497 households, 756 small businesses, and 328 medium/large businesses connected to electricity in the greater Cotonou, Natitingou, Parakou, Djougou, and Bohicon areas. These cities represent 3 northern departments and two southern departments of Benin's 12 administrative departments. The sample frame for the infrastructure surveys is not inclusive of all SBEE customers because it was designed to cover the geographic areas most likely to be affected by the infrastructure projects. Thus, any surveys we conduct using the infrastructure sample, whether we are simply adding questions to ongoing surveys or re-selecting sample units from the sample frame to supplement the samples being surveyed, will not be representative of the population of SBEE customers. Nonetheless, we believe primary data collected via the infrastructure survey or its sample frame is the best source of consumer survey data to answer several evaluation questions, because (a) no representative sample frame of SBEE customers is available, and (b) the cost of creating a representative sample is prohibitive. Collecting survey data using the infrastructure sample will yield adequate information for the descriptive analyses proposed in this performance evaluation. We have estimated a number of surveys that should be adequate to provide suggestive evidence to support the evaluations and we can oversample particular groups of interest, such as female heads of households, female business owners or electricity-intensive businesses, if needed and feasible. We will design specific survey samples, including subgroups, as project implementation becomes clearer in the coming months.

d. Respondents

In addition to interviewing SBEE staff, households, and small, medium, and large businesses for the surveys described in Section E, we will select focus group members who are part of subgroups of interest to the evaluation. To create a pool of potential focus group members, we will work with our local qualitative data collection team to develop a roster of key resource persons in different geographic locations who have broad social connections. Using information from these resource persons, our local team will collect a list of names, phone numbers, and demographic information to create a database of potential focus group members. When rapid-feedback focus groups are needed, we will determine the appropriate profiles for different focus groups and use WhatsApp to recruit focus group members. We may also use WhatsApp to obtain rapid feedback from database members on their perceptions about changes to the tariff or other implementation activities and to keep the lines of communication open for future focus groups.

e. Staff

Mathematica will work closely with local data collection partners to design and provide training and support to their technical and interviewing staff. We will set criteria for recruitment and selection ahead of training, and will select interviewers for any given data collection after the training based on objective measures of competency. This will ensure that any staff who struggle to implement the instrument in training are not involved in the data collection.

We will select data collection partners on the basis of skill, experience, competence, and cost. We expect to work with known partners in Benin to carry out surveys and focus group discussions.

f. Data processing

All data collected for this evaluation will be transferred and stored securely so that only the Mathematica team may access them. Once we finish the evaluation, we will prepare de-identified data sets, along with codebooks and user manuals for public access to the data, in accordance with MCC guidelines. Specifically, we will ensure that the data files we submit are free of any information, whether personal or geographical, that introduces a reasonable risk of anyone's making a deductive disclosure of the identity of individual participants. This might include recoding top and bottom outliers to missing values or collapsing certain variables based on geographic grouping.

g. Data quality

Mathematica adheres to a standard set of best practices to ensure all data are accurate, reliable, and promptly delivered. These best practices include the use of computer-assisted personal interviewing systems such as Survey Solutions or Surveybe, rigorous training for local partners, survey back-checks, and other quality assurance measures. We will perform a risk analysis before starting any data collection and observe proper procedures for getting permission from any relevant local authorities. All data will be stored on a secure cloud server (not on tablets or other devices used by enumerators) to minimize the risk of compromised personally identifiable information. We will submit all instruments to MCC for review and input before using them.

h. Summary table

Table V.12 summarizes the quantitative data collection we plan to support the Benin Policy Reform and Institutional Strengthening evaluation.

Table V.12. Summary table of quantitative data collection

Data collection	Round 1	Round 2	Round 3	Sample unit/respondent	Sample size	Relevant instruments/ modules
Survey data	X	X	X	Businesses selling appliances (in-person)	20-30	Energy efficiency awareness and acceptance
	X		X	SBEE customers (telephone)	350-385 hh*, 50-80 firms*	Tariff acceptance and awareness, SBEE performance
	X		X	SBEE employees (telephone)	400	Billing/ payment processes
Administrative data	X	X	X	PNEE		Energy efficiency awareness/ acceptance
	X	X	X	EE audit consumption data	20	Energy efficiency audits
	X	X	X	IPP generation data		IPP capacity
	X	X	X	SBEE generation data		SBEE capacity
	X	X	X	SBEE revenue and expenditures		SBEE organizational efficiency
	X	X	X	Transaction advisor (Nodalis)		Baseline KPIs for SBEE
				Management Contractor		Post KPIs for SBEE
				GOPA infrastructure consultant		Blackouts, non-technical losses, and billing practices
Observations		X	X	Businesses selling appliances	10-15	Energy efficiency

*We will add questions to ongoing surveys of households and firms. Proposed sample sizes are minimums. We will determine final sample sizes and composition after project implementation plans are finalized.

Table V.13. Summary table of qualitative data collection

Data collection	Rounds 1	2	3	Sample unit/ respondent	Sample size	Relevant instruments/ modules
Document review				EE project documentation		EE awareness/acceptance
				PNEE administrative documentation		EE awareness/acceptance
				Nodalis documentation		IPP regulation, Management contractor performance
				Reports from major donors		Multiple
				Social Impact off-grid evaluation team		Private sector participation
				ARE documentation		Regulatory environment, regulatory capacity
				E&Y documentation		IPP regulation
				Consultant		Energy code implementation
				SBEE contrat-plans		contrat-plan implementation
				SBEE HR documentation		Utility management practices
				Communication consultant reports		Communication campaign implementation
				Communication campaign outputs		Communication campaign effectiveness
Key informant interviews	X	X	X	MCC/MCA staff	10-12	All sub-activities
				ABERME, customs, and energy assoc. representatives	5	Energy Efficiency project implementation
				Social Impact off-grid evaluation team	1	Private sector participation
				IPP representatives	5-7	Private sector participation, regulatory environment, management contractor performance

Table V.13 (*continued*)

Data collection	Rounds 1	2	3	Sample unit/ respondent	Sample size	Relevant instruments/ modules
				MCC communications specialist	1	Tariff perceptions, communications campaign implementation, and effectiveness
				Consultant	1	Energy code implementation
				ARE staff, ARE donors	7-9	Regulatory capacity
				Contrat-plan consultant, SBEE technical staff, MoE representatives	6-9	*Contrat-plan* implementation
				Management contractor, auditor, MCA, GoB	10-12	Management contractor performance, management practices, infrastructure sustainability
				SBEE directors	5-8	Support for SBEE
				AFD, EU	2	Management contractor performance
				Communications consultant (IdeaConsult)	1	Communications campaign implementation and effectiveness
				EE audit recipients	3-5	Energy efficiency audits
Media review	ongoing	ongoing	ongoing			Regulatory environment Management contractor performance
Focus groups	X		X	Female business owners, SBEE customers	7-10	Tariff perceptions
			X	SBEE staff	4-6	Management contractor performance
	X	X	X	Communication campaigns audience	7-10	Communications campaign implementation and effectiveness

2. Secondary data

a. Sources and relevance

We will answer many of the research questions by examining secondary data from SBEE including information on budgets, bill collection, maintenance system output, and power purchase and generation. Other sources of secondary data will include the PNEE system for

tracking imports of energy- efficient appliances, data collected by the management contractor about the operational efficiency of SBEE, and data collected by MCA-B as part of its monitoring and evaluation. We will examine KPI data from the management contractor and verification data from the MC auditor. For all secondary data sources, we will review metadata and methodology reports to understand the content of data sets before analyzing the data. We will establish transparent communication with responsible parties at SBEE and government entities to increase the likelihood of obtaining secondary data in the period after the management contract has ended.

b. Analysis Plan

b.1. Quantitative analysis plan

For both the PRIS and Utility Strengthening Activity, we propose a pre-post analysis to look at how outcomes change; examples of outcomes are knowledge about and awareness of tariffs for PRIS, and changes in processes and financial health for the Utility Strengthening Activity. Through this analysis, we will estimate the average change in outcome values over time, using the ordinary least squares regression model in Equation V.1.

$$\text{Eq. V.1} \qquad y_{it} = \beta * Post_t + \lambda_i + \in_{it}$$

where *i* is an index denoting beneficiaries (household or businesses) 1…N, and *t* indicates time ranging from 1 to 3 and corresponding to baseline, midline, and end-line data rounds. *Post* indicates whether data were collected before or after the intervention, and respectively takes on the values of 0 and 1. Outcome y_{it} is specific to a beneficiary at a given time, and may be a continuous or binary variable. The key outcomes we will examine include beneficiary awareness and outcomes related to SBEE's financial health and changed processes. The estimate of interest is β and measures the average difference in outcomes between pre- and post-periods. Household characteristics that do not change over the time frame of the evaluation, such as the household head's gender, are controlled for through the inclusion of household fixed effects, λ_i. To understand how effect sizes differ by subgroup, we will use Eq. V.2, which includes an interaction of the post indicator with an indicator for subgroup membership.

$$\text{Eq. V.2} \qquad y_{it} = \beta_1 * Post_t + \beta_2 * Post_t * 1(Subgroup)_i + \lambda_i + \in_{it}$$

For example, if we wish to estimate whether urban households had larger gains in awareness than peri-urban households did, we would examine the statistical significance of β_2. Although a pre-post analysis cannot establish causality, it will provide information on longer-term outcomes and thus complement the qualitative data. Specifically, for the pre-post analysis of awareness of the tariff reform, we will add or adapt questions in the phone or in-person surveys the Infrastructure evaluation team is conducting. We will use these data to create a longitudinal panel sample of businesses and households, allowing us to apply a pre-post design that accounts for time-invariant characteristics of the businesses and households in our sample when measuring the changes in outcomes over time. For the Utility Strengthening Activity, we will use a pre-post analysis for outcomes related to SBEE's financial health and operational improvements.

b.2. Qualitative analysis plan

Our four-step approach to analyzing the data collected through interviews and FGDs relies on thematic framing and triangulation. It proceeds as follows (Creswell 2009): (1) raw data review and management, (2) initial coding, (3) detailed coding, and (4) data interpretation and writing. In the first step, we will read the transcripts that are either provided by the data collection firm or developed by Mathematica staff members, and group the transcripts according to the data method and source (for instance, FGDs with female SBEE customers, or interviews with owners of appliance stores). During this step, we will review all data and eliminate any observations that are incomplete or not useful for our analysis.

In the second step, we will read through the transcripts several times to get a holistic sense of the data. We will further develop the coding scheme, which is a set of themes encountered in the transcripts from the KIIs and FGDs, mapped to the research questions and theory of change. For example, initial themes might include "implementation challenges" and "changes from design. The third step involves refining the coding scheme and using NVivo or similar qualitative data analysis software to code the transcripts according to key themes. We will review, organize, and analyze the codes produced through this software into themes that relate to the theory of change and the evaluation questions, and that are raised by multiple respondents. We will then compare themes and codes by respondent type and location to identify consistent and differing themes across respondent groups.

Once we have analyzed each qualitative data source, we will triangulate findings from the KIIs, focus groups, and our other data sources. This process will make it easier to discover new trends and relationships, confirm patterns or findings, and detect discrepancies or disparate experiences. We will use a coding hierarchy to guide the process of triangulating findings across data sources and types. For example, when investigating whether implementation went according to plan, we will triangulate information from interviews with MCA-B staff, focus groups, and our document review. If we find significant inconsistencies, we might ask to do more interviews to explore the theme in more depth.

H. Anticipated challenges

Our design offers the best opportunity to answer the key research questions of the evaluation while being mindful of resources. Implementing the design could still face some challenges, however, and we address these below.[7]

Uncertainty over project design. Currently, many aspects of the Public Education and Information Activity have yet to be finalized, so our evaluation design is tentative. The nature of the campaigns, the number and type of beneficiaries or audiences, opportunities for experimental designs, and the expected outcomes will all influence the design that is ultimately chosen. Some of the implementation decisions will have a bearing on the sample sizes and types of data collection required to assess the project's outcomes.

[7] Challenges to implementing the Reform Project are presented in the Evaluability Assessment (Annex A, Chapter III).

Utility Strengthening Activity: implementation timeline and delays. The management contractor's four-year contract is expected to end in November 2023, and Mathematica's evaluation contract ends four months later, in March 2024. End-line data will have to be collected several months before the MC's work is completed to allow enough time for data analysis and writing of the report, which will limit our assessment of the management contractor's performance and the sustainability of its effect on SBEE. Similarly, SBEE's financial statements are often released with a one-year lag. Given that end-line data collection will take place in 2024, we will not be able to analyze SBEE's financial statements beyond 2022, which will limit the conclusions we can draw about the utility's financial health and prospects for sustainability. Any implementation delays will exacerbate the situation by further reducing the amount of support provided to SBEE at the time of data collection.

Moreover, implementation delays might limit the type, quality, and amount of data we are able to gather during each data collection round if the corresponding compact activities are running behind schedule. We will work with the MCC and MCA-B teams to adjust the schedule of data collection, to the extent possible, in a way that optimizes the learning opportunities.

Attributing changes in outcomes to the Reform Project. The Reform Project is taking place at the same time that other donors are supporting reforms to improve Benin's power sector and to spur economic growth. In fact, MCC has looked for complementarities between the compact activities and activities supported by other donors, such as the World Bank, the AFD and the European Union. These complementarities will make it difficult to unambiguously attribute observed changes to MCC-funded activities. Although the evaluation is not intended to draw causal conclusions about the effects of the Reform Project, we will explore the unique contribution of the Reform Project by ensuring that our interview protocols include questions designed to ascertain the scope and results of support from other donors and about potentially complementary or counterproductive roles in influencing outcomes.

Data sources: quality and availability. Our proposed evaluation design relies on administrative data from SBEE to assess the utility's financial viability and operational improvements. Our ability to conduct the analysis and meet agreed-upon deadlines might be compromised if data are inaccurate or imprecise, or if there are delays in obtaining the data from SBEE, the management contractor, or MCA-B. We will perform standard quality assurance checks on the first round of data received from SBEE to determine whether data quality poses a major risk to the evaluation. This early assessment will allow us to consider alternative data sources for the remaining data collection rounds, if needed. Early in the evaluation process, we will try to discuss expectations and requirements for data sharing with SBEE to prevent delays caused by lack of communication.

When we collect the primary data, we might also find that certain informants are uncooperative or are not useful data sources. For example, while we have identified appliance retailers and wholesalers through our data collection for the infrastructure evaluation, we might not find stores selling EE appliances, or the stores we find might not allow data collection on their premises. The unknown cost of data collection is another issue, and we might have to adjust our data collection plan based on cost. Our recent data collection procurements in Benin revealed that the

quality of submissions, level of data collection experience, and costs vary widely. We will alert MCC quickly if we need to adjust sample sizes, timing, or type of data collection if costs are outside estimated ranges. We will pilot all our measurement instruments and data collection procedures and be prepared to modify the measures and/or design based on pilot findings.

Staff turnover and replacements. Our ability to gauge stakeholders' perceptions about the effects of the Reform Project might be limited by staff turnover at MCA-B, SBEE, ARE, and other key entities, because new staff probably will have no reference point to compare conditions before and after the compact. We will attempt to interview former staff to capture perceptions about the sector before the Reform Project was introduced.

Political events. Political transitions or crises in Benin can affect our evaluation timeline. Most notably, general elections for president in Benin will take place in the first half of 2021. To avoid the perception that our evaluation is politically motivated, we will not carry out sensitive data collection in the three-month period before the elections or in the immediate aftermath.

VI. ADMINISTRATIVE

Careful management of this complex multi-component project and evaluation, with attention to the timeline, is essential. In this section, we discuss several administrative issues relevant to conducting the evaluation and present a timeline for evaluation activities.

A. Summary of IRB requirements and clearances

Mathematica is committed to protecting the rights and welfare of human subjects by obtaining approval from an Institutional Review Board (IRB) for relevant research and data collection activities. U.S. IRB approval requires us to submit three sets of documents: (1) a research protocol, in which we describe the purpose and design of the research and provide information about our plans for protecting study participants, their confidentiality, and their human rights, including how we will acquire consent for their participation; (2) copies of all data collection instruments and consent forms that we plan to use for the evaluation; and (3) a completed IRB questionnaire that provides information about the research protocol, how we will securely collect and store our data, our plans for protecting participants' rights, and any possible threats to participants resulting from any compromise of data confidentiality. We believe the IRB review of this study will qualify for expedited review because it presents minimal risk to participants. IRB approval is valid for one year; we will submit annual renewals for approvals as needed.

We will also ensure that the study meets all U.S. and local research standards for ethical clearance, including, if necessary, submitting our study for approval by the *Institut national de la statistique et de l'analyse économique* (INSAE), Benin's national statistics agency. To obtain the certification required to conduct social sciences research in Benin, Mathematica's local research team will submit the required application materials, including a description of the methodology, the instruments and enumerator manuals, a community awareness plan, the timeline, the budget, and a dissemination plan to the required local agency. Mathematica might ask MCA-Benin to facilitate the process. Based on our experience working in Benin, Mathematica will seek IRB approval at least two months before starting data collection. If either the U.S. IRB or local authorities recommend changes to protocols or instruments, the survey firm, MCC, and Mathematica will work together to accommodate the changes, and all parties will agree on the final protocol before data collection begins.

B. Data protection

All data collected for this evaluation will be securely transferred from the data collection firm to Mathematica, stored on Mathematica's secure server, and made accessible only to project team members who use the data. After producing and finalizing each of the final evaluation reports, we will prepare corresponding de-identified data files, user manuals, and codebooks based on the quantitative survey data. We understand that these files could be made available to the public; therefore, the data files, user manuals, and codebooks will be de-identified according to MCC's most recent guidelines. Public use data files will be free of personal or geographic identifiers that would permit individual respondents or their households to be identified, and we will remove or adjust variables that introduce reasonable risks of deductive disclosure of the identity of

individual participants. We will also recode unique and rare data by using top and bottom coding or replacing these observations with missing values. If necessary, we will also collapse any variables that make an individual easier to recognize because of geographic or other factors into less easily identifiable categories.

The data collection instruments (both the quantitative instruments and qualitative protocols) will include consent statements approved by our IRB that guarantee the confidentiality of respondents to the extent possible. If data are collected on paper instruments, the local data collection firm will ensure the safe handling and transport of the instruments from the field to the main office for data entry; the instruments will be stored there in lock-and-key cabinets. If data are collected electronically (our preferred approach), they will be stored on a secure server approved by Mathematica. The data collection firm will share electronic data files, including administrative data from SBEE and the management contractor, with Mathematica via a secure file transfer system, such as a file transfer protocol (FTP) or file exchange website (FX or BOX site). The data will be stored on a secure Mathematica server and will be accessible only to project team members who use them. All project team members have signed a nondisclosure agreement pertaining to confidential information. For internal control and audit purposes, the local data collection firm will retain the data files, both in paper and electronic form, for the entire duration of the project, including the base contract and the subsequent option contracts. All of the collected data and databases are the property of Mathematica and will be delivered to us at the end of the contract.

C. Preparing data files for access, privacy and documentation

Public use data will enable any stakeholder, researcher, or agency to understand the source data and analysis behind MCC evaluations, and could inspire a wide range of new policy-relevant research, thus maximizing the benefits of MCC's investments in large-scale data collection efforts in developing countries. The Mathematica team will prepare quantitative data files for public use, following MCC's Evaluation Microdata Guidelines, and will deliver complete data packages for the MCC Evaluation Catalog. In addition to de-identified quantitative data files, we will provide user manuals and codebooks that adhere to MCC's most recent guidelines. Public use data files will be free of personal or geographic identifiers that would enable unassisted identification of individual respondents or their households, and we will remove or adjust variables that introduce reasonable risks of deductive disclosure of the identity of individual participants. We will also recode unique and rare data by using top and bottom coding or replacing the affected observations with missing values. If necessary, we will also collapse any variables that make an individual easy to identify (because of geographic or other factors) into categories that make it harder to identify individuals.

D. Dissemination plan

To ensure the results and lessons from the evaluation reach a wide audience, we will work with MCC to increase the visibility of the evaluation overall and the findings on the energy sector specifically, focusing on policymakers and practitioners. We will present findings from each round of data collection in baseline, interim, and final evaluation reports. We will present draft

findings to MCC and to stakeholders in Benin for feedback before finalizing them. Depending on the available budget, we will present findings either remotely or in person.

After the interim and final evaluation reports are accepted, the team will develop a policy brief with findings and lessons relevant to MCC and local stakeholders. We expect the broader research community to have a strong interest in the findings from the evaluation. To facilitate wider dissemination of findings and lessons learned, we will collaborate with MCC and other stakeholders to identify more forums—conferences, workshops, and publications—for disseminating the results, and encourage other donors and implementers to integrate the findings into their programming.

E. Evaluation team: roles and responsibilities

Our team brings expertise on electrification in Africa, including in Benin; an understanding of institutional reform, political economy analysis, and utilities management; and decades of experience conducting impact and performance evaluations in West Africa. As the project director, **Dr. Sarah Hughes** will be responsible for coordinating with various partners, communicating with the client, and ensuring the delivery of high quality products that meet MCC's needs. She brings more than two decades of experience conducting impact and performance evaluations, large-scale surveys, and mixed methods studies for the U.S. Agency for International Development (USAID), MCC, the World Bank, and foundations, as well as experience leading the current evaluation of the Benin II Energy Compact Generation and Distribution Projects. Dr. Hughes will also lead survey and qualitative data collection. **Mr. Nils Junge**, serving as our senior analyst and expert on governance and institutional reform, will help Dr. Hughes and the evaluation team ensure the pertinence, methodological soundness, and technical suitability of all of the evaluations. Mr. Junge brings over a decade of substantive expertise leading programs and providing technical assistance on governance, policy reform, and energy sector reform in a variety of countries, including Ghana, Senegal and Mauritania, for clients such as MCC, USAID, the World Bank, and the Asian Development Bank.

Ms. Patricia Costa, a senior analyst, will develop data collection instruments in collaboration with Hughes and Junge and will oversee the qualitative and quantitative data collection. **Mr. Cullen Seaton,** serving as an analyst, will support the analysis and data collection. **Dr. Arif Mamun** will lead the CBA component for this evaluation and provide quality assurance on all deliverables. **Dr. Anthony Harris** will lead the quantitative analysis of administrative data and will coordinate data analysis across the two Benin evaluations. **Ms. Dara Bernstein** manages the project internally for Mathematica and will support the data collection and analysis. **Mr. Serge Kennely Wongla** will serve as a local research coordinator and data quality expert, helping us communicate with MCA-Benin and other stakeholders in Benin. He will identify and oversee local data collection partners to ensure international standards for fieldwork, ethics compliance, and data quality. **Mr. Mawuena Adjogah**, an electrical engineer and former director of sales and customer relations and IT director for the Togo electric utility, will provide expertise in regional energy institutional reform, customer satisfaction measurement, and assessing utility financial records and asset management. He will also travel to Benin and engage with stakeholders for

baseline administrative data collection, midline administrative data collection, and end-line administrative data collection.

F. Evaluation timeline and reporting schedule

The evaluation activities will be ongoing through March 2024 but will be concentrated around the baseline, interim, and final data collection. The interim study will be used to present findings from our implementation analysis, project outputs, and some early outcomes (including trends) that are already measurable at that stage. The final report will focus more on all outcomes and on the sustainability of the project outcomes. We will present outcomes at two points in time for any outcome that can be reliably measured at interim and at endline. Administrative data and documentation will be collected regularly. We expect baseline data collection to begin at the end of 2019, with interim data collection starting in 2021 just before Compact closeout, and end-line data collection, timed one and a half years after the end of the Compact to evaluate program sustainability, taking place in 2024. Figure VI.1 and Table VI.1 present the evaluation timeline and reporting schedule.

Figure VI.1. Evaluation timeline

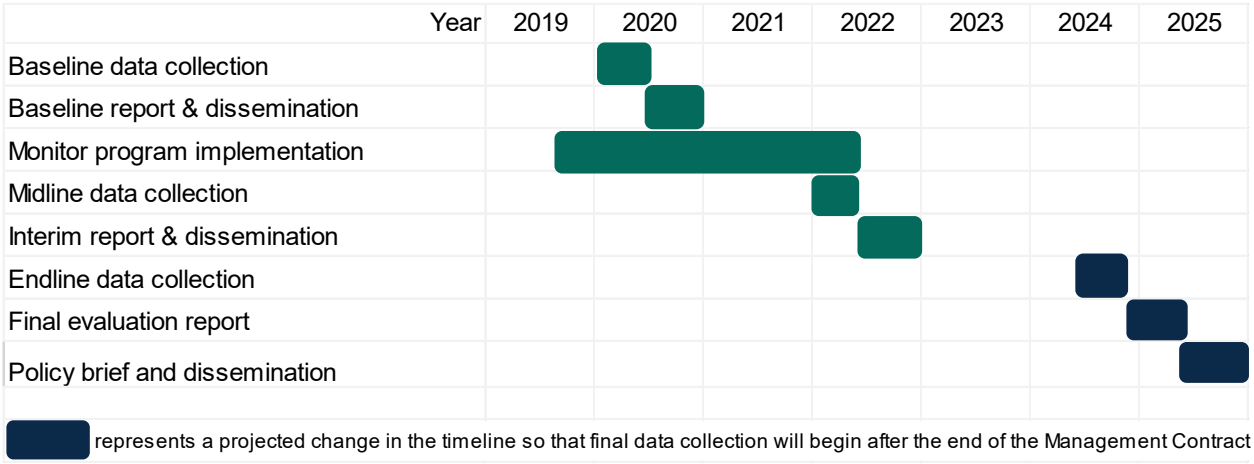


Table VI.1. Evaluation reporting schedule

Name of round	Data collection	Data cleaning and analysis	First draft report expected	Final draft report expected
Baseline report	December 2019–February 2020	March–May 2020	June 2020	September 2020
Interim report	January–March 2022	April–May 2022	June 2022	September 2022
Final report	March – April 2024	May–July 2024	August 2024	October 2024

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[8] Note: this is an unpublished summary of the PRIS project.

[9] Note: this is document is an unpublished summary of the investment memo, which is a confidential document that Mathematica no longer has access to.

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Annex A:

Compact Logic Model

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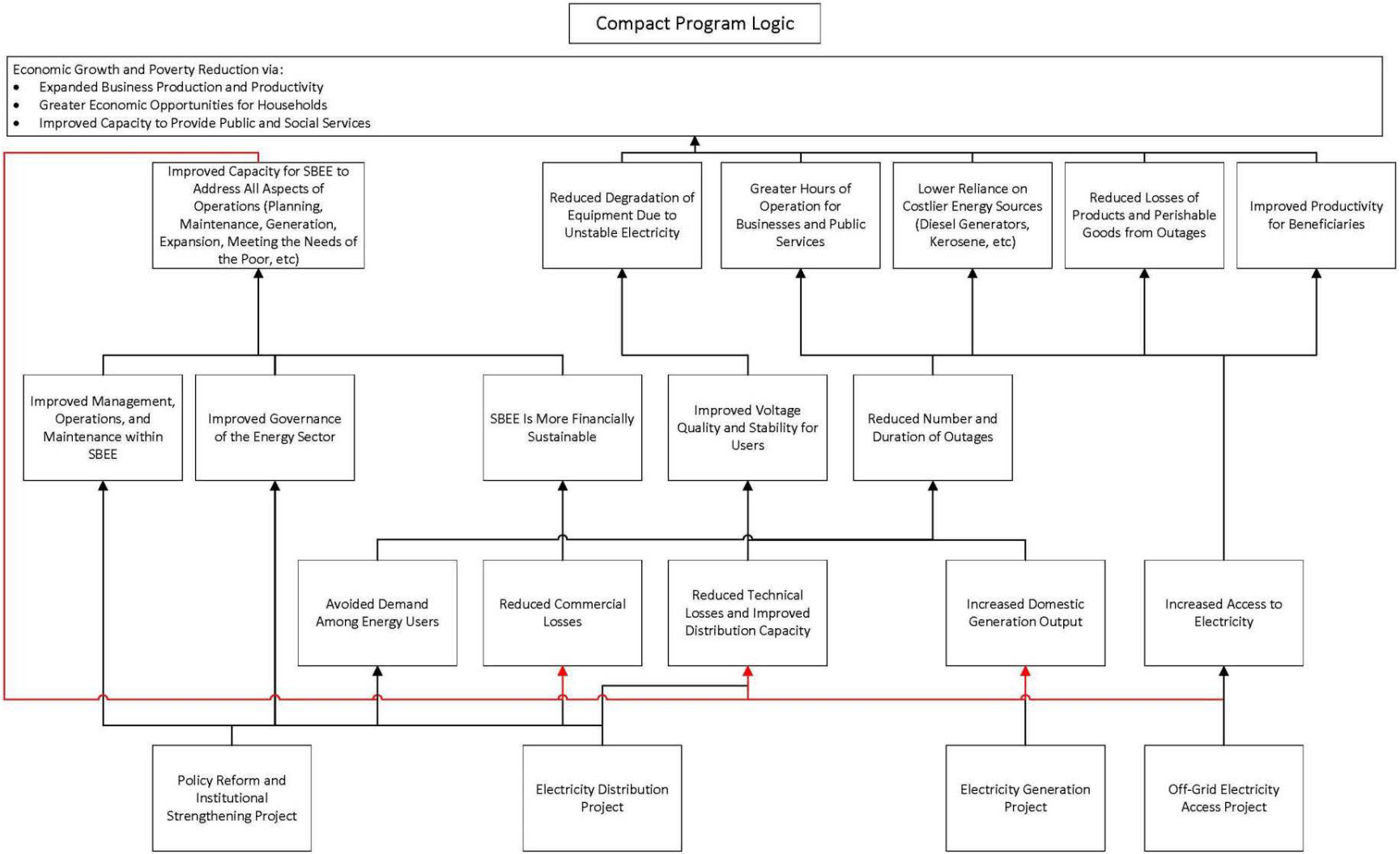
Figure A.1. Benin II Compact logic model



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Annex B:

Gantt Chart

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Figure B.1. Benin policy reform institutional strengthening evaluation work plan: Quarterly project schedule for base and option periods

Task		Year	2019			2020					2021				2022				2023				2024				2025	
		Period	Base			Option Period I					Option Period II				Option Period III													
		Quarter	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	**Assess evaluation plan**			—																								
	Kickoff																											
	Evaluability assessment report*				□ Δ ▲																							
	Work plan with expected deliverables deadlines			▲																								
2	**Develop evaluation design report**				—																							
	Design trip				□																							
	Evaluation design report				Δ ▲																							
	Nesstar metadata template for evaluation catalog entry																											
3, 8, 12	**Develop and revise evaluation materials**					—							—								—							
	Data collection terms of reference					▲								▲								▲						
	Survey nstruments and training manuals including pretest																											
	Qualitative protocols and focus group discussion guides																											
	Institutional Review Board					▲								▲								▲						
	Data collection training and (pilot) oversight						□ ◊								□ ◊								□ ◊					
4, 9, 13	**Supervise data collection**						—	—							—								—					
	Oversee data collection (quantitative)																											
	Conduct KII, oversee qualitative							▲							▲								▲					
	Adminsitrative data collection							▲							▲								▲					
5, 10, 14	**Develop reports and data documentation packages**							—	—							—	—							—	—			
	Analysis (qualitative/quantitative)																											
	Baseline report							Δ	▲																			
	Interim report															Δ	▲											
	Endine report																							Δ	▲			
	Nesstar																											
6, 11, 15	**Disseminate reports**									—	—				—									—	—			
	Agenda, minutes from local stakeholder workshop																											
	Dissemination										□ ▲				□ ▲										□ ▲			
	Five page evaluation brief														▲										▲			
	Presentation materials; updates to Nesstar template										◊														◊			
7	**Monitor program implementation and conduct risk assessment**					—	—	—	—	—	—	—	—	—	—	—												
	Written status of implementation in treatment and control groups																											
	Written risk assessments included in monthly progress reports																											

Δ Draft deliverable ▲ Final deliverable □ Trip to Benin ◊ Presentation/Meeting * will be submitted as part of the EDR

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Annex C:

Benin Electricity Infrastructure (CEB and SBEE)

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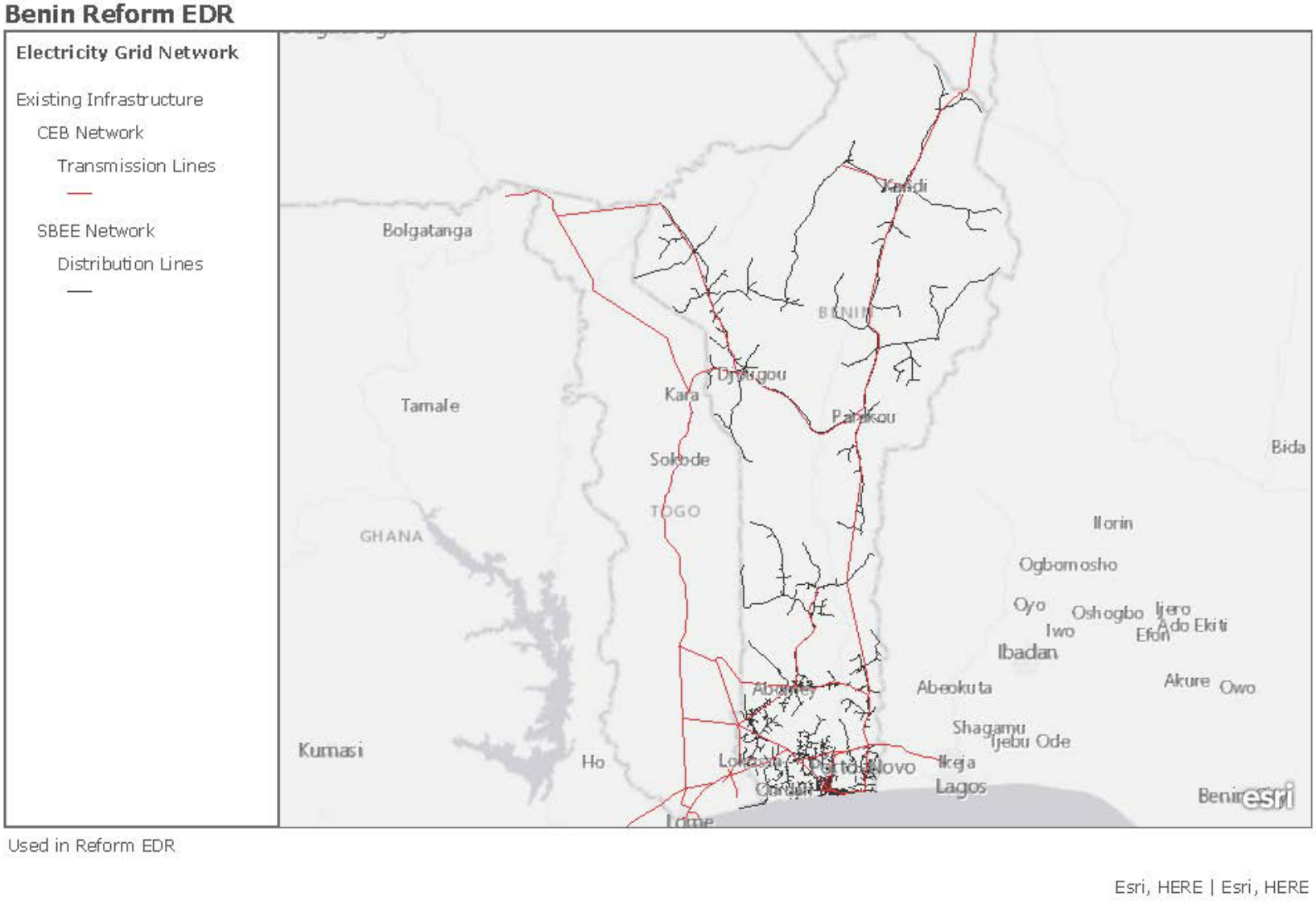
Figure C.1. Benin Electricity Infrastructure (CEB and SBEE)



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Annex D:

Stakeholder Comments and Responses

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Table D.1. Stakeholder comments on earlier drafts of the Benin policy reform and institutional strengthening evaluation design report and Mathematica's responses

Commenter name or division	Reference	Comment	Evaluator response
RCM	Page 38, Table V.3	Add the World Bank and AFD to the list of key informants for the utility strengthening activity.	Table revised to address the comment
RCM	Page 38, Table V.3	Add Ministry of Finance both for the regulation activity and the utility activity.	Table revised to address the comment
EPG	Page 1, paragraph 1	This is not meant as a comment on the report but merely passing along information to MPS – it is mentioned in the report that trade with Nigeria accounts for 20% of Benin's GDP. It should be noted that the border between Nigeria and Benin has been closed this year; it is suggested to be mindful of the situation.	Text revised to address the comment
EPG	Page 1, paragraph 2	It is suggested to add a footnote to document the generation capacity of 349 MW.	Added a citation for this statistic
EPG	Page 1, paragraph 3	In the third line, replace transmission with distribution. SBEE is first and foremost a distribution company while responsibility for transmission in Benin and Togo resides with the bi-national CEB.	Text revised to address the comment
EPG	Page 3, paragraph 1	Is it clear that "upgrading and replacing lines and substations" also means building new lines and substations?	Text revised to address the comment
EPG	Page 5, paragraph 1	In the discussion of the evolution of the reform project, it is suggested to add to the two reorientation items already listed a third and that is the joint MCA-MCC decision to pursue the solar PV projects as IPPs rather than as utility assets.	Text revised to address the comment
EPG	Page 7, paragraph 2	Minor correction – when referring to CoM August 2018 decision approving the tariff policy and plan, that came two months after when the decision should have been taken (Compact EIF + one year, which would have been June 2018).	Text revised to address the comment

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
EPG	Page 7, paragraph 3	Please correct the text as it is incorrect to say that MCC extended the deadline for satisfying the condition about implementing the tariff plans as the Compact specifies that the Outside Date for the Government's compliance with the conditions precedent (CPs) to the On-Grid Tranche is 30 months after EIF (December 22, 2019) (definition of Outside Date in Section VII to the Compact). Follow-up comment from MCC: The edited text reads as follows: "The proposed tariff schedule increased the tariff on average across user types by 5 percent in the first year and by 10 percent in the second year. MCC specified that the tariff reform requirement must be satisfied by December 22, 2019. If the tariffs are not implemented by that date, GoB will forfeit $80 million of grid-tranche financing (mostly intended for the Distribution Project)." As regards the first part of the paragraph, while it is true that the Council of Ministers considered and even approved a two-step tariff increase – 5% in one year followed by a 10% increase in the following year -- that decision was never implemented or even made public. Due to the continued sensitivity around potential tariff increases, and given that the EDR will be in the public domain, I would request that the statement be removed. As for the second part of paragraph, it is true that MCC required that the tariff reform requirement be satisfied by EIF plus 30 months which happens to be December 22, 2019. A slight rewording as had been suggested in the matrix would be preferred.	Text revised to address the comment
EPG	Page 8	It may or may not be relevant but it may be worth noting that it has been 10 years since there has been a change in the tariffs charged by SBEE.	Text revised to address the comment
EPG	Page 9, Table II.2	Elaborate on tariff studies to include cost of service study and projection of revenue requirements.	Text revised to address the comment
EPG	Page 9, paragraph 1	In describing ARE, it is important to note that the commissioners (9 in all) were appointed in advance of the setting up and staffing of the executive secretariat. Also, when referring to independence of the regulatory commission, not only should it not depend on donor funding but, more importantly, it should not be dependent on government funding which has been the case for ARE.	Text revised to address the comment
EPG	Page 10	While the original design of the reform project contemplated funding various studies including development of a national gas policy, that has not happened and is now not likely to. In addition to contracting with consultants to revise the Benin-Togo and Benin electricity codes, MCA has also hired a consultant to assist in developing a network code.	Text revised to address the comment
EPG	Page 10, Table II.3	The table presents planned tasks and tasks to date – As currently worded, the table implies that the building to house the regulatory agency (ARE) has already been constructed. As of today, that is not the case – the building is under design and is still to be physically constructed. Please edit accordingly.	Table and text revised to address comment

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
M&E/PM	Page 11	ANADER does not exist anymore. They have been replaced by ABERME. Comment also applies to table II.7	Text revised to address the comment
EPG	Page 12	In the last line on that page refer to the $80 million as the on-grid tranche (to distinguish it from the off-grid tranche of $20 million).	Text revised to address the comment
EPG	Page 13	Please make a number of corrections/edits to the text. First, E&Y (not Nodalis) has been retained as the transaction advisor for the IPP project. What is the basis for singling out Djougou and Natitingou (versus the other solar PV sites) as potentially not operational prior to the Compact End Date?	Text revised to address the comment; specific mention of Djougou and Natitingou projects has been removed.
EPG	Page 13	As for the comment about expectations for receipt of expressions of interest, it should be noted that GoG received 33 pre-qualification submissions in August 2019 (and there is difference between an EoI and a pre-qual).	Text revised to address the comment
EPG	Page 16, paragraph 1, last sentence	This sentence seems to refer to the requirement pre-EIF that, in addition to GoB and SBEE adopting the first contrat plan, there be a change in the composition of the Board of Directors of SBEE from a political board to a more professional body that included technically qualified directors. Please revise text accordingly.	Text revised to address this comment
EPG	Page 16, paragraph 3	There are several points to be modified in this paragraph. First, the management contract is not always between the utility and the management contractor as is the case in Benin; the client is MCA and the GoB, represented by the Ministries of Energy and Finance. Second, the transaction advisor was hired by MCA (not MCC) and is Nodalis; their mandate, in addition to creating the roadmap, etc. was to be the transaction advisor. [The scope was also increased to add drafting of a concession/operating license for SBEE to be issued by ARE and to update the contrat plan.]	Text revised to address the comment
EPG	Page 17	Missing from the list of key personnel comprising the resident team of the management contractor is the internal auditor. It may be worth noting that other specialists from the management contractor will lead some of the specific initiatives/deliverables called for.	Text revised to address the comment
EPG	Page 20, Table II.7	Need to re-examine comment that Ministry of Economy and Finance oversees disbursement of MCA fund.	Table revised to address the comment
EPG	Page 21, Table II.7 (contd.)	CEB – mandate now limited to transmission and responsibility for legacy generation assets. Follow up comment from MCC: The comment that I had been made in the comments matrix as it relates to CEB was that its "mandate now limited to transmission and responsibility for legacy generation assets". The key word in the phrase – generation – was left out of the track changes version – please insert it in the phrase.	Table and text revised to address the comment
EPG	Page 21, Table II.7 (contd.)	IPPs – In addition to benefiting from improved enabling environment, they would benefit from improved financial condition of SBEE as the off-taker under the power purchase agreements.	Table revised to address the comment

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
EPG	Page 21 and elsewhere	In the table and in other places in the report, IPPs are called foreign investors, which, in the case of Benin, they are likely to be. But the point in introducing IPPs is to bring in private capital to invest in generation, regardless of the national origin of the source of capital – an important distinction. The reference to foreign investors appears in numerous places throughout the document (e.g. page 24, page 25, page 43).	Text revised to address the comment
M&E/PM	Page 21	I would recommend also including as key stakeholders: - Donors (World Bank, AFD) - MCA - MCC - Cellule D'appui Aux Partenariats Public-privé (cappp) - Unité Chargée de la Politique de Développement des Energies Renouvelables (UC/PDER) - Direction Nationale de Contrôle des Marchés Publics (DNCMP)	Table revised to address the comment
EPG	Page 26	With respect to the reference to Ghana as having signed a management contract – are you referring only to management contracts in the electricity sector or in other sectors? If only the electricity sector, delete the reference to Ghana; if this includes other sectors, keep Ghana (had management contract in the water sector). Follow-up comment: In the literature review section of the report on the subject of institutional support and management contracts, the text as written lists a number of countries that have had management contracts in the power sector. I am skeptical about the reference to Guinea-Bissau but do know that there was a management contract in Guinea. Ask MPR to check their references.	Text revised to address the comment Follow-up reply: The Guinea-Bissau management contract dates from 1991, we removed it from the list as the passage in question refers to "recent" management contracts. Guinea was added to the list.
M&E/PM	Page 34, Table V.1. EE sub-activity	I do not see why “IPP directors” would be a data source for this sub-activity. Data from MCA consultants and public & private sector entities benefiting from energy efficiency audits should be data source. (Comment also applies to table V.3.)	Table revised to address the comment
M&E/PM	Page 34, Table V.1. data sources	Consider including MCC and MCA staff as KIIs across sub-activities. I recommend focusing on management staff, relevant sector/project leads, legal, and procurement (for both MCC and MCA). Comment applies to Table V.13. on Page 66 as well.	Agreed; Table revised to address the comment
EPG	Page 34, Table V.1. data sources	Is this a typo? – LKIIs with maintenance and regional technical staff.	Table revised to address the comment
M&E/PM	Page 39, Step 2	Consider including political economy analysis dimensions listed on the following page (actors & interests, power structures….) as themes in your coding scheme to ensure the ‘political economy lens’ is actually integrated in the analysis.	Agreed; Text revised to address the comment
M&E/PM	Page 37, Table V.2	“RQ.A.2. What are the lessons learned?” – Consider removing this as a separate evaluation question. MCC generates lessons learned based on the evaluation’s findings.	Table revised to address the comment

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
M&E/PM	Page 37	Semiannual KIIs – are these in person or by phone? The frequency will create rich data needed for evaluation but might be burdensome.	Our intention is for our local consultant to carry out most of these KIIs in person or by phone and to keep the conversations brief and focused on updates, thereby limiting the burden on respondents.
EPG	Page 38, Table V.3	Under key informants for energy efficiency, consider adding other donors active in this space (such as GTZ, SNV, etc.). For focus groups for energy efficiency, why are consumers not going to be consulted for impacts on utility bills and consumption patterns.	We have added KIIs with donors as a data source for our EE evaluation. Our decision not to ask consumers about the impact off EE measures on their electricity bills is motivated by the fact that we can't control for other factors that might contribute to their bills. Putting aside tariff increases, we don't have any way of verifying that consumers are using new appliances in the same way that they used old appliances.
M&E/PM	General comment	It does not seem like the effects of the energy efficiency audits are being evaluated. The EDR should describe how the effects of audits and EE interventions may be measured. The key indicator should be KWh saved. Follow-up comment: Note that the outcome may not always be kwh saved. It could be FCFA saved, for instance if the energy efficiency intervention is to use more biogas from agricultural bi-products and less SBEE electricity.	We have added a research question (RQ B4) to deal with this inquiry. Our evaluation will rely on MCA data and KIIs. Follow-up reply: Noted; thank you.
M&E/PM	Page 43, Figure V.2	It seems the trend analysis would require the companies to have monthly data on the quantity or value of EE products sold. Is that correct and are you confident you will be able to obtain that data?	The trend analysis graphic presents an idealized example with a datapoint for each month over the period of the compact. In practice, a trend analysis will still be informative even if datapoints are spaced farther apart. For example, quarterly observations could still yield an informative trend analysis.
M&E/PM	Page 44	It's unclear how you will define the sample of IPPs. Which companies will you be interviewing? Those selected for the MCA solar IPPs? Others that have closed deals with the GoB? Those that bid on the solar IPPs but lost? Please note there were 33 companies submitting pre-qualifications of which 21 were approved by the evaluation panel. This comment also applies to P34, Table V.1.IPP sub-activity Follow-up comment: might be interesting to speak to firms that tried to develop IPPs before the framework. You say 'at least' so this option remains open.	The text has been updated specifying the following sample: • Two or more that won the bidding process • Two or more that were approved but lost the bidding process • Two or more that were approved but declined to bid • Two or more that requested pre-qual materials but did not submit them (if available) Follow-up reply: Noted; thank you.
M&E/PM	Page 44, RQ.C.1.	Consider editing this evaluation question to make it more specific to what MCC was hoping to achieve with the IPP framework: "Did the IPP framework establish clear institutional roles and responsibilities, a competitive bidding process, standard forms of contract, and credit enhancements?"	The current wording of the question encompasses these specific elements, but also gives us latitude to investigate additional policies or frameworks that might emerge over the life of the compact.

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
M&E/PM	Page 44, RQ.C.4.	How is consumption disaggregated according to the proposed categories? I have only seen electricity supply disaggregated by source and whether it is an IPP.	Our intent is to evaluate production according to the specified categories, not consumption. The text now reflects this.
EPG	Page 44, RQ.C.4.	This could be divided into two questions – one pertaining to IPP generation capacity and output and the other to generation capacity and output from clean energy sources.	Text revised to address this comment
M&E/PM	Page 45, second paragraph	Administrative data on private investment in IPP power generation would probably be housed within ARE or DGRE, not SBEE.	Text revised to address the comment
EA	Page 45	Will it be possible to estimate the change in gap between the actual and cost-reflective tariff over time? It would important be to know whether the gap reduced and by how much. This is a key parameter we are struggling with in ex-ante (investment decision) PIR CBA models for other compacts.	Cost-reflective tariff regime is a monitoring indicator in the indicator tracking table. MCA should be obtaining that information from ARE on an annual basis. However, given the tariff methodology is new, we would not expect historic data on this indicator.
EPG	Page 46, RQ.D.6.	It is likely that increased cash flow in SBEE, to the extent there is any, would go to improved/increased maintenance expenditures before network expansion. Consider dividing this into two questions.	We have added maintenance to this research question along with some other categories. We've left this as one question for the time being, as it isn't clear the extent to which MCA can disaggregate the relevant data.
EPG	Page 46, paragraph 2	Proposed revisions: "“To adequately address these questions, we will seek out a broad sample of IPPs including at least two that won the bid, at least two that were ~~approved~~ pre-qualified and bid but lost the bid, at least two that were ~~approved~~ pre-qualified but declined to bid, and potentially two that requested pre-qualification materials but did not submit ~~them for approval~~packages for consideration.” From MCC: On a related note and for the benefit of MPR (but which need not be addressed in the report), as currently structured with two lots, there will only be two bidders winning bidders at most (and potentially one if the same bidder is selected for both lots).	This is helpful to know, thank you. Text revised slightly to address this comment
EPG	Page 48, paragraph 1	The same comment applies to the text in the first paragraph of page 48.	Text revised to address the comment
EPG	Page 48, paragraph 4	Why would CEB be included among the entities to be questioned when conducting the PEA – they are not regulated by ARE.	Text revised to address the comment
EA	Page 50	Will it be possible to include one or more indicators of output per labor unit? This would be necessary to understand whether any qualification changes had productivity effects.	We're skeptical of the meaningfulness of indicators like the ratio of SBEE employees to MWh sold. These can move up or down without for a variety of reasons unrelated to labor productivity.

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
EA	Page 50	Maintenance is a key area where efficiency effects are expected, and it is concerning that only qualitative stakeholder perceptions will be collected. Is it possible to collect informative administrative data? Will it be possible to do an analysis of upper/lower bound effects on life-cycle maintenance costs and potential technical efficiency effects?	We are not opposed to including some quantitative analysis of administrative data on maintenance. However, including this will depend on the availability and quality of data as well as the eventual objectives of the management contractor and what MCC actually ends up funding. Since other funders appear to be responsible for large portions of these tasks and systems, we're reluctant to overpromise including these analyses.
EA	Page 54, Table V.9	Key outcome metric is missing key elements as is. The first key outcome is who was exposed to the campaign. Second would be understanding of those exposed (as you include here). Third would be whether audience beliefs changed. Can those elements be added?	Given the large scope, difficulty and cost associated with identifying who might be exposed to the campaigns from among the population, we do not include this as a key outcome. We have added the third outcome identified in the comment.
EA	Page 55	Two suggestions: First, would it be possible to clearly state here that the output from this evaluation will be provided to the on-grid evaluation team to inform their ECBA work? This would seem logical if complementariness between the investments are high. Two, would it be possible to specify that, although this is the current recommendation, it will be revisited at a later date? Many things may change between now and when the CBA would be performed. For example, if MCC produces a Closeout CBA for the PIR investment, we would strongly prefer for the evaluator to use the evaluation results to update parameters in that model to the extent possible.	Yes to both recommendations. The text has been updated accordingly.
M&E/PM	Page 45, RQ.D.3.	I would suggest reverting back to original language. It's important to know both awareness and acceptance of tariffs. Are consumers aware of the price they pay for electricity? Do they accept it as being reasonable?	We decided to refocus this question on acceptance rather than awareness because the former is much easier to measure. Additionally, acceptance is more critical to the logic model than awareness.
M&E/PM	Page 46, RQ.D.6.	I suggest not limiting this question to 'network expansion', but also to maintenance, new capital investments, and staff training (tracked in ITT). This question is about the following outcome: "Increased Capital for Utility Maintenance and New Capital Investments". If there is a reason to focus only on network expansion, please explain.	We've expanded the scope RQ D.6 to address this comment.
M&E/PM	Page 46	The press clippings are from MCC, not MCA.	Text revised to address the comment
M&E/PM	Page 46-47	SBEE data collected by the management contractor and verified by contract auditor could end up being a useful source of information to assess the effects of tariff reforms. This data may be related to megawatt hours sold, bill collection rates, and/or the number of active clients divided by total number of clients.	Noted; we are expecting data from the management contractor to inform research questions D1, D3, D4, D5, and D6.

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
M&E/PM	Page 48	MCA is currently tracking SBEE investments in infrastructure. This is not currently disaggregated by type of infrastructure investment (network expansion vs something else). Follow-up comment: this is a good recommendation, but I'm skeptical it will be able to be implemented. It depends on the management contractor's priorities.	We recommend that MCA disaggregate its tracking data on infrastructure expenditures to include network expansion, maintenance, new capital investments, and staff training. Follow-up reply: Noted; thank you.
M&E/PM	Page 48	The evaluator proposes to assess ARE capacity across three dimensions: HR, technical, and financial. This is reasonable. While a full regulatory assessment is beyond this evaluation's scope, the evaluator should consider adopting elements of the African Development Bank's electricity regulatory index.	We are open to this suggestion, but it depends on the final set of activities that end up included in the project/compact. We hesitate to give this part of the evaluation too much weight given that AFD/EU are providing so much of the funding and support for ARE.
EPG	Page 49	Regarding the start date for the management contractor, it is now November 4, 2019 (not September).	Text revised to address the comment
M&E/PM	Page 49, RQ.E.2a.	This evaluation question is phrased as a 'yes/no' that will be implicitly answered through the other evaluation questions. Consider removing.	Table revised to address the comment
M&E/PM	Page 49, RQ.E.2b.	How does the evaluator understand the word 'commitments' in this evaluation question? This could open the door to a broad assessment of the management contractor's performance against its contractual requirements. I would recommend focusing on key performance indicators that are most logically related to the utility strengthening activity's higher-level results. This is reflected in the next set of evaluation questions. Follow-up comment: not hugely satisfied with this response. 'commitments' remains vague, but I'll accept to move forward as it is.	Question E2 is meant to be a higher-level question that will inform the more granular analyses specified in subsequent questions. Follow-up reply: We will consider refining question E2 (in discussion with MCC) as we begin the baseline data collection. We note that the management contractor has just been installed at SBEE at the time of this report.
M&E/PM	Page 49, RQ.E.3c.	This evaluation question is also 'yes/no'. There seem to be two questions of interest. First, did the MC's assistance help SBEE staff improve their performance? Second, did the MC transfer skills so those improvements can continue when their contract is done?	The first question will fall under E2, only the second would fall under E3c.
EPG	Page 50, paragraph 1	In terms of what MCC is funding, it is important to note that in addition to funding the transaction advisor for the management contract, the compact is funding that portion of the management contractor and the contract auditor fees for the period from the entry into force of the management contract through the Compact End Date. Due to delays in the management contract coming into place, this will cover ~2/3 of the term of the four year management contract.	Noted, text revised to address this comment.
M&E/PM	Page 50, last paragraph	Does the "terms" of contrat plan refer to its performance objectives?	Yes

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
EPG	Page 52, paragraph 2	While this may not be possible to do at this stage in the design, it may be interesting to assess the performance of the management contractor and the GoB/SBEE treatment of the management contractor during the MCC funding period (until the Compact End Date) and then during the alternative funding period (~2/3:1/3 split in time).	We expect to report the management contract auditor's findings on the performance of the management contractor against its KPIs. We could consider comparing that performance during the compact vs. after the compact as part of the final evaluation.
EPG	Page 53, Table V.8	In terms of outcome indicators, consider adding measures of customer satisfaction and employee satisfaction as indicators to be measured.	Table revised to address the comment
M&E/PM	Page 53, first paragraph	The proposed data collection as actually one year after the compact's close at which point there will still be approximately 6 months left on the management contract. Consider postponing the final data collection to occur 6 months after the management contract closes.	We agree that it would benefit the evaluation to push back the final data collection until after the close of the management contract. We have revised the text and figures to reflect this. We will discuss the contract period of performance and budget implications of this change with MCC.
M&E/PM	Page 54, Section E	Perhaps too early to make such a decision now, but there may be merit in integrating the evaluation of information/communication activities into the other evaluations. At the very least, I think evaluation reports would be more readable if these findings are presented in their relevant sections (tariff + energy efficiency).	We appreciate this suggestion. We agree these findings will fit better when presented with our findings on the relevant subactivities to the PRIS activity.
M&E/PM	Page 54	Does the budget cover the rapid-feedback focus groups? Is there a deliverable after each round?	i. While we have not initiated a procurement process to obtain final costs of focus group discussions, based on our recent experience carrying out qualitative data collection in Benin, we believe we will have the budget to carry out 4 of these focus groups. We will re-assess the value of the rapid focus groups once we pilot them. ii. Rather than provide a deliverable after each round, we intend to present results altogether in the midline or endline reports.
EA	Page 56	We typically don't include any benefits to MCC in our models, and the inclusion of MCC here might confuse readers since MCC does not accrue any financial benefits (indeed, the inclusion of MCC in the analysis below does not seem to add much).	We agree that no financial benefits would accrue to MCC (or other donors), but it is necessary to include MCC and other donors in the accounting framework primarily to capture the cost aspect of the CBA. We clarified this in the revised text.
EPG	Page 58, paragraph 1	The text refers to reduction in commercial and technical losses resulting from the Distribution Project. Please remove the reference to commercial losses here as the Distribution Project is not funding investments to reduce commercial losses – i.e., there are no activities focused on metering, billing, and collection processes of SBEE.	Text revised to incorporate the suggestion in the comment.

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
EA	Page 58	Maybe clarify that 'improved financial health' would be expected to result in a reduction in the cost-reflective tariff rate. Follow-up comment: I would say the relationship is the other way. a more cost-reflective tariff improves financial health/viability of sector.	We have added text in Table V.10 to clarify this point. Follow-up reply: Noted; thank you.
EA	Page 58	Re: impossibility to disentangle benefits - What about the energy efficiency sub-activity? According to your configuration of the potential costs and benefits above this seems separable.	We added a footnote to clarify the point about the energy efficiency sub-activity.
EA	Page 58	Re: for costs to entities other than MCC - Please comment here also on collection of costs to other donors performing complementary PIR investments that you believe would have to be modelled as part of the treatment (likely simply through requesting admin data from those donors). It is important to document some estimate of those costs, as they would need to be included in any CBA produced by (or using the information from) this evaluation.	Text revised to incorporate the suggestion in the comment.
EA	Page 58	Re: assumption around similar investments - Note that for purpose of the primary CBA calculations, our guidelines do require that you assume a similar investment would not have taken place in the counterfactual. Any supplementary analysis/commentary on the likelihood that the GoB or other donors would have performed similar activities without the project would certainly be of interest to MCC, though.	Clarified in the text.
EA	Page 61, Table V.11	"MCC and other donors" column. Consider removing column.	Even though no financial benefits would accrue to MCC (or other donors), it is necessary to include MCC and other donors in the accounting framework to capture the cost aspect of the CBA.
EA	Page 61, Table V.11	Re: improved SBEE financial health from efficient management - Maybe define this rather as reduced long-run cost reflective tariff from more efficient management. Sub-elements could be broken-out (e.g. improved lifecycle maintenance, labor productivity, etc.).	We added the reduction in cost-reflective tariff as a separate long-run benefit in Table V.11.
EA	Page 61, Table V.11	Re: complementary investments - Does this include other donor PIR investments that it would be necessary to include as part of the 'treatment'?	Because the benefits covered by the CBA framework would reflect outcomes of other complementary investments by MCC, GoB, and other donors, we think those should be considered as part of the "treatment".
EA	Page 61	Re: discount rate - Note that our guidelines do require that the primary CBA use a 10% discount rate. Although, you are free to express concern about and/or to present analysis of sensitivity to this rate.	Text revised to address the comment.

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
M&E/PM	Page 62/63, telephone surveys	Still using the listing done under the Infra evaluation, is there an inexpensive way to expand the sample for the telephone surveys so as to avoid respondent burden but still keep quarterly frequency? I don't think having panel data for the reform evaluation is as critical.	Regarding respondent burden, we should note that our intention is to add a few more questions onto the end of the short surveys that are already being conducted for the infrastructure evaluation. We will not be contacting any given respondent any more frequently than already planned, which is quarterly. That said, we will consider selecting a new sample from the infrastructure listing sample frame to carry out this survey. We will need to review and obtain estimates for the potential costs of selecting a new sample & programming a new instrument but we would expect to use the same interviewing team to minimize costs for training, site use, etc.
M&E/PM	Page 63	Could you explain whether and how you could use statistical techniques to transpose the infra sample to something that is more nationally representative?	We will use sampling weights to ensure that our data are representative of the population targeted by the project. Depending on need and cost, we may use multilevel regression with post-stratification (MrP), a technique that can be used with a nonprobability sample to account for its nonrepresentativeness. This methodology is best described in the following papers: 1. Gelman, Andrew, et al. "High-Frequency Polling with Non-Representative Data." In Political Communication in Real Time: Theoretical and Applied Research Approaches. Dan Schill, Rita Kirk, Amy E. Jasperson, eds. New York, NY: Routledge, 2017. http://www.stat.columbia.edu/~gelman/research/published/high_frequency_polling.pdf 2. Ghitza, Yair, and Andrew Gelman. "Deep Interactions with MRP: Election Turnout and Voting Patterns among Small Electoral Subgroups." American Journal of Political Science, vol. 57, no. 3, July 2013, pp. 762–776. http://www.stat.columbia.edu/~gelman/research/published/misterp.pdf. We will consider these or other options during the sampling portion of the baseline phase and will discuss our recommendation with the PM/COR
M&E/PM	Page 63	For readers who are not familiar with Benin, it would be helpful to add a sentence describing the extent to which the infra baseline sample covers the national territory.	Text revised to address the comment

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
M&E/PM	Page 66, Table V.12.	Might be a typo on the third row. SBEE employees? Should be SBEE customers, no? why would the questions to SBEE customers (households) not also be asked to SBEE customers (firms).	Yes, this was a typo. The SBEE customer survey will apply to both households and businesses.
M&E/PM	Page 66, Table V.12	Please distinguish in-person and telephone survey data. Since there are columns for rounds, it's unclear whether the telephone data is included in this table.	Tables revised to include this information
EPG	Page 67, Table V.13	For the document review, consider adding documentation generated by E&Y as the IPP consultant/transaction advisor.	Table revised to address the comment
M&E/PM	Page 68, Table V.13	Does the '4-6' refer to just SBEE staff or to SBEE technical staff, customer, and staff? Follow-up comment: ok, but that means there is no sample size proposed for SBEE technical staff and SBEE customer related to management contractor performance.	"4-6" refers to SBEE staff only (this corresponds to the communications campaign evaluation). Follow-up reply: It appears there was a formatting error in the "sample size" column. We have corrected this error.
M&E/PM	Page 68	Comparing differences between female-headed households with male-headed households is not analytically meaningful for assessing the project's differentiated effects on men and women. This was recently discussed in a Center for Global Development event entitled 'Is Household Headship a Useful Concept? A Research and Policy Conversation'	This comment refers to an example used to explain our operationalization of dummy variables in a regression analysis, not our planned analysis itself. The example has been changed to urban and peri-urban households to avoid confusion.
M&E/PM	Page 76, Table VI.1.	See comment on P53, first paragraph.	We agree that it would benefit the evaluation to push back the final data collection until after the close of the management contract. However, we need to clarify the budget implications of this action before making a commitment.
EPG	Page A.10	This is perhaps a comment to be made as a footnote. It may be worth noting that while EU is providing support in the form of consulting services and capacity building to ARE, it should be mentioned that the EU funding cannot be used fund infrastructure while there is no such limitation on the use of MCC funding; hence the decision to use MCC funding for ARE to develop a suitable headquarters building to house their activities.	Text revised to address this comment
M&E/PM	Page A.11	"Compact activities must align with the Master Plan, but implementation of the plan itself is no longer part of compact activities." – The Master Plan was a CP to entry into force so that it could be used as the basis for investment decisions. MCA/MCC monitors the Government's implementation of the Master Plan, which MCA documents in quarterly conditions precedent reports.	Text revised to address this comment
EPG	Page A.13	Minor edit in text – change financial clauses to financial closings (and change the same in figure A.2 which appears in this section and is repeated in the main body of the report as well).	Text revised to address this comment
EPG	Page A.18	It may be worth mentioning that MCC approved a reallocation of funds from the Compact's Utility Strengthening Activity (which included the maintenance management sub-activity) under the PRIS Project. This modification was for the purpose of reallocating MCC Funding to support the management contract for SBEE.	Text revised to address this comment

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
EPG	Page A.19, second paragraph, last sentence	The statement is not correct and needs to be revised. PRIS (Policy Reform and Institutional Strengthening) is the Project. Under PRIS, there are three activities: (i) Policy, Regulation and Institutional Support Activity; (ii) Utility Strengthening Activity; and (iii) Public Information and Education Activity. The reallocation that took place was to remove funds from the Maintenance Sub-activity under the Utility Strengthening Activity and move them to the Governance and Management Sub-activity under that same Activity in order to provide for the management contract.	Text revised to address this comment
M&E/PM	Page A.21	MPR recommends removing the question on the project's economic impact. This means we are dropping CEA and CBA?	Yes, this is our recommendation. See subsection V.F of the EDR for an in-depth discussion of our rationale.
M&E/PM	Page A.22	Is the second to last question really not answerable?	Although it might be interesting to learn about the motivations of appliance buyers, we believe a study design that would allow us to attribute some difference in propensity to purchase EE appliances resulting from exposure to the labelling would be infeasible. In addition to the high cost of developing a sample, we wouldn't have access to an adequate control group.
EA	Page A.22	We typically don't include any benefits to MCC in our models, and the inclusion of MCC here might confuse readers since MCC does not accrue any financial benefits (indeed, the inclusion of MCC in the analysis below does not seem to add much).	We agree that no financial benefits would accrue to MCC (or other donors), but it is necessary to include MCC and other donors in the accounting framework primarily to capture the cost aspect of the CBA. We clarified this in the revised text.
EPG	Page A.31	With regards to the multiple oversight consultancies that have been put into place, it is appropriate to comment that neither the PMC, the ESOC, nor the supervisors have responsibility as it relates to the PRIS Project. That is to say that PRIS, as compared to infrastructure, has less outside supervision (with the exception perhaps of the management contract auditor).	Text revised to address this comment
EPG	Page A.32	As it relates to the statement "implementation of cost-reflective tariffs is achievable during the term of the compact, leading to additional financing for the sector", it is important to be mindful of the Compact definition of the Tariff Plan: "Tariff Plan means the phased implementation plan to be delivered by the Government to MCC on or prior to the first anniversary following the entry into force of this Compact setting out a course of action to move SBEE to full cost recovery tariffs." While it is certainly the expectation that GoB, in implementing the Tariff Plan, will move in the direction of cost reflective tariffs, this is not a requirement that they necessarily reach fully cost reflective tariffs by the Compact End Date.	We've reworded this assumption to "tariffs that are more cost-reflective" in order to avoid the implication you've singled out.
EPG	Page A.37	As regards "notable omissions" in the M&E Plan, it must be noted that the Compact is not directly funding activities geared toward the reduction of commercial losses – indirectly, yes.	Text revised to address this comment
M&E/PM	Page A.38, Table A.4	This assessment is very useful for MCA and MCC's improvement of its M&E plan. However, it seems some indicators may be incorrectly labeled as not being included in the M&E plan (logic model component # 2 and #7).	Table revised to address the comment

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
M&E/COR	Page 3	Repeat verb in following sentence: MCC expects these objectives are expected to be met through implementation of the three activities:	Table revised to address the comment
M&E/COR	Page 37	Does the budget cover semi-annual KIIs? Will there be a deliverable after each round? Will these be done by MPR staff or local consultants?	i. Yes ii. Results will be included in the interim or final evaluation report iii. Our local consultant will conduct semi-annual KIIs
M&E/COR	Page 42	Please clarify whether/how a trend analysis differs from pre-post as a methodology (i.e. assessing changes over time). Follow-up comment: MCC classifies its evaluations by methodology type and we want what is included in the EDR to match the classification we use in our evaluation pipeline. You may want to check with Clair/Audrey working on the Mozambique urban water evaluation who found a way to incorporate both pre-post and trends analysis into the methodology description.	In our formulation, these two techniques are similar insofar as they seek to measure and compare a given outcome at different points in time. The principal difference is that a trend analysis involves more frequent observations and thus allows for a more nuanced understanding of how the outcome responds to the intervention. Follow-up reply: Text revised to address this comment
M&E/COR	Page 74	Evaluation timeline: Please provide detail on the purpose of the interim study. Will the focus be on the evaluation questions about implementation? Will it answer all evaluation questions and the interim and final reports will reflect results at two points in time? The EDR should be clearer about this. Follow-up comment: Please incorporate this response into the EDR. State which outcomes you expect to assess in the interim evaluation.	The interim study will be used to present findings from our implementation analysis, project outputs, and some early outcomes (including trends) that are already measurable at that stage. The final report will focus more on all outcomes and on the sustainability of the project outcomes. We will present outcomes at two points in time for any outcome that can be reliably measured at interim and at endline. Follow-up reply: Text revised to address this comment. We have added asterisks to the chapter V research question tables to indicate which outcomes will not be part of the interim report.
Cossi Houeninvo	Page iii	[DGR] N'existe plus. Dissoute et remplacée pare la Direction Générale des Ressources Energetiques (DGRE) Follow-up comment: Please replace names with functions. MCA Operations for Joel and MCA M&E for Cossi.	Noted, text revised to address this comment Follow-up reply: Comments revised to reflect this note

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
MCA operations	Figure II.3	Le processus: - La SBEE saisit le Ministère de l'Energie avec sa requête - Le Ministère de l'Energie approuve ou rejette l'ajustement - Ensuite l'ARE est saisi pour donner son avis - Si l'ARE donne son avis favorable, le dossier est retransmis au Ministère de l'Energie - Le Ministère de l'Energie soumet alors au Gouvernement/Conseil des Ministres pour adoption - Les tarifs ayant obtenu l'avis conforme de l'ARE font l'objet d'un arrêté du Ministre de l'Energie - La SBEE prend action pour l'implémentation	We have updated the figure to reflect these steps
MCA operations	Page 11	Remplacer dans le paragraphe ANADER par ABERME	Text revised to address this comment
MCA operations	Page 11	les précisions sur les rôles de l'ABERME et de l'ANM dans la gestion du programme de l'étiquetage énergétique. L'ABERME, avec l'étroite collaboration des Ministères sectoriels, est chargée de veiller à l'application des normes et mesures d'éfficacité, de l'étiquetage énergétique en vigueur au Bénin. 1- Les formalités douanières sont subordonnées à la délivrance par l'Agence Béninoise de Maitrise d'Energie et d'Electrification Rurale (ABERME) de ce certificat de conformité délivré dans un délai raisonnable à compter de la date de dépôt de la saisine écrite. 2- L'ABERME détermine le modèle et la classe énergétique à apposer sur l'équipement selon les résultats de test de performance énergétique réalisé et selon les procédures de test en vigueur par un laboratoire local ou étranger agrée par l'ANM. 3- L'ANM fournit et met à jour une liste de laboratoires de test à recommander aux promoteurs et vérifie les laboratoires proposés par les promoteurs quel que soit le pays où est situé ce laboratoire ; 4- Les agents des services de la Direction Générale du Commerce et de l'ANM (Inspecteurs du Commerce) sont en charge du prélèvement par échantillonnage des appareils dans les missions de vérification du marché ; 5- Le(s) laboratoire(s) de test de l'ANM testent la qualité et fournit les données relatives à la performance énergétique d'un produit. Les résultats des tests sont appréciés par l'ABERME pour certifier la classe énergétique du produit.	Thank you for this detailed information which will greatly assist us in our evaluation of the Energy Efficiency sub-activity.
MCA operations	Page 12	SYDONIA was the custom platform. La nouvelle que MCA finance c'est plutot une Plateforme nationale dédiée aux Normes et de l'Etiquetage Energétique (PNEE)	Text revised to address this comment
MCA operations	Page 13	All of them must be operational before the end of the Compact	Text revised to address this comment
MCA operations	Page 16	Revoir cette section et parler aussi de la mise en place d'un Conseil d'Administration digne de son nom à la SBEE	Thank you for the reminder. Text revised to address this comment
MCA operations	Figure II.9	Le tableau est à revoir. Le Calendrier des activités a glissé. Le Contrat Plan 2 s'arrime sur la durée du contrat de gestion.	We understand that the Contrat Plan II begins January 2020 and ends at the same time as the end of the management contract. Figure II.9 attempts to convey this timeline.
MCA M&E	Table II.7	Ajouter la Banque Mondiale et l'AFD	Table revised to address this comment

Table D.1 (*continued*)

Commenter name or division	Reference	Comment	Evaluator response
MCA operations	Page 22	Remplacé par l'ABERME	Table revised to address this comment
MCA M&E	Page 32	Cette problematique est traitée au niveau du projet distribution. Quoique pour les pertes non techniques, des actions connexe de sesnibilisation (sur le code de la route dimunier la détérioriation des infrastructure electrique, le vol des cable , etc)	It is true that the distribution project assesses technical losses; our point here is that it will be difficult to determine whether compact resources were adequately allocated to reduce losses at a disaggregated level given the aggregated nature of the available (or expected) administrative data.
MCA M&E	Table V.3	L'auditeur des contrats peut fournir aussi des informations très utiles	Table revised to address this comment

Note: The page numbers in this table refer to pages in an earlier draft of the evaluation design report and may not align with the page numbers in the final version of the report.

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