Evaluation of the Benin Policy Reform and Institutional Strengthening Project: Baseline and Implementation Status Report

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Acronyms

ABERME	Agence Béninoise d'Electrification Rurale et de Maîtrise d'Énergie
AERE	Alternatives pour l'Énergie, les énergies Renouvelables et l'Environnement
AETS	Application Européenne de Technologies et de Services
AFD	Agence Française de Développement
ANM	Agence Nationale de Normalisation, de Métrologie et du Contrôle de la Qualité
APDP	Autorité de Protection des Données à caractère Personnel
ARE	Autorité de Régulation de l'Electricité
ARMP	Autorité de Régulation des Marchés Publics
ATI	African Trade Insurance Agency
BAI	Bureau d'Analyse et d'Investigation
CAPPP	Cellule d'Appui au Partenariat Public-Privé
CBA	cost-benefit analysis
CEA	cost-effectiveness analysis
CEB	Communauté Electrique du Bénin
CFA	West African CFA franc
CODIR	Comité de Direction
CP	conditions precedent
CSC	Comité de Suivi et du Contrôle
DG	Directeur général
DGRE	Direction Générale des Ressources Energétiques
DNCMP	Direction Nationale du Contrôle des Marches Publics
ECOWAS	Economic Community of West African States
EDR	evaluation design report
EE	energy efficiency
EPAC	Ecole Polytechnique d'Abomey-Calavi
ERR	economic rate of return
E&S	Environmental and social
EU	European Union
FGD	focus group discussion
GDP	gross domestic product
GoB	Government of Benin
HR	human resources

HSE	Health, safety and environment
HVB	high voltage B
INSAE	Institut National de la Statistique et de l'Analyse Économique
IPP	independent power producer
IRB	Institutional Review Board
IT	information technology
ITT	indicator tracking table
KII	key informant interview
KPI	key performance indicator
kV	kilovolt
kVA	kilo-volt-ampere
kWh	kilowatt-hour
LBNL	Lawrence Berkeley National Laboratory
LV	low voltage
MCA-B	Millennium Challenge Account Benin II
MCC	Millennium Challenge Corporation
M&E	monitoring and evaluation
MHI	Manitoba Hydro International
MoE	Ministère de l'Énergie
MPEER	Ministère du Pétrole, de l'Énergie et des Énergies Renouvelables
MSC	management services contractor
MW	megawatts
MWh	megawatt-hours
MV	medium voltage
NPS	Net Promoter Score
PIEA	Public Information and Education Activity
PPA	power purchase agreement
PPP	public-private partnership
PRIS	Policy, Regulation and Institutional Support
PV	photovoltaic
RFP	request for proposal
SBEE	Société Béninoise d'Énergie Electrique
TA	technical assistance
TCN	Transmission Company of Nigeria
TOR	terms of references

TREDD	Transparent, Reproducible, and Ethical Data and Documentation
USAID	United States Agency for International Development
VRA	Volta River Authority

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Executive summary

This report provides baseline statistics and information about the implementation of the Reform Project, one of four projects implemented under the MCC-Benin Power Compact. The report, delivered about 3 years into the 5 year compact, serves as the baseline for the independent evaluation of the Reform Project, which Mathematica will carry out through 2024. This report summarizes the implementation of the project as of October 2020, highlights key outputs and some early outcomes, and assesses risks to the successful implementation and sustainability of project goals.

A. Overview of the compact and interventions studied

The Millennium Challenge Corporation (MCC) is partnering with the Government of Benin to implement the Benin Power Compact (also known as the Benin II Energy Compact) from 2017 to 2022 to improve electricity generation, distribution, and access and to align the various programs supporting the Beninese power sector with GoB priorities. The Benin Power Compact includes four projects: (1) the **Electricity Distribution Project**, which will rehabilitate and upgrade portions of 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 (Reform 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 are expected to lead to improved governance, management, and operations of the electricity sector and improved quality and reliability of electricity. Overall, the compact's chief objective is to achieve economic growth and poverty reduction through expanded business production and productivity, increased economic opportunities for households, and improved capacity to provide public and social services. The **Reform Project** consists of three activities: (1) the ***Policy, Regulation and Institutional Support Activity*** (referred to as the ***Policy Activity***); (2) the ***Utility Strengthening Activity***; and (3) the ***Public Information and Education Activity* (*PIEA*).** These activities support, complement, and are, in part, necessary for the success of the other compact projects. In addition, some components of the Reform Project were specifically intended to assist the GoB in meeting the conditions precedent for the $80 million On-Grid Tranche funding for the Electricity Distribution Project. Those conditions precedent are: (1) implementation of an institutional framework for independent power production, (2) release of a competitive solicitation for an IPP in Benin, (3) GoB compliance with the tariff plan, and (4) evidence of compliance with the Government Arrears Payment Plan.

The ***Policy Activity*** comprises *three sub-activities* that together aim to improve the governance of the energy sector:

1. Regulation and Tariff Sub-Activity, includes implementation of a cost-reflective tariff (a condition precedent for the On-Grid Tranche funding), establishment of an independent regulator (*Autorité de Regulation de l'Electricité* [ARE]), and support for updates to a range of policies to support changes in the energy sector—such as review and revision to electricity codes and a study assessing feasibility of a stand-alone generation company
2. Energy Efficiency Sub-Activity, which aims to expand and strengthen energy efficiency standards and labeling by developing technical standards, implementing energy efficiency regulation, developing and launching a consumer product labeling program, equipping a testing laboratory for

energy efficient appliances, and technical assistance for enforcing the program. The sub-activity also supports energy audits of public sector buildings and industrial companies to identify possible sources of energy waste and find ways to promote energy-efficient practices.

3. Independent Power Producer (IPP) Sub-Activity, which aims to create the enabling conditions to attract private investment in Benin's power sector by reviewing and updating energy codes, supporting legislation and decrees covering IPPs, and developing an IPP framework, which is a condition precedent to the On-Grid Tranche Funding. The sub-activity also includes designing a competitive IPP solicitation process (the launch of which is a condition precedent for the On-Grid Tranche) and providing transaction advisory services and technical assistance for the procurement of four solar power plants with a combined capacity of 50 MW.

The objective of the ***Utility Strengthening Activity*** is to improve SBEE's operational independence and improve its governance, management, and financial capacity so that it is more financially viable and can better serve its customers. Activities funded under this activity include a contrat-plan between the GoB and SBEE, a management services contract, an external contract auditor to monitor performance against the contrat-plan and management services contract, and improvements to SBEE's human resources, customer services, and work environment. Although the GoB implementing agency for the compact, MCA-Benin (MCA-B), originally planned to provide support directly to SBEE, these improvements will be now carried out by a management services contractor recruited through a competitive process. The management services contractor will lead management and operations of SBEE for four years (2019–2023), with tasks that include but are not limited to assessing the current situation of SBEE and identifying priority action areas, developing and implementing a plan for restructuring, modernizing, and improving the performance of SBEE, formulating a financial model and business plan, and ensuring knowledge transfer to SBEE staff. The Utility Strengthening Activity is intended to increase financial independence, increase cost savings and collections, and create a safer workspace at SBEE. These short-term outcomes are expected to lead to improved financial management of the utility which, in turn, will support longer term maintenance, densification, and extension plans that align with planned improvements in the energy sector.

MCC designed the third activity, the ***PIEA,*** to provide key stakeholders and project participants with the information and education needed to support the intended reforms. The aim of the activity was to promote energy efficiency through behavior- change communications and to assist in public acceptance of the new energy tariffs. The short-term outcomes of the PIEA are reduced electricity demand and increased acceptance and payment of the new tariffs. The tariff communications sub-activity is no longer a focus of the PIEA, as the GoB is leading communications around tariffs[1].

B. Evaluation questions and methodology

Mathematica is implementing a mixed method performance evaluation to assess the Reform Project's implementation, that is, whether the program was implemented as planned, how well the activities and sub-activities were integrated, and what facilitated or inhibited implementation of the project. The evaluation will also use a combination of quantitative and qualitative data to assess outcomes of the

[1] In practice, MCA-B continues to support some elements of the tariff reform communications. Please see Chapter V for a full discussion.

project, focusing on whether, how and why activities and sub-activities achieved objectives. Table ES.1 summarizes our approaches and data sources for the evaluation.

Table ES.1. Activities, approaches, and planned data sources

Activity and sub-activity	Type of analysis	Approaches	Planned data sources[a]
All activities and sub-activities	Implementation	Mixed-methods assessment of implementation fidelity with a political economy lens	KIIs, focus group discussions, program monitoring data, media reports, and administrative data
1. 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-B staff, MCA-B consultants, 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 Sub-Activity	Outcome	Pre-post analysis of trends in IPP generation, assessment of IPP investments	KIIs with MCC/MCA-B staff, MCA-B consultants, IPP principals, and ARE technical staff, SBEE data, consultant reports
Regulation and Tariff Policy Sub-Activity	Outcome	Qualitative analysis with a political economy lens	KIIs with MCC/MCA-B and ARE staff, MCA-B consultants, SBEE, MCA-B implementation teams, press review, MCA-B communications, BAI
2. Utility Strengthening Activity[b]			
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 services contractor; KIIs with MCC/MCA-B staff, management services contractor, MCA-B consultants, 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 services contractor; document review of maintenance practices and costs; KIIs with MCC/MCA-B, SBEE, maintenance and regional technical staff
3. Public Information and Education Activity			
Education and Communication of Tariff Changes Sub-Activity[c]	Outcome	Analysis of changes in knowledge, attitudes, and/or practices using quantitative and qualitative methods	KIIs with MCC/MCA-B 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-B staff and public and private firms receiving energy audits; reviews of media reports; surveys on energy efficiency adoption; focus groups with consumers

[a] This column shows all data sources to be used throughout the course of the evaluation. Not all data sources were available for this report, as described further in Appendix A, Section F.

[b] The Utility Strengthening Activity originally comprised two sub-activities— the Governance, Management, and Finance Sub-Activity and the Maintenance Sub-Activity. In practice, the management services contractor assumed responsibility for much of the activity's implementation, including maintenance, as of November 2019.

[c] The Education and Communication of Tariff Changes Sub-Activity is no longer part of the PIEA, as MCA-B has transferred responsibility for tariff communications to ARE.

ARE = Autorité de Régulation de l'Electricité; BAI = Bureau d'Analyse et d'Investigation; GoB = Government of Benin; IPP = independent power producer; KII = key informant interview; KPI = key performance indicator; MCA-B = Millennium Challenge Account Benin; MCC = Millennium Challenge Corporation; PIEA = Public Information and Education Activity; SBEE = Société Béninoise d'Énergie Électrique.

C. Summary of baseline status and early outputs

Our baseline study revealed a number of key findings for each of the activities and sub-activities, summarized below in Table ES.2.

Table ES.2. Key findings from the baseline analysis of the Reform Project

Activity or subactivity	Findings and early outputs
Key findings on implementation of the Reform project	• Budget reallocation across compact activities, changes in GoB's priorities and investments, and other donor activities contributed to significant design changes since compact signature. • Implementation delays of some elements of the project pose potential completion and funding risks. • Many respondents praised GoB for its engagement in and support of the Reform Project and other energy sector reform activities and identified a range of ministries and actors as key drivers for implementing compact activities and reforms.
Policy Activity	
Key findings on the Regulations and Tariff and Sub-Activity	• The independent regulator, ARE, approved new tariff schedules in 2018 and 2019; GoB approved the tariff schedule in December 2019 • GoB implemented a subsidy that offsets the new tariffs, potentially risking SBEE's ability for long term financially stability • ARE is functional although not yet financially independent
Key findings on the energy efficiency Sub-Activity	• MCA-B supported and the GoB has adopted standards and labeling for light bulbs, air conditioners, and refrigerators • MCA-B completed energy audits of ten businesses and ten public entities, with audits of ten additional public entities underway.
Key findings on the IPP Sub-Activity	• MCA-B developed and the GoB adopted a framework for IPPs to enter Benin's energy sector • The GoB Ministry of Energy launched a procurement for solar power plants, garnering interest among over 20 private power producers, and received eight submissions which are under consideration in late 2020

Activity or subactivity	Findings and early outputs
Utility Strengthening Activity	
	• SBEE and GoB met some, but not all, of their obligations under the first contrat-plan (contract) that sets out key performance metrics and financial obligations of both parties. • The management services contractor has been in place at SBEE for a year and is viewed favorably by staff as it completes its assessment and workplan. • SBEE's financial situation remains precarious and has worsened since the start of the COVID-19 pandemic
Public Information and Education Activity	
	• The sub-activity no longer includes tariff communications although MCA-B continues to support tariff-related communications through other channels. • The energy efficiency information and education campaigns have been delayed. • The activity's budget has been cut from $2 million to $300,000.

D. Next steps

After this baseline and early implementation analysis, we will continue to monitor developments across the Reform Project through the end of the compact. We will combine baseline results with administrative data to conduct a performance evaluation at interim and will report on early outcomes and trends as the compact comes to a close in 2022. We will conduct a final round of primary data collection—including KIIs among energy sector stakeholders in Benin and among implementation teams, focus group discussions among consumers, and surveys of SBEE employees and appliance sellers in 2024—and will combine these data with baseline and interim values for an assessment across outcomes. We note that having access to project reports, implementation assessments, meeting notes and reports on key indicators will be vital for a robust evaluation of the activity.

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I. Introduction

A. Country context

Benin has experienced rapid economic growth in recent years, but a lack of reliable electricity limits the country's economic potential. The growth in Benin's gross domestic product (GDP) was 6 percent in 2018 and 6.9 percent in 2019, driven in large part by agricultural production and an expanding service sector (World Bank 2019a). However, Benin remains vulnerable to external shocks, such as climate change and regional economic conditions. 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). These challenges are compounded by frequent power outages and insufficient access to electricity. Only 32 percent of Beninese households have access to electricity (Power Africa 2018). In addition, a 2016 survey found that 60 percent of Beninese businesses cite a lack of reliable electricity as a constraint to their operations (World Bank 2016). Overall, the lack of reliable electricity limits the economic potential of all consumers, from large industrial firms to individual households.

Benin has increased its electricity generation capacity, but the distribution system is aging and undersized for demand. In 2019, Benin was able to replace costly electricity from rental diesel-power generators with supply from the newly commissioned plant at Maria Gleta, which has an installed capacity of 127 megawatts (MW). With a total installed generation capacity of 180MW, Benin has substantially reduced its reliance on imported electricity (Ministère de l'Énergie 2019a). Imported electricity as the share of supply in megawatt-hours (MWh) fell from approximately 95 percent in 2017 and 2018 to about 45 percent as of March 2020 (MCA-Benin II 2020a). The Government of Benin (GoB) aims to be energy independent by 2022 with a total installed capacity of 240 to 250 MW (Ministère de l'Énergie 2019b). Despite improvements in generation, Benin's state-run utility, *Société Béninoise d'Énergie Électrique* (SBEE), faces numerous challenges in providing quality electricity to its approximately 650,000 low voltage (LV) customers and nearly 1,000 medium voltage (MV) customers (MHI 2020d). The distribution network is characterized by technical and commercial loss rates that averaged 26.7 percent (combined) at the end of 2019, as well as frequent overloads and excessive voltage fluctuations (MCA-B 2020a; MHI 2020d). Equipment shortages and insufficient maintenance prevail, resulting in connection times of up to 300 days and frequent outages (SBEE 2019a).

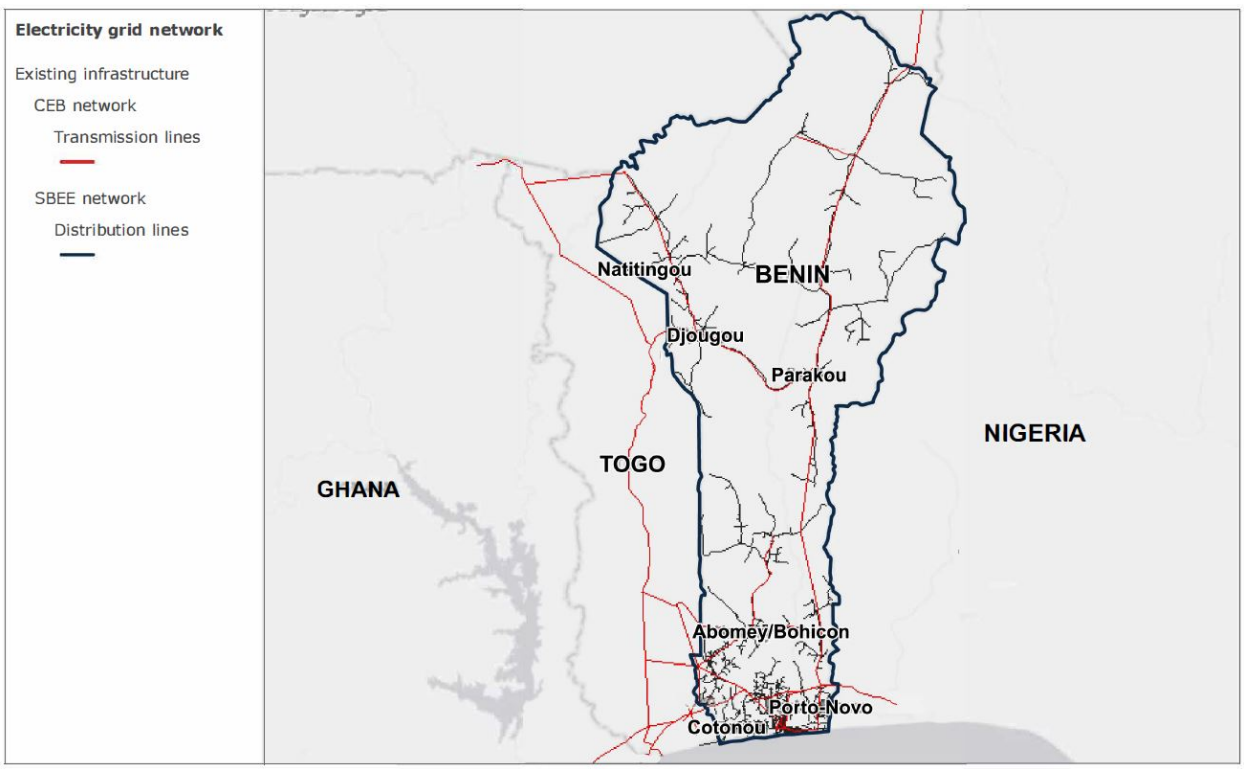
The inability of SBEE to provide quality electricity to its customers is, in part, the product of an artificially low tariff, inadequate regulatory environment, and poor operational and financial performance at SBEE. Prior to GoB's adoption of a new tariff structure in December 2019, Benin's electricity tariff had not changed since 2010. The previous tariff structure kept electricity retail prices low, even though the cost of supplying electricity exceeded the tariff paid by consumers. This situation has led to deficits and restricted maintenance for SBEE, which, in turn, has resulted in further deterioration of the electricity infrastructure and equipment, an inability to prevent electricity shortages, and inadequate resources to expand the grid.

To help alleviate these problems, GoB prioritized the power sector in its "Bénin Révélé" economic action plan and has actively encouraged infrastructure investments and sector reform (Bénin Révélé 2016). It is in this context that the Millennium Challenge Corporation (MCC) is partnering with GoB to implement the Benin Power Compact (also known as the Benin II Energy Compact) from 2017 to 2022 to improve electricity generation, distribution, and access and to align the various programs supporting the Beninese power sector with GoB priorities.

B. Overview of the compact and interventions studied

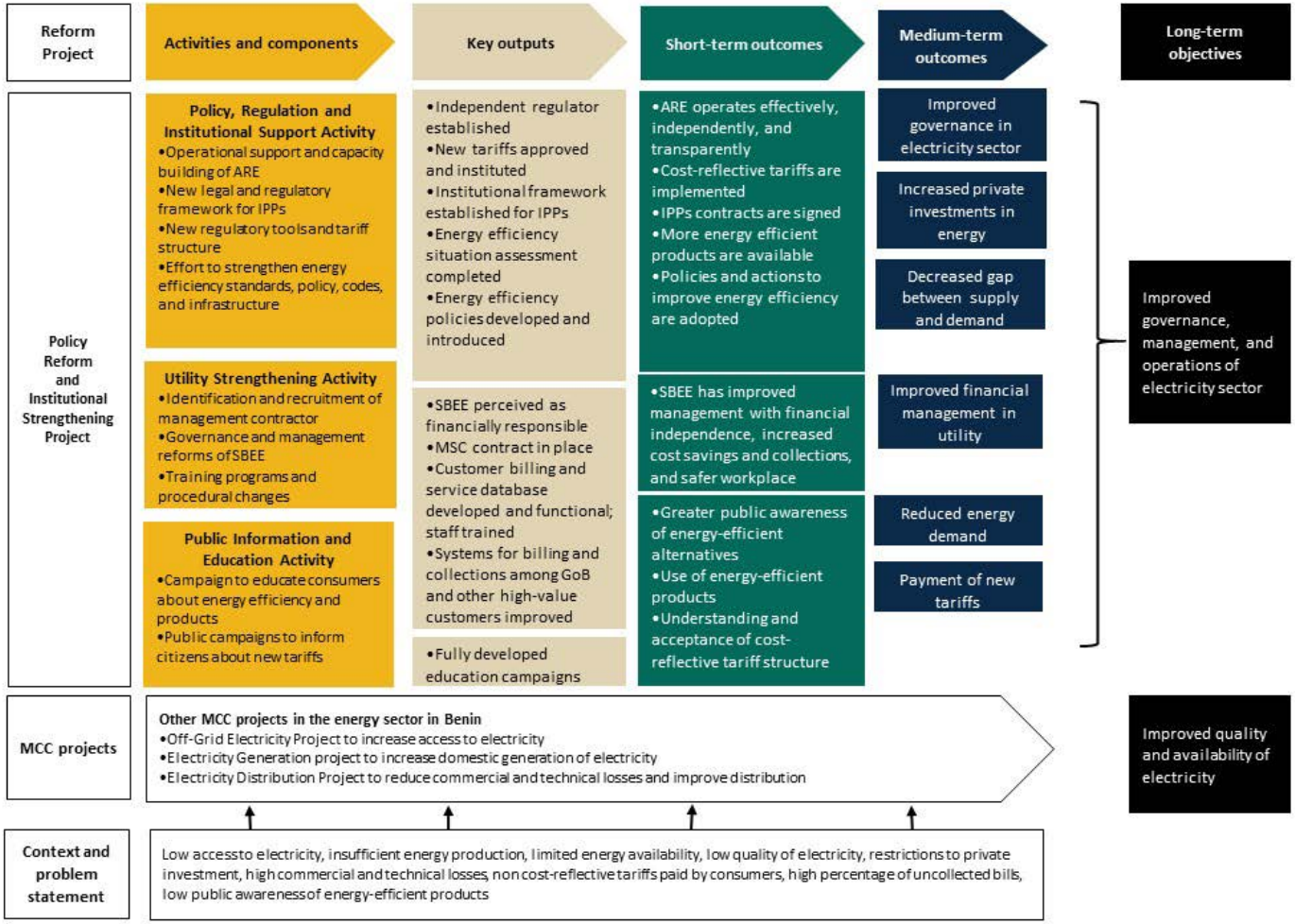
The Benin Power Compact includes four projects: (1) the **Electricity Distribution Project**, which will rehabilitate and upgrade portions of the country's electrical grid and construct a national dispatching center; (2) the **Electricity Generation Project**, which supports entry of private energy producers 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 (Reform 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 are expected to lead to improved governance, management, and operations of the electricity sector and improved quality and reliability of electricity. Overall, the compact's chief objective is to achieve economic growth and poverty reduction through expanded business production and productivity, increased economic opportunities for households, and improved capacity to provide public and social services. A map of the project regions and Benin's on-grid electricity infrastructure is presented in figure I.1.

Figure I.1. Map of project regions and on-grid infrastructure



In Figure I.2, we illustrate the program logic of the Reform Project, which is the subject of this evaluation. The program logic describes the main components and key outputs of each activity. It also displays the short- and medium-term outcomes expected to result from each activity, as well as the overall long-term objectives of the Reform Project. Below in Figure I.2 we describe each activity and sub-activity in turn. We discuss the assumptions underlying the program logic in further detail in the evaluability assessment, which is presented as an annex to our design report (Hughes et al. 2019).

Figure I.2. Reform Project program logic



Source: Hughes et al. (2019)

ARE = Autorité de Régulation de l'Electricité; GoB = Government of Benin; IPP = independent power producer; MSC = management services contractor; MCC = Millennium Challenge Corporation; SBEE = Société Béninoise d'Énergie Électrique.

The **Reform Project** consists of three activities: (1) the ***Policy, Regulation and Institutional Support Activity*** (referred to as the ***Policy Activity***); (2) the ***Utility Strengthening Activity***; and (3) the ***Public Information and Education Activity*** **(*PIEA*).** These activities support, complement, and are, in part, necessary for the success of the other compact projects. In addition, some components of the Reform Project were specifically intended to assist the GoB in meeting the conditions precedent for the $80 million On-Grid Tranche funding for the Electricity Distribution Project. Those conditions precedent are: (1) implementation of an institutional framework for independent power production, (2) release of a competitive solicitation for an IPP in Benin, (3) GoB compliance with the tariff plan, and (4) evidence of compliance with the Government Arrears Payment Plan. The Millennium Challenge Account Benin II (MCA-B) is the Beninese governmental agency responsible for oversight and management of the compact's implementation.

The ***Policy Activity*** comprises three sub-activities that together aim to improve the governance of the energy sector. The sub-activities are expected to accomplish this objective by strengthening regulation, establishing and implementing a cost-reflective tariff policy, and providing institutional frameworks for independent power producers. These three sub-activities are described below:

1. Regulation and Tariff Sub-Activity, which includes implementation of a cost-reflective tariff (a condition precedent for the On-Grid Tranche funding), establishment of an independent regulator (*Autorité de Regulation de l'Electricité* [ARE]), and support for updates to a range of policies to support changes in the energy sector—such as review and revision to electricity codes and a study assessing feasibility of a stand-alone generation company
2. Energy Efficiency Sub-Activity, which aims to expand and strengthen energy efficiency standards and labeling by developing technical standards, implementing energy efficiency regulation, developing and launching a consumer product labeling program, equipping a testing laboratory for energy efficient appliances, and technical assistance for enforcing the program (The sub-activity also supports energy audits of public sector buildings and industrial companies to identify possible sources of energy waste and find ways to promote energy-efficient practices.)
3. Independent Power Producer (IPP) Sub-Activity, which aims to create the enabling conditions to attract private investment in Benin's power sector by reviewing and updating energy codes, supporting legislation and decrees covering IPPs, and developing an IPP framework, which is a condition precedent to the On-Grid Tranche Funding. The sub-activity also includes designing a competitive IPP solicitation process (the launch of which is a condition precedent for the On-Grid Tranche) and providing transaction advisory services and technical assistance for the procurement of four solar power plants with a combined capacity of 50 MW.

Some short-term outcomes of the Policy Activity are that ARE will operate effectively and independently, that cost-reflective tariffs will be implemented, that IPP contracts to build solar power plants are signed, and that energy efficiency policies are adopted. The program logic assumes that these outcomes will translate into improved governance, increased private investment, and increased availability of energy efficient products.

The objective of the ***Utility Strengthening Activity*** is to improve SBEE's operational independence and improve its governance, management, and financial capacity so that it is more financially viable and can better serve its customers. Activities funded under this activity include a contrat-plan between the GoB and SBEE, a management services contract, an external contract auditor to monitor performance against the contrat-plan and management services contract, and improvements to SBEE's human resources,

customer services, and work environment. Although MCA-B originally planned to provide support directly to SBEE, these improvements will be now carried out by a management services contractor recruited through a competitive process managed by MCA-B. Manitoba Hydro International (MHI), a Canadian firm, was selected to fill this role. MHI will lead management and operations of SBEE for four years (2019–2023), with tasks that include but are not limited to assessing the current situation of SBEE and identifying priority action areas, developing and implementing a plan for restructuring, modernizing, and improving the performance of SBEE, formulating a financial model and business plan, and ensuring knowledge transfer to SBEE staff. The Utility Strengthening Activity is intended to increase financial independence, increase cost savings and collections, and create a safer workspace at SBEE. These short-term outcomes are expected to lead to improved financial management of the utility which, in turn, will support longer term maintenance, densification, and extension plans that align with planned improvements in the energy sector.

MCC designed PIEA to provide key stakeholders and project participants with the information and education needed to support the intended reforms. The aim of the activity was to promote energy efficiency through behavior- change communications and to assist in public acceptance of the new energy tariffs. The short-term outcomes of the PIEA are reduced electricity demand and increased acceptance and payment of the new tariffs. The tariff communications sub-activity is no longer a focus of the PIEA, as the GoB is leading communications around tariffs [2].

C. Evaluation design overview

For this performance evaluation, we employ various analytical methods and data sources to answer 36 evaluation questions tied to the Benin Power Compact's logic model. In Table B.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 relies heavily on project monitoring data and KIIs. 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 sustainability analyses of specific sub-activities, we will use administrative and survey data to corroborate our findings through qualitative methods.

Table I.1. Activities, approaches, and planned data sources

Activity and sub-activity	Type of analysis	Approaches	Data sources[a]
All activities and sub-activities	Implementation	Mixed-methods assessment of implementation fidelity with a political economy lens	KIIs, focus group discussions, program monitoring data, media reports, and administrative data

[2] In practice, MCA-B continues to support some elements of the tariff reform communications. Please see Chapter V for a full discussion.

Activity and sub-activity	Type of analysis	Approaches	Data sources[a]
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-B staff, MCA-B consultants, 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 Sub-Activity	Outcome	Pre-post analysis of trends in IPP generation, assessment of IPP investments	KIIs with MCC/MCA-B staff, MCA-B consultants, IPP principals, and ARE technical staff, SBEE data, consultant reports
Regulation and Tariff Policy Sub-Activity	Outcome	Qualitative analysis with a political economy lens	KIIs with MCC/MCA-B and ARE staff, MCA-B consultants, SBEE, MCA-B implementation teams, press review, MCA-B communications, BAI
Utility Strengthening Activity[b]			
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 services contractor; KIIs with MCC/MCA-B staff, management services contractor, MCA-B consultants, 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 services contractor; document review of maintenance practices and costs; KIIs with MCC/MCA-B, SBEE, maintenance and regional technical staff
Public Information and Education Activity			
Education and Communication of Tariff Changes Sub-Activity[c]	Outcome	Analysis of changes in knowledge, attitudes, and/or practices using quantitative and qualitative methods	KIIs with MCC/MCA-B 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-B staff and public and private firms receiving energy audits; reviews of media reports; surveys on energy efficiency adoption; focus groups with consumers

[a] This column shows all data sources to be used throughout the course of the evaluation. Not all data sources were available for this report, as described further in Appendix A, Section F.

[b] The Utility Strengthening Activity originally comprised two sub-activities— the Governance, Management, and Finance Sub-Activity and the Maintenance Sub-Activity. In practice, the management services contractor assumed responsibility for much of the activity's implementation, including maintenance, as of November 2019.

[c] The Education and Communication of Tariff Changes Sub-Activity is no longer part of the PIEA, as MCA-B has transferred responsibility for tariff communications to ARE.

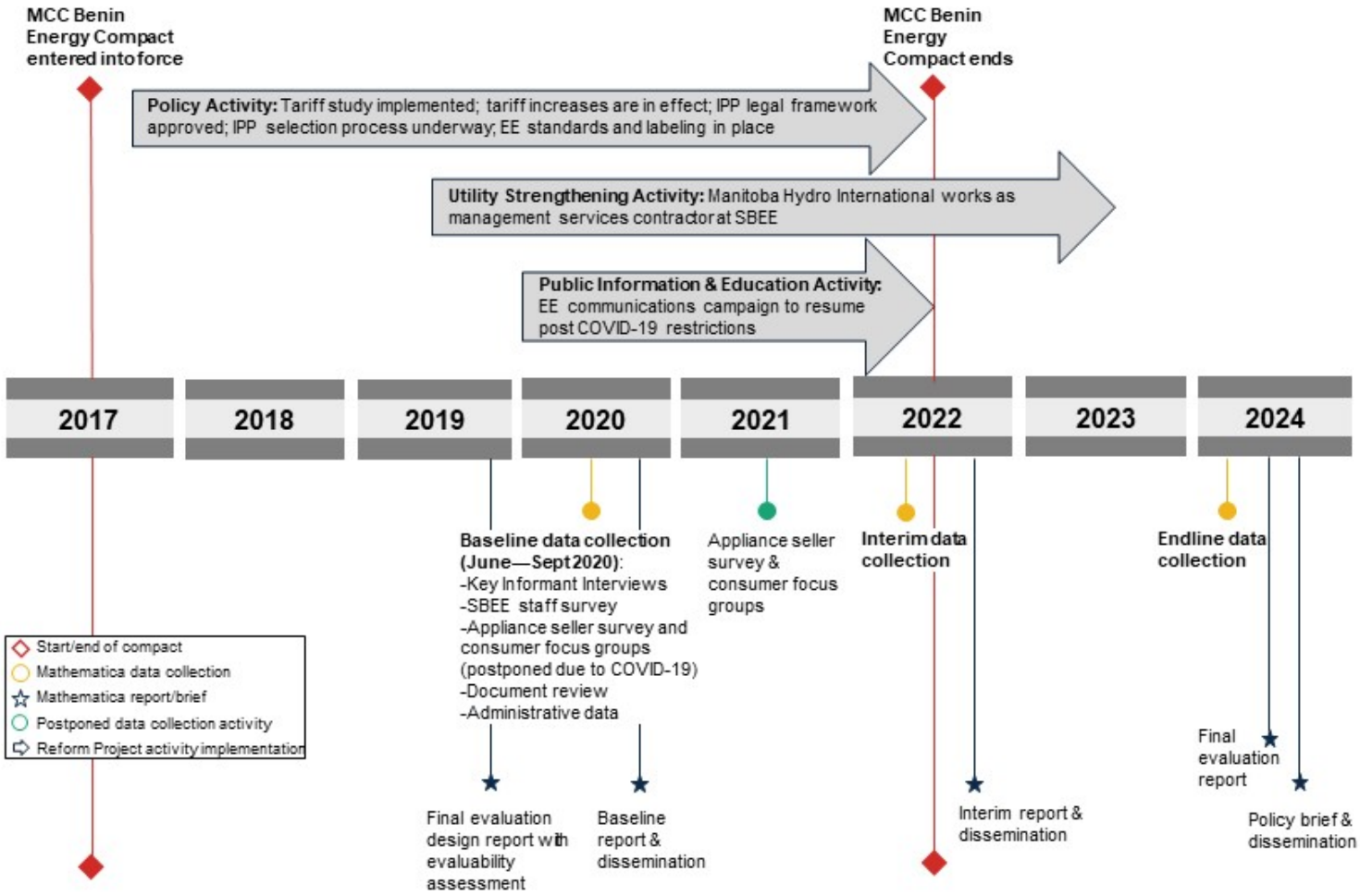
ARE = Autorité de Régulation de l'Electricité; BAI = Bureau d'Analyse et d'Investigation; GoB = Government of Benin; IPP = independent power producer; KII = key informant interview; KPI = key performance indicator; MCA-B = Millennium Challenge Account Benin; MCC = Millennium Challenge Corporation; PIEA = Public Information and Education Activity; SBEE = Société Béninoise d'Énergie Électrique.

This report is the baseline report for an evaluation that will include interim and endline rounds of data collection in 2022 and 2024. Although we assessed some early outputs of the Reform Project for this report, most analyses will be conducted for the interim and final reports. The methods we plan to employ are described below.

D. Timing of this report

In Figure I.3, we present the timing of the main evaluation activities (shown as data points) in relation to the timing of implementation of the three Reform Project activities (shown as arrows, with text summarizing the current status of activities). The Benin Power Compact entered into force in 2017. Implementation of the Policy Activity began in 2016. The tariff studies and IPP framework have now been completed. The tariff increase, along with a 100 percent subsidy of the increase, went into effect in December 2019. Other components, such as the IPP solicitation and various energy efficiency activities, are in progress as of October 2020. Implementation of the Utility Strengthening Activity began in 2016 with the contrat-plan. In November 2019, MHI was installed as the management services contractor at SBEE for a period of four years, meaning that the final 16 months of the management services contract will take place after the compact end date. The energy efficiency communications plan for PIEA was completed in late 2019, but implementation of the plan is currently on hold due to the global outbreak of COVID-19. There are plans to resume the campaign in fall 2020.

Figure I.3. Reform Project implementation and evaluation timeline



Note: EE = energy efficiency; IPP = independent power producer; MCC = Millennium Challenge Corporation; SBEE = Société Béninoise d'Énergie Électrique

Our activities for the evaluation of the Reform Project will extend through 2024 and include (1) an implementation status update (this report) in year 3 and 4 of the compact, (2) an interim report, just after the end of the compact in 2022, and (3) a final evaluation report in 2024, two years after the compact has ended. Originally, we had planned to conduct baseline data collection in spring 2020; however, we postponed the data collection until June–August 2020 due to COVID-19. We also changed the baseline data collection scope due to the pandemic. Several data collection activities were planned to be conducted in-person, but these had to be cancelled or converted to a remote format. Specifically, we cancelled a survey and observation of appliance sellers in Cotonou, as well as two planned focus group discussion with electricity consumers. We conducted all key informant interviews remotely using video calls.

This implementation status update report, drafted in October 2020, presents the baseline situation and implementation status of the Reform Project activities around the end of year 3 of the compact. The interim report will present findings from our implementation analysis, project outputs, and some early outcomes (including trends) that are already measurable at the end of the compact in 2022. The final evaluation report will focus on outcomes and on their sustainability as measured in 2024. We will present outcomes at two points in time for any outcome that can be reliably measured at interim and at endline.

E. Link to economic rate of return and beneficiary analysis

MCC estimated the economic rate of return (ERR) for the Reform Project and Electricity Generation and Distribution Projects combined, including administration and monitoring and evaluation costs.[3] Thus, in our evaluation design, we assessed the following three types of analyses to determine how best to measure the costs and benefits of the Reform Project independent of the Generation and Distribution Projects: cost-effectiveness analysis (CEA), cost-benefit analysis (CBA), and ERR. Our assessment was 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.

We concluded that ERR and CEA would not be appropriate analytical models for this project's context, given the difficulties in differentiating the benefits of the Reform Project from those of the Generation and Distribution Projects. Instead, we proposed to provide outputs from this project to the team conducting the CBA and independent evaluation for the Generation and Distribution projects (also a Mathematica team). A full account of our reasoning can be found in the evaluation design report (Hughes et al. 2019).

F. Roadmap of the report

This report presents an implementation status update of the Reform Project. The data and findings presented in this report cover the period from the compact signing in September 2015, through compact entry into force in June 2017, until October 2020. Our analyses provide information that explains *how* and *why* activities have or have not been implemented as planned and the pre-intervention value of outcomes of interest, as applicable. The remainder of the report is organized in the following manner:

- In Chapter II, we summarize the implementation status and sequencing of the Reform Project activities at the time of report writing in October 2020.

[3] MCC evaluated the ERR of the Off-grid Project separately.

- In Chapters III, IV, and V, we present a brief overview of the literature relevant to each of the three activities; describe the evaluation questions, evaluation methods, and data sources; and present the data and information that is available to answer the evaluation questions.
- In Chapter VI, we summarize lessons learned from the baseline evaluation activities and describe administrative matters related to the study—such as protocols used for safeguarding human subjects, data access, privacy, our dissemination plan, and the evaluation team's roles and responsibilities.

The report includes three appendices. In Appendix A, we provide a brief overview of the evaluation design, summarize the baseline data sources and outcomes, and describe changes made to the baseline data collection due to the COVID-19 pandemic. In Appendix B, we detail the primary data collection efforts that contribute to the analysis in this report. Finally, in Appendix C, we provide the list of documents reviewed for this report.

II. Implementation status of the Reform Project

For this evaluation, Mathematica is carrying 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 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 were implemented. The information in this report provides a snapshot of implementation in the fourth year of the compact and sets the stage for the analyses to be conducted for the interim and endline reports.

Key observations

- Major budget reallocation across compact activities, changes in GoB's priorities and investments, and other donor activities contributed to significant design changes since compact signature.
- Implementation delays pose potential completion and funding risks.
- Many respondents praised GoB for its engagement in and support of the Reform Project and other energy sector reform activities and identified a range of ministries and actors as key drivers for implementing compact activities and reforms.

In this chapter, we present the evaluation questions and approach and explain how this report contributes to the implementation analysis described in the preceding paragraph. We then describe the evolution of the project design and fidelity of implementation thus far. We conclude the chapter with a brief discussion of the timing and sequencing of activities.

A. Evaluation questions and approach

To understand how the Reform Project is unfolding, we seek to answer evaluation questions focused on the fidelity of program implementation and the sequencing of sub-activities. We present the evaluation questions in Table II.1.

Table II.1. Implementation evaluation questions, approach, and data sources

Evaluation question	Approach	Data source	Contribution of this report
RQ.A.1. What is the fidelity and degree of program implementation? In the event of deviations from the original design (such as changes in 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 • Key informant interviews	• Provides update on implementation status three years into the compact and explores reasons for challenges, successes, and design changes. • Assesses risks to the program logic and expected outcomes
RQ.A.2. Were the sub-activities timed and sequenced to facilitate the achievement of expected results?	• Synthesis of stakeholder perceptions	• Desk review • Key informant interviews	• Presents current information and perceptions on timing and sequencing of sub-activities.

B. Evolution of program design and fidelity of implementation

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?*

1. Status of project design in the compact's fourth year

There have been significant changes to the design of the Reform Project since the compact's signature in 2015 and since its entry into force in June 2017. The major reasons for those changes include budget reallocation across compact activities, changes in GoB's priorities and investments, and other donor activities. Overall, MCC reduced the Reform Project's budget from $44 million to $25.5 million to cover escalating costs on the Distribution Project. MCC correspondingly reduced the scope of the Energy Efficiency Sub-Activity and the PIEA. Other changes to project design, such as revisions to the tariff reform timeline and recruitment of a management services contractor for SBEE, reflect GoB priorities and interests. Meanwhile, other donor activities reduced or obviated the need for MCC support in some areas, such as capacity building for ARE. In the section that follows, we describe each of the major design changes in detail.

a. Policy Activity

The GoB approved a tariff increase but simultaneously implemented a subsidy to offset the increase. One of the compact's conditions precedent for the release of $80 million of On-Grid Tranche funding for the Electricity Distribution Project was that the GoB was required to adopt a tariff policy and tariff plan by December 22, 2019. In December 2019, the GoB approved a tariff schedule with a 5 percent increase planned for 2020 and a 10 percent increase for 2021. The tariff schedule was expected to cover

94 to 97 percent of costs. This approval satisfied the compact condition precedent for the On-Grid Tranche funding,. However, GoB simultaneously applied a subsidy to be paid by GoB, effectively shielding consumers from an increase in electricity costs. As of October 2020, GoB has paid SBEE 5.5 billion CFA (roughly $9.8 million) for the subsidy arrears and declared that the five percent tariff increase would apply to two-thirds of SBEE's customers as of October 1, 2020 (MCC 2020).

MCC is now focusing on funding physical infrastructure for ARE in addition to support for specific studies and targeted capacity building for ARE . To establish a functioning independent regulator, MCC originally planned to provide broad support that would include 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 three years of ARE implementation. Once the compact took effect, MCC and MCA-B 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 and MCA-B decided to focus most of the compact's support for ARE on investing in physical infrastructure by providing ARE with its own building and equipment (such as computers and printers) and procuring a vehicle for its use[4]. MCC and MCA-B are providing additional support to ARE in the form of various studies, and the tariff consultant developed a communications plan and provides training to help ARE advocate for reforms in the energy sector.

MCA-B's involvement with the grid code updates has evolved over time. Under the original design, MCC planned to fund a legal review of the Benin-Togo and Benin Electricity Codes. Since then, the EU has funded revisions to the Benin Electricity Code. MCA-B contracted an expert to develop a grid code for LV and MV connections, and another funder is supporting revisions to the Benin-Togo Code, which is still underway.

MCC and MCA-B made substantial cuts to the Energy Efficiency Sub-Activity due to the reallocation of funds to the Electricity Distribution Project. The reallocation of funds resulted in freezing investments in energy-efficient light bulb distribution, national energy efficiency laboratory construction, and follow-up support to implement energy efficiency recommendations for the public administration energy efficiency audit recipients. As of September 2020, MCC plans to fund the energy efficiency laboratories for refrigerators and lamps, but the other frozen activities remain unfunded.

The IPP Sub-Activity has expanded to include not just development of an IPP framework but also procurement of IPPs for solar photovoltaic plants. Under the original design, MCA-B planned to develop an IPP framework to improve the enabling conditions to attract IPP investment in Benin's power sector (the implementation of which was a condition precedent for the $80 million On-Grid Tranche Funding for the Electricity Distribution Project). The purpose of the Generation Project was to design and construct four photovoltaic (PV) power plants. However, after compact signing, MCC worked with a transaction advisory consultant to promote the idea of an IPP project in Benin and eventually received GoB buy-in for this approach. MCC and MCA-B agreed to pursue the solar PV projects as IPPs rather than construct them as utility assets, shifting funds from the Generation Project to the Distribution Project. The compact is now funding transaction advisory services for the IPP selection as part of the IPP Sub-Activity, which also supports the GoB in meeting the On-Grid Tranche condition precedent of releasing a competitive IPP solicitation.

[4] EU funding cannot be used to fund infrastructure, while there is no such limitation on the use of MCC funding.

b. Utility Strengthening Activity

MCC is funding a management services contractor to support SBEE, rather than providing direct assistance to SBEE. At the time of compact signature in 2015, MCC planned to directly improve key aspects of SBEE's operations through technical assistance and capacity building, staff training, and improved maintenance systems (among other activities). In November 2016, the GoB, particularly newly-elected President Talon, pushed for a management services contract to improve the functioning of SBEE rather than the planned supports. MCC agreed to this change in the spring of 2017, just prior to compact entry into force in June 2017. Over the first two years of the compact, MCA-B coordinated with the GoB, prepared the solicitation, launched a procurement, and ultimately contracted with MHI to assume management and operations of SBEE for four years. While a multi-member monitoring committee (the Comité de Suivi et Côntrole) oversees MHI's work, MCA-B also procured a management services contract auditor to verify that the management services contractor is complying with the terms of its contract and meeting key performance indicators. MCA-B will fund the first 32 months of MHI's four-year period of performance, while the GoB will fund the remaining 16 months of the contract that extend past the compact end date.

c. Public Information and Education Activity

MCC significantly reduced funding for the Public Information and Education Activity. In April 2020, MCC reduced the budget for this activity from $2 million to $300,000 and reallocated those funds to the Distribution Project. MCA-B dropped communications about tariff reform entirely due to the political sensitivity of the topic, although, in practice, MCA-B has provided tariff communications support to ARE and GoB. MCA-B also reduced and altered the scope of the energy efficiency communications component, which was initially envisioned to include behavior change programming and communication. Instead, Energy Efficiency Sub-Activity contractors will now conduct communications activities as part of their scopes of work.

2. Implementation status, barriers, and facilitators in the compact's fourth year

Having described changes to the design of many of the Reform Project's activities, we now address the implementation component of the evaluation question. We describe the fidelity of implementation for the Reform Project as a whole and assess the barriers and facilitators to implementation. This section provides an overview of the implementation status and the different factors that have contributed to the rollout of activities, while the individual chapters that follow provide additional details on the implementation of specific activities and sub-activities. These implementation updates also provide context for the early outputs reported in the subsequent chapters.

More than three years after the compact's entry into force, implementation of several activities has been delayed, causing potential completion and funding risks. In Figure II.1, we present a timeline of major activities under the Reform Project as of October 2020. The timeline shows how some activities have only recently been implemented, while others remain to be fully implemented (meaning that some activities will continue beyond the compact end date). For instance, the fourth year of MHI's contract will occur after the compact end date due to delays through the procurement process. The GoB has agreed to assume responsibility for paying the final year of MHI's contract, although some stakeholders expressed concern about whether this will happen. Delays in GoB review and approval of the IPP framework and additional delays throughout the IPP procurement process mean that the selected IPPs will likely not complete construction of the solar PV plants prior to the compact end date. Initially, there was a concern

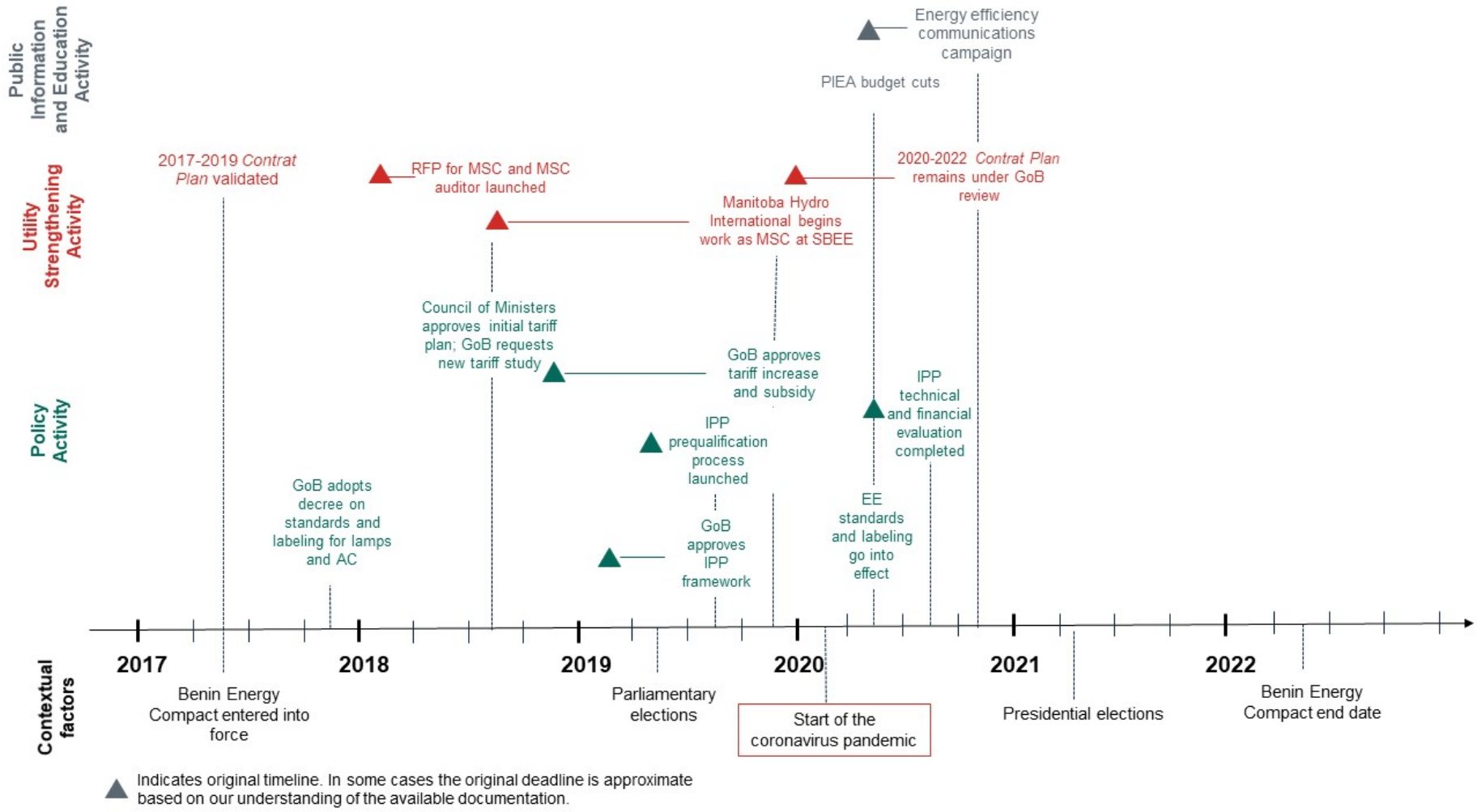
Impact of COVID-19 on project timelines

No implementation update would be complete without discussion of the effects of the global pandemic on the Reform Project. Delays due to the inability of international consultants to travel to Benin, temporary internal travel restrictions, physical distancing guidelines in Benin, and the economic downturn caused by the response to the pandemic have all played a role. Examples of these effects include the following:

- SBEE suspended disconnections for nonpayment and GoB delayed full implementation of the tariff increase.
- MHI delayed planned activities that required international consultants and suspended some in-person activities as MHI and SBEE staff temporarily moved to remote work.
- MCA-B canceled in-person energy efficiency communication campaign activities or moved them online.
- Messaging about COVID-19 overshadowed communications about other topics, such as energy efficiency standards and labeling.
- Economic impact of the pandemic and difficulty obtaining equipment from overseas has hindered implementation of energy efficiency audit recommendations for some businesses.

that GoB would need to provide credit enhancements after the African Trade Insurance Agency's ten-year guarantee expires, posing a potential completion risk. However, it was subsequently clarified that the ten-year guarantee could be renewed. Tariff reforms, which were initially expected to go into effect in 2018, were ultimately approved in December 2019 along with a subsidy. This delay has left SBEE in a continued precarious financial position and may limit MHI's ability to implement significant changes within SBEE.

Figure II.1. Timeline of major Reform Project activities to date



Notes: AC = air conditioning; EE = energy efficiency; GoB = Government of Benin; IPP = independent power producer; MSC = management services contractor; PIEA = Public Information and Education Activity; SBEE = Société Béninoise d'Énergie Électrique

Stakeholders cited the deliberative and sometimes communal decision-making institutional culture in Benin as cause for implementation delays. One frequent explanation from MCC, MCA-B, and consultants was that delays arise when many different people and organizations need to weigh in on decisions and approvals. For instance, an MCA-B respondent described how reports or policy recommendations from MCA-B are shared with each minister, who in turn shares the report with their experts. Each team of experts studies the report, poses questions, and discusses potential changes. Finally, each minister signs the report; MCA-B then shares it with the office of the president, whose experts (such as the President's legal counsel) review, discuss, and propose changes. Finally, the report is reviewed by an inter-ministerial committee, which sends the report to the Council of Ministers; the Council of Ministers shares it with the president for approval. This process can take up to two months or more. Another MCC respondent described how large steering committees are held to review documents or make decisions, often involving participants who do not have expertise on the topic at hand.

> **"When it comes to decisions or review, the government will create a large steering committee to give them a voice and weigh in. In some workshops, people with no experience were invited to weigh in... it is a consultative society."**
>
> **"In Benin, decision-making processes are very long. Meetings, document review and approval, etc. – it all takes a lot of time."**
>
> -Key informant interviews

Stakeholders frequently cited challenges in the procurement process as a cause for implementation delays, although respondents differed on the underlying cause. Various respondents linked long procurement timelines to the slow pace of input and review from MCA-B, MCC, and GoB. In some instances, bidders requested and received additional time to respond to requests for proposals (RFPs) and/or initiated lengthy (and burdensome) bid challenges. For example, IPP bidders requested and received a two-month extension, shifting the deadline for full proposals from March 19, 2020 until May 14, 2020. During the management services contract procurement, the bid challenge period was extended by two months. In the most extreme cases of procurement challenges, poor quality of work from consultants resulted in the need to cancel an existing procurement and issue a new RFP or reallocate the work to other contractors.

> **"Procurement is *very* slow. It takes much longer than expected due to bid challenges and bidders asking for more time, evaluation panels take a long time and sometimes a key person on an evaluation panel gets pulled away...so process stalls."**
>
> -Key informant interviews

Government engagement has largely been a facilitator to implementation. Many respondents praised the GoB for its engagement in and support of the energy sector reform activities. The current president of Benin requested more widespread reform of the energy sector and suggested that MCC fund a management services contractor to spearhead SBEE's transformation. Leaders from the GoB and the Government of Togo also changed the role of the *Communauté Electrique du Bénin* (CEB) as the sole energy producer, permitting SBEE and the GoB to enter into contracts with producers and to generate electricity itself—such as through the natural gas and heavy fuel oil powerplant at Maria Gleta, which began generation in mid-2019. Stakeholders from MCC and MCA-B as well as consultants identified technical and managerial staff in the Ministry of Energy, Ministry of Finance, Bureau d'Analyse et d'Investigation (BAI) and the Ministry of Planning and Development as key stakeholders who understand that certain reforms and actions—such as increasing tariffs and engaging an independent regulator and a

management services contractor—are necessary to improve the sector. Respondents described ARE as competent and beginning to fulfill its role in the first few years of the compact.

The role of political will and barriers and facilitators to implementation will be explored in greater detail through the political economy analysis we will conduct for the interim and final evaluation. In

> **"Each institution played its role [for the management services contract]. The President wanted this project to move forward...[and]... BAI was the conductor of the orchestra."**
>
> **"Ministry of Energy was the most important with regards to technical competence....They coordinated effectively with other stakeholders and understood the project goals very well."**
>
> -External consultant

C. Timing and sequencing of sub-activities

> ***RQ.A.2.*** *Were the sub-activities timed and sequenced in such a manner to facilitate the achievement of expected results?*

Many of the sub-activities are intertwined such that delays or design changes in one sub-activity may have ripple effects on other sub-activities. The IPP Sub-Activity is an example of an area in which multiple actions need to take place in a certain order to allow for full implementation. The IPP framework, the updated Benin electricity code, and the grid code were all necessary preconditions for the launch of the IPP procurement because they define the parameters for IPPs to sell electricity to SBEE; the roles and responsibilities of private firms, the utility, and government agencies; and processes for competitive bidding. It was also necessary to eliminate CEB's exclusive right to purchase and generate electricity to allow SBEE to purchase electricity directly from IPPs. The Energy Efficiency Sub-Activity offers another example of sequenced actions. The GoB had to first approve the standards and labeling policy before the Customs agency (*Direction Générale des Douanes et Droits Indirects)* could align its website with the regulations and enforce imports and sales of energy efficient appliances and before MCA-B could launch the energy efficiency communications campaign. Within the Utility Strengthening Activity, the ability of MHI to implement reforms and projects at SBEE is partially contingent on tariff reform, which will play a role in improving SBEE's financial situation.

In Chapters III, IV, and V, we provide early observations on the degree to which these linkages and sequencing have held true for specific sub-activities. We will continue to monitor implementation throughout the rest of the compact period in order to assess whether appropriate sequencing has occurred.

III. Policy activity: Baseline situation and early outputs

This chapter is divided into three sections corresponding to the three sub-activities within the Policy Activity: the Regulation and Tariff Sub-Activity, the Energy Efficiency Sub-Activity, and the IPP Sub-Activity. For each sub-activity, we provide a brief overview of the relevant literature as background; outline the evaluation questions, evaluation methods, and data sources; and discuss information currently available to inform the evaluation questions. While Chapter II focused on the status of project design and implementation for the Reform Project as a whole (*what* has happened), in this section we seek to explain *how* and *why* activities have or have not been implemented as planned. We provide a picture of the project at baseline and describe early outputs. We also present the pre-intervention value of outcomes of interest, as applicable.

Key observations

- Regulation and Tariff Sub-Activity
  - ARE approved new tariff schedules in 2018 and 2019; GoB approved the tariff schedule in December 2019
  - GoB implemented a subsidy that offsets the new tariffs, potentially risking SBEE's ability to become financially stable
  - ARE is functional although not yet financially independent
- Energy Efficiency Sub-Activity
  - MCA-B supported and the GoB has adopted standards and labeling for light bulbs, air conditioners, and refrigerators
  - MCA-B completed energy audits of ten businesses and ten public entities
- IPP Sub-Activity
  - MCA-B developed and GoB adopted a framework for IPPs to enter Benin's energy sector
  - The GoB Ministry of Energy launched a procurement for solar power plants and received eight submissions which are under consideration in late 2020

A. Regulation and Tariff Sub-Activity

Benin's power sector has long suffered from an insufficient and poorly organized legal and regulatory framework that has hindered development and investment in electricity generation and distribution (SOFRECO-AF-Mercados EMI 2018; MCC 2012). The Regulation and Tariff Sub-Activity aims to address these problems through implementation of a cost-recovery tariff and capacity building of ARE,

the independent regulator[5]. Underlying these interventions are the assumptions that (a) a cost-reflective tariff will be paid by consumers which, in turn, will strengthen SBEE; and (b) the establishment of a competent regulator will lead to improved governance in the sector, increased confidence in the country's energy market, and thus increased private sector investment. Indeed, recent studies of energy sector regulation highlight the need for strong institutions as a prerequisite for achieving sustainable power sector reform (Foster and Rana 2020). Effective legislation to support reform, the commercialization of utilities, and the implementation of efficient tariff schemes are found to be necessary elements of successful reform (Lee and Usman 2018). Studies of independent regulation, on the other hand, remain inconclusive on the impact of independent regulation alone on sector performance and end-user well-being (Bacon 2018). Some studies find that establishing an independent regulatory agency and enabling privatization boosts power sector performance and increases access to power (Imam et al. 2019). Other studies suggest that the chief benefit of an independent regulator is not improving sector performance but rather improving the likelihood that the economic surplus created by other reforms (such as privatization and unbundling) reaches end-users and does not solely benefit investors and commercial clients (Jamasb et al. 2015). For Benin, in the long term, an independent regulator and cost-recovery tariffs are expected to result in a virtuous cycle of reduced life-cycle losses and increased capital for maintenance and capital investments.[6]

Since the Benin compact's entry into force in June 2017, MCA-B has provided support to ARE, commissioned tariff studies, and advocated for a revised tariff schedule. In Table III.1, we show the progression of work from inception to November 2019, when we completed the evaluation design report (EDR), and to October 2020, at the time of writing of this report.

Table III.1. Objectives and tasks of the Regulation and Tariff Sub-Activity

Planned tasks at inception	Tasks completed (November 2019)	Tasks completed (October 2020)
Objective: Reform energy tariffs in Benin to contribute to a more financially sustainable utility company		
• Conduct financial review of current costs • Conduct several tariff studies (including cost of service study and projection of revenue requirements) • Develop a tariff plan • Publicize plan and raise awareness • Implement tariff plan by June 2018	• Tariff studies completed in 2017 • Tariff policy advanced through approval process and approved in August 2018 but not implemented • New tariff studies to update tariff schedule completed in summer 2019 • MCA-B provided support to Ministry of Energy to ensure better understanding of implications of implementing tariff plan	• GoB approved new tariff plan in December 2019 and announced a subsidy that offsets the tariff increase. • At the request of the GoB, tariff consultant drafted study of targeted subsidies for vulnerable populations. • 3-month billing moratorium for most customers implemented in response to COVID-19 pandemic.

[5] This evaluation does not cover the compact's support to ARE in the off-grid sector.
[6] For a more detailed presentation of the literature relevant to the Reform Project program logic, see Hughes et al. 2020.

Planned tasks at inception	Tasks completed (November 2019)	Tasks completed (October 2020)
Objective: 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	• Provided ad hoc support through studies and technical assistance • Procured vehicles through the Implementing Entity Agreement (IEA). • Contract signed for study, design, supervision consultant for the ARE building • Provided much of remaining support in coordination with the World Bank and EU whose projects support ARE • Procured a consultant to develop low- and medium-voltage grid codes. The codes were validated in October 2019.	• Site approved for ARE building • Request for proposals for construction of ARE building ready for release (released November 3, 2020). • Tariff consultant continues to coordinate with ARE (and other stakeholders) on tariff training.

ARE = Autorité de Régulation de l'Electricité; EU = European Union; GoB = Government of Benin; MCA-B = Millennium Challenge Account Benin II.

1. Evaluation questions, approach, and key findings

The evaluation questions for this sub-activity focus on the utility and the regulator setting tariffs that reflect the cost of electricity, public acceptance of new tariffs, improvement in the utility's finances, and the functioning and independence of the regulator. In Table III.2, we present the evaluation questions related to the Regulation and Tariff Sub-Activity and briefly describe the evaluation methods, data sources, and contributions of baseline data to address each evaluation question as well as summarize the results. To answer these evaluation questions, we drew on interviews with key stakeholders, MCA-B's implementation and monitoring reports, publicly available documents and information from ARE and the *Ministère de l'Énergie* (MoE), implementation reports submitted by consultants to MCA-B, and press reports. Several questions are not answered in this baseline report because the implementation has not advanced far enough to answer the question. For other evaluation questions, administrative or primary data from some sources, such as the SBEE consumer survey (planned for late 2020), are not yet available. Any deviations from our original evaluation design are described in Appendix A.

Table III.2. Evaluation questions, methodology, data sources, and early outputs for Regulation and Tariff Sub-Activity

Evaluation question	Evaluation method	Baseline data source	Role of baseline data collection	Early outputs
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	Describe the status of new tariff implementation and any mitigating circumstances	• A new tariff schedule with an average increase of 5 percent over the previous tariffs was approved December 4, 2019 and was to be implemented January 1, 2020. The GoB simultaneously applied a 100 percent subsidy while requesting a new tariff study to determine targeted subsidies for vulnerable populations, for specific types of clients, and for emergencies. • The tariff schedule, once it is fully implemented, is designed to cover 94–97percent of the cost of service, up from 80 percent.
RQ.D.2. Has the sector regulator assumed its mandated role in setting and adjusting tariffs?	• Qualitative analysis	• KII • Document review	Describe ARE's role in setting and adjusting tariffs in first three years of compact	• With support from the MCA-B-funded consultant, ARE reviewed, made recommendations on, and approved new tariffs, which were adopted by the Conseil des Ministres in December 2019.
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	• n.a.	n.a.	• Public opinion on the tariffs has not been assessed[a]; the tariff change is likely not noticeable to customers in 2020 since it is offset by subsidies. • We plan to collect data on consumer acceptance of tariffs and whether consumption has changed over the course of this evaluation and will present results in the interim and final evaluation reports.
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	Describe structures, procedures, and data availability necessary for use of the tariff-setting tool	• The tariff consultant provided the tariff adjustment tool as well as training on the required inputs and the tool's use to ARE, SBEE, MoE, and other stakeholders. The tariffs can be adjusted as validated data from SBEE becomes available.
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	Describe changes in SBEE's finances since implementation of the new tariff	• The new tariff structure, itself, has not had the expected impact on SBEE's balance sheet or cash flow as of September 2020. The tariff increases were fully offset by a blanket subsidy, which, in theory, would improve SBEE's balance sheet as long as the GoB pays the value of the subsidy to SBEE.
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	• n.a.	n.a.	• n.a. for now

Evaluation question	Evaluation method	Baseline data source	Role of baseline data collection	Early outputs
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	Describe whether tool was used to change tariffs.	• The tariff tool was used to set the tariff schedule implemented in December 2019. However, the GoB implemented a subsidy for certain customers, driven by the GoB's opinion that electricity quality and customer service improvements must occur before a tariff increase.
RQ.D.8. To what extent has the Grid Code been implemented?	• Qualitative analysis of stakeholder perceptions	• Document review • KIIs	Describe implementation of the Benin Grid Codes	• The Benin Electricity Code was approved by the Council of Ministers in April 2020. Grid codes for both low voltage and medium/high voltage have been approved by ARE (ARE 2020 001). Revisions to the Benin-Togo Electricity Code have begun but have not yet been approved as of September 2020.
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	Describe ARE technical, financial, and operational functioning and funding	• ARE has demonstrated that it is operational; it has a professional staff with the appropriate skills for reviewing and setting rules in the energy sector; and it has produced guidance on a broad array of rules, policies, and laws in the energy sector in the past few years (including guidance on policies to support the IPP framework). • It is not clear whether ARE is funded as planned (through levies on consumers and producers) at the time of writing or through government payments. Nonetheless, ARE appears to have adequate funding to be fully operational.
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	Describe ARE's political independence	• ARE was fully engaged in the tariff setting activity and recommended a change to the tariff implementation initially proposed by the tariff consultant. • It is not clear whether ARE was involved in the GoB's decision to apply a subsidy to offset the 2020 tariffs.

Note: [a]ARE conducted a small sample (n=26) consumer consultation in fall 2019 that showed residential consumers were against tariff changes (ARE 2019a), but some commercial consumers favored a rate increase if it led to better quality electricity.

^ This evaluation question is only partially answered in this report because implementation had not yet begun and/or insufficient data were available at the time of writing.

This evaluation question is not answered in this report because implementation had not yet begun and/or insufficient data were available at the time of writing.

ARE = Autorité de Régulation de l'Electricité; GoB = Government of Benin; IPP = independent power producer; KII = key informant interview; MCA-B = Millennium Challenge Account Benin II; MoE = Ministère de l'Énergie; n.a. = not applicable; SBEE = Société Béninoise d'Énergie Électrique.

2. Implementation of new tariff policy

RQ.D.1. To what extent has the new tariff policy been implemented?

On December 4, 2019, the GoB announced a new tariff schedule for SBEE electricity customers, but the extent to which this new tariff policy can be considered "implemented" is unclear. For the period from January 1 to December 31, 2020, the GoB approved an average tariff increase of 5 percent across client categories, excluding "lifeline" clients—that is, clients in the lowest usage category, whose rates remain unchanged (Table III.3). A second tariff increase of 10 percent above the 2019 tariffs, on average, is expected to be applied January 1, 2021. The new tariff schedule includes increases in the tariff rates across most customer types (LV and MV, residential, and commercial), holds the monthly fixed fee steady for domestic and small business customers, and introduces time-of-use pricing for MV clients. A simultaneously applied subsidy offsets the change in tariffs. Specifically, the GoB applied a global subsidy from January to October 2020, and a targeted subsidy to last until December 2021. The targeted subsidy applies to BT1 Tranche 1 customers, artisans consuming less than 500 kwh, and certain medium voltage customers.

Table III.3. Tariff schedule: 2010-2019, 2020, and 2021 (proposed)

	Current tariffs (2019)		1st step revised tariffs (January 1, 2020–December 31, 2020)		2nd step revised tariffs (January 1, 2020–December 31, 2020)	
	Energy (CFA/kWh)	Fixed cost (CFA/kVA/ month)	Energy (CFA/kWh)	Fixed cost (CFA/kVA/ month)	Energy (CFA/kWh)	Fixed cost (CFA/kVA/month)
Tariff BT1 (low voltage): Domestic use						
Tranche 1: <20 kWh	78	500	78	500	86	500
Tranche 2: 0-250 kWh	109	500	114	500	125	500
Tranche 3: > 250 kWh	115	500	134	500	148	500
Tariff BT2 (low voltage): Professional use and prepaid						
Flat rate	111	500	114	500	125	500
Tariff BT3 (low voltage): Public lighting						
Flat rate	122	500	122	1,000	133	1,000
Tariff MT0: Low-voltage clients with 48 kVA < PS < 630 kVA						
Flat rate	111	None	114	500	125	500
Tariff MT1: Medium-voltage clients with PS =< 630 kVA						
Flat rate	94	None	92	1,000	100	3,000
Peak hours	94	None	155	1,000	164	3,000
Regular hours	94	None	83	1,000	91	3,000
Tariff MT2: Medium-voltage clients with PS > 630 kVA						
Flat rate	94	4,500	88	6,000	96	6,000
Peak hours	94	4,500	138	6,000	150	6,000
Regular hours	94	4,500	81	6,000	88	6,000
Tariff MT3: Pure industry clients with outages during peak hours						
Flat rate	78	None	-	-	-	-
Tariff MT4: Pure industry clients without outages during peak hours						
Flat rate	78	7,000	-	-	-	-

Source: ARE 2019b

Notes: CFA = West African CFA franc; kVA = kilo-volt-ampere; kWh = kilowatt-hour.
The exchange rate as of October 2020 is 1 West African CFA ≈ 0.0018 USD.

3. Regulator's role in tariff setting

> ***RQ.D.4.*** *Are the structures and procedures in place to allow recurring adjustments to the tariff?*
>
> ***RQ.D.7.*** *Was the tariff adjustment tool used to change tariffs? If not, what drove tariff changes?*

Over the past three years, ARE has participated in the tariff setting process by reviewing, making recommendations on, and approving new tariffs. The independent regulator was established in 2007 and was granted an advisory role in setting electricity tariffs at that time. In 2015, ARE's statute was changed to increase its authority from "*providing guidance on tariff schedules* before their approval and publication by the state…" to "*approving tariff schedules* before their publication by the state…" (ARE 2015, emphasis added). To support ARE's fulfillment of its broadened regulatory role, MCA-B hired a tariff consultant to develop the financial model that underpins the tariffs and to train sector stakeholders (including SBEE, MoE, and ARE) on tariff setting. In 2018, ARE's technical, legal, and financial team reviewed the tariff consultant's initial proposed changes to the tariff schedule, which recommended an average increase in tariffs of 7 percent in the first year and 7 percent in the second year. The GoB, led by the office of the president, opted for a first-year increase of 5 percent, on average, and a second-year increase of 10 percent. We were unable to determine whether ARE agreed with the plan to revisit and revise the originally proposed tariff schedule. ARE reviewed and approved the new "5 + 10" tariff schedule and the Council of Ministers adopted it in December 2019.

4. Tariff adjustment tools and their use

> ***RQ.D.2.*** *Has the sector regulator assumed its mandated role in setting and adjusting tariffs?*

The tariff tool, developed by the tariff consultant, was used to develop the initial tariff structure proposed in 2018 and was used again for the updated tariff schedule implemented in 2019. The tariff consultant used international standards to develop the tariff setting tool and provided training and capacity building to SBEE, ARE, and MoE, as well as other stakeholders in its use (IdeaConsult 2016). A new tariff schedule was initially developed in November 2017 and formally presented to the relevant ministries and ARE in March 2018. In August 2018, the Council of Ministers approved the new tariff schedule, and representatives of ARE and the MoE publicly announced the planned tariff changes. The structures and procedures are in place to adjust the tariffs, as demonstrated by the changes to the tariff schedule between the 2018 announcement and the eventual tariff schedule revealed in 2019. The tariff schedule developed in 2017 included a 7 percent increase in tariffs in the first year and another 7 percent in the second year (IdeaConsult 2019). While the impetus for changing the step-up increase from "7 + 7" to "5 + 10" is not entirely clear, the tariff consultant used the tool again in 2019, inputting updated data, to propose the ultimate tariff schedule implemented in December 2019.

The tariff adjustment tool was not the only driver of tariff changes; social and political considerations led to alterations in the proposed tariff increase and delays in implementation. As described in chapter II, the GoB successfully met the compact condition precedent of implementing a cost- reflective tariff policy before the prescribed deadline of December 22, 2019, thus allowing MCC to

release the $80 million of On-Grid Tranche funding for the Distribution Project. This final approval followed two years of efforts to implement new tariffs. At the same time, the GoB expressed concerns about the quality and timeliness of the data used to determine the rates, as the tariff consultant had relied on financial data provided by SBEE, of which the most recent year was 2016. In September 2018 (internal CODIR tracker received from Millennium Challenge Corporation, 2020), GoB requested that the tariff schedule incorporate the potential cost of electricity for solar generation, which was a planned part of the MCC investments, and the Ministry of Planning requested a review of the impact of the rates on poor and marginalized households. These requests led MCA-B to modify the tariff consultant's contract and slowed down implementation of the originally proposed tariff changes (internal CODIR tracker received from Millennium Challenge Corporation, 2020; MCA-B 2019b). After a lengthy procurement process to modify the tariff consultant's contract and eventual adjustments to the tariff model to incorporate more up-to-date data, the GoB slowed approval of the tariffs until SBEE implemented service improvements, including clearing a backlog of connection requests in the fall of 2019. In late 2019, the tariff schedule was reviewed and approved by ARE and adopted by the Council of Ministers.

The GoB passed, and plans to fund, a subsidy that covers the difference between the old and the new tariff. The subsidy effectively prevents many SBEE customers from perceiving an increase in their per kilowatt-hour costs and shifts the burden of cost recovery from customers to the GoB. The subsidy is likely to mitigate public opposition to tariff increases while it is in place, as many consumers will not experience an increased cost per unit of electricity. SBEE's financial performance should still improve as long as the GoB pays for the subsidy. However, MHI's third quarterly report, the most recent available at the time of writing, shows that the GoB had not paid the equivalent of the subsidy to SBEE through the first half of 2020. It is reasonable to assume that GoB arrears to SBEE will increase while the subsidy is in effect, potentially curtailing SBEE's ability to invest in maintenance, infrastructure, training and the like. Overall, the GoB's implementation of the subsidy indicates a lack of political will for tariff increases and brings into question the future of tariff reform after 2021. Further, the subsidy undercuts the reform effort to put the utility and the power sector on a more financially sustainable path. As some key stakeholders have noted, "tariffs can be lowered just as easily as raised."

5. Tariff structure and the utility's financial health

RQ.D.2. How has the new tariff structure affected SBEE's balance sheet, income statement, and cash flow statement?

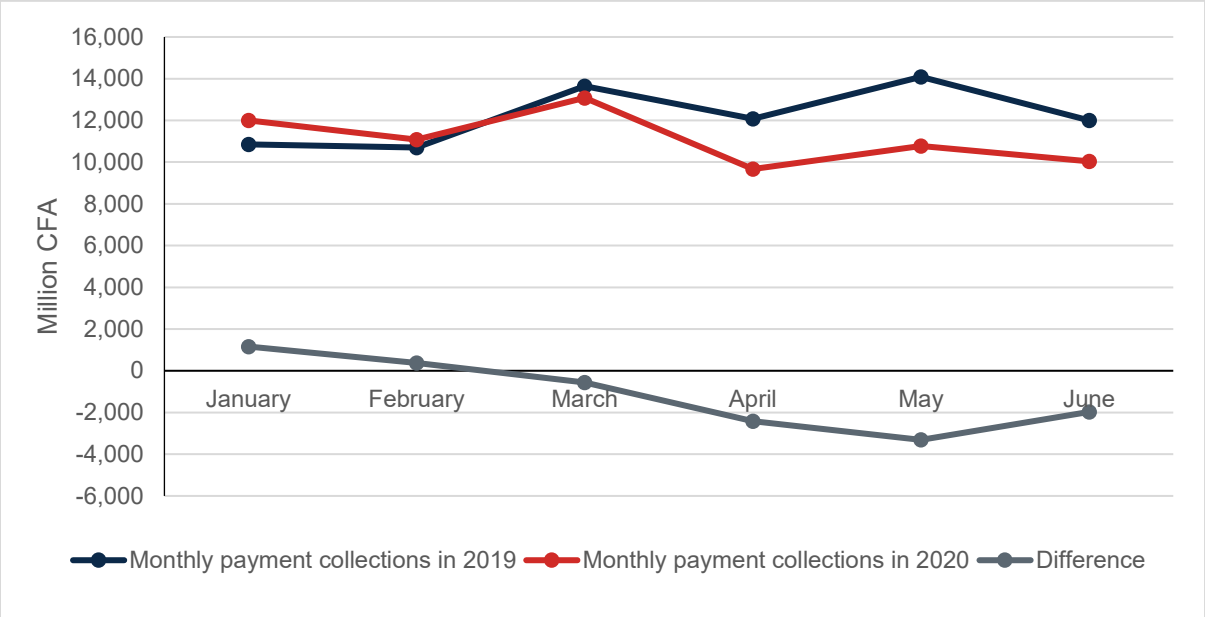
The tariff increase has not improved SBEE's balance sheet or cash flow in 2020, while the COVID-19 pandemic obscures and worsens the utility's financial situation. The tariff consultant estimated that the tariffs in effect from 2010–2019 covered approximately 80 percent of the marginal cost of electricity. The new tariffs were designed to cover 94 to 97 percent of SBEE costs in the first few years of implementation. In 2020, SBEE expected 6.7 billion West African CFA francs (CFA) in increased revenue from implementation of the new tariffs, which represents a 5 percent increase in revenue over 2019. This increase was not realized in the first half of the year in part because GoB has not paid its electricity bills or covered the cost of the tariff subsidy for the January to May period, which totaled approximately 4.7 billion CFA (MHI 2020d). SBEE's operational cash flow is also down. During the period from March to May 2020 when Benin implemented several mitigation measures to contain the spread of COVID-19, revenue fell by 6.3 billion CFA, or 16 percent compared to the same period of the previous year (see Figure III.2). Collections are down, in part due to inability to collect but also due to a

moratorium on collections during the lockdown. SBEE's cash flow forecast from April to December 2020 shows a shortfall of funds amounting to 39.2 billion CFA, which represents 31 percent of the total 2019 revenue.

Figure III.1. Process to implement tariff reform in Benin

Note: ARE = Autorité de Régulation de l'Electricité; SBEE = Société Béninoise d'Énergie Électrique.

Figure III.2. Payment collections (in millions of CFA)



Source: MHI 2020d

Notes: In this graph, the "difference" line indicates the difference between the 2020 and the 2019 payment collection figures.

CFA = West African CFA franc

We note, also, that fees for some SBEE services have been reduced in 2020. In Table III.4, we present SBEE's connection fees, which SBEE reduced by 12 percent overall and by 31 percent for lower-consumption customers. Some respondents informed us that connection fees for small and medium businesses were eliminated entirely in 2020, but we were unable to confirm this with SBEE.

Table III.4. Connection costs approved in June 2020

Connection type	Power (kVA)	Intensity (A)	Tariffs in place (CFA)	New tariff (CFA)	Tariff change (% of previous tariff)
2 wires	1-6	5-30	122,782	85,000	-30.8%
4 wires	6-20	10-30	211,032	130,000	-38.4%
4 wires	30	45	435,969	330,000	-24.3%
4 wires	33	50	435,969	390,000	-10.5%
4 wires	40	60	435,969	530,000	21.6%
Additional 2 wires	1-6	5-30	51,167	42,500	-16.9%
Additional 4 wires	6-20	10-30	92,864	65,000	-30.0%

Source: SBEE 2020

A = ampere; CFA = West African CFA franc; kVA = kilo-volt-ampere.

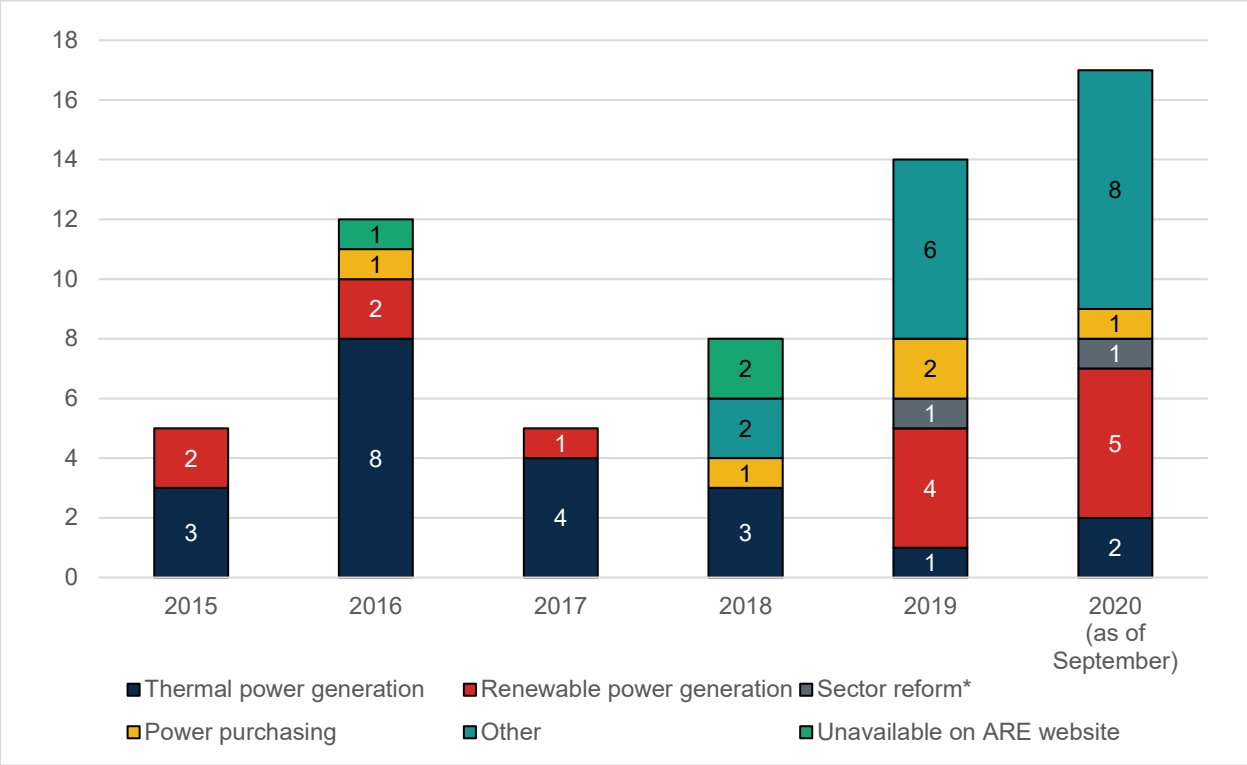
6. ARE operations

RQ.D.9. To what extent is ARE operational? Does ARE have the resources necessary to successfully carry out its mandate?

RQ.D.10. To what extent has ARE been able to make major decisions independently from the Government?

Since 2015, ARE has fulfilled its role in tariff setting and has been a dynamic presence for other energy-related policy guidance. Stakeholders ranging from MCA-B and MCC to outside donors, SBEE directors, and GoB officials have praised the quality of ARE's work as the independent energy sector regulator. Several respondents specifically praised the personal competence, dynamism, and dedication of the ARE president in carrying out ARE's mandate, even during early years when ARE lacked resources. In addition to reviewing, recommending changes to, and approving the new tariff schedule, ARE has reviewed and made public its assessments of proposed legal and regulatory changes in thermal and renewable energy generation, power purchasing, and other topics—which may be interpreted as a sign of transparency. ARE has completed this work even though only 38 percent of positions have been filled, according to MCA-B's indicator tracking table. In Figure III.3, we show the increasing number of formal opinions or guidance, known as "avis," promulgated by ARE from 2015 to 2020. It is notable that

Figure III.3. ARE notices (avis) published: 2015–2020



Source: https://are.bj

Note: The sector reform *avis* published in 2019 was related to SBEE tariffs.
ARE = Autorité de Régulation de l'Electricité; SBEE = Société Béninoise d'Énergie Électrique.

ARE has been reliant on outside donors or the GoB for funding its operations, equipment, and training. Although the compact requires that the GoB provide sufficient resources for the operation of ARE, ARE's operations suffered from a lack of funding in the early compact period. The World Bank, *Agence Française de Développement (*AFD), EU, and MCA-B projects have provided funding for various elements of ARE's operations, including support for personnel recruitment, office rental, equipment, training, and other support. Beginning in 2019, a .05 percent levy on SBEE's revenue was planned to provide funding for ARE's operations. At the time of writing, it is not clear whether ARE's main source of funding is this levy or if its primary funding continues to be the GoB. MCA-B has undertaken to build ARE its own offices.

Independence for a regulator implies the ability to make decisions without prior approval from other government bodies and the condition that no entity other than a court can overrule the regulator's decisions (Brown at al. 2006). For a regulator to be independent, it must be organizationally separate from other ministries, have earmarked and secure funding, and have autonomy over personnel matters and protection from dismissal without due cause (Brown et al. 2006). ARE is organizationally separate, and we noted no reports of interference in its internal management. However, ARE's funding through a levy on SBEE revenue, while approved, has not yet been assured. Further, ARE's decisions on tariffs have met slowdowns by the GoB. ARE approved the 2018 tariff schedule, but the GoB did not implement it nor did the GoB implement the revised 2019 tariff schedule until the deadline was looming for the condition precedent for the $80 million On-Grid Tranche of funding for the Distribution Project. While some respondents asserted that ARE is fulfilling its expected role as an independent voice promoting the welfare of consumers, its ability to operate independently at this time is uncertain.

7. Implementation of the grid code

RQ.D.8. *To what extent has the grid code been implemented?*

Both of the Benin grid code and the Benin-Togo grid code must be updated and ensure full and proper functioning of the electricity grid in Benin. Benin's low voltage and medium-high voltage grid codes have been implemented as of 2019. Grid codes provide the specifications for equipment used by a network and establish parameters for connecting to the electricity network, which are necessary preconditions for independent power producers to enter the market. MCA-B's consultant presented low voltage and medium-high voltage grid codes for Benin in 2019. The consultant and other stakeholders noted the absence of a coherent grid code for electricity transmission, much of which is under CEB's purview. For example, CEB lines operate at 60 kilovolts (kV), whereas SBEE operates at 63kV and each interconnection between the grids must be guided by coherent specifications, its responsibilities for equipment, access, and maintenance also must be clearly identified. MCA-B has modified the consultant's contract to draft a grid code for adoption by CEB. This latter code is not yet in force.

B. Energy Efficiency Sub-Activity

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 includes activities designed to reduce the quantity of electricity required to meet consumers' functional needs. Through the two main components of the Energy Efficiency Sub-Activity, MCA-B 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 (see Table III.5). Although rates of appliance ownership are still relatively low across sub-Saharan Africa, 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). A recent study on space cooling notes that adoption of high-efficiency air conditioning units and improvement in building envelopes—that is, construction materials and design features—could reduce energy needs by 58 percent (Campbell et al. 2020). Appliance standards aim to eliminate low-efficiency units from the marketplace by controlling the specifications of imports.

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. 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 (Karatasou et al. 2014).

In Table III.5, we provide a summary of the tasks completed to date, as well as what had been achieved in November 2019 (at the time we wrote the EDR), compared to what was planned. In the section that follows, we provide additional details on the current status of activities.

Table III.5. Objectives and tasks of the Energy Efficiency Sub-Activity

Planned tasks	Tasks completed (November 2019)	Tasks completed (October 2020)
Objective: 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	• Decree for light bulbs and air conditioners was introduced in 2016 and approved in December 2018. Energy efficiency laboratories in design phase	• Revisions to the current light bulb and air conditioner decree, as well as a new decree with standards for refrigerators, have been drafted but not yet approved by GoB. • The new standards and labeling for light bulbs and air conditioners went into effect on June 30, 2020. • Energy efficiency audits are complete; follow-on support is planned for businesses but not public administration buildings. • Work was put on hold, so MCA-B now plans to fund an energy efficiency test laboratory for refrigerators and lamps. • Ministerial decree published establishing procedures for imports and sales of light bulbs, refrigerators, and air conditioners in October 2020.

GoB = Government of Benin; MCA-B = Millennium Challenge Account Benin II.

1. Evaluation questions, approach, and key findings

RQ.B.1. *To what extent has the Government of Benin adopted and implemented policies and actions to improve energy efficiency?*

RQ.B.2. *To what extent were new or strengthened standards and labeling for energy efficiency implemented during the compact?*

The evaluation questions for the Energy Efficiency Sub-Activity focus on national policies and actions to improve energy efficiency and the availability of energy-efficient products as well as on the effect of energy efficiency audits on energy consumption. In Table III.6, we summarize the evaluation method and data source for each evaluation question as well as the contributions of the baseline data to answering the evaluation questions. To answer these questions, we drew primarily on information from available documentation and from interviews with key stakeholders. We also analyzed data from the energy efficiency audit reports, although administrative data from other sources (such as the forthcoming customs import platform) were not yet available at the time of writing. Any deviations from our original evaluation design are described in Appendix A.

2. Adoption and implementation of energy efficiency policies and rules

By issuing a decree on energy efficiency standards and labeling for light bulbs and air conditioners, Benin is making progress toward improving energy efficiency. Benin has promoted energy efficiency actions and policies for the past 25 years, particularly focused on reducing energy consumption within the government and public administrative buildings. In 2015, the Ministry of Energy produced a National Energy Efficiency Action Plan which set targets for efficient lighting; high-performance electricity distribution, standards, and labeling; and commercial and industrial energy efficiency (MERPMEDER 2015). In the same year, Benin introduced minimum performance standards for light bulbs and air conditioners. This introduction was in line with the Economic Community of West African States (ECOWAS) legislation on standards for light bulbs, refrigerators, and air conditioners, which was passed in 2012 (AETS/AERE 2018). Benin's current decree (No. 2018-563) for light bulbs and air conditioners was introduced in 2016, approved in December 2018, and entered into force June 30, 2020. The GoB approved a new decree with standards for refrigerators in October 2020 (internal CODIR tracker received from Millennium Challenge Corporation, 2020). One stakeholder described these decrees as critically important to the success of the Energy Efficiency Sub-Activity because they "establish the national norms by which everyone must abide." As such, they are a precondition to implementation of activities around standards and labeling.

The new standards and labeling for light bulbs, air conditioners and refrigerators aim to address challenges that have prevented widespread use of energy-efficient products in Benin. Stakeholders cited numerous challenges facing the energy-efficient appliance market in Benin before the new standards were in effect. Respondents described a market in which other countries send rejected high-energy use appliances to Benin because of a lack of regulation and technical requirements. Under the new standards, customs will be responsible for regulating imports of energy-efficient consumer appliances. Although there is some concern that Benin's relatively porous borders (perhaps slightly mitigated by the closed border with Nigeria) may undermine these efforts, multiple stakeholders expressed optimism that the standards would at least reduce the importation of poor-quality appliances—especially since neighboring countries now have their own standards in place.

Table III.6. Role of baseline data for the Energy-Efficiency Sub-Activity, by evaluation question

Evaluation question	Evaluation method	Baseline data source	Role of baseline data collection	Early outputs
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	• Describe the policies and actions implemented thus far	• The current decree (No. 2018-563) for light bulbs and air conditioners was introduced in 2016 and implemented in June 2020. Revisions to that decree as well as a new decree with standards for refrigerators have been drafted and approved in October 2020.
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	• Describe the current status of implementation of standards and labeling	• The new standards and labeling for light bulbs and air conditioners went into effect on June 30, 2020.
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	• KIIs	• Quantitative data not available at the time of writing; KIIs provide information on the current situation and anticipated challenges	• We were unable to speak to appliance sellers due to COVID-19; however, stakeholders were generally optimistic that the market will adapt to the new regulations and that availability and sales of energy-efficient products will increase.
RQ.B.4. Have the recipients of energy efficiency audits changed their consumption?^	• Descriptive analysis	• KIIs • Administrative data	• Describe audit recipient energy consumption prior to the audits • Describe the audit process and expectations for implementation of the recommendations	• Firms report being motivated to implement changes, and some have already taken actions in response to the audit's recommendations.

^ This evaluation question is only partially answered in this report because implementation had not yet begun and/or insufficient data were available at the time of writing.

KIIs = Key informant interviews.

COVID-19 and budget cuts have hampered the energy efficiency communications campaign, which is critical to ensuring success of the sub-activity. A key theme across stakeholders was the importance of behavior change among consumers. Respondents described an effective communications campaign as key to this behavior change because consumers "have nothing to guide their decision making," do not understand energy efficiency labels, and do not think in terms of future savings from reduced energy consumption. As described in Chapter II and Chapter V, COVID-19 has slowed implementation of the energy efficiency communications campaign, budget cuts have reduced the scope, and the campaign has not always focused specifically on behavior change. Each of these factors may reduce consumers' ability to make the informed decisions that are necessary for the success of this activity.

Reductions in the scope of the Energy Efficiency Sub-Activity compromise the compact's ability to achieve desired outcomes related to reduced energy demand. Reduced energy demand is a key medium-term outcome that is expected to lead to improved financial stability of SBEE. Although at least one stakeholder felt that the suspension of plans for a national energy efficiency laboratory would not affect the overall compact, others expressed concern that the change was a risk to the sub-activity. As part of the new regulations established for energy-efficient light bulbs and air conditioners, importers must present results of lab tests for the equipment. The Customs agency can randomly select products to test to ensure that the results are accurate; however, without a national laboratory for testing air conditioners or refrigerators, this testing will not be possible. MCA-B recruited *Application Européenne de Technologies et de Services* (AETS)/*Alternatives pour l'Énergie, les Énergies Renouvelables et l'Environnement (*AERE) to design and support the implementation of a refrigerator test laboratory and to assess and strengthen the *Ecole Polytechnique d'Abomey-Calavi* (EPAC) lamp test laboratory. As of September 2020, MCA-B is funding an energy efficiency test laboratory for refrigerators and lamps (MCA-B 2020b).

3. Market for energy-efficient products

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?

Because of COVID-19 restrictions on in-person data collection, we were not able to conduct the planned appliance seller survey and observations. However, interviews with key stakeholders offer the following observations about the situation around the time the new light bulb and air conditioner standards and labeling requirements went into effect on June 30, 2020.

> **"Success is more demand for energy-efficient products: more are available, and more are sold."**
>
> – KII respondent on the Energy Efficiency Sub-Activity's desired outcomes

Stakeholders were generally optimistic that the market will adapt to the new regulations and that availability and sales of energy-efficient products will increase. Energy-efficient labels are not new in Benin; however, the country previously did not have its own standard labeling system, and most consumers did not understand the labels or know to look for them. Importers were reluctant to import energy-efficient appliances because consumers typically opted for the cheapest product without thinking about long-term value and operational costs. Most stakeholders expressed optimism that—with increased regulation and communication—importers,

wholesalers, and distributers would easily recognize the importance and value of energy-efficient appliances. Respondents expressed the opinion that "store owners are pro whatever they can sell" and that stores that follow labeling rules "will win the market." Reactions from MCA-B workshops with trade associations and retailers held prior to COVID-19 were positive, with distributors reporting that consumers are ready to pay for equipment that is more expensive but has lower energy costs.

4. Energy efficiency audits

RQ.B.4. Have the recipients of energy efficiency audits changed their consumption?

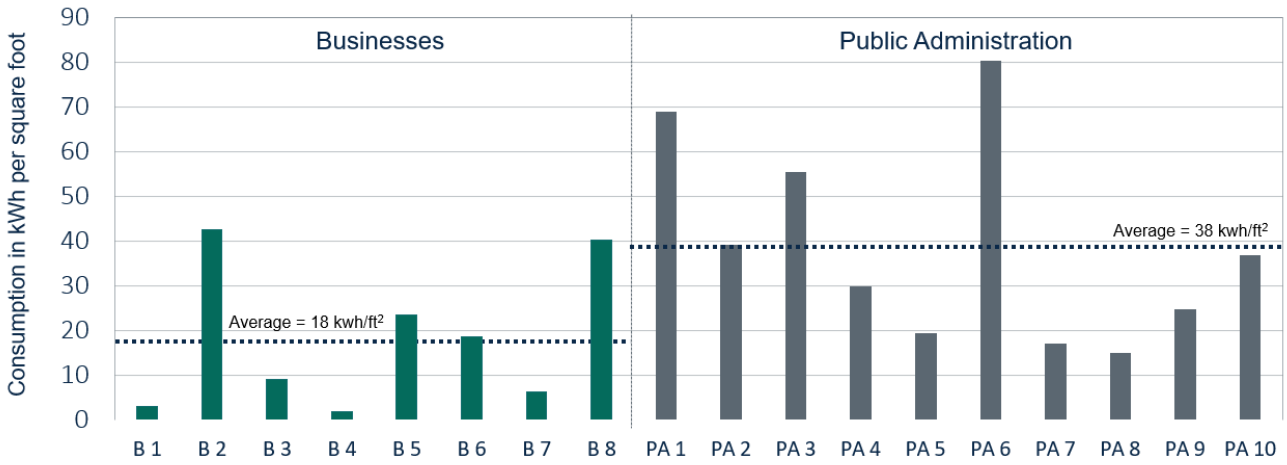
The energy efficiency audits revealed common areas for energy savings across firms and public administrative buildings. An external consultant conducted the audits in 2018 and 2019 in 10 public agencies and 10 businesses. The audits identified recurring weak points across agencies and firms, including excessive use of lighting and air conditioning, old or poorly performing equipment, installations that are not up to code, lack of system for monitoring energy consumption indicators, lack of standards and processes for buying and assessing the energy efficiency of new equipment, and lack of training for key personnel. Common recommendations were consistent with these weaknesses and included behavior change, equipment repair and replacement, institution of energy indicators, and installation of renewable energy generation on premises. The audited institutions have also benefited from two trainings on energy consumption and cost management.

Audited firms report being motivated to implement changes and have already taken some actions in response to the audit's recommendations. The energy audit consultant reported that some firms were initially hesitant to participate because of the negative connotation of the word "audit," but they were ultimately able to convey the purpose and benefits of the audits. The two interviewed firms reported a positive experience with the audit and emphasized that the results were relevant to their organization, particularly because electricity, gas, and backup generation are significant expenses. The audits revealed that many public buildings were built without efficient energy management taken into consideration. The audited firms and public administrations are expected to devise, budget for, and disseminate a specific action plan to address the audit recommendations. One firm reported that the audit essentially confirmed some of their assumptions and accelerated their timeline for making changes. Both interviewed firms reported that they are already taking steps to address the recommendations, first by organizing internally and spreading awareness among employees. Both interviewed firms also delineated between longer-term recommendations that will require substantial investment (such as renewable energy projects) and those that can be done in shorter-term at lower cost by organizing internally (such as making operational changes, raising awareness, and improving the functionality of equipment).

> **"When people hear the word audit, they are hesitant. But [the energy efficiency audits] were about identifying which buildings consumed a lot, and then improving their systems; not about telling people that they are doing bad work."**
>
> – Key informant interview respondent on the objectives of the energy efficiency audits

Energy consumption varied widely across businesses and public administration buildings prior to the energy efficiency audits. The energy efficiency audit reports present energy consumption and expenditure data for 2017 or 2018, depending on the data available for each business or organization. These data show the baseline situation for the audited entities. Annual energy consumption varied considerably across businesses, from 200,977 kilowatt-hours (kWh) to 57,465,091 kWh in absolute value (Table III.7) and from 2 to 42 kWh per square foot (Figure III.4). Annual energy consumption for public administration buildings ranged from 137,066 kWh to 2,148,755 kWh in absolute value and from 15 to 80 kWh per square foot.

Figure III.4. Baseline annual energy consumption among audited businesses and organizations, in kWh per square foot



Note: Consumption per surface area is not shown for two of the ten audited businesses because information on these buildings' square footage was not available.

"B" indicates business and "PA" indicates public administration. kWh = kilowatt-hour.

Source: SGS Senegal 2019 individual audit reports for business and public administration buildings; data correspond to 2017 for some firms and 2018 for others.

Table III.7. Summary of electricity consumption for businesses and public administrations

	Minimum consumption (kWh)	Maximum consumption (kWh)	Mean consumption (kWh)	Median consumption (kWh)
Businesses	200,977	57,465,091	9,509,889	2,497,704
Public administrations	137,066	2,148,755	759,379	422,585

Source: SGS Senegal 2019 individual audit reports for business and public administration buildings; data correspond to 2017 for some firms and 2018 for others.

kWh = kilowatt-hour.

Energy represents a substantial cost for businesses, but firms face barriers to implementing the audit recommendations due to cost, senior-level buy-in, and access to equipment. About half the audited businesses provided enough information to calculate the cost of energy as a proportion of revenue, which ranged from 1 to 6 percent. This range is roughly in line with findings from the survey of medium and large firms we conducted for our evaluation of the Generation and Distribution projects, which showed the cost of energy was 3.3 percent of revenue among the sample of 333 medium and large business SBEE customers (Hughes et al. 2019). The energy efficiency-audited firms reported that the recommendations that will be hardest to implement are those that require the largest investment. In order to convince leadership, it will be necessary to demonstrate that the expected long-term energy savings outweigh the initial investment. MCA-B plans to support implementation during a pilot program in businesses later in 2020, which may help to address some of these challenges. One firm noted that progress has slowed because COVID-19 has made it hard to procure new equipment to implement recommendations.

C. Independent Power Producer Sub-Activity

IPPs are private firms that generate electricity and sell it in bulk at an agreed-upon price usually defined by a power purchase agreement (PPA). While short-term PPAs may be concluded, many PPAs last 15 to 30 years and thus provide a steady stream of revenue to the venture. IPPs are attractive to energy-poor countries because they promise to boost generation capacity while providing capital that the country does not have and offering private entities an investment opportunity.

Historically, Benin has lacked a clear and transparent framework for public-private participation in the energy sector. This gap, combined with low tariffs, has discouraged private investment in electricity generation. Because an IPP's financial viability is inextricable from the financial viability of its primary off-taker, often the state-owned utility, IPPs are most likely to succeed when their establishment is part of a larger reform package that guarantees a market for their product (Eberhard et al. 2016). Other key determinants of IPPs' success include the country's planning and contracting capabilities (Eberhard et al. 2016), competitive bidding and transparent selection processes (Eberhard et al. 2016; Lee and Usman 2016), statutory provisions to formalize the IPP negotiation process under a comprehensive framework (Woodhouse 2006; Zelner et al. 2009), public sentiment on the role of private enterprise (Zelner et al. 2009), and the presence of an independent regulator (Nagayama 2010). As one interview respondent noted, "With IPPs in general, it's always a tradeoff in terms of deciding whether to let private actors finance the operation and [bring] in their own management, or whether it should be financed by the state, which is the most profitable option for the state."

A market survey conducted in early 2019 found that a wide range of actors in the energy market (such as developers, banks, and investment funds) were highly interested in the IPP procurement but expressed concerns about the regulatory environment in Benin. Specifically, some respondents indicated that, although the installation of a management services contractor at SBEE was a positive development, more reforms would be needed. In addition, respondents indicated that MCA-B's participation in the solicitation process was critical to ensure transparency and respect of environmental and social protection regulations (Ernst and Young et al. 2019).

It is in this context that, 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 through the creation of an IPP framework. The purpose of such a framework is to govern the generation, transmission, sale, and distribution of electrical energy through IPPs. An IPP framework should clearly articulate stakeholder

roles and responsibilities, transparent and competitive bidding processes, and standard models of electricity purchase contracts and credit enhancements. The framework should also define the typical schedules and deadlines, resources to be assembled (such as project teams and committees), project inputs and outputs, conditions to be met for the project to progress, and tools for financial and risk management. The legal framework should lay out the rights of private investors, including tax incentives, to help encourage private investment (Ernst & Young et al. 2018a). Under the IPP Sub-Activity, MCC is also funding transaction advisory services for the procurement of four solar PV plants run by IPPs. These activities are intended to support the GoB in achieving two of the four conditions precedent for the On-Grid Tranche Funding: implementation of an IPP framework and release of a competitive solicitation for an IPP in Benin. In Table III.8, we present the planned tasks, as well as the status of those tasks in November 2019 (at the time of the EDR) and in October 2020 (at the time of data collection for this report).

Table III.8. Objectives and tasks of the IPP Sub-activity

Planned tasks	Tasks as of November 2019	Tasks as of October 2020
Objective: Create environment to foster more IPPs		
• Review and update energy codes • Study and outline options for IPP • Develop IPP framework • Design competitive IPP solicitation process • Provide transaction advisory services and TA • Finalize concessions and PPAs	• IPP studies completed • The GoB approved the IPP Framework in July 2019; IPP transaction advisory services ongoing for four solar photovoltaic plants. • GoB launched an IPP pre-qualification process and selected the pre-qualified bidders.	• IPP solicitation launched in December 2019 to pre-qualified bidders. • IPP solicitation yielded 8 bids • IPP technical and financial evaluation completed; finalization of contract and public announcement of winning bidder pending • MCC goal to reach financial close with the selected IPPs and begin construction by the compact end date (June 2022)

GoB = Government of Benin; IPP = independent power producer; PPA = power purchase agreement; MCC = Millennium Challenge Corporation; TA = technical assistance.

1. Evaluation questions, approach, and key findings

The evaluation questions for this sub-activity focus on the degree to which Benin has implemented policies and frameworks for IPPs and whether those policies and frameworks are credible, as well as the extent to which IPPs have invested in Benin. In Table III.9, we summarize the evaluation method and data source for each evaluation question as well as the contributions of the baseline data to answering the evaluation questions and initial results. To develop initial results to these questions, we drew on implementation reports and studies from MCA-B consultants, publicly available GoB documents and Ministry of Energy data, MCA-B's monitoring data, and interviews with key stakeholders. Some questions are not answered in this baseline report because the implementation has not advanced far enough to answer the question or because administrative or primary data from some sources were not yet available at the time of writing. Because selection of the IPPs had not yet been publicized at the time of

writing, we have not yet interviewed the IPPs who submitted bids.[7] Any deviations from our original evaluation design are described in Appendix A.

[7] We plan to conduct interviews with IPPs that submitted bids while the draft report is being reviewed and will add findings here, as relevant.

Table III.9. Role of baseline data for the IPP Sub-Activity, by evaluation question

Evaluation question	Evaluation method	Baseline data source	Role of baseline data collection	Early outputs
RQ.C.1. To what extent were new policies and frameworks for IPPs implemented?	• Qualitative descriptive analysis	• Document review • KIIs	Discuss the degree of implementation of IPP framework	• The GoB approved the IPP framework in July 2019; the framework is being used to guide the IPP solicitation.
RQ.C.2. Have any IPP transactions reached financial close?	• Mixed-methods descriptive analysis	• Document review • KIIs	Asses the status of IPP transactions	• MCC's goal is to reach financial close with the selected IPPs by the compact end date (June 2022).
RQ.C.3. How much private investment is there in IPP power generation in Benin?	• Quantitative descriptive analysis	• Administrative data • KIIs	Present the baseline value of private investment	• Between 2017 and 2019, nearly all of Benin's domestic generation was from short-term rental generation, which MCA-Benin's ITT classified as an IPP. In 2019, GoB suspended the rental generation contracts. Currently less than 1 percent of domestic generation is from IPPs (MCA-B 2020a).
RQ.C.4. What percentage of Benin's electricity supply is produced by IPPs?	• Pre-post outcomes analysis of trend in IPP- generated electricity	• Administrative data from MCA-B/SBEE	Present the baseline value of IPP generation of energy	• We can only report on the percentage of Benin's domestic generation that is produced by IPPs because we do not have data on the share of imported electricity produced by IPPs. Currently, less than 1 percent of domestic generation is from IPPs (MCA-B 2020a).
RQ.C.5. What percentage of Benin's electricity supply is produced from clean energy sources?	• Pre-post outcomes analysis of trend in clean energy generation	• Administrative data from MCA-B/SBEE	Present the baseline value of generation of clean energy	• Benin currently produces about 45 percent of its electricity supply domestically, nearly 100 percent of which is from the Maria Gleta thermal power plant.

Evaluation question	Evaluation method	Baseline data source	Role of baseline data collection	Early outputs
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	n.a.	• n.a. because no PPAs are in place.
RQ.C.7. Do IPPs perceive the regulatory framework as credible and transparent?	• Qualitative descriptive analysis of stakeholder perceptions	• KIIs	Discuss the perceived credibility and transparency of the framework	• The IPP solicitation is widely viewed as a success, and the number of serious bids suggests Benin has the regulatory environment necessary to attract private investment.

^ This evaluation question is only partially answered in this report because implementation had not yet begun and/or insufficient data were available at the time of writing.
# This evaluation question is not answered in this report because implementation had not yet begun and/or insufficient data were available at the time of writing.
ARE = Autorité de Régulation de l'Electricité; GoB = Government of Benin; IPP = independent power producer; KII = key informant interview; n.a. = not applicable; PPA = power purchase agreement; MCC = Millennium Challenge Corporation; SBEE = Société Béninoise d'Énergie Électrique; MCA-B = Millennium Challenge Account Benin II.

2. IPP policies and frameworks

RQ.C.1. *To what extent were new policies and frameworks for IPPs implemented?*

The GoB adopted the IPP framework in July 2019 after significant delays during the development and approval phases. In May 2018, MCA-B hired an IPP Framework Consultant & IPP Transaction Advisor. In this role, the consultant was tasked with, among other things, developing an IPP framework and model contracts for IPP projects, conducting risk and grid-level analyses, and launching and overseeing the competitive solicitation process for one or more IPP PV plants. Under the original timeline, the IPP framework was to have been completed by the end of 2018. However, preparation of the framework took longer than expected. Once the framework was presented to the GoB in early 2019, it passed through many rounds of government review before it was accepted during the Council of Ministers meeting on July 31, 2019. Nevertheless, multiple stakeholders expressed that there is strong political support for IPPs.

The IPP framework builds on laws and institutions in place prior to the compact's entry into force by defining the roles and responsibilities of each actor in the sector and the process for an open and transparent IPP procurement. In 2017, the GoB adopted a public-private partnership (PPP) law that established the legal framework and conditions for the award and management of PPP agreements in Benin. The law also created the support unit for PPPs (*Cellule d'Appui au Partenariat Public-Privé* [CAPPP]) to support the GoB in its PPP policy by producing a prioritized catalog of projects that may be the subject of a PPP, carrying out studies, supporting the *Direction Nationale du Contrôle des Marches Publics* (DNCMP) and the *Autorité de Régulation des Marchés Publics* (ARMP), and issuing opinions about project awards or PPP contract modifications. Stakeholders explained that, although many of the rules and procedures outlined in the PPP law were relevant to IPPs, it was important to have something specific to the power sector.

As described in the IPP Transaction Advisor's inception report, the purpose of the IPP framework was to clearly articulate stakeholder roles and responsibilities, transparent and competitive bidding processes, and standard models of electricity purchase contracts and credit enhancements (Ernst & Young et al. 2018a). Interviewed stakeholders felt that the IPP framework had largely achieved those objectives, with some possible exceptions. One stakeholder expressed the opinion that the IPP framework effectively defined roles and responsibilities for lenders, investors, and the government, resulting in a clear investment environment and a balance across stakeholders. The IPP framework also dictates a procurement process that includes an open prequalification step and an open international RFP with multiple validation steps. In one respondent's words, the framework

"This framework will make it possible to set fair electricity prices. Electricity is particular; if a producer is not sure whether they'll be paid, they won't invest, and that breaks the monopoly on energy generation. A guaranteed electricity price is necessary to bring them (IPPs) into the market."

-KII respondent (translated quote)

« Ce cadre permettra de pratiquer le juste prix de l'électricité. L'électricité est un peu spéciale ; si un producteur n'est pas sûr qu'il sera payé, il n'investira pas, et c'est pourquoi le monopole de la production d'électricité est rompu. Besoin d'un prix garanti de l'électricité pour les amener (IPP) à entrer sur le marché. »

-KII respondent (original quote)

provides "certainty that the process will take place correctly" and ensures a competitive tariff, both of which make Benin more attractive to investors. However, respondents also identified weaknesses with the IPP framework. One respondent felt that it was too narrowly focused on PV solar power plants, while others shared that the IPP framework cannot overcome concerns about the financial health of SBEE and that additional credit enhancements will be needed. Indeed, the IPP framework notes that "this question [of credit support] will come up each time that an IPP RFP is launched" (Ernst & Young et al. 2018b). Another respondent suggested that, while the IPP framework offers the tools necessary to recruit IPPs, Benin's ability to do so will ultimately depend on the competence and actions of the actors involved.

3. IPP investment and transactions

RQ.C.2. *Have any IPP transactions reached financial close?*

RQ.C.3. *How much private investment is there in IPP power generation in Benin?*

RQ.C.4. *What percentage of Benin's electricity supply is produced by IPPs?*

RQ.C.7. *Do IPPs perceive the regulatory framework as credible and transparent?*

As of October 2020, the GoB had not yet announced the winning bidders due to delays throughout the procurement process. MCA-B launched the prequalification process for the competitive IPP solicitation in July 2019, representing a delay of several months due to the long time needed for GoB approval of the IPP framework. In total, 35 firms submitted materials for prequalification, 21 were approved for prequalification, and 16 participated in the IPP site visit. Delays persisted throughout the solicitation progress, first from challenges with approval of the pre-qualified firms, and then when the proposal deadline was extended by nearly two months at the bidders' request. At the time of this report, eight firms had submitted proposals, and the review panel had completed the technical and financial evaluations and sent the evaluation report to DNCMP and ARE for validation. With financial close expected to take 9–12 months, MCC's target is to reach financial close by the compact end date.

> **"Credit enhancement will probably be one of the most essential determinants of the IPP program's success."**
>
> -IPP Transaction Advisor Final Report

The ability to reach financial close, and specifically the need for credit enhancements and guarantees, poses a completion risk. Because of SBEE's continued precarious financial position and because the IPP contracts are structured as long-term (25 year) concessions, credit enhancements are critical to reaching financial close. The IPP contract is expected to be structured with a 10-year African Trade Insurance Agency (ATI) guarantee. Despite initial concerns that a GoB guarantee would be required after the ATI guarantee expired, it has since been clarified that the ATI guarantee may be renewed (internal CODIR tracker received from Millennium Challenge Corporation, 2020). Donor funds may be needed for to provide credit enhancement and offset fees. However, it is not clear what donors are willing to support, and as one respondent noted, "there's only so much MCC can do."

Currently, there is almost no private investment in IPP power generation in Benin, as shown by the amount of domestic energy supply provided by IPPs. In its indicator tracking table, MCA-B categorizes the Aggreko rental generation as supply from IPPs. However, multiple stakeholders noted that the contract was not really an IPP but rather rental contracts that Aggreko won in response to a call for

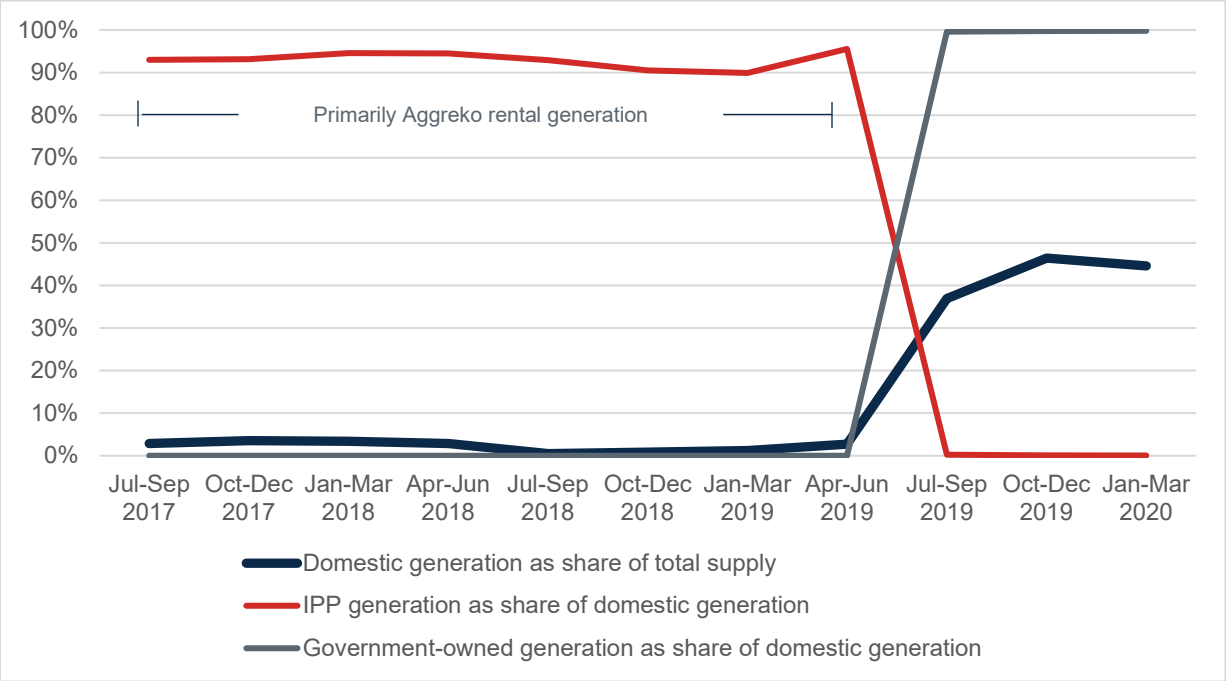
proposals (see text box). With that distinction, almost none of Benin's domestic energy generation is supplied by IPPs. MCA-B's indicator tracking table shows that between July 2019 and March 2020, IPPs produced 265 MWh of electricity, accounting for 0.2 percent of Benin's domestic generation (MCA-B 2020a).

As of March 2020, domestic electricity generation accounted for 45 percent of Benin's electricity supply, and IPPs produced less than 1 percent of the domestic electricity supply. Fifty-five percent of Benin's electricity supply is imported, but the Ministry of Energy does not provide a breakdown of the source of the imported electricity (government or utility-owned or IPP). However, MCA-B is tracking domestic energy generation, which provides important information on the share of domestic generation supplied by IPPs. From early 2017 to mid-2019, the Aggreko rental generation accounted for over 90 percent of Benin's domestically produced energy supply and about 3 percent of Benin's total electricity supply (shown as IPP generation in Figure III.X). In 2019, the new thermal power plant at Maria Gleta came online with an installed capacity of 127 MW, reducing Benin's reliance on imported electricity from 97 percent to between 55 and 65 percent. Currently, Maria Gleta represents nearly 100 percent of Benin's total domestic electricity supply.

Aggreko rental generation

In 2016, the GoB selected multinational power supply company Aggreko to provide rental generation capacity to meet Benin's critical energy supply needs. From 2017 to 2019, Aggreko operated 100 MW of installed thermal generation capacity in Benin. The GoB paid a high price for this rental generation—by some reports, three times the cost of other sources. Once the dual-fuel plant Maria Gleta II came online in 2019, with 127 MW of installed capacity, the GoB was able to cancel its contract with Aggreko, which decommissioned the rental generators.

Figure III.5. Benin's domestic electricity generation



Source: MCA-B 2020a.
IPP = independent power producer.

The level of interest in the IPP solicitation process and the number of serious bids received suggests that firms view Benin as attractive for private investment. There were 21 pre-qualified firms approved by ARE (a number that one respondent said was "enormous, particularly for Francophone West Africa"). By the deadline on May 15, 2020, eight firms submitted proposals. Key informant interview (KII) respondents indicated that the bids were serious and legitimate, a fact which suggests that "IPPs genuinely want to invest in Benin and have some confidence in Benin" and signals confidence in the credibility of the IPP framework. Other respondents gave the opinion that the IPP framework has created a "clear, effective process."

4. Electricity supply from clean energy sources

RQ.C.5. *What percentage of Benin's electricity supply is produced from clean energy sources?*

As of March 2020, domestic electricity generation accounted for 45 percent of Benin's electricity supply, of which almost all was from the thermal power plant at Maria Gleta. The solar power plant IPPs being supported by MCC have not yet reached financial close, and are not expected to be completed until after the end of the compact.

Fully understanding how much of Benin's electricity supply is from clean energy sources requires data not only about Benin's domestic electricity generation, but also about the sources of imported electricity, off-grid electricity, and self-generation. To our knowledge, there is no centralized database containing this information. However, we can still provide some information on the degree to which Benin's domestic and imported electricity is produced from clean energy sources.

Imported electricity: Prior to the commissioning of Maria Gleta in 2019, Benin produced only 3 percent of its total electricity supply, relying heavily on imports from CEB and imports transmitted by CEB from Ghana, Nigeria, and Côte d'Ivoire. The table below shows the sources of CEB's electricity imports in 2017 and the percentage of each supplying country's energy generation that is from clean energy sources. In 2018, CEB ceased import activities and became solely a transmission company, leaving SBEE to contract directly with Ghana and Nigeria for electricity imports.

Table III.10. Sources of CEB's electricity imports

Electricity source	Percentage of CEB's total supply	Percentage of source's total generation that is from clean energy sources
Transmission Company of Nigeria	60%	23% [b]
Ghana's Volta River Authority	11%	52% [c]
Cote d'Ivoire	4%	23%[d]
CEB-owned power plants	25%	44% [e]

[a] Source: Direction Générale des Ressources Energétiques (DGRE) 2018.

[b] Source: Nigerian Electricity Regulation Authority 2018.

[c] Source: Volta River Authority 2018.

[d] Source: Ministère du Pétrole, de l'Énergie et des Énergies Renouvelables (MPEER) 2017.

[e] Source: DGRE 2018.

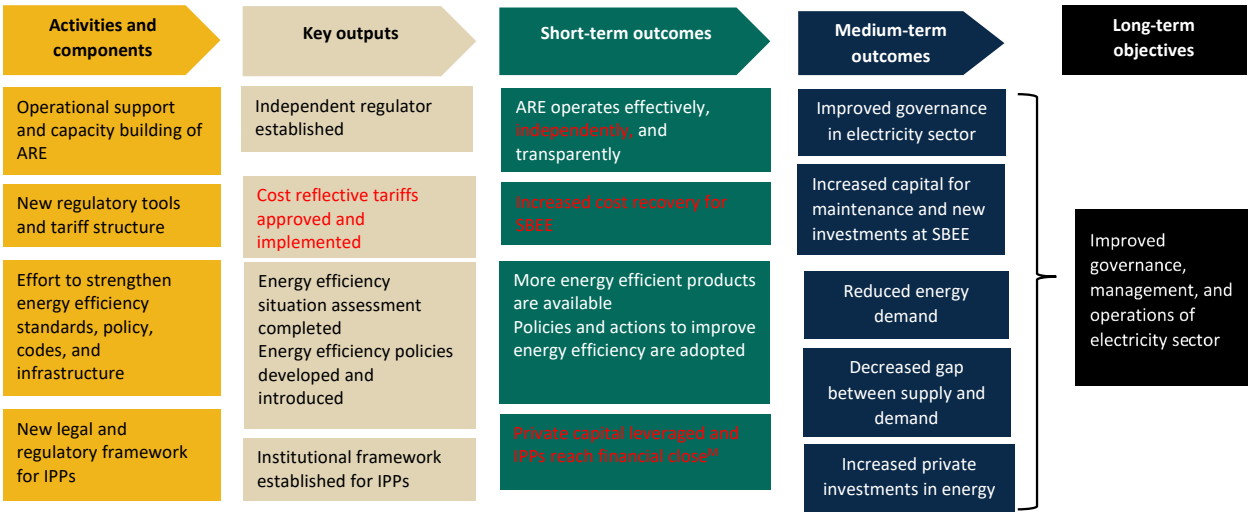
CEB = Communauté Electrique du Bénin.

Domestic electricity: MCA-B's Indicator Tracking Table reports Benin's domestic generation supply by energy sources (MCA-B 2020a). These data show that in 2017, 25 percent of Benin's domestic generation output was from clean energy sources (solar and hydro); however, the majority of that generation was actually from CEB's Nangbeto hydropower plant located on the Mono River in Togo and so should not be considered Benin's domestic power generation. This figure increased slightly to 28 percent in 2018. In 2019, the thermal power plant at Maria Gleta came online and now produces nearly 100 percent of Benin's domestic electricity supply, reducing Benin's reliance on imports from neighboring countries. We do not currently have information on the share of Benin's off-grid and self-generated electricity that is from clean energy sources.

D. Assessment of the Policy Activity logic model

Some of the changes to the Policy Activity's design and delays in implementation may have implications for the linkages and assumptions in the logic model. In Figure III.6, we show the Policy Activity's logic model. Text in red indicates outputs and outcomes that are at risk based on the current status of implementation. We then discuss the outputs and outcomes at risk.

Figure III.6. Risks to the Policy Activity logic model



Note: Red text denotes outputs and outcomes that are at risk.

[M] Wording for this outcome was modified.

[A] Outcome was added to this version of the logic model (not included in earlier versions).

[R] Task or item was removed from the logic model.

ARE = Autorité de Régulation de l'Electricité; IPP = independent power producer; SBEE = Société Béninoise d'Énergie Electrique.

Expected output: ARE operates effectively, independently, and transparently. ARE currently relies on outside donors and the GoB for funding. The expectation is that, in the medium term, ARE will reduce its reliance on donors through a levy on electricity consumption collected through SBEE and a license fee on IPP investments. Eventually, assuming finances improve, ARE will gain financial and operational

independence in decision making, which will help create a more stable financial position for the utility and an enabling environment for private investment—overarching goals of the project. However, those funding sources have not yet materialized, demonstrating that the establishment of a regulating body does not ensure its independence. Although most stakeholders agreed that ARE is operating effectively and transparently, we cannot yet conclude that it is operating independently. This poses a potential risk to medium- and long-term outcomes related to improved governance of the energy sector.

Expected outcome: New cost-reflective tariffs approved and implemented; increased cost recovery for SBEE. The program logic has an underlying assumption that tariff reform will be implemented in a way that improves cost-recovery. The subsidy implemented in December 2019 undercuts that assumption, so the "cost-reflective tariffs approved and implemented" outputs and the "increased cost recovery for SBEE" short-term outcome risk not being fully achieved. A lack of cost-reflective tariffs has serious negative implications for improved financial management of SBEE and, in the long-term, improved management and operations of the electricity sector.

Expected outcome: Private capital leveraged and IPPs reach financial close and begin construction. At the current pace of implementation, MCA-B hopes to reach financial close with the selected bidder(s) and begin construction prior to the compact end date. It is not expected that construction and commissioning of the IPPs will be completed until after the compact has closed. SBEE's continued precarious financial position means that the selected bidder(s) have requested credit enhancements. Although there was initially concern that the GoB would need to provide those credit enhancements, it now appears that ATI/ACA credit support can be renewed. Nevertheless, a failed IPP procurement for any reason would put the "decreased gap between supply and demand" medium-term outcome at risk.

E. Next steps

After this baseline and early implementation analysis, we will continue to monitor developments in the Policy Activity through the end of the compact. We will conduct the appliance seller survey and consumer focus group discussions (which we were not able to complete at baseline due to COVID-19) in 2021. We will combine those results with our baseline results and administrative data to conduct a performance evaluation at interim and will report on early outcomes and trends as the compact comes to a close in 2022. We will conduct a final round of primary data collection—including KIIs among stakeholders in Benin and the United States, focus group discussions among consumers, and surveys of appliance sellers in 2024—and will combine these data with baseline and interim values for an assessment across outcomes. We note that having access to project reports, implementation assessments, meeting notes and reports on key indicators will be vital for a robust evaluation of the activity.

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IV. Utility Strengthening Activity: Baseline situation and early outputs

In this chapter, we present baseline statistics for outcomes of interest and, where applicable, provide a summary of early outputs of the Utility Strengthening Activity. We provide a brief overview of the relevant literature; outline the evaluation questions, evaluation methods, and data sources; and discuss information currently available to inform the evaluation questions.

Key observations

- SBEE and GoB met some, but not all, of their obligations under the first *contrat-plan* (performance contract).
- The management services contractor has been in place at SBEE for a year and is viewed favorably by staff as it completes its assessment and workplan.
- SBEE's financial situation remains precarious and has worsened since the start of the COVID-19 pandemic.

A. Utility Strengthening Activity

SBEE occupies a unique position at the center of Benin's power sector and, accordingly, is a central object for reform and institutional strengthening within the Benin II compact. The Reform Project, and specifically the Utility Strengthening Activity, aims to strengthen governance, management, and financial management at SBEE with the goal of transforming it into a politically independent and financially solvent organization. Two major interventions have been initiated along these lines. The first is a set of *"contrat-plans,"* or performance contracts, that seek to legally define the relationship between SBEE and the GoB by setting clear contractual requirements for each party. The second is a management services contract that the project designed and procured over the first two years of the compact. Canadian firm MHI was selected to lead management and operations at SBEE for four years, beginning in November 2019. The recruitment of MHI represents an expansion of the original scope of the Reform Project and responds to the president of Benin's desire to take stronger measures to ensure reform at SBEE.

The president's decision to call for a management services contract at SBEE is supported by a body of literature and precedent from neighboring countries. The United States Agency for International Development (USAID) conducted an analysis of management services contracts at public utilities and found that they can be effective when certain conditions are satisfied. These conditions include consistent government support for the contractor, adequate financing, and clear performance benchmarks, among others (Wood 2018). The World Bank analyzed management services contracts at public utilities in 17 sub-Saharan Africa countries and concluded that they are most likely to be effective when coupled with other types of investments in institutional strengthening (Eberhard et al. 2011).

In Table VI.1, we show the progression of work from inception to November 2019, when we completed the EDR, and to October 2020, at the time of writing this report.

Table IV.1. Objectives and tasks of the Utility Strengthening Activity

Planned tasks at inception	Tasks completed (October 2019)	Tasks completed (November 2020)
Objective: 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	• Management services contractor will assume many of the originally planned tasks based on President Talon's request. The two sub-activities are now under purview of the management services contractor.	• As management services contractor, MHI has been overseeing management and operations of SBEE since November 2019. • The Council of Ministers has not yet approved the second contrat-plan.

SBEE = Société Béninoise d'Énergie Électrique.

1. Evaluation questions, approach, and key findings

The evaluation questions linked to the Utility Strengthening Activity focus on the implementation status and outputs of the contrat-plans and the management services contract. These questions are detailed below in Table IV.2. To answer these questions, we drew on a variety of quantitative and qualitative data sources, including telephone surveys of SBEE employees; KIIs; and a systematic review of SBEE, MHI, and auditor reports. For future analyses, we also intend to leverage administrative data from MHI's key performance indicators (KPIs) and outputs from the second contrat-plan. Some of the evaluation questions are not addressed in this report because the relevant interventions are still at an early stage of implementation or reports and data were not available at the time of writing. There have been some updates to our data collection plans since the publication of our EDR; these are linked to the COVID-19 pandemic and are described in Appendix A.

Table IV.2. Evaluation questions, methodology, data sources, and early outputs for the Utility Strengthening Activity

Evaluation questions	Methodology	Data collection	Role of baseline data collection	Early outputs
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 • KIIs	Analyze whether objectives of first contrat-plan were met; assess content of second contrat-plan	• Both SBEE and GoB partially satisfied the requirements of the first contrat-plan (2017–2019). The unmet requirements are included as requirements in the second contrat-plan, which is drafted but not yet in force.
RQ.E.2. Has the management contractor been able to meet its commitments under the management contract?#	• Qualitative descriptive analysis	n.a.	n.a.	• Ten months into the management services contractor's term at SBEE, during its diagnostic phase, it is too early to answer this evaluation question.
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 • KIIs	n.a.	• Baseline values of some KPIs are available but it is too early to assess performance against the KPIs.

Evaluation questions	Methodology	Data collection	Role of baseline data collection	Early outputs
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	• KIIs • Surveys	Describe GoB and SBEE perceptions of MHI after 10 months.	• Early perceptions of the management services contractor are broadly positive.
RQ.E.5. How do IPPs perceive SBEE's ability to meet its obligations under PPAs?#	• Qualitative descriptive study with a political economy lens	• Document review • KIIs	n.a.	• At the time of writing, the GoB had not yet announced the selected IPP firm(s), so we were not able to conduct interviews with selected and non-selected firms as originally planned. We plan to conduct these interviews at a later date and will include findings in an update of this report or in the interim report. Please see Chapter III, Section D, for a description of the IPP solicitation process and stakeholders' perceptions of the IPP framework.
RQ.E.6. Did SBEE's cost recovery and financial health improve?	• Pre-post analysis	• Administrative data	Describe SBEE's balance sheet	• At the time of writing, SBEE is in poor financial health with no apparent positive outlook.
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	Describe staff perceptions of billing and payment processes at baseline	• SBEE employees note improvements since the arrival of MHI, but it's not yet known whether customers agree.
RQ.E.8. Did SBEE improve its bill collection and reduce its overall commercial losses?	• Pre-post analysis	• Administrative data	Describe baseline situation related to commercial losses and collection rate	• Both metrics figured into the first contrat-plan, but there has not yet been significant progress.
RQ.E.9. To what extent has labor productivity increased at the utility?	• Pre-post analysis	• Administrative data	Describe early outputs	• MHI has taken steps to improve labor productivity, but it is too early to measure results.

Evaluation questions	Methodology	Data collection	Role of baseline data collection	Early outputs
RQ.E.10. Did the technical assistance from the management contractor to SBEE lead to improved maintenance practices?^	• Qualitative analysis of stakeholder perceptions	• Document review • KIIs	Present baseline situation of maintenance practices	• At baseline, SBEE's maintenance challenges include lack of regular maintenance, no central log of maintenance records, and lack of replacement parts.
RQ.E.11. Does SBEE have the capacity to continue maintaining infrastructure (both MCC and non-MCC funded)?#	• Qualitative sustainability analysis	• Document review • KIIs	Describe SBEE's technical, financial, and operational capacity at baseline	• SBEE's weak financial position impedes its ability to improve maintenance practices.
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*	• MHI has implemented several management changes that stakeholders view as positive developments; however, it is too early to measure the impact on operational efficiency.

^ This evaluation question is only partially answered in this report because implementation had not yet begun and/or insufficient data were available at the time of writing.

# This evaluation question is not answered in this report because implementation had not yet begun and/or insufficient data were available at the time of writing.
GoB = Government of Benin; IPP = independent power producer; KII = key informant interview; KPI = key performance indicator; MCC = Millennium Challenge Corporation; MHI = Manitoba Hydro International; n.a. = not applicable; PPA = power purchase agreement; SBEE = Société Béninoise d'Énergie Électrique.

2. Implementation of the contrat-plans

RQ.E.1. To what extent have GoB and SBEE abided by the terms of the approved contrat-plan since its adoption?

The first contrat-plan established clear performance objectives for SBEE and defined the relationship between SBEE and GoB. The first contrat-plan represented an innovation in the relationship between GoB and SBEE. One respondent explained that "it was the first time SBEE had clear objectives in advance." The contrat-plan included 50 commitments for SBEE and 21 commitments for the GoB, across six domains: finances, generation and distribution, commercial, human resources, information systems, and governance. For each commitment, the contrat-plan defines monitoring indicators, specifies the agency responsible, and sets a deadline for completion. For this report, we relied on information from the report on the evaluation meeting of the contrat-plan dated July 2019 and on the December 31, 2018 progress report, both of which reviewed results from 2017 and 2018. We did not have access to a report or meeting notes evaluating progress on the contrat-plan through 2019. We note that there seems to be some discrepancy across documents. The contrat-plan lists a total of 71 commitments across GoB and SBEE, while the report on the evaluation meeting states cites 86 total commitments.

Contrat-plan

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 that included members with technical qualifications to provide additional oversight.

Contrat-plan 2017–2019 implementation challenges

- Delayed implementation of some generation and distribution projects
- Meter shortage at SBEE
- Lack of human resources in strategy sectors, which negatively impacts debt collection
- Late payment of public administration bills
- Significant costs of electricity generation and purchase
- Not instituting contrat-plan monitoring and evaluation entities.

The GoB and SBEE met some, but not all, of the objectives from the 2017-2019 contrat-plan. The report from the 2019 evaluation meeting cites that by the end of 2018, SBEE and GoB had jointly accomplished 39 of the 86 commitments. Another 18 commitments were partially achieved/in progress, while 29 had not yet been achieved (SBEE 2019b). The report summarized the main challenges encountered in implementing the contrat-plan, as shown in the text box. Despite these challenges, more than one respondent noted that the contrat-plan had led to the creation of defined performance indicators and improvement in the quality of SBEE's service.

Major challenge areas for SBEE included bill collection and improvements in service quality. The evaluation report noted that the SBEE regional offices had not been able to achieve objectives related to bill collection and service quality and provided specific recommendations for improving performance at the regional level. The report also noted reductions in total losses (technical and commercial losses combined) as a major challenge. When the contrat-plan was developed in 2016, total losses in the sector were 23 percent. The contrat-plan set targets for a total loss rate of 21 percent in 2017 and 18 percent in 2018 and 2019. By the end of 2018, the total loss rate was 22.4 percent. MCA-B's indicator tracking table and KIIs suggest that the total loss rate by the end of 2019 was about 21 percent (MCA-B 2020a), but MHI's diagnostic report of SBEE estimates that total losses averaged 26.7 percent over 2019 (MHI 2020d). It is unclear why these numbers differ. Regardless, these figures are still well short of the target of 18 percent by 2018. The contrat-plan evaluation report suggested that the lack of new meters to replace defective meters was one contributing factor, because defective meters make it impossible to correctly bill customers. We note, however, that the inability to separate out technical losses from commercial losses masks potential progress or backsliding on the two very different kinds of losses. Reduced commercial losses requires better billing and collections, while reduced technical losses requires better maintenance and investment in the equipment and infrastructure. According to the 2018 progress report, SBEE has implemented activities to reduce both types of losses, but without separate monitoring, we cannot determine whether SBEE has had more success in one area or the other.

The GoB's chronic late payment of electricity bills negatively affects SBEE's financial position. SBEE's financial health depends on adequate cash flow and funds for investing in its operations and infrastructure. The GoB, one of SBEE's largest customers, has historically fallen short in paying for the electricity it consumes. Because of this, MCC required a government arrears payment plan one of the prerequisites for disbursing $80 million of On-Grid Tranche funding. The GoB, under the contrat-plan, committed to other actions to improve SBEE's financial position, such as taking on the cost of expensive emergency electricity generation and imposing harsher penalties to reduce vandalism of electricity lines and theft of electricity. According to the 2018 progress report, the GoB had not met many of these objectives. Additionally, GoB transferred some costly contracts to SBEE and did not take action to prevent vandalism and fraud, according to the review. The GoB had settled its bills with SBEE through December 31, 2017 but had not paid its bills for 2018 by the time the progress report was written. This delay was resolved in 2019 as MCC made government arrears payment one of the requirements for disbursing $80 million in On-Grid Tranche funding.

SBEE and GoB did not fully monitor and enforce the first contrat-plan's objectives. According to the first contrat-plan, there should have been numerous actors involved in tracking and reporting progress on the contrat-plan objectives. These actors include:

- A *comité d'évaluation et de suivi,* housed at the Ministry of Finance and composed of representatives from the ministries that signed the contrat-plan. This entity should have met at least once a quarter to review progress on both GoB and SBEE's commitments. By the end of 2018, however, the *comité* had not been put in place.
- A dedicated coordinator within SBEE, tasked with monthly monitoring of SBEE's progress on its commitment. This coordinator was expected to work with focal points from various SBEE departments to obtain the data necessary to report on SBEE's progress. According to the 2018 progress report, the coordinator role was subsumed by the *cellule suivi-evaluation* created at SBEE. It was this group that produced annual reports on the status of the contrat-plan implementation.

- A *comité de pilotage du contrat-plan,* led by the President's cabinet head and charged with meeting once a year to assess the fulfillment of the main contractual requirements based on a rapport produced by the *comité d'évaluation et de suivi.* No such *comité de pilotage* exists.
- An independent auditor, hired by GoB to monitor the first contrat-plan and resolve disputes between the parties involved. GoB never recruited this auditor.

Stakeholders noted that the lack of rigorous monitoring of progress toward the contrat-plan objectives resulted in a situation in which SBEE and GoB did not respect deadlines and did not meet many of the contrat-plan objectives. One respondent noted that, although SBEE had the *cellule suivi-evaluation* in place, it tracked indicators that were not relevant to the management of SBEE. One respondent suggested that an unbiased independent auditor would be key to assuring accountability. A plan for this is in place, as the management services contract auditor is tasked with filling the role of independent auditor of the contrat-plan. Overall, respondents felt that more rigorous monitoring of the second contrat-plan would be necessary to improve performance.

The second contrat-plan, developed in order to align with the management services contract, offers the opportunity to achieve the objectives not met under the first contrat-plan, to set more ambitious targets for SBEE's performance under the management services contractor, and to improve monitoring of progress. Despite the fact that not all objectives were achieved, respondents noted that the first contrat-plan had succeeded in opening up discussion and negotiation between SBEE and GoB and pressed SBEE to develop a long-term vision and goals. The second contrat-plan is thus a natural continuation of that work and builds on the content of the first contrat-plan. It includes the objectives that were not met under the first contrat-plan as well as new objectives that put it in line with the management services contract. The director general of SBEE (part of MHI's team) is responsible for signing the second contrat-plan and ensuring that SBEE meets its commitments. MHI's KPIs are aligned with the second contrat-plan and go further in their requirements for SBEE's performance than the second contrat-plan. Once the second contrat-plan is signed, MHI will include contrat-plan progress updates in its quarterly reports. To improve internal monitoring, MHI has already taken steps to better define who within SBEE is responsible for monitoring and reporting progress on the contrat-plan. In addition, MCA-Benin and GoB hired an independent auditor to monitor performance under both the contrat-plan and the management services contract.

Challenges to achieving the objectives of the second contrat-plan include the delay in implementation as well as performance issues at SBEE. The second contrat-plan has been under development since early 2019, when the management services contractor transaction advisor developed a draft contrat-plan as part of its MCA-B-funded work on the management services contract (Nodalis Conseil 2020). In July 2019, MCA-B met with GoB to finalize the document. However, as of August 2020, SBEE's *Conseil d'Administration* had not yet reviewed and passed the contrat-plan to the Council of Ministers for approval (notes from CSC meeting held on August 12, 2020). It is not clear what has caused the delays. Although MHI, which assumed leadership of SBEE in November 2019, is proceeding with its work to achieve its KPIs regardless of the status of the contrat-plan, it is not clear whether the GoB has an incentive to abide by its commitments before the contrat-plan is approved. In addition to the issue of timing, respondents from MHI cited a few challenges to meeting SBEE's commitments under the contrat-plan, including reducing technical and commercial losses, SBEE's culture, and a skill gap resulting from insufficient training and recruitment practices that are not transparent or objective.

3. The management services contract and SBEE's performance

RQ.E.2. *Has the management contractor been able to meet its commitments under the management contract?*

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?*

MHI's leadership team has been in place at SBEE for a year at the time of writing, making it too early to assess the degree to which MHI has been able to meet its commitments. The first nine months of the management services contract were to be dedicated to assessing SBEE and refining plans and KPIs for the remainder of the contract. The initial management services contract includes 41 KPIs (shown in Table IV.3), which MCA-B, the auditor, and the *Comité de Suivi et du Contrôle* (CSC) will use to assess MHI's performance.

Table IV.3. Management services contract key performance indicators

Technical performance indicators	
T1	Service continuity indicator (excluding external cause)
T2	Number and duration of outages at MV / LV stations
T3	Number and duration of outages at source or MV distribution stations
T4	Availability rate of power plants
T5	Specific consumption of power plants (fuel, lubricant)
T6	Average cost of produced kWh
T7	Average cost of thermal kWh
T8	Variation in voltage compared to nominal voltage
T9	Percentage of overloaded HVB substations
T10	Percentage of distribution stations overloaded
T11	Percentage of distribution feeders with normal end-of-line voltage
Commercial performance indicators	
C1	Distribution network efficiency
C2	Number of active subscribers / number of total subscribers
C3	Number of subscribers billed / number of active subscribers
C4	Number of subscribers billed by the meter / number total of active subscribers
C5	Number of subscribers billed on meter reading / number of active subscribers with a post-payment counter
C6	Number of subscribers billed in prepayment / total number of subscribers billed
C7	Cumulative amount old receivables / average monthly billing
C8	Unpaid rate per billing session (month M) and by category of subscribers on date M + 6
C9	Recovery rate from private LV subscribers (TauxrBTpr)
C10	Rate recovery rate for private MV subscribers (TauxrMTpr)
C11	Recovery rate for public subscribers
C12	Compliance of metering installations for large customers
C13	Average price per kWh invoiced

C14	Rate and processing times for customer complaints
C15	Average client troubleshooting time
C16	Number of frauds detected and recovered
C17	Number of employees / 1,000 active subscribers
HR performance indicators	
H1	Safety of employees and third parties
H2	Indicator relating to staff training
H3	Female workforce / total workforce per position
H4	Number of vulnerable or disadvantaged staff / total workforce per position
HSE performance indicators	
E1	Implementation of the integrated HSE management system
E2	Availability of an initial state and of the monitoring program of the physical, biological and human environment
E3	E&S due diligence of investment projects
E4	Hours of training provided as part of the capacity building program (E&S safeguard)
E5	Availability of the operating site rehabilitation program
E6	Number of contracts with suppliers and subcontractors including specific HSE clauses
E7	Volumes of hazardous substances used on operating sites and in transformer stations
Other Indicators	
A1	Indicators for monitoring the progress of investment projects (including those in progress)
A2	Difference between IT stock and physical stock

Source: MCA-B 2018a.

E&S = Environmental and social; HR = human resources; HSE = Health, safety and environment; HVB = High voltage B; IT = information technology; kWh = kilowatt-hour; LV = low voltage; MV = medium voltage.

The transaction advisor for the management services contract provided baseline values from 2017 for several indicators. To develop KPIs and establish benchmarks, the transaction advisor calculated baseline values for most of the technical and commercial performance indicators but were unable to determine values for some of the human resources and HSE indicators. In Table IV.4, we show values for several key indicators, alongside target values for 2020 and 2023. More recent information is not yet available; therefore, we are unable to gauge what improvements, if any, have been made since 2017.

Table IV.4. Baseline values and targets for a selection of management services contractor indicators

Category	Number	Indicator	2017 value	2020 target	2023 target
technical	T2	number and duration of blackouts (MV and LV)	782; 4195 hours	600; 3000 hours	150; 600 hours
technical	T10	percentage of distribution stations that are overloaded	3.74%	3%	1%
commercial	C1	distribution network efficiency	77%	-	86%
commercial	C3	Number of billed accounts / number of active accounts	70%	82%	100%
commercial	C4	Number of accounts billed by a meter / number of active accounts	70%	80%	98%
HR	H3	female workforce / total workforce (per position)	23%	-	-

HR = human resources; LV = low voltage; MV = medium voltage.

The COVID-19 pandemic has hindered some of the management services contractor's tasks, but it is on track with the first major deliverable. The management services contract stipulates that MHI conduct a diagnostic assessment of SBEE over the course of the first nine months of the contract period, which began November 4, 2019. This assessment was negatively affected by travel restrictions due to COVID-19 – because MHI staff and consultants were not able to travel to Benin, some work was conducted remotely while other tasks were postponed. MHI delivered the draft diagnostic assessment in August 2020; it is under review at the time of writing this report. During this diagnostic period, MHI determined a need to expand the initial MHI team through the addition of an information technology (IT) director. The Presidency also identified the need for a procurement director.[8]

The monitoring committee is closely overseeing the management services contractor and the auditor. MHI delivered its first two quarterly reports to the monitoring committee, while the management services contract auditor provided its own assessment of MHI's performance during these periods. The monitoring committee found some fault with MHI's reports and recommended revisions to their content. At the same time, the monitoring committee found the auditor's work inadequate and incomplete. While the changes to MHI's reports are likely relatively straightforward to complete, the auditor is perceived by several key stakeholders as not fulfilling the requirements of the position. One stakeholder indicated that the auditor has not assigned a dedicated contract manager to this project. Rather, several individuals have been involved in the auditing tasks leading the stakeholder to conclude that no single individual in the auditor team has complete knowledge of the auditor's and management service contractor's tasks.

MHI has taken quick action to address a serious lack of staff training, especially within the internal audit department. In MHI's initial assessment of SBEE, they noted that there had not been a training in the internal audit department in nearly a decade and that the average tenure of staff in that department was only four years. Based on these findings, MHI developed an internal audit department training plan for 2020 as one of its first actions (MHI 2020a). The training plan includes weekly trainings on office software applications; monthly trainings on new processes, risk management, and other topics; quarterly trainings to review work over the past quarter; and an annual training outside of the company with a globally recognized audit firm. MHI is also planning trainings for the human resources department, commercial department, legal department, and regional offices. Results from our survey of SBEE staff, conducted in July–August 2020, reveal that 71 percent of respondents said a training plan exists and 47 percent of respondents said that they have a training scheduled sometime in the next six months.

4. Performance of the management services contractor

> ***RQ.E.4.*** *What are the perceptions (by GoB, SBEE employees, and other stakeholders) of the performance of the management services contractor?*

Clear communication on the purpose and nature of a management services contractor was key to gaining public and union support. Despite strong political will from the office of the President, a broad spectrum of stakeholders initially expressed uncertainty about the value or feasibility of a management services contractor "taking over" the national electric utility. Key informants noted that MCA-B was initially hesitant about a management services contractor but has since come to see the value of having

[8] The new IT director position will be funded through the reallocation of $3 million from the Off-Grid Project; MCC does not plan to fund the procurement director position.

one firm responsible for improving SBEE's performance across divisions. MCA-B, particularly the operations department and the transaction advisor, devoted considerable time and energy to alleviating the SBEE unions' concerns about the management services contractor. MCA-B also facilitated a communications campaign to correct misconceptions among the public and to describe in simple terms the purpose of the management services contract. Multiple stakeholders noted that most people now seem to understand the purpose of the management services contractor for improving SBEE's performance.

Stakeholders across the sector have confidence in MHI's ability to improve SBEE's performance. In June 2020, interviewed stakeholders reported that the new SBEE *Directeur Général* (DG) has formed a positive relationship with the Minister of Finance and is respected by the President. As one respondent stated, the MHI team is "taking their work and objective seriously;" a broad range of stakeholders reported similar beliefs and had positive perceptions of MHI at as of mid-2020. Most of MHI's staff have stayed in Benin and continued to work during the COVID-19 pandemic; this commitment has been well-received by various energy sector stakeholders.

Despite initial panic about the changes proposed by MHI, SBEE staff at all levels report largely positive impressions of MHI's performance. In a mid-2020 interview with an MHI staff member, the respondent reported that about 90 percent of staff seem to be receptive to the proposed changes. In June 2020 Mathematica conducted a survey of 600 SBEE employees in conjunction with its data collection partner, SDI. Results from this survey are consistent with that assessment. When asked to rate the overall performance of MHI on a five-part scale, 33 percent of respondents rated their performance as "very good" and an additional 54 percent rated their performance as "good." Only 2 of the 600 respondents surveyed rated MHI's performance as "poor," and none gave a rating of "very poor." When asked to assess the relevance of the current reform efforts underway at SBEE, 94 percent of respondents indicated that they were "very necessary" or "somewhat necessary."

SBEE staff perceive improvements across a broad range of outcomes since the arrival of MHI. When asked to assess the change in performance along several dimensions, a majority of respondents noted better staff management, higher quality of customer service, more political independence for SBEE, a reduction in the frequency of blackouts, a reduction in the processing time for new connection requests, and better organization of repairs. As shown in Table IV.5, there is broad consensus that performance improved in all six areas; five of the six are perceived to have improved by at least 90 percent of respondents. The only potential outlier in this section is the level of political independence for SBEE, where 75 percent of respondents perceived an improvement (more independence) versus 12 percent who perceived a deterioration (less independence) and 13 percent who did not perceive a change. It should be observed that this is the area in which the management services contractor has the least agency.

Table IV.5 SBEE staff perceptions of changes since the arrival of MHI

	Change since MHI's arrival		
Outcome	Better	No change	Worse
Quality of staff management	90%	8%	2%
Quality of customer service	93%	6%	1%
Level of political independence for SBEE	75%	13%	12%
Frequency of blackouts	91%	6%	3%
Connection request processing time	94%	4%	2%
Organization of repairs	90%	9%	1%

Source: Data from 2020 SBEE Staff Employee Survey

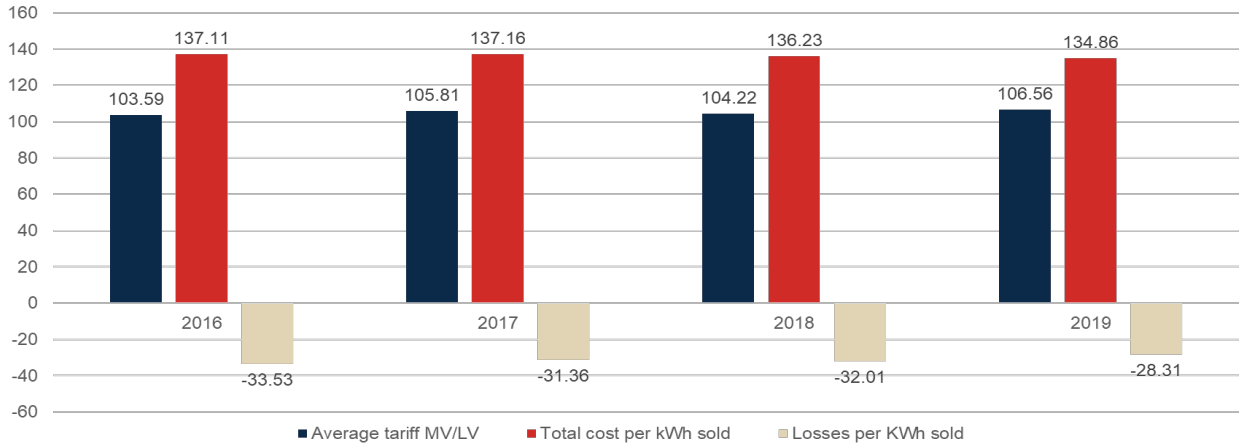
MHI = Manitoba Hydro International; SBEE = Société Béninoise d'Énergie Électrique.

5. The management services contractor and SBEE's financial health

RQ.E.6. Did SBEE's cost recovery and financial health improve?

SBEE's average tariff (shown in Figure IV.1) covered from 75 to 77 percent of the average cost of service between 2016 and 2020, with a slight improvement to 79 percent in 2019 (shown in Figure IV.1).[9] The cost-reflectiveness of tariffs is an important marker of the financial health of a utility and is both a key indicator for the success of the Utility Strengthening Activity and a prerequisite for the sustainability of reforms in the sector, as well as the long-term sustainability of the utility.

Figure IV.1. SBEE average tariff vs. cost of service 2016–2019



Source: MHI 2020d

Note: The total costs are the sum of variable and fixed costs, such as energy imports, thermal power plant rental, O&M, depreciation, salaries, admin costs, financial expenses, etc.

kWh = kilowatt-hour; LV = low voltage; MV = medium voltage; SBEE = Société Béninoise d'Énergie Électrique.

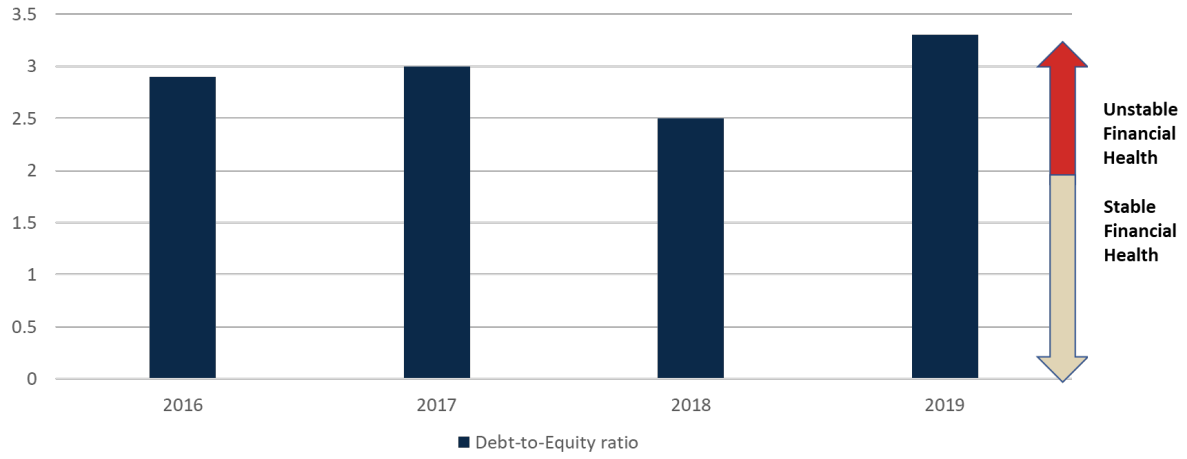
SBEE's financial health at baseline shows an indebted company with low cash liquidity. The primary source of revenue for the utility is electricity sales; therefore, a low-cost recovery rate is usually a marker of poor financial health. Considering SBEE's financial health in a broader sense, the management services contractor argues that SBEE's financial situation is dire and the utility lacks sufficient resources to do much more than pay salaries and vendors (MHI 2020b). This assessment aligns with pre-compact studies, the Ministry of Energy's analysis of SBEE's finances in 2019, and analyses conducted by the tariff consultant at ARE. In Figure IV.2, we present SBEE's debt-to-equity ratio, an important metric for evaluating the overall financial health of a company, including utilities.[10] Generally, ratios of 0.5 and below are considered excellent, while ratios above 2.0 indicate a less financially stable company. A high

[9] The 2019 estimate used non-audited data.

[10] To calculate a company's debt-to-equity ratio, we divide its total liabilities (long-term debts) by the amount of equity (the debt and equity a company uses to finance its operations).

debt-to-equity ratio also indicates a company uses debt to finance its growth. Companies that invest large amounts of money in assets and operations, such as utilities, often have a higher debt-to-equity ratio (over 2), which indicates they might not be able to produce enough money to repay debts. In Figure IV.2, we show that SBEE's debt-to-equity ratio has been increasing (with the exception of 2018), and its highest ratio (above 3) was in 2019.

Figure IV.2. SBEE's debt-to-equity ratio



Source: MHI 2020d

SBEE = Société Béninoise d'Énergie Électrique.

Financial weakness at SBEE has a range of causes. The stakeholders we interviewed in 2020 cited a range of explanations for SBEE's poor financial position, some of which were also reflected in MHI's diagnostic report:

- Monthly deficit partly driven by the cost of operating the Maria Gleta thermal power plant
- Defective meters, a lack of replacement meters, and a shortage of meter-reading staff prevent bill collection from customers
- Long delays in the release of SBEE financial statements (up to one year), impeding planning
- Bribe-taking among technicians and meter installers for repairs and new connections

Respondents reported other concerns and opinions about SBEE's financial state:

- History of weak management, poor decision making, and lack of financial controls at SBEE
- Funds at the utility wasted on failed or non-transparent procurements
- Inability to resolve unpaid bills, which now amount to 120 billion CFA
- 373 billion CFA committed to 20 major projects, over which SBEE does not have full management control

The Utility Strengthening Activity is expected to address most of the challenges articulated by respondents and identified in the assessments conducted by MCA-B consultants 2014/2015. MHI has already made efforts to improve the finances at the utility through bill collection (see Section 5 below) and a reduction in administrative costs. It is important to note that the client base is growing; in 2019 the

number of new SBEE customers increased by almost 31,000 (or 5.1 percent), which may be viewed as a positive sign for potential future financial health of the utility (MHI 2020d).

6. SBEE's billing and payment processes

> ***RQ.E.7.*** *To what extent did SBEE's billing and payment processes improve from the perspective of its personnel and of its customers?*
>
> ***RQ.E.8.*** *Did SBEE improve its bill collection and reduce its overall commercial losses?*

A survey of SBEE customers and MHI's assessment indicate that SBEE's customer service is dire. In 2019 Mathematica collected customer satisfaction data from households and businesses for the evaluation of the Electricity Distribution and Generation Projects[11]. At the time, 47 percent of household respondents, 44 percent of small business respondents, and 53 percent of large business respondents reported that they were somewhat or very dissatisfied with the quality of SBEE's customer service.

MHI examined several aspects of the customer experience as part of their baseline situation analysis. Their observations include the following comments:

- Customers perceive SBEE as a company that does not care about the customer experience.
  - Sales agents often lack a customer-oriented approach and are sometimes unwilling to take responsibility for customer requests.
  - SBEE storefronts outside of Cotonou are often difficult to find.
  - Customers often are not informed of outages and repairs. MHI notes that this issue may be improving with increased outreach on social media.
  - SBEE has not developed a strategy for promoting energy efficiency among its clients.
- Due to staff shortages, SBEE meter-readers are sometimes accompanied by assistants who are not employed by the company.
  - These assistants do not have uniforms and are not identified with badges; this presents a security risk to customers.
  - Unofficial SBEE workers are more prone to produce incorrect meter readings.
- Substandard billing and payment processes present persistent problems for customers.
  - SBEE frequently encounters disputes from customers who claim to submit payments but do not see their accounts updated accordingly. This issue has been particularly prevalent among customers using the "poste money" system.
  - In extreme cases, customers may risk service interruption stemming from SBEE's inability to properly process payments.

The diagnostic report also noted efforts to improve the quality of customer service that were already underway when MHI arrived:

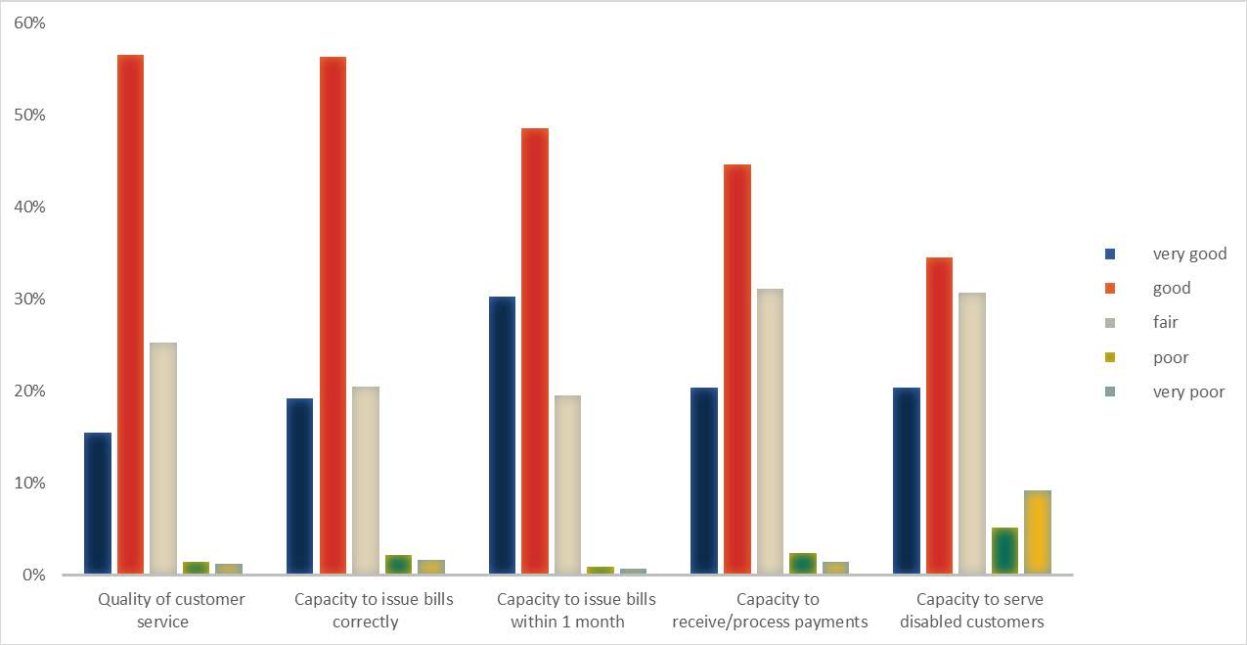
[11] MCA-B has contracted the National Statistics Institute (INSAE) to conduct a customer satisfaction survey in late 2020, which will provide updated information on current customer satisfaction.

- Customers reported an improved quality of electricity (meaning fewer and shorter outages).
- SBEE improved the customer experience for paying bills through the introduction of mobile payment options in October 2019 and increasing the number of clerks and computers at physical locations.
- SBEE created an online portal to request a new connection.

MHI has prioritized communication with customers and service quality for MV customers. MHI is keenly aware that over 40 percent of SBEE's revenue is from MV customers, although those customers make up only a small fraction of SBEE's total number of customers. For that reason, MHI's reorganization of SBEE includes the hiring of staff dedicated to its 998 largest customers. In addition, MHI has opened a complaint line and is working to improve communication with customers.

SBEE personnel perceive billing and payment processes to be effective. In our summer 2020 staff survey, we asked staff to rate five aspects of SBEE's billing and payment systems on a five-part scale. The majority of respondents ranked each of the five aspects as "good" or "very good." There thus seems to be a disconnect between SBEE employee perceptions and MHI's assessment of SBEE's "substandard" billing processes. "Quality of customer service" received the highest rating, and "capacity to serve handicapped customers" received the lowest. Figure IV.3 below illustrates the distribution of responses for all five aspects of billing and payment included in the survey.

Figure IV.3. Staff perceptions of SBEE billing and payment processes

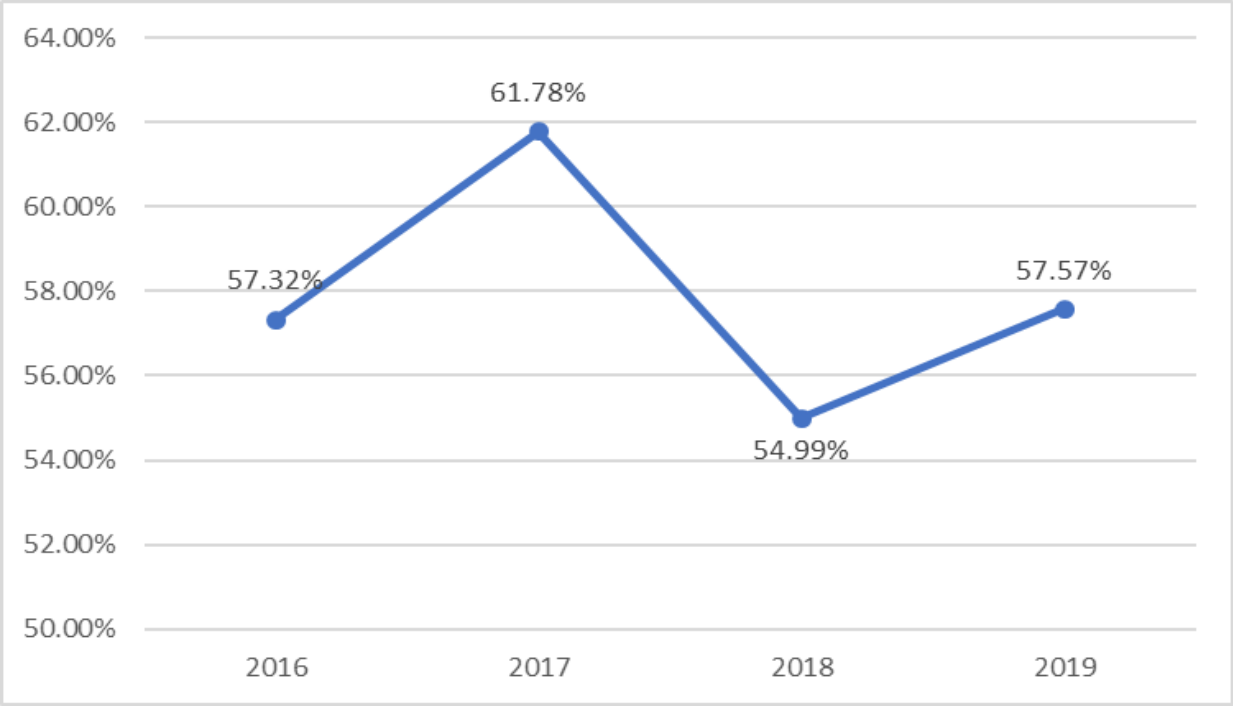


SBEE = Société Béninoise d'Énergie Électrique.

A key finding from the evaluation of the first contrat-plan (2017–2019) was that SBEE did not meet its objectives for bill collection and commercial loss reduction. As discussed in Section B.1 of this chapter, bill collection and commercial losses were two areas in which SBEE fell short of expectations during the first contrat-plan. From 2016 to 2019, bill collection rates ranged from 55 to 62 percent with no upward trend, as shown in Figure IV.4. Data from mid-2019 suggests that the cost recovery rate for

businesses and government offices is even lower than the overall rate. In the first half of 2019, this figure was just 50 percent, with nearly 3 billion CFA in unpaid bills from businesses and government offices (SBEE 2019c).

Figure IV.4. SBEE cost recovery rates from 2016 to 2019



Source: SBEE 2019c

SBEE = Société Béninoise d'Énergie Électrique.

Although it is too early to tell whether MHI is making progress on improved bill collection and commercial losses, stakeholders reported that MHI is strengthening the commercial losses team and has implemented an approach called "know your clients." However, some changes may take several years to implement. For instance, SBEE needs a current, centralized client database in order to track problem clients and reduce commercial losses—an effort that is expected to take two to three years to develop.

7. Labor productivity and management practices at SBEE

RQ.E.9. *To what extent has labor productivity increased at the utility?*

RQ.E.10. *Did the technical assistance from the management contractor to SBEE lead to improved maintenance practices?*

RQ.E.11. *Does SBEE have the capacity to continue maintaining infrastructure (both MCC and non-MCC funded)?*

RQ.E.12*. In what other ways have SBEE management practices changed? Are these changes associated with more efficient operations?*

MHI's plans to improve productivity at SBEE include training, creation of defined career paths with performance-based pay structures, shifts from paper-based to electronic-based work, and rules and sanctions for employee behavior. Low levels of productivity and challenges with working with SBEE prior to MHI's arrival were common themes among stakeholder interviews inside and outside the utility. Respondents noted that staff lack clear scopes of work and capacity to fulfill their roles, with one respondent saying that, if there were outages or equipment breakdowns, "people didn't know what to do or how to do it." The status quo was a work environment in which simple tasks required multiple levels of review, staff did not work quickly or diligently, and bribes were common. Although it is too early to determine whether labor productivity has increased, MHI has plans to conduct numerous staff trainings, define career paths, implement performance-based pay and promotions, reorganize teams to avoid redundancies, implement ethics requirements and enforce them, and implement email and electronic-based work practices.

"Now staff are required to wear badges that record arrival and departure time. This has resulted in improved punctuality among staff."

– KII respondent (translated quote)

« Actuellement il é été mis en place un dispositif de badge avec un dispositif d'enregistrement des heures d'arrivée et des heures de départ. Cela a eu pour impact d'ameliorer la ponctualité au travail du personnel »

- KII respondent (original quote)

SBEE's weak financial position has led to restricted maintenance, resulting in deterioration of the electricity infrastructure and equipment (Hughes et al. 2020). Officials from SBEE and MCA-B reported that, independent of low generation capacity, many blackouts are caused by the failure of distribution infrastructure components. Baseline management services contractor KPI data indicate that, in 2017, LV and MV customers experienced 782 blackouts, for a cumulative total of 4,195 hours of disrupted service. These failures can be linked to poor maintenance practices and may worsen as the grid infrastructure continues to age. The following are aspects of poor maintenance practices:

- **Lack of regular maintenance.** Regular preventive maintenance of the electric grid has not always been a common practice. A few SBEE agency leads reported that preventive maintenance of the electric grid is not conducted until a problem with the grid occurs.
- **No central log of maintenance records.** SBEE personnel observed that no central maintenance database currently exists, limiting the utility's ability to plan routine maintenance. Although the compact originally included funds for a computerized management system for SBEE's equipment and stocks, this is now part of the French architecture firm Défisol's scope. According to MCC respondents, the project is moving too slowly, and MCC is frustrated that they can't control the timing (the database is expected to be completed after the compact end date).
- **Lack of replacement parts.** SBEE respondents reported that SBEE does not own a sufficient number of replacement transformers and circuit breakers. This lack of needed equipment to address network issues, especially when several occur simultaneously, can lead to prolonged outages when equipment failure occurs.

- **Centralized storage of spare parts.** Some interviewees suggested that poor or slow maintenance is a symptom of inventory problems at SBEE. In particular, they noted that spare parts are stored at a central location and are often not readily available when needed in remote locations.

MHI has elevated the role of regional directors within SBEE. Within SBEE, the regional offices are responsible for bill collection, service quality, and customer service, making them critical to both the financial and technical operations of SBEE. The regional offices are also responsible for meeting many of the objectives in the contrat-plan. Despite the critical role of the regional offices, stakeholders noted that prior to MHI's installation, SBEE's central office received a disproportionate amount of resources and training, leaving regional offices with insufficient and unskilled staff, a lack of resources to manage technical and commercial losses, and no decision-making power. Under MHI, regional directors are now directly involved in decision making and will receive dedicated training and additional resources.

> **"At the first meeting with MHI, all the regional directors sat in the back against the walls, while the other directors were sitting around the conference table. MHI said, 'No, you guys have to come to the table,' so they switched places."**
>
> **"It is abnormal that the central administration is better resourced than the regional directorates and that the central gets all the training. This is an absolute reverse of what it should be and needs a cultural change"**
>
> -Key informant interviewees

MHI has already started making changes to address an organization chart that was "not at all adequate." MHI respondents noted that SBEE contained an inappropriate balance of administrative and technical staff and that MHI plans to grow the technical departments while shrinking the administrative departments. Other changes are underway to increase controls on employee behavior. This includes substantially reducing the general inspection department, setting up systems and sanctions to prevent fraud, and implementing hiring standards to reduce the problem of "copinage" (the hiring and/or promotion of family and friends). Interview respondents were extremely critical of SBEE's organization and practices, noting that there was a "total allergy to ethics and performance control" and a "culture of no controls."

In 2017, SBEE, with MCA-B support, conducted a gender audit and introduced a "Social and Gender Charter," expressing commitment to workplace gender equality. The charter asserts SBEE's dedication to the principal of gender equality in the areas of recruitment, compensation, job assignment, and training opportunities. Moreover, it reiterates SBEE's commitment to protect workers against workplace harassment of all kinds, including the stigmatization of disabled employees. Specific measures to enforce this charter have not been announced as of the time of writing.

Ten months into MHI's tenure, SBEE staff have a positive perception of the quality of management. In the 2020 SBEE employee survey, 60 percent of respondents rate the quality of management as "good," and an additional 19 percent rate it as "very good." When asked about their level of confidence in the future of SBEE, 54 percent replied "confident" or "very confident," while an additional 44 percent replied "completely confident." This represents an improvement since 2018, when 70 percent said they were "confident" or "very confident," but only 18 percent indicated that they were "completely confident."

Comparison of staff satisfaction surveys in 2018 and 2020 show improvements in staff perceptions in several areas. MCA-B conducted a survey of all SBEE staff members in 2018 to gauge their level of

satisfaction with their employer and their perceptions of SBEE management. Mathematica's 2020 staff survey borrowed several questions from the 2018 survey in order to provide a comparison. In general, there were improvements across several different metrics. However, we do not have sufficient information to conclusively attribute these improvements to the arrival of MHI. The management services contract is just one of many potential reasons why these improvements may have occurred. It could also be the case that marginal improvements in employee perceptions of SBEE reflect the fact that the study populations are different due to employee turnover in the two intervening years.

Notably, SBEE's employer net promoter score has improved from -10 percent in 2018 to -2 percent in 2020. This finding is accompanied by a 23 percent increase in the number of employees who are "very confident" or "completely confident" in the future of SBEE, and a 35 percent increase in the number of employees who rate the quality of management at SBEE as "good" or "very good." Overall, it appears that our evaluation is beginning in a period during which staff perceptions of SBEE are on an upswing.

Our 2020 SBEE employee survey data suggest that there is no significant gender gap in SBEE employee satisfaction. Men and women reported similar levels of satisfaction with respect to a range of topics, including their work conditions, the objectivity of staff movement, and work-life balance. However, women were slightly more likely than men to be satisfied with their level of compensation (54 percent of women vs. 44 percent of men) and scored slightly lower in the Net Promoter Score index (-7 percent for women vs. 1 percent for men). The most significant gender difference occurred in the rate of workplace harassment; 40 percent of women reported experiencing some type of harassment at SBEE, as opposed to 31 percent of men.

Net Promoter Score (NPS) is a standard measure of how likely a group of people are to recommend a given brand or product to their friends and colleagues. It may be operationalized to measure customer satisfaction (customers recommending a product) or employee satisfaction (employees recommending their employer). The measure is constructed from the following survey question:

On a scale of 0 to 10, how likely is it that you would recommend our company/product/service to a friend or colleague?

Those who respond in the range of 0 to 6 are classified "detractors;" those who respond 7 or 8 are classified "passives;" and those who respond 9 or 10 are classified "promoters." The NPS is then calculated by the following formula:

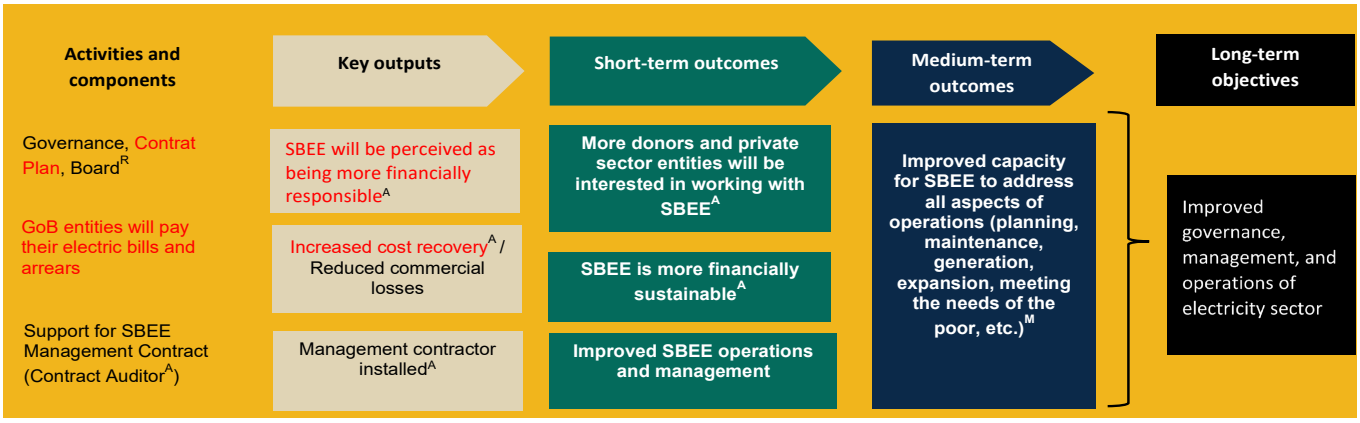
$$\frac{(number\ of\ promoters - number\ of\ detractors)}{total\ number\ of\ respondents}$$

Source: Net Promoter System

B. Assessment of the Utility Strengthening Activity logic model

The early outputs and implementation status summarized in Section IV.C may have implications for the linkages and assumptions in the logic model. In Figure IV.5, we show the Utility Strengthening Activity's logic model. Text in red indicates outputs and outcomes that are at risk, based on the current status of implementation and the early outputs observed three years into compact implementation.

Figure IV.5. Risks to the Utility Strengthening Activity logic model



Note: Red text denotes outputs and outcomes that are at risk.

[M] Wording for this outcome was slightly revised.

[A] Outcome was added to this version of the logic model (not included in earlier versions).

[R] Task or item was removed from the logic model.

GoB = Government of Benin; SBEE = Société Béninoise d'Énergie Electrique.

Expected output: contrat-plan implementation. As of October 2020, the second contrat-plan for 2020–2022 has not yet been approved by the Council of Ministers. SBEE, under MHI's leadership, will work to achieve the objectives laid out in the contrat-plan because they largely match MHI's KPIs. However, without the new contrat-plan in place, it is not clear that the GoB has an incentive to meet its commitments, which include payment of electric bills and arrears.

Expected output: SBEE will be perceived as being more financially responsible. It is too early to tell whether MHI will able to significantly improve the financial situation of SBEE and its image among donors, private sector entities, and consumers. However, as noted in Section IV.B above, there are some factors affecting SBEE's financial viability which are outside of the management services contractor's control, and which could affect the short- and medium-term outcomes of the Utility Strengthening Activity.

Expected output: Increased cost recovery. SBEE's ability to recover its costs and become more financially stable depends on improvements to its commercial losses and bill collection rates, possibly a reduction in its fixed and/or variable costs, and implementation of a cost-reflective tariff. As discussed in Chapter III, the GoB passed tariff increases, along with a subsidy to fully cover the cost of that increase. A lack of cost-reflective tariffs has serious negative implications for SBEE's financial sustainability and, in the long-term, SBEE's capacity to manage all aspects of its operations.

C. Next steps

We will continue to monitor developments in the Utility Strengthening Activity through the end of the compact. We will combine baseline results with administrative data to conduct a performance evaluation at interim and will report on early outcomes and trends as the compact comes to a close. We will conduct a final round of primary data collection, including KIIs, focus group discussions, and staff surveys in 2024, and we will combine these data with baseline and interim values for an assessment across

outcomes. Having access to financial, generation, and consumption data for SBEE, as well as reports on the KPIs, will be vital for a robust evaluation of the activity.

V. Public Information and Education Activity: Baseline situation and early outputs

In this chapter, we present a summary of early outputs of the PIEA. We provide a brief overview of the literature; outline the evaluation questions, evaluation methods, and data sources; and discuss information currently available to inform the evaluation questions. At one time, the PIEA included two sub-activities—one focused on tariff reform and the other on energy efficiency. The purpose of the information campaign on tariff reform was to educate consumers on the reasons for and benefits of changes to the electricity tariffs, with a goal to increase the likelihood of acceptance and payment of higher tariffs. The energy efficiency campaigns are intended to inform consumers about energy efficient products and energy conservation behavior, with a goal to reduce energy demand. As described in Chapter II, MCC and MCA-B, in consultation with ARE and GoB, removed the tariff information campaign sub-activity from the PIEA. We note that MCA-B continues to provide support on tariff-related communications via the tariff consultant (see discussion in Chapter III).

Key observations

- The sub-activity no longer includes tariff communications.
- The energy efficiency information and education campaigns have been delayed.
- The activity's budget has been cut from $2 million to $300,000.

A. Public Information and Education Activity

The PIEA focuses on energy efficiency communications, premised on the idea that consumer behavior can promote or hinder energy efficiency efforts. The PIEA educates consumers (including citizens, businesses, and public administration officials) on the benefits of energy efficiency and provides information to help consumers make informed decisions about appliance purchases and energy consumption (Dokpo 2019). This approach holds promise: information campaigns have the potential to reduce household electricity consumption if they are conducted as complementary activities to more specific policies, such as energy labeling policies (LBNL 2015). Further, behavior change interventions have been shown to lead to large energy savings (Karatasou et al. 2014). However, consumers may lack the knowledge necessary to assess quality and efficiency of appliances and therefore make purchase decisions based on purchase cost rather than longer term costs or efficiency.[12] A recent survey found many consumers in Benin rely on friends' advice about what equipment to purchase and rarely consider the operation costs of the equipment (Dokpo 2019). Another survey with importers and households found that 87 percent of importers and 81 percent of households believe that the purchase cost of appliances is the main barrier to adopting energy-efficient practices and equipment (Dokpo 2019). The energy efficiency communications campaigns are expected to address these problems.

[12] Decisions based on purchase rather than lifetime cost is known as, "first-cost bias." In this scenario, consumers choose the lowest first-cost option, as they may not be aware of the life cycle benefits of an energy-efficient option, which typically comes at a higher first cost (Campbell et al. 2020).

In Table V.1, we show the progression of work from inception to November 2019, when we completed the EDR, and to October 2020, at the time of writing of this report.

Table V.1. Objectives and tasks of the Public Information and Education Activity

Planned tasks	Tasks completed (November 2019)	Tasks completed (October 2020)
Objective: Greater public awareness and buy-in of energy-efficient alternatives and acceptance of new tariff structure, leading to improved governance, management, and operations of the electricity sector		
• Communications campaign to educate consumers about energy efficiency, renewable electricity sources, and related topics • Public campaigns to inform citizens about new tariffs	• MCA-B carries out a media landscape and develops a communications strategy • Communication about tariff reform is removed from PIEA • Individual contractors become responsible for developing energy efficiency communications strategies • MCA-B hires a consultant to develop energy efficiency strategy and communications plan (finalized in December 2019)	• MCA-B and new consultant conduct energy efficiency-focused workshops with professional associations (such as electricians and importers) and a press event to announce the new labeling decree and discuss with the media ways to convey information around energy efficiency • COVID-19 delays information campaign activities

MCA-B = Millennium Challenge Account Benin II; PIEA = Public Information and Education Activity.

1. Evaluation questions, approach, and key findings

The educational campaigns proposed under the PIEA are expected to lead to greater public awareness and buy-in of energy-efficient alternatives, resulting in more efficient use of energy and avoided demand for electricity. The evaluation questions related to the PIEA focus on how the campaigns are implemented, how the campaigns were understood by their audiences, and whether the campaigns changed behavior (Table V.2). For this baseline report, we carried out a qualitative analysis of stakeholder knowledge and perceptions about the design of the energy efficiency communications campaigns and early implementation. We reviewed the energy efficiency communications strategy and compared the plan to what has been implemented to date. We conducted KIIs with MCC and MCA-B key stakeholders, exploring changes to the campaigns' implementation plans and funding, and explored risks to implementation. MCC and MCA-B stakeholders provided their perspectives on stakeholder reactions to the initial energy efficiency communications campaigns conducted among professional associations and journalists in 2020, and we plan to conduct focus groups with campaign audiences, when conditions allow, as input to the interim report.

Table V.2. Evaluation questions, methodology, data sources, and key findings for the Public Information and Education Activity

Evaluation question	Evaluation method	Baseline data source	Role of baseline data collection	Early outputs
RQ.F.1.a To what extent were the communications campaigns implemented? b. Did the audience understand the campaigns' content as intended? c. Did audience perceptions change?	Qualitative analysis of stakeholder perceptions and knowledge	• Document review • Key informant interviews	Assess the status of the communications campaign implementation	Slow procurement of a communications consultant, budget and scope reductions, and the ongoing health pandemic have delayed communications campaigns.

2. PIEA development and implementation

RQ.F.1.a *To what extent were the communications campaigns implemented?*

The PIEA has mutated over the first three years of the compact, making it difficult to assess whether it is being implemented as planned. The PIEA was formulated as a stand-alone activity, but, at its inception, lacked a clear and consistent focus or implementation strategy. The Benin Power Compact contained little information about the PIEA at signature. It described the activity as aiming, "*to inform the public about energy sector policy reforms and to change energy use behavior through information and education about energy efficiency, renewable electricity sources and related topics. To this end, the [PIEA] will create a program to educate consumers about energy efficiency and renewable energy for household use*." (MCC 2015). This suggests that, as originally conceived, the PIEA focused mostly on energy efficiency communications. However, the PIEA logic model presented in MCA-B's first monitoring and evaluation (M&E) plan, drafted in December 2017, shows two parallel components: (1) education and communication of tariff changes and (2) education and communication of energy efficiency information (MCA-B 2017). The shift to include tariff reform communication was, as one MCC stakeholder noted, *"a way to get ahead in the public relations battle, knowing we would have to increase tariffs over the course of the compact."* Indeed, MCA-B support for communications around tariff reform continued into 2020 through the tariff consultant's contract (see Chapter III), but the Tariff Reform Information and Education Sub-Activity was removed from the PIEA in 2018.

Since the compact entered into force in June 2017, the PIEA has lacked clear leadership and strategy and has suffered from procurement delays. In 2017, MCA-B carried out a media landscape and developed a communications strategy focusing on communicating the development and achievements of the compact, as well as sensitization of compact stakeholders. Although the strategy mentions providing communication about energy efficiency and tariff reforms, it did not include details about the use of the PIEA funds (then $2 million) for those activities (MCA-B 2018b). To develop an implementation plan, MCA-B released an RFPs in 2018 to hire a strategy and communications plan consultant, but the procurement was launched late and eventually failed, delaying development and implementation of a strategy aligned with the program logic. To compound this problem, the PIEA has not had a clear leader within MCA-B distinct from the communications division or the team

implementing the Energy Efficiency Sub-Activity. MCA-B's sixth quarterly report on compact progress listed a procurement for an energy efficiency communications consultant under the Energy Efficiency Sub-Activity rather than the PIEA and noted that information and education activities had not yet been budgeted (MCA-B 2019a). One MCC stakeholder we interviewed had difficulty identifying the PIEA lead at MCA-B. This lack of clear leadership may have exacerbated the lack of a well-defined strategy, implementation plan, and timeline for the activity. Because of delays, MCA-B added a requirement to the scopes of work for individual contractors, such as the energy efficiency labeling consultant, to include communications strategies in their work.

Disaggregating energy efficiency communications across consultants filled the gap until MCA-B hired a PIEA consultant in 2019. Beginning in 2018, the responsibility for energy efficiency communications was shared across the existing energy audit and norms/standards contractors (SGS and AETS, respectively) and an individual expert in energy. The contractors organized workshops and worked as a team to develop a joint communication strategy that established a synergy between the PIEA and the Energy Efficiency Sub-Activity. A year later, in July 2019, MCA-B contracted with a consultant to review existing communications activities, harmonize the work across all these consultants, and develop a plan for the PIEA. The consultant presented the plan to MCA-B in December 2019 and MCA-B approved it in September 2020.

The energy efficiency communications plan will disseminate information to diverse groups with the goal of helping consumers adopt energy efficient behaviors. The goal of the communications campaign is to help household and public administration consumers make better choices on the appliance market and encourage them to gradually adopt energy saving behaviors, including adoption of energy-efficient appliances. To achieve this goal, the communications campaign will sensitize importers, customs officials, manufacturers, sellers and distributors of appliances, electricians, refrigerator engineers, and journalists about energy efficiency appliance labeling to ensure compliance with regulations entering into force in 2020. Once made aware of the regulations and advantages of adopting energy-efficient appliances, this group is expected to pass on the message to electricity consumers. At the same time, energy efficiency campaign stakeholders led by SBEE, the rural electrification ministry (*Agence Béninoise d'Electrification Rurale et de Maîtrise d'Énergie* [ABERME]), and the national norms and standards agency (the *Agence Nationale de Normalisation, de Métrologie et du Contrôle de la Qualité* [ANM]), plan to disseminate information to consumers via various means, such as digital tools (Facebook, YouTube, LinkedIn, and WhatsApp), radio spots, TV spots, written press, sensitization sessions, ad displays, and so on. (Dokpo 2019). The communications campaign serves an important purpose, which is, as one stakeholder put it, *"[consumers] need to acquire info, understand, and discuss*" the energy efficiency choices available to them.

The communications campaign is vital to the energy efficiency sub-activity's success

"*Consumers are the most important stakeholders who will most influence the success of this [energy efficiency] activity.*" – KII respondent

3. COVID-19 related delays

As a result of the COVID-19 pandemic, energy efficiency communications have not reached the general public as intended. In the first quarter of 2020, MCA-B and the energy efficiency communications consultant began implementing the PIEA. They held workshops with professional associations—such as electricians, appliance service providers and appliance importers—just before COVID-19 restrictions were put in place. They carried out a press event in March to discuss and announce the new energy efficiency labeling law that came into force on June 30, 2020 and discuss with the media ways to convey information around energy efficiency. One MCA-B stakeholder, who was not involved in the communications campaign, noted that "*today there's more interest in energy efficiency among both public and private actors thanks to the communications campaigns*." The campaign was suspended in March 2020 due to COVID-19 and planned activities were converted to an online format. Some stakeholders expressed concern that the online campaigns would not reach the lower- and middle-income consumers, who tend to have more limited access to the Internet. Artisans, national federations of people with disabilities, and students have been especially difficult to reach during the COVID-19 restrictions period, as these types of awareness-raising activities are typically carried out face-to-face in workplaces, conference rooms, and focus groups. Since April 2020, all communication in Benin became focused on COVID-19, making it difficult to carry out communications on other topics. However, MCA-B said that they were planning to implement radio and TV spots starting in July 2020 to reach a broader audience. The larger energy efficiency campaign was expected to resume activities in the September 2020. At the time of writing, we are unable to verify whether the campaign has restarted.

4. Scope and funding reduction

The PIEA's reduced funding and scope has implications for the project's logic model and activity's success and sustainability. In April 2020, the budget for the PIEA was reduced from $2 million to $300,000 when funds were reallocated to the Distribution Project. A key MCC stakeholder noted that the *"PIEA is the only PRIS [Policy, Regulation and Institutional Support] Project activity that was impacted by such significant funds reduction."* Energy efficiency activities, such as public awareness and discussion groups, have been placed on hold due to the lack of funds and may not resume until reserve resources free up as other projects advance. Our interviews with key MCC stakeholders indicate uncertainty about the extent to which public awareness communications around energy efficiency (and the PIEA as a whole) will be implemented in the future.

5. Measuring results

Measuring communications campaigns' effects on consumer behavior is complex, and currently there are no plans to measure the PIEA's effects on consumer behavior. MCA-B's original and revised M&E plan included indicators for energy efficiency awareness campaigns, such as the total number of awareness campaigns held on the efficient use of energy by households, but the plan does not include the means to measure the effects of the PIEA's campaigns on consumer behavior. Generally, the stakeholders we interviewed believe it is difficult to measure the effects of the communications campaigns on consumer behavior. MCA-B's reluctance to measure the effect may be due to the relatively high cost to detect any changes compared to the cost of sub-activity implementation. Stakeholders also argued that the largest improvements in energy efficiency knowledge and practices will come from the Off-Grid Electricity Project, which has its own communications campaign component.

6. Tariff reform communications

Although tariff reform communications are no longer part of the PIEA, MCA-B has provided substantial support for tariff communication. In 2017, after discussions with the GoB, MCA-B decided not to get directly involved in the planned campaign to educate the public about tariff reform. MCA-B supported communication on the topic in other ways. In 2018, MCA-B set up a committee on energy communications to improve the communication synergy among stakeholders. The committee included MCA-B, SBEE, ARE, ABERME, MoE, and ANM, and its purpose was to anticipate and develop answers to tariff reform questions from journalists and the public and provide a consistent response. Stakeholders at MCA-B and MCC believed that the strategy to support the major institutions in the energy sector in educating the public about the tariff reform would strengthen the image and promote the role and responsibilities of the independent regulator, ARE. MCA-B also added a communications training component to the tariff consultant's contract (see Chapter III). By 2019, ARE was implementing the communications campaign regarding the new electricity tariffs.

B. Assessment of the PIEA logic model

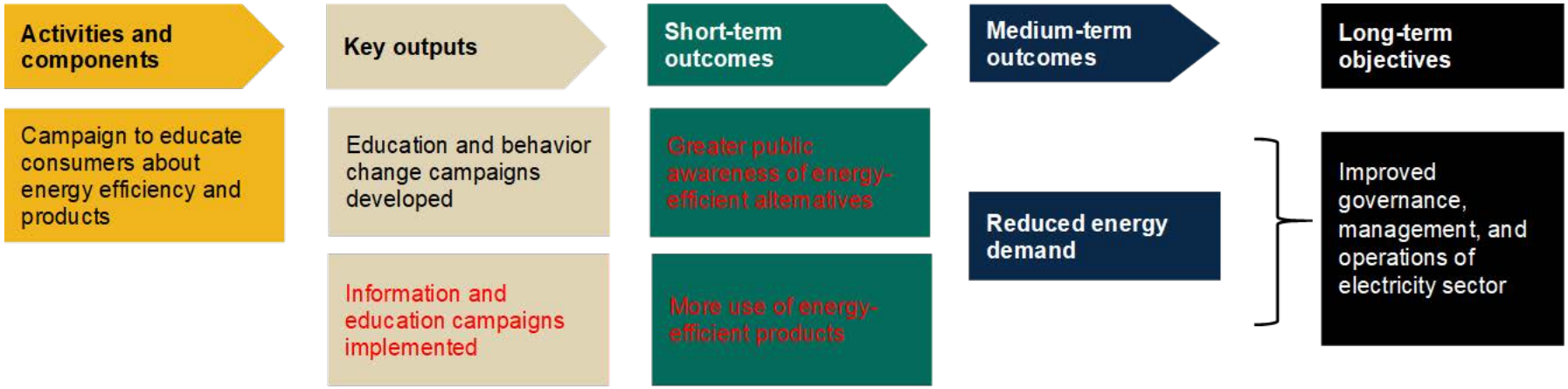
The evolving scope of the PIEA and delays in implementation may have implications for the linkages and assumptions in the logic model. In Figure V.1, we show the PIEA's logic model. Text in red indicates outputs and outcomes that are at risk, based on the current status of implementation.

Expected outcome: Greater public awareness and buy-in of energy-efficient alternatives. A slow startup, early problems with a failed procurement, and budget cuts decrease the likelihood that MCA-B's PIEA will conduct broad communications campaigns that would influence energy efficiency choices by stakeholders. COVID-19 has also caused delays to the implementation of energy efficiency communications, particularly for in-person activities. MCA-B's communications team has shifted some activities online. While other donors or GoB actors may carry out energy efficiency campaigns, it is unclear whether this outcome can be achieved by MCA-B with a reduced scope for communications.

Expected outcome: More use of energy-efficient products by households and businesses. Even if the energy efficiency communications result in greater public awareness and buy-in, the communications strategy lacks strong behavior change components, according to some stakeholders. A key assumption of the compact's logic model is that reduced energy demand will, in combination with other compact activities, contribute to a reduced gap in peak demand and supply in Benin. However, if households and businesses do not adopt better energy consumption practices, that assumption is at risk. Furthermore, as we noted in the evaluability assessment (Hughes et al. 2020), raising awareness about the initiatives and shifting consumers' perceptions may not be sufficient to cause changes in individuals' behavior. Other factors, such as lack of financial resources, may prevent individuals from enacting the desired behaviors, and the outcome presupposes the availability of energy-efficient products in the market. Overall, the risk to these two short-term outcomes put the medium-term outcome and long-term objective at risk as well.

Figure V.1. Risks to the Public Information and Education Activity logic model

Public Information and Education Activity



Note: The Tariff Reform Information and Education Sub-Activity has been removed from this logic model, as this sub-activity was removed from the PIEA in 2018.

Text in red indicates outputs and outcomes that are at risk, based on the current status of implementation.

C. Next steps

We will continue to monitor developments in the Public Information and Education Activity through the end of the compact. We will combine baseline results with administrative data to conduct a performance evaluation at interim and will report on early outcomes and trends as the compact comes to a close. If feasible, we will conduct focus groups among campaign audiences during the last year of the compact to assess their understanding of the campaign messages and changes in their perceptions and behavior.

We will conduct a final round of primary data collection, including KIIs with implementers and campaign audience members in 2024, and combine these data with baseline and interim values for an assessment across outcomes. Having access to MCA-B reports data and assessments of the campaigns will be vital for a robust evaluation of the activity.

VI. Evaluation data needs and administration

This chapter identifies gaps in the data available for the baseline study, makes recommendations for data preservation and tracking to ensure robust evaluation of the Reform Project, and outlines our approach to ethical and secure data collection.

A. Notes on data availability for this baseline and upcoming evaluation

The Reform Project has an ambitious and interrelated set of objectives to accomplish during the compact. In the preceding chapters, we have used the project's logic models to identify some potential risks to accomplishing these goals. We note, however, that the logic models have not been updated to reflect changes in the design of the project. We respectfully recommend that MCA-B implementation and M & E teams review and update the logic models and make explicit the assumptions underlying them to ensure that outputs and outcomes of the activities align with project objectives. Related, we recommend that MCA-B review the indicators included in the indicator tracking table (ITT) to ensure that the indicators are clearly defined and aligned with the compact program logic. This task will benefit both the project monitoring activities and evaluations by allowing the implementation teams, GoB stakeholders and others to measure progress toward project results.

Our baseline study has relied heavily on documents produced by consultants and contractors to MCA-B; policies, laws and regulations available through ARE's website and websites of the Ministry of Energy and other agencies; meeting notes from committees reviewing deliverables and policy proposals; meeting notes from MCC and MCA-B's biweekly implementation update; quarterly updates and narratives on the ITT; and in-depth interviews with consultants, staff within SBEE, ARE, the ministries, other donors, MCA-B and MCC. To ensure that this evaluation as well as MCA-B and MCC's own monitoring meet the needs of stakeholders in Benin and the U.S., we respectfully suggest that MCA-B establish a document archive system that collects, organizes and maintains not only project plans, quarterly reports and final reports but also meeting notes and internal decision documents. A well-archived library of documents will facilitate learning from the Reform Project's implementation, successes and challenges for future policy reform and institutional strengthening efforts in Benin and elsewhere.

As noted in previous chapters, the COVID-19 pandemic altered our plans for in-person data collection. Specifically, we were unable to establish baseline values for energy efficient appliance sales through a survey of appliance sellers or for consumer sentiment about tariffs or energy efficiency communications campaigns. When feasible, we plan to carry out the appliance seller survey using retrospective questions to understand the evolution of retailer and wholesaler stock as well as knowledge about energy efficient appliances and customer preferences. Also when feasible, and if audiences are clearly defined by the implementation team, we will conduct focus group discussions among consumers to assess knowledge, attitudes and practices around energy efficiency.

B. Institutional Review Board clearance and protocol for safeguarding human subjects

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. Our team has ensured that the evaluation meets all U.S. research standards for ethical clearance and received approval from Health Media Lab, its U.S.-based IRB, before starting data collection in the spring of 2020. 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' confidentiality, explaining their rights as participants in research, and 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, and any possible threats to participants resulting from any compromise of data confidentiality. IRB approval is valid for one year; we will submit annual renewals for approvals as needed.

We also ensured that the study met local research standards for ethical clearance and submitted our study for approval by the *Institut National de la Statistique et de l'Analyse Économique* (INSAE), Benin's national statistics agency, and by the *Autorité de Protection des Données à Caractère Personnel* (APDP), Benin's authority responsible for the protection of personal data. To obtain the certification required to conduct social sciences research in Benin, Mathematica's local research team coordinated with the agencies and submitted the required application materials.

In each of these applications, we specified the measures our data collection teams took to mitigate the health risks posed by COVID-19. These measures included conducting all surveys and interviews remotely and funding personal protective equipment for in-person enumerator trainings. We ensured that all subcontractors provided handwashing stations and that work environments—namely, the survey call center—strictly enforced social distancing and the use of masks.

C. Preparing data files for access, privacy, and documentation

All data collected for this evaluation are securely transferred from the data collection firm to Mathematica, stored on Mathematica's secure server, and accessible only to project team members who use the data. After producing and finalizing the endline evaluation report at the end of our contract, we will prepare corresponding de-identified data files, user manuals, and codebooks based on the quantitative survey data for each round of data collection. 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 for transparent, reproducible, and ethical data and documentation.

Public use quantitative data files will be free of personal or geographic identifiers that would permit individual respondents or their households to be identified. We will remove or adjust variables that introduce reasonable risks of deductive disclosure 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 collapse any variables that may enable an individual to be recognized because of geographic or other factors into less easily identifiable categories.

The data collection instruments (both the quantitative instruments and qualitative protocols) include consent statements approved by our IRB that guarantee the confidentiality of respondents to the extent possible. When data are collected on paper instruments (such as notes from key informant interviews), the interviewer ensures the safe handling and transport of the instruments (as applicable) from the interview location to the main office for data entry; the instruments are then stored there in lock-and-key cabinets. Data collected electronically (such as survey data) are stored on a secure server approved by Mathematica. The data collection firm shares electronic data files with Mathematica via Box, an enterprise cloud-based solution for secure file sharing and collaboration. Each user who participates in the data transfer sets up a unique login credential. Administrative data from SBEE, MCA-B, and the management services contractor are shared via Box or the sender's preferred secure file transfer site. Once we have possession of these data, we will store them on a secure Mathematica server, and they 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 (as applicable), for the entire duration of the project—including the base contract and the subsequent option contracts. Because the collected data and databases are the property of Mathematica, they will be delivered to us at the end of the contract.

D. Dissemination plan

To ensure the results and lessons from the evaluation reach a wide audience, particularly policymakers and practitioners, we will work with MCC to increase the visibility of the evaluation overall and the findings on the energy sector specifically. 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 and feasibility of travel, 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 publicizing the results, and we will encourage other donors and implementers to integrate the findings into their programming.

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Appendix A

Study Design and Data Sources

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This report is the first report developed as part of Mathematica's mixed-methods performance evaluation for the Reform Project. More than three years after the Benin Power Compact's entry into force, we describe the baseline situation of Benin's energy sector and provide an implementation status update for each activity of the Reform Project.

In the sections that follow, we first provide a brief overview of the evaluation design and the evaluation activities that we will conduct over the next four years. We then summarize, for each activity or sub-activity, the quantitative outcomes definitions and data sources. We conclude with a summary of changes made to the baseline data collection due to the COVID-19 pandemic. The evaluation design is described in greater detail in the evaluation design report (Hughes et al. 2020), and the evaluation questions and corresponding data sources are described in Chapters III, IV, and V of the main report. For a complete account of data sources used for this baseline report, see Appendix B. For a full list of documents reviewed for this report, see Appendix C.

A. Evaluation design overview

For this performance evaluation, we employ various analytical methods and data sources to answer 36 evaluation questions tied to the Benin Power Compact's logic model Across activities and sub-activities, we will assess implementation using a mixed-methods approach grounded in political economy, which relies heavily on project monitoring data and KIIs. 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 sustainability analyses of specific sub-activities, we will use administrative and survey data to corroborate our findings through qualitative methods.

B. Implementation analysis

Over the remainder of the compact, we will conduct 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, as well as 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 serve to properly contextualize the outcome analyses such that it reflects only those activities that were implemented. Our implementation analysis will draw on a variety of sources, such as project documentation, quantitative administrative data, KIIs, and a review of news stories. For this baseline report, we provided an implementation status update. We will draw on the information collected and analyzed for this report in order to conduct the full implementation analysis for the interim and final evaluation reports.

1. Analytic approach

Process mapping. To carry out our implementation analysis, we will first carefully review the logic model for each activity and sub-activity; we will use this information to develop a flowchart or process map demonstrating the order and interconnection of tasks within and across sub-activities. To construct the process maps, we will draw on information from project plans, regulatory documents (for sub-activities that require passage of reforms), and project reports. 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. We will first construct these process maps for the interim evaluation report and will then update and refine the maps for the final evaluation report.

Qualitative analysis. We will organize and categorize program documents by source, topic, and date and link them to the appropriate sub-activity, task, and evaluation 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 focus group discussions (FGDs). Our approach to analyzing the data collected through interviews and FGDs relies 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. We followed this approach for this baseline report and will adopt the same strategy for the interim and final evaluation reports.

Political economy analysis. To assess barriers and facilitators to implementation, 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 evaluation questions related to implementation, results, and sustainability. The exercise involves gathering, organizing, and assessing information along the following four dimensions:

1. Actors and interests—the key organizational and individual stakeholders in the realm of regulatory reform as well as the primary interests of each party with respect to reform
2. Power structures and accountability—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
3. Political and social tensions—any long-standing political or social conflicts or tensions related to regulatory reform
4. Institutions and rules—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

We presented early versions of (1) an influence and support matrix that depicts actors' level of influence and support for the reforms and policies promoted by the Reform Project, as of October 2020, and (2) a stylized drawing indicating the relationships between key energy sector stakeholders. As part of the interim and final evaluation reports, we will update these figures and expand upon the political economy analysis, as described in the EDR.

2. Data sources

Our implementation analysis will draw on a variety of sources, such as project documentation, quantitative administrative data, KIIs, and FGDs with beneficiaries. At baseline, we were unable to conduct FGDs with beneficiaries because of COVID-19. We plan to conduct those focus groups when it is safe to do so.

C. Policy Reform and Institutional Strengthening Activity (Policy Activity)

The Policy Activity includes three distinct sub-activities:

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

In the section that follows, we describe the analytic approach, data sources, and key outcome metrics for each sub-activity.

1. Regulation and Tariff Sub-Activity

Our evaluation of the Regulation and Tariff Sub-Activity will rely most heavily on **qualitative analysis** techniques, using methods that include **qualitative descriptive analyses**, **analysis of stakeholder perceptions**, **contribution analysis**, **sustainability analysis** and **pre-post analysis**. These methodologies will draw primarily on a review of documents from SBEE, MHI, ARE, GoB, and MCA-B in conjunction with SBEE financial data and electricity consumption data from our telephone survey of SBEE customers within the MCA-B infrastructure evaluation currently underway. The evaluation questions, methods, and data sources are presented in Table III.2 in the main report.

The evaluation of the Regulation and Tariff Sub-Activity will include quantitative outcomes from surveys and administrative data sources. In Table A.1, we present the indicators used to measure each outcome, as well as their definitions and specific data sources. We flag those outcomes for which data were not yet available at baseline.

Table A.1. Quantitative outcome definitions at baseline for Regulation and Tariff Sub-Activity

Outcome	Indicators	Definition	Source
Degree to which tariffs are cost-reflective^	• Cost-reflective tariff regime	• Calculated as the • Average tariff per kilowatt-hour / Average revenue requirement per kilowatt-hour of electricity supplied to customers	• MCA-B ITT
	• Increased cost recovery for SBEE	• Calculated as the Total revenue collected Total operating cost. Total operating cost is defined as operating expenses plus depreciation	• MCA-B ITT

Outcome	Indicators	Definition	Source
Payment of electricity bills^			
SBEE solvency	• Balance sheet • Revenue • Monthly bill collections	• Assets, liabilities, and equity • SBEE annual revenue (CFA) • Monthly payment collections (CFA)	• SBEE financial data from MHI quarterly reports
	• Increased cost recovery for SBEE	• Calculated as the • Total revenue collected / Total operating cost. Total operating cost is defined as operating expenses plus depreciation	• MCA-B ITT
Increased capital for utility maintenance and new capital investments^			
ARE technical, financial, and operational capacity	• Financial self-reliance of ARE • Percentage of positions filled	• Calculated as the • ARE revenue from levies and fees collected / ARE's total budget • Calculated as the • Number of individuals on ARE's payroll / Total number of positions in the official organizational chart	• MCA-B ITT

^ Denotes outcomes or indicators for which data was not yet available at baseline.
ARE = Autorité de Régulation de l'Electricité; ITT = Indicator tracking table; CFA = West African CFA franc; MCA-B = Millennium Challenge Account-Benin II; MHI = Manitoba Hydro International; SBEE = Société Béninoise d'Énergie Électrique.

2. Energy Efficiency Sub-Activity

Our evaluation of the Energy Efficiency Sub-Activity will rely on qualitative descriptive analysis to assess the adoption of new policies and the implementation of specific actions, such as strengthened standards and labelling. We will employ a **pre-post analysis** coupled with qualitative outcomes analysis to determine effects on the market for energy-efficient appliances. In addition, we will use **descriptive analysis** to determine the changes made by energy efficiency audit recipients. Our data sources include KIIs with representatives of relevant GoB entities, energy consumer association representatives, and the energy efficiency auditees themselves. We will also analyze administrative data from the Customs Authority and the energy efficiency audit reports, and we will conduct a survey of appliance sellers and observations of whether labeled energy-efficient products are available in stores. At baseline, we were not able to conduct the appliance seller survey and observations as planned due to COVID-19, but we plan to collect these data when it is feasible to do so. The evaluation questions, methods, and data sources are presented in Table III.6 in the main report.

The evaluation of the Energy Efficiency Sub-Activity will include quantitative outcomes from surveys and administrative data sources. In Table A.2, we present the indicators and their definitions, as well as the specific data source for those indicators. We flag those outcomes for which data were not yet available at baseline.

Table A.2. Quantitative outcome definitions at baseline for Energy Efficiency Sub-Activity

Outcome	Indicator	Definition	Source
Sales of energy-efficient–labeled appliances^	• TBD	• TBD	• Survey of appliance sellers
kWh saved	• kWh consumption • Electricity saved^	• Annual kWh consumption of electricity • kWhs of electricity saved by public entities and industrial companies benefiting from MCA-B support	• Energy efficiency audit recipient reports • MCA-B ITT

^ Denotes outcomes or indicators for which data was not yet available at baseline.
ITT = Indicator tracking table; kWh = kilowatt-hour; MCA-B = Millennium Challenge Account Benin II; TBD = to be determined.

3. Independent Power Producer Sub-Activity

Our evaluation of the IPP Sub-Activity will rely on **qualitative descriptive analyses** to assess the degree of implementation of the new IPP framework as well as IPP perceptions of that framework. We will use **mixed-method descriptive analysis** to characterize the state of IPP transactions and the level of private investment in IPP power generation. We will use **pre-post and trend analyses** to establish patterns in the amount of electricity consumed in Benin that originates from clean energy and IPP sources. Finally, we will conduct a **qualitative analysis of stakeholder accounts** to understand the implementation and effects of PPAs. These analyses will draw on administrative data from SBEE, MHI, and/or MCA-B for quantitative outcomes. We will rely on document review and KIIs with representatives from SBEE, MHI, MCA-B, ARE, GoB and the IPP themselves to conduct our qualitative analyses. At baseline, we were not able to speak to IPPs since the winning bidder(s) had not yet been publicly announced at the time of writing. The evaluation questions, methods, and data sources are presented in Table III.9 in the main report.

The evaluation of the IPP Sub-Activity will include quantitative outcomes from administrative data sources. In Table A.3, we present the indicators and their definitions, as well as the specific data source for those indicators. We flag those outcomes for which data were not yet available at baseline.

Table A.3. Quantitative outcome definitions at baseline for IPP Sub-Activity

Outcome	Indicator	Definition	Source
Value of private investment	• Amount invested by IPPs	• Total amount invested by IPPs in energy generation	• MCA-B ITT
IPP generation of energy	• Capacity installed by IPPs (MCA-B-funded and non-MCA-B-funded)	• Total MW installed by IPPs	• MCA-B ITT
	• Total electricity supply (domestic IPP-owned)	• Total electricity, in MW hours, produced in a year (domestic IPPs)	
Clean energy generation of energy	• Total generation output (PV, hydro, biomass)	• Combined generation output from existing and new projects in the country, by energy source	• MCA-B ITT
	• Percentage of electricity generated by CEB's suppliers that is from clean energy sources	• As reported by each exporting country's electric utility, the percentage of total generation that is from clean energy sources.	• Administrative data from individual country electric utilities (Nigeria, Ghana, Cote d'Ivoire) and from CEB

ITT = Indicator tracking table; CEB = Communauté Electrique du Bénin; IPP = independent power producer; PV = photovoltaic; MCA-B = Millennium Challenge Account Benin II; MW = megawatts.

D. Utility Strengthening Activity

Our evaluation of the Utility Strengthening Activity draws on a range of qualitative and quantitative evaluation methods including **qualitative and quantitative descriptive analyses**, **political economy analysis**, and **pre-post analysis**. To answer the evaluation questions, we will draw on data from a phone survey with SBEE staff members, administrative data from SBEE, MHI, MCA-B, and its infrastructure consultant, GOPA-Intec, documents from a range of project stakeholders, KIIs with SBEE directors, MHI staff, GoB representatives, IPPs, and FGDs with SBEE staff and customers. At baseline, we were not able to conduct FGDs due to COVID-19. The evaluation questions, methods, and data sources are presented in Table IV.2 in the main report.

The evaluation of the Utility Strengthening Activity will include quantitative outcomes from surveys and administrative data sources. In Table A.4, we present the indicators and their definitions, as well as the specific data source for those indicators. We flag those outcomes for which data were not yet available at baseline.

Table A.4. Quantitative outcome definitions at baseline for Utility Strengthening Activity

Outcome	Indicator	Definition	Source
Management services contractor performance	• Technical performance indicators • Commercial performance indicators • Human resources performance indicators^ • Health and safety performance indicators^ • Other indicators^	• The initial management services contract includes 41 key performance indicators which will be used to assess the degree to which MHI has met its commitments.	• SBEE, MHI, and MSC Auditor reports • Nodalis Conseil (baseline values of technical and commercial indicators)
SBEE satisfaction with management services contractor	• Perception of MHI's overall performance	• SBEE employee rating of MHI's overall performance, ranging from "very good" to "very poor"	SBEE employee survey (2020)
	• Perception of changes at SBEE since MHI's arrival	• SBEE employees were asked whether the following outcomes were better, worse, or the same since MHI's arrival: quality of staff management, quality of customer service, level of political independence for SBEE, frequency of blackouts, connection request processing time, and organization of repairs	
	• SBEE employer Net Promoter Score	• Calculated as the • Number of promoters-number of detractors / Total number of respondents	• SBEE employee survey (2018 and 2020)
Private sector investment in energy	• Amount invested by IPPs	• Total amount invested by IPPs in energy generation	• MCA-B ITT
Utility balance sheet	• SBEE cost recovery rate	• Ratio of average electricity tariff over the average cost of service	• Ministry of Energy; MCA-B ITT
	• SBEE debt-to-equity ratio	• Calculated as the • Total liabilities / Amount of equity	• MHI reports

Outcome	Indicator	Definition	Source
Staff and customer satisfaction with billing and payment	• Customer satisfaction index^	• Rating of customer service (technical and non-technical) by SBEE customers	• MCA-B/INSAE customer satisfaction survey (expected late 2020)
	• Staff perceptions of SBEE billing and payment processes	• SBEE employees were asked to rate the following items on a five-point scale from "very poor" to "very good": quality of customer service, capacity to issue bills correctly, capacity to issue bills within one month, capacity to receive/process payments, capacity to serve handicapped customers	• SBEE employee survey (2020)
Commercial losses^	• TBD (SBEE currently reports on technical and commercial losses combined)	• TBD	• SBEE, MHI
	• SBEE cost recovery rate	• Ratio of average electricity tariff over the average cost of service	• Ministry of Energy; MCA-B ITT
Collection rate	• Rate of monthly bill collection	• Average rate of monthly bill collection over the past three months	• MCA-B ITT
SBEE technical, financial, and operational capacity	• Perceptions of SBEE management	• SBEE employee rating of quality of management on a five-point scale from "very poor" to "very good". • SBEE employee confidence in the future of SBEE	• SBEE employee survey (2020)
	• SBEE staff trained	• Total number of SBEE staff trained in accordance with management services contract	• MCA-B ITT

^ Denotes outcomes or indicators for which data was not yet available at baseline.

INSAE = Institut National de la Statistique et de l'Analyse Économique; IPP = independent power producer; ITT = indicator tracking table; MCA-B = Millennium Challenge Account Benin II; MHI = Manitoba Hydro International; MSC = management services contractor; SBEE = Société Béninoise d'Énergie Électrique; TBD = to be determined.

E. Public Information and Education Activity

Our evaluation of the PIEA will use qualitative analysis of stakeholder perceptions to determine the extent to which the intended audience understood the messaging and whether their perceptions changed. We will rely on document review and KIIs with stakeholders, including the MCA-B communications director and the energy efficiency communications consultant. We also plan to conduct communication campaign audience FGDs; however, these were canceled for baseline due to COVID-19. The evaluation questions, methods, and data sources are presented in Table V.2 in the main report.

F. Adapting with COVID-19: Changes in data collection activities

The baseline data collection was originally scheduled to take place in April 2020. The drastic escalation of the global COVID-19 pandemic in March 2020 caused several disruptions to the data collection effort, with some ramifications to the overall study design.

- All KIIs were conducted remotely. Key informants were invited to use video chat software, but some used voice-only calls due to technical constraints. We were able to effectively conduct the majority of planned interviews in this manner.
- All planned FGDs were cancelled entirely. These included planned discussions with audience members of the communications campaigns and SBEE customers. FGDs may be resumed for the interim and endline studies.
- The planned in-person survey of appliance sellers was cancelled along with observations of appliance sales. These may be resumed, if feasible, for inclusion in the interim report.

For the evaluation questions affected by these changes, we relied more heavily on document review, administrative data, and other secondary sources for this baseline report.

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Appendix B

Overview of primary data collection

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This appendix details the various primary data collection efforts that contribute to the analysis in this report. These efforts were undertaken in collaboration with local partners from June to August 2020. Initially, data collection was scheduled to begin in April 2020, but the emergence of COVID-19 led to delays. All planned in-person data collection efforts were either cancelled or adapted to be conducted remotely.

A. SBEE employee survey

In the EDR, we described a remote survey of SBEE employees (to be carried out by text or email) with a sample size of at least 400. As we developed our data collection plan, we determined that a telephone survey would likely result in a higher response rate and more reliable data. To design our survey, we drew some questions from an SBEE staff survey conducted by MCA-B in 2018. We also included new questions that addressed topics such as SBEE's billing and payment processes and perceptions of the management services contractor. The survey included four modules:

- Employee Satisfaction
- Training at SBEE
- Billing and Payment Processes
- Perceptions of Management

1. Sampling strategy

MCA-B provided a list of all 1,812 SBEE employees (as of June 2020), which served as the sample frame. We stratified the sample by three variables: sex, region (headquarters or regional), and job category. The sex variable was not provided in the original employee list, so local team members created an "inferred sex" variable based on respondents' first names. Sex was later confirmed with respondents during the survey; over 97 percent of respondents had been identified correctly. The rate of misidentifying males as females was roughly the same as the rate of misidentifying females as males. The data set comprising the sample frame provided only individual job titles, rather than job type categories. These job titles were not standardized and contained various spellings and levels of specificity; there were 672 unique job titles in the provided list. These 672 job titles were classified into the five categories used by MCA-B in their 2018 SBEE staff survey: (1) director or equivalent, (2) *chef de service*, (3) *chef de section/secteur*, (4) agent/technician, and (5) other.

The three variables (sex, region, and job category) were used to create 20 sampling strata, with half of the cases randomly selected from each stratum. All members of certain smaller strata (such as women in leadership positions) were selected to ensure that these groups were adequately represented in the sample.

2. Survey implementation

Mathematica contracted with *Societé de Developpement Internationale* (SDI) to conduct the study in collaboration with Vocaltel, a market research firm operating a call center in Cotonou. Both partners have previously worked with Mathematica on a telephone survey of SBEE customers for the related evaluation of the MCA-B infrastructure projects. SDI conducted survey training in conjunction with Mathematica's local consultant from August 3–7, 2020; Mathematica headquarters staff participated in the training remotely via video conferencing. This training included a one-day pilot test to validate assumptions made in the questionnaire and to refine question wording.

Respondents received an email from SBEE leadership in the first week of August notifying them of the upcoming survey and encouraging them to participate. Survey calling began on Monday, August 10, 2020, and concluded on Friday, August 28, 2020. Altogether, 600 interviews were completed, providing strong representation across all 20 sampling strata. In Table B.1, we show the characteristics of the surveyed sample and the characteristics of the population of interest.

Table B.1. SBEE staff survey sample characteristics

Characteristic	Sample		Population	
	Percent	N	Percent	N
Sex				
Male	73%	439	76%	1305
Female	27%	161	24%	407
Job type				
Director or equivalent	10%	57	9%	157
Chef de service	5%	31	5%	91
Chef de section/secteur	14%	84	13%	216
Agent/technician	65%	389	65%	1118
Other	7%	39	8%	131
Department				
Headquarters	26%	154	28%	480
Total		**600**		**1,713***

*The total survey population of 1,713 is smaller than the 1,812 total employees of SBEE because some job types were excluded from our analysis. These exclusions include drivers, guards, and nurses.
SBEE = Société Béninoise d'Énergie Électrique.

3. Sample replacement and response rate

Mathematica provided SDI with a stratified random sample of 60 percent of available respondents (1,059 cases), with a target response rate of 50 percent. After two weeks of multiple attempts to contact all unreached cases, SDI was unable to reach the 50 percent target. The primary causes of non-completion were non-response and inactive phone numbers. Mathematica provided an additional sample of 196 cases. In Table B.2, we present the response rates and final case dispositions for the original sample and the additional sample. Across the two samples, the survey team achieved an overall response rate of 48 percent (600 respondents). The large majority of survey non-response falls into the categories of "number contacted" or "not found/no longer exists"; these issues were difficult to mitigate because only one phone number was provided for the majority of respondents.

Table B.2. SBEE employee baseline survey: Response rates

Status	Original sample		Additional sample		Total	
	Percent	N	Percent	N	Percent	N
Number contacted	20%	211	22%	43	20%	254
Not found/no longer exists	24%	255	28%	55	25%	310
Not available	2%	17	2%	4	2%	21
Refused	<1%	4	0%	0	<1%	4
No SBEE	5%	54	6%	12	5%	66
Completed surveys	49%	518	42%	82	48%	600
Total sample size	**1,059**		**196**		**1,255**	

Note: "Number contacted" indicates cases for which the phone number rang but no one answered.
"Not found/no longer exists" indicates cases for which the phone number did not ring; reasons include a number being disconnected/deactivated, a phone being outside of service area, or the associated SIM card being removed from the phone.
"Not available" refers to cases who requested to complete the interview at a later time but could then not be reached for follow-up.
"Refused" refers to cases who declined to participate after listening to the consent statement.
"No SBEE" refers to cases that were not currently employed by SBEE because they had recently left the company or, less commonly, because the number had been reassigned.
SBEE = Société Béninoise d'Énergie Électrique.

4. Data quality checks

SDI undertook a rigorous five-step process to ensure the quality of survey data:

1. **Systematic review of survey instruments.** The SDI team reviewed each question of the survey questionnaire to identify any ambiguities in question wording, sensitive questions, or structural issues. Mathematica staff validated the questionnaires before enumerators training and then further adjusted the questions, as needed, based on the pilot test results.
2. **Direct monitoring of calls.** The SDI supervisor discretely listened in to 120 survey calls in real time.
3. **Survey back-checks using call recordings.** The SDI supervisor randomly selected 20 percent of all completed calls, listened to the recordings, and re-entered responses to create a back-check data set. SDI then compared these back-check data against responses entered by the caller to identify any discrepancies.
4. **Algorithmic review of data.** The SDI supervisor used a Stata program to detect any inconsistencies in data quality. These inconsistencies included non-standard missing values, out-of-range responses, and violations of survey logic. SDI either corrected or further investigated these inconsistencies, as appropriate.
5. **Regular feedback to surveyors.** The SDI supervisor intervened with individual surveyors regarding errors detected through direct monitoring and review of call recordings. In addition, SDI created a WhatsApp group to keep all team members apprised of new information and to correct any frequently detected errors.

Mathematica conducted frequent checks of data received from SDI to screen for data quality issues and identify any emerging patterns. The SDI supervisor and Mathematica staff held a weekly meeting to discuss survey progress and to troubleshoot any logistical issues. At the conclusion of the survey,

Mathematica rigorously examined the cleaned data for item missingness. No significant issues linked to item missingness were uncovered.

5. Key outcomes

Mathematica analyzed several key outcomes that were included both in MCA-B's 2018 survey as well as our own 2020 survey. Table B.3 provides values for these outcomes and shows how they changed over a two-year period.

Table B.3. Comparison of key outcomes between 2018 and 2020 surveys

Outcome	Mean 2018	Mean 2020	Difference	
Experienced harassment (%)	26%	33%	7%	***
Recommends SBEE (scale of 0 to 10)	6.90	7.31	0.40	***
detractor (%)	38%	30%	-7%	***
neutral (%)	44%	42%	-3%	
promoter (%)	18%	28%	10%	***
Training plan exists (%)	80%	71%	-8%	***
Perceptions of SBEE performance				
very good (%)	6%	13%	7%	***
good (%)	48%	54%	6%	**
fair (%)	41%	31%	-10%	***
poor (%)	4%	2%	-2%	***
very poor (%)	1%	1%	0%	
Quality of management at SBEE				
very good (%)	3%	19%	16%	***
good (%)	41%	60%	19%	***
fair (%)	46%	19%	-27%	***
poor (%)	9%	1%	-7%	***
very poor (%)	2%	1%	-1%	*
Level of confidence in the future of SBEE				
completely confident (%)	18%	44%	26%	***
very confident (%)	21%	18%	-3%	
confident (%)	49%	36%	-13%	***
not confident (%)	10%	1%	-9%	***
not at all confident (%)	2%	1%	-1%	**
Aware of current reform efforts at SBEE (%)	79%	94%	15%	***
Opinion of current reform efforts at SBEE				
very necessary (%)	35%	44%	10%	***
somewhat necessary (%)	62%	50%	-12%	***
somewhat unnecessary (%)	3%	2%	-2%	*
very unnecessary (%)	0%	4%	4%	***

Note: Stars are used to indicate the significance of the difference between the two means; * signifies p <.1, ** signifies p <.05, and *** signifies p <.01

B. Key informant interviews

1. Sample size and procedure

Mathematica team members conducted 31 KIIs by phone or videoconference due to concerns about the spread of COVID-19. Mathematica developed the KII sample based on its team's knowledge of relevant actors in Benin and with substantial contributions from MCC. Mathematica, MCC, or MCA-B sent each sample member an initial invitation to participate in the study. Those that accepted received a follow-up email to schedule the interview. This second email included an overview document containing the following elements:

- Introduction to the study
- Statement of informed consent
- Definitions of key terms to be used in the interview
- Overview of topics to be discussed

The final sample included respondents from MCC, MCA-B, SBEE, MHI, technical consultants, energy efficiency audit recipients, ARE, and BAI, as shown in Table B.4.

Table B.4. Number of interviews, by respondent type

Respondent type	Number of interviews
MCC/MCA-B staff	13
SBEE/MHI staff	6
Energy efficiency audit recipients	3
ARE staff	1
Technical consultants	6
Energy efficiency audit firm	1
BAI staff	1
Total	**31**

ARE = Autorité de Régulation de l'Electricité; BAI = Bureau d'Analyse et d'Investigation; MCA-B = Millennium Challenge Account Benin II; MCC = Millennium Challenge Corporation; MHI = Manitoba Hydro International; SBEE = Société Béninoise d'Énergie Électrique.

2. Development of key informant interview guides

Mathematica developed KII guides based on the evaluation questions and the Reform Project's program logic. These questions were organized into modules according to their topic; questions that related to gender or that were intended to contribute specifically to political economy analysis were interspersed throughout the modules and color coded for easy identification by the interviewers. Mathematica tailored these guides to specific groups of respondents and, in some cases, individual respondents. MCC provided feedback on all interview guides before data collection began.

C. SBEE customer survey

This evaluation relies on two sources of data on SBEE customers. The first is a baseline survey that INSAE is conducting for MCA-B. At the time of writing the survey data collection was underway. We plan to include findings from that survey in the interim report.

The second source of customer survey data is the household and small business survey that Mathematica is conducting for the evaluation of the Electricity Distribution and Generation Projects. We have included relevant data from the baseline survey (conducted in 2019) in this report. We will show changes in customer satisfaction over time in the interim report, using data from the Electricity Distribution and Generation Project interim data collection.

Appendix C

List of documents reviewed

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Document title	Author	Date
Compact		
Monitoring and Evaluation Plan: Version 2	MCA-B	June 2019
Rapport Annuel de Performance du Programme MCA-Bénin II : Exercice 2019	MCA-B	April 2020
Analyse des Contraintes à l'Investissement Privé et à la Croissaince Économique au Bénin	MCC	July 2012
Millennium Challenge Compact Between the United States of America Acting Through the Millennium Challenge Corporation and the Republic of Benin	MCC	September 2015
Summary Paper Regarding Modification to the Benin Power Compact: April 2020	MCC	April 2020
Summary Paper Regarding Modification to the Benin Power Compact: March 2019	MCC	March 2019
Benin II Compact: Annual Supplemental Information Sheet April 2018 - June 2020	MCC	October 2020
CODIR notes	MCC	Ongoing
Overall PRIS Project		
Summary Paper Regarding Benin's Policy Reform and Institutional Support Project	MCC	April 2015
Utility Strengthening Activity		
Conseiller en Transactions en vue de la Mise en Place d'un Contrat de Gestion au Profit de la SBEE : Rapport de Démarrage	Nodalis Conseil	December 2017
Conseiller en Transactions en vue de la Mise en Place d'un Contrat de Gestion au Profit de la SBEE : Rapport de Clôture	Nodalis Conseil	February 2020
Indicateurs de Performance SBEE	Nodalis Conseil	Shared with Mathematica October 2020
MHI Quarterly Report on the SBEE Management Contract – November 4-December 31, 2019	MHI	January 2020
MHI Quarterly Report on the SBEE Management Contract – January 1-March 31, 2020	MHI	May 2020
MHI Quarterly Report on the SBEE Management Contract – April 1-June 30, 2020	MHI	August 2020
Réaliser le diagnostic de la situation de la Société Béninoise d'Énergie Électrique (SBEE) : Diagnostic Intégré de l'Entreprise	MHI	August 2020
MHI COVID-19 Risk Report	MHI	April 2020
TOR for SBEE Management Contract Auditor	MCA-B	August 2018
TOR for SBEE Management Contractor	MCA-B	September 2018

Document title	Author	Date
Presentation on first mission to Benin and initial SBEE management contract audit findings	SOFRECO/AAA KPMG Togo	February 2020
SBEE Management Contract Auditor Report: January 1—March 31, 2020	SOFRECO/AAA KPMG Togo	July 2020
SBEE Charte Sociale et Genre	SBEE	September 2020
Policy Activity		
Regulation and Tariff Sub-Activity		
Etude et plan tarifaires sur l'électricité au Bénin : Rapport de démarrage	IDEA Consult	October 2016
Etude et plan tarifaires sur l'électricité au Bénin : Stratégie finale et recommandations	IDEA Consult	February 2018
Avis No. 2019-011/CNR/ARE : Rélatif à la requête de la Societe Beninoise d'énergie électrique (SBEE) pour la modification de ses conditions tarifaires actuelles	ARE	November 2019
Règlement de service de la Société Béninoise d'Énergie Electrique (SBEE)	ARE	February 2020
List of technical ARE staff	ARE	Received March 2020
S'rlection d'un cabinet d'architecte pour la construction du siège de l'ARE (Études architecturales & techniques et suivi des travaux)	MCA-B	December 2018
Independent Power Production Sub-Activity		
Rapport intermédiaire sur le projet de révision du Code béninois de l'électricité	SOFRECO, AF-Mercardos EMI	July 2018
Elaboration du code réseau de la Société Béninoise d'Énergie Electrique pour les installations de production raccordées sur la BT	Benaissa Ayadi (Energy code consultant)	October 2019
Elaboration du code réseau (HT/MT) de la Société Béninoise d'Énergie Electrique	Benaissa Ayadi (Energy code consultant)	September 2019
Contract between MCA-Benin II and the grid code consultant (M. Benaissa Ayadi)	MCA-B	March 2019
Inception Report: Independent Power Production Development in Benin	IOS Partners	March 2014
RFP for IPP Framework (Consultant and IPP Transaction Advisor)	MCA-B	July 2017
IPP Framework Consultant and IPP Transaction Advisor Inception Report	Ernst & Young/ GOPA-International Energy Consultants GmbH (intec)/Mayer Brown International LLP	August 2018
IPP Solicitation Release	MCA-B	December 2019
Energy Efficiency Sub-Activity		
Individual energy efficiency audit reports	SGS Senegal	2020

Document title	Author	Date
Rapport de démarrage: Appui à la mise en vigueur des normes de performance énergétique et du programme d'étiquetage pour les lampes, climatiseurs et réfrigérateurs au Bénin	AETS/AERE	October 2018
Manuel sur les normes et l'étiquetage énergétique au Bénin à l'endroit de l'importateur	AETS/AERE	February 2020
Manuel à l'endroit des distributeurs d'équipements électroménagers	AETS/AERE	February 2020
Flowchart showing the roles and responsibilities for importing, selling, and monitoring energy efficient appliances.	MCA-B/MCC	December 2019
Report on technical assistance to government bodies: Support for the implementation of energy performance standards and labeling program for lamps, air conditioners and refrigerators in Benin	AETS/AERE	May 2020
Global implementation report on stakeholders' capacity building plan: Support for the implementation of energy performance standards and labeling program for lamps, air conditioners and refrigerators in Benin	AETS/AERE	May 2020
Public Information and Education Activity		
Stratégie et plan de communication sur l'efficacité énergétique du consultant communication	Dr. Alain Junior Dokpo (Energy efficiency communications plan consultant)	December 2019

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Appendix D

Stakeholder Comments and Responses

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Report: Evaluation of the Benin Policy Reform and Institutional Strengthening Project: Baseline and Implementation Status Report

General

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
Stakeholder	General	L'analyse faite dans le rapport doit intégrer des précisions sur la dynamique en terme de défis ou freins à l'amélioration dans la mise en œuvre des réformes ;	Nous sommes d'accord qu'une discussion des défis à l'amélioration dans la mise en œuvre des réformes est très importante. Dans ce rapport de référence nous avons touché sur ces points. Dans le rapport intermédiaire et le rapport final (qui sont des rapports analytiques) nous inclurons une discussion plus profonde.
Stakeholder	General	*Integrer dans le rapport le point de ce qui est déjà et ce qui sera fait après la fin du Compact ;* *Intégrer dans le point des réalisation l'étude GENCo ; le niveau d'avancement dans l'élaboration du Code Bénino-Togolais d'électricité ;* *La prise en charge des couts du CG après la fin du Compact*	Dans le rapport intermédiaire (provisoirement ciblé vers la fin du compact) nous inclurons une discussion de ce qui sera fait après la fin du Compact. Aussi, il y a eu certains développements après la période de référence (par exemple, l'annonce du GENCo) qui nous décrirons dans le rapport intermédiaire.

Executive Summary

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
EPG	xiii	Section A, Overview. Rather than saying "renovate: the country's electrical grid, it would be more accurate to say "rehabilitate and upgrade portions" of the country's electrical grid.	This change has been made.
EPG	xvi	Table ES2, Key findings. Regarding the comment that GoB implemented a subsidy that offsets the new tariffs, there appears to be a difference in understanding of the actions and sequence of events related to implementation of tariffs in Benin. See more fulsome discussion of this point at comments on page 6 of the Introduction chapter of the report.	Please see response to the comment on page 6.
DCO	xvi	The GoB Ministry of Energy launched the IPP solicitation, not MCA-B	This change has been made.
DCO		Overarching comment for entire report: There is not enough appreciation of the relationship between the $80 million On-Grid Tranche, the Conditions Precedent associated with it, and the contracts funded by the compact through the policy project to assist the GoB in meeting the CPs. That was part of the fundamental architecture of the compact. We conditioned a significant amount of money for infrastructure on what we perceived to be at the time some of the core reforms to the sector and the utility we thought would ensure the sustainability of our investments and attract private capital into generation. As to whether we chose the right CPs, and whether the GoB has really honored those is another question (and certainly you do discuss at length whether the GoB has honored its commitments)	Thank you for this comment. We have reinforced the role of the CPs in the Reform Project design in the ES, the introduction, and where relevant in the main report (particularly in the tariff and IPP subsections).
M&E/PM & EPOG	Page xiv Overview of the compact…	For description of IPP sub-activity, it is important to specify that the transaction advisory services are related to the 4 Solar PV plants of 50MW while the consulting services related to the establishment of the enabling conditions and IPP framework are broader in scope.	This distinction has been made.
M&E/PM	Page xiv "The tariff sub-activity was removed…"	The PIEA project logic is still in the Benin II M&E plan.	We have revised the text to clarify that implementation of the tariff communications is no longer a key part of the PIEA (and also on Page 6)

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
M&E/PM	Table ES.1.	This table lists the planned data sources, and not the actual ones. I would suggest changing the title of the table or differentiating data sources that were not used for the baseline report.	Thank you for this comment. We have revised both the table title and the column header to say, "planned data sources." We also added table note explaining that the table includes all data sources to be used throughout the evaluation, but that not all sources were available for this report. These changes were made in the main report as well.
M&E/PM	Table ES.2 "MCA-B completed energy audits…	I would suggest indicating the number of energy audits and their implementation status.	This change has been made.
M&E/COR	General	Please use the term "evaluation question" throughout, rather than "research question". Both are used and we prefer the former to emphasize the focus on evaluating the tested hypotheses noted in the logic (vs. looking into other research Qs).	We have replaced "research question" with "evaluation question" throughout the document"

I. Introduction

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
DCO	1	Most recent technical/commercial loss figures from SBEE are 24 percent (Check diagnostic for Production, Distribution..etc.)	The number in the report (21%) was obtained from MCA's ITT for end of 2019. MHI's diagnostic report cites the average total loss rate from 2019 as 26.7%, up from 22.4% in 2018. We have replaced the figure in the introduction with this 26.7% estimate and added some text about the discrepancy in Section IV.A.
DCO	2	Re: compact chief objective, please refer back to specific language in Compact Annex I-2 and Program Logic as the objective as stated is incorrect	We have made this correction.
M&E/PM & EPG	2	B. Overview. 'rehabilitate', 'strengthen', or 'upgrade' are better terms to use than 'renovate' when referring to the grid strengthening activities. See similar comment in the Executive Summary section; also note that only selected portions or sections of the national grid will be improved.	We have replaced "renovate" with "rehabilitate and upgrade portions of" as suggested in the ES.
DCO	4	"including performing reconciliation exercises and financial analyses, improving customer management, upgrading information technology, and supporting SBEE in recovering amounts due from government and public entities" - This does not reflect either the description in Annex I-4 of the compact.	We have adapted the language in this section using text from the latest M&E Plan.
DCO	4	"such as the development of new human resources guidelines and practices; research and training; and upgraded information systems to improve inventory tracking, procurement, bill collection, and customer service" This is inconsistent with MHI's ToR. Please revisit and ensure consistency.	We have made revisions using language directly from MHI's ToR.
DCO	5	Please ensure Table I.1 includes MCA consultants as KIIs.	We have added MCA consultants where relevant (here and in the Executive Summary table).
DCO	6	"Implementation of the Policy Activity began in 2017" Implementation began with the Contrat Plan, Tariff, and GENCO consultancies all of which started in 2016.	We have changed the date to 2016.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
EPG	6	D. Timing of Report. As regards the statement that the tariff increase and subsidy went into effect in December 2019, that is not entirely correct. As written, the report indicates that, following the December 2019 Council of Ministers approval of a 5% tariff increase for 2020, the tariff increase went into effect in January 2020. However, to ease the burden on certain ratepayers, the Government agreed to subsidize tariffs, again starting in January 2020. It is correct to say that in December 2019, the Council of Ministers approved a tariff increase but it did not go into effect immediately because the Government wanted to study options for targeted subsidies so as to minimize the impact of the tariff increase on selected vulnerable groups. Then, in early 2020 following the rise of the COVID pandemic, as part of its package of economic mitigation measures, the Government did choose to provide rate relief and subsidies for a period of time (similar to what was done by neighboring countries as part of their pandemic relief measures). The study of subsidy schemes and options which was commissioned by MCA and funded under the compact through the contract with IDEAConsult was completed in September/October 2020 such that the planned tariff increase is to go into effect as of November 1, 2020 (date of implementation to be confirmed) along with the targeted subsidy scheme as designed and approved. This is a point that recurs in multiple places throughout the report but which will not all be cited here. (See, for example (i) page 8, Figure I.3 re policy activity; (ii) pages 12-13 describing the policy activity; (iii) page 19, second bullet under key observations; (iv) page 20 in Table III.1; (v) pages 22-23, Table III.2 under early outputs; (vi) pages 24-26, implementation of tariff policy.	Thank you for this comment. Our understanding is that, from the point of view of GoB and SBEE, the tariff increase was "implemented" in early 2020 even though it was not visible to customers because of the subsidy. A recent email from MCC seems to confirm this interpretation: *For the last year or so, tariffs had nominally increased but the Government subsidized the increment represented by the increase throughout 2020.* We have not changed the text in this report, but will ensure that our interim report describes the timing of the targeted subsidy and of the increase being applied to customers' bills. We welcome a more precise definition of "implementation" of the tariffs, which could be used in this evaluation as well as MCC and MCA reporting.
DCO & EPG & M&E/PM	6	"Implementation of the Utility Strengthening Activity began in 2019." Implementation began with the Contrat Plan in 2016 followed by the Gender Audit, SBEE staff survey, and Management Contract transaction advisor (whose contract is dated November 7, 2017 and for which the procurement was launched in March 2017). Also note the MHI contract, which came into effect in November 2019, extends 16 months beyond the compact end date.	We clarified that the Utility Strengthening Activity started in 2016 and that the MHI contract will extend 16 months past compact end date.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
DCO & M&E/PM	9	"MCC estimated the economic rate of return (ERR) for the entire Benin Power Compact rather than estimating it separately for each of the four projects" MCC did not estimate an ERR for the entire Compact. Rather, there was one for the 'on-grid' projects (Reform, Gx, and Dx) that included costs of admin and M&E. Off-grid was evaluated separately and post-investment decision (prior to signing of co-financing agreements for OCEF)	We have revised the text accordingly.
EPG	9	E. Link to ERR. Rather than relying on MCC 2017 guidelines for economic analysis, it would be better to refer to MCC guidelines that were in place in early 2015 when the ERR was computed for PRIS, Generation and Distribution. [Please note that MCC EA is about to publish a guidance document for Power Sector Cost-Benefit Analysis Design Principles.]	Thank you for this comment. We used the 2017 guidelines when we considered different approaches to measuring costs and benefits in the Evaluation Design Report. We'll update our actual approach to cost benefit analysis for the Reform evaluation, if needed, when the new guidance comes out.
DCO	9	"beginning of the compact in June 2017" Beginning of compact was September 2015 – when it was signed; not EIF. MCA-Benin spent more than $17 million during the CIF period from compact signing to EIF.	We have revised the text.

II. Implementation Status of the Reform Project

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
DCO	11	RE: key observations: You should qualify the budget changes as "major"	This change has been made.
DCO	12	"In the section that follows, we describe each of the major design changes in detail." Supporting the PV generation plants through an IPP modality is a major scope change that does not seem to be included. That was always an idea we had and it was baked into the ToR for the transaction advisor, but at compact signing we did not have clear approval from the former Yayi government to pursue the solar plants as an IPP. The fact we made that decision (among others in the generation project) freed up $120 million to transfer to cover cost overruns in the distribution project. There have also been smaller items we cut not because of budget but because other donors took them on or the GoB was already ahead on the issue like the gas policy and review of the energy Code but those are minor issues.	We believe that this point is covered under the last paragraph of the Policy Activity section: "The IPP Sub-Activity has expanded to include not just development of an IPP framework but also procurement of IPPs for solar photovoltaic plants."
DCO & EPG	12	"The original project design included implementing a new cost-recovery electricity tariff in 2018" You seem to omit the requirement for the GoB to adopt a tariff policy and tariff plan as conditions precedent to $80 million in compact infrastructure funding (the "On-Grid Tranche). We provided TA through this activity in order to help the GoB achieve this. Also, that deadline (2018) is inaccurate. In the Compact the deadline for satisfaction of the condition precedent to the $80 million On-Grid Tranche was not later than 30 months from EIF which was December 22, 2019 .	Thank you for this clarification. The 2018 date was the initial tariff schedule implementation date proposed in the reports from Idea Consult, the MCA-B contractor. However, we agree that it makes sense to frame the discussion in terms of compliance with the conditions precedent deadline and have revised the paragraph accordingly.
DCO & EPG	12	"The eventual tariff schedule was both delayed in implementation and changed in design." Relative to what? Changed in design relative to the tariff consultant's original recommendation, yes, but in form and substance there is nothing in the design that is contrary to what is in the compact or the investment memorandum. The underlying principle is to move to full cost recovery tariffs over time.	We have removed this sentence from this paragraph since the intention is to provide a high-level summary. A more complete discussion (consistent with the points made in this comment) is included in Chapter 3.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
Stakeholder	12	*Approfondir la cause de la dimmunition du budget des réformes*	Nous avons inclus les informations dont nous disposons, qui sont contenues dans les documents fourni par MCC et des entretiens avec des personnes clés. Nous apprécions des détails supplémentaires que nous avons peut-être manqués et qui peuvent être incluse dans le rapport intermédiaire.
DCO	13	Where did you get this figure? The 15 percent increase was supposed to reach cost-reflective tariff level if accompanied by GoB subsidy…and of course once cost structure changes in model, the tariff levels should change.	This statistic was provided by one or more knowledgeable respondents involved in implementation or oversight of the activity. Our confidentiality assurances don't allow for greater detail on the provenance of the figure. We welcome additional information if the commenter disagrees with the figure.
DCO & EPG	13	"**MCC is now focusing on funding physical infrastructure and support for specific studies for ARE rather than capacity building.**" We have provided substantial capacity building on tariff policies and modelling, IPP frameworks, and off-grid electrification. I see the building as additive rather than zero sum with capacity building. The agreement on the part of MCC/MCA to fund a headquarters building for ARE arose from the fact that other active donors, notably EU and WB, were providing substantial technical assistance and support to ARE as an institution but were precluded from funding physical infrastructure for ARE while MCC/MCA could do so. In the end, MCC/MCA agreed that, if the Government provided a suitable site, we would fund the design and construction of the headquarters building.	We have rephrased the introductory sentence to clarify that the physical infrastructure is in addition to targeted capacity building for ARE.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
DCO & EPG	13	"given cost overruns on the Distribution Project" Even in 2015 during compact development, the desire and intent on the part of MCC was to pursue an IPP project in Benin but, prior to compact signing, the Government was not fully receptive to the approach. Shortly after signing, MCC worked with the core team to advance the IPP approach. From this timeline, one can see that the decision to pursue the solar IPP was independent of any cost overruns in the distribution project. The decision to pursue the IPP was supported by the good work of the transaction advisory consultant and the positive interest from the market.	We have revised this sentence accordingly.
EPG	14	b. Utility Strengthening. With respect to the split of funding for the management contract as between MCA-Benin and GoB, MCA will fund 32 months of the contract (from November 2019-June 2022) while GoB will fund the remaining 16 months of the 4 year contract.	We have incorporated these specific durations.
DCO	14	"selected IPPs will likely not begin construction" it is rather complete construction	This change has been made.
DCO	14	"There is a completion risk for the IPP" This is not exactly true. The IPP plants do not need to be built by the end of the compact since they are built with private investment. What is key is that financial close be reached by compact closure – financial close being supported by the compact-funded transaction advisor and including RAP implementation	Thank you for this comment. Our understanding is that additional generation capacity from IPPs remains an end-of-compact goal for the compact. Specifically, MCA-Benin's revised M&E plan lists 50MW as the end-of-compact target for the outcome "generation capacity added from new IPPs." For that reason, we feel it is still accurate to refer to completion risk for the IPPs.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
DCO	15	"not yet clear whether GoB will provide those." Credit support for the transaction is through ATI-ACA, which Benin subscribes to. So the GoB is backing the transaction indirectly via its membership and financial contribution to ATI-ACA.	Our initial understanding from the CODIR was that the GoB has been asked to provide credit support beyond the ATI/ACA's ten-year guarantee. However, based on a subsequent comment in this document, we now understand that the ATI/ACA guarantee can be renewed. We have revised the text accordingly.
EPG	16	Figure II.1, Timeline. The timing shown for the launch of the procurements for the management contractor and the contract auditor is roughly correct – the exact dates are 9/27/18 and 10/1/18, respectively.	Thank you. We've shifted the line slightly to show that the procurements were launched at the end of September/beginning of October
EPG	17	Last paragraph – The statement that GoB changed the role of CEB as the sole energy producer is not entirely correct inasmuch as CEB is an international organization governed by a bi-national body comprised of certain ministers from Benin and Togo.	The text has been revised to clarify that this was a joint decisions by the governments of Benin and Togo.

III. Policy Activity: Baseline situation and early outputs

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
EPG	21	Table III.1. In the column headed "planned tasks at inception", construction of a building for ARE had not yet come into the picture at that point in time. During its early days, ARE operated out of GoB space – various conference rooms. Starting in September 2016, with funding from the EU, ARE rented dedicated space for its offices. The idea of having MCC/MCA fund an office building first surfaced in 2018 (date to be verified) when MCA commenced drafting the terms of reference to procure the services of the study, design, supervision consultant for the ARE building. Under the heading of tasks completed by November 2019, it may be worth mentioning that the purchase of vehicles for ARE was through the Implementing Entity Agreement (IEA). Under the heading of tasks completed by October 2020, the procurement documents for the construction of the ARE building were actually issued 11/3/2020.	Thank you for these clarifications. The table has been revised accordingly.
DCO	23	"It is not clear whether ARE is funded as planned" ARE is funded through a levy on consumer tariffs as well as through levies on private investment in the power sector. The actual budget level however is controlled by the Presidency to ensure costs are kept reasonable	Our conversations with a variety of respondents did not yield clear information on ARE's funding sources in recent years and whether the funding was actually being received. We will continue to investigate for our interim report.
DCO	24	"how long the subsidy will last" The subsidy is limited to the BT Tranche 1, artisans consuming less than 500 kWh, and certain MVA customers (hotels and agroindustry focused on export). I will get you the final report from the tariff study consultant, which is what the GoB adopted. The general subsidy is to be phased out by Nov 1, while the targeted subsidies are supposed to be phased out in 2021.	Thank you for this information. We have included this information in the text.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
Stakeholder	24	*Approfondir l'analyse de la mise en œuvre du tarif reflétant les coûts : quel est le cout de revient du Kwh à la SBEE ? quel est le prix de vente du Kwh par la SBEE. L'endettement lourd de la SBEE ne laisse présager de la réalisation de l'équilibre financier*	Nous sommes d'accord que c'est un point important, et c'est quelque chose que nous discutons dans la section IV.A.5. Le ITT et les rapports de MHI sont nos sources de données officielles. Pourtant, cette statistique n'était pas disponible dans la période de référence.
DCO	25	"we were unable to determine" The President of ARE can answer these specific questions.	Our interviews with a variety of respondents did not yield answers to these questions, but we will continue to investigate for our interim report.
Stakeholder	30	*En ce qui concerne la régulation. Le code a été adopté. Cependant, il y a des préalables (condition indispensable) à remplir pour garantir la durabilité. Cela passe par l'élaboration de règlement des services* ;	Merci pour ce commentaire.
EPG	37	C. IPP Activity. It is stated that IPPs sell electricity at a fixed prices – that is not always the case. In some cases, there may be a fixed price per kWh for the life of the contract or a price subject to indexation (according to an agreed formula). In other cases, the electricity is sold with a combination of a fixed capacity payment and a variable energy charge. As for the benefit of IPPs to a government, especially one in a developing country, one advantage that is not mentioned is that the private sector provides the capital that the country either does not have or would have difficulty raising on its own.	We have revised the text accordingly.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
EPG	38	Table III.8. In the column headed Tasks as of November 2019, it may be worth mentioning that the GoB launched a pre-qualification process for the IPP and selected the pre-qualified bidders. Under the heading of Tasks completed as of October 2020, consider mentioning that the IPP solicitation was launched in December 2019 to the pre-qualified bidders. As for the IPP-related compact goal, refer to other comments on that topic – completion of construction, start of construction, financial close. The compact end goal has changed over time.	We have revised the table accordingly. Regarding the IPP-related compact goal, our understanding is that MCC aims for the IPPs to reach financial close and begin construction by end of compact, but that the M&E plan still includes 50MW new generation capacity as one of the compact targets.
EPG	39	Table III.9. See comments above. It is stated in the table that "Between 2017 and 2019, nearly all of Benin's domestic production was from short-term rental generation provided by an IPP. In 2019, GoB suspended the IPP contracts." The arrangements in place with Aggreko (and to a lesser extent with MRI) were leases and did not constitute IPP contracts.	We agree with this comment and have revised the text to clarify that these were rental generation contracts that MCA's ITT classified as IPPs.
Stakeholder	41	*Indiquer les références des actes qui montrent que le Gouvernent a adopté le cadre IPP, la politique de développement de l'Electricité Hors réseau.*	Nous avons ajouté dans le rapport le numéro du décret pour la réglementation de l'électrification hors-réseau.
DCO & EPG	42	"it is unclear whether the GoB is willing to provide a guarantee after the first 10 years, which could be a barrier to financial close (internal CODIR tracker received from Millennium Challenge Corporation, 2020)." EY subsequently clarified that the ATI-ACA guarantee (liquidity support and possibly political risk cover) can be renewed at the end of the 10 year period; this is no longer an issue.	Thank you – we have revised the text here and earlier in the report to reflect this information.
DCO	43	Agrekko rental generation - It is debatable as to whether the Agrekko contract and other leased genset contracts are actually IPPs; they are rather leasing and service contracts without the full legal architecture of an IPP – Power Purchase Agreement, Grid Connection Agreement, etc. In my view Benin does not currently and has never had a real IPP	We agree with this comment and have revised the text to make the distinction clearer.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
EPG	43	With respect to imported electricity, purchases have historically been from CEB (bi-national company) and through CEB from VRA (Ghana government owned generation company), TCN (Nigerian government-owned transmission company), and a small amount from Cote d'Ivoire. Following CEB's cessation of import activities for SBEE and CEET, SBEE entered into a contract with VRA (to be verified).	Thank you for this information. We have added these details in the text. However, we do not have information on the percent of SBEE's imports that come from each country so we have left the table as-is.
M&E/PM	Figure III.5.	This graph highlights the issue of counting rental generation units as IPPs. I recommend distinguishing down IPPs and rental generation.	We agree that rental generation should be considered separately from IPPs; however, the ITT reports on the two sources combined and we do not have disaggregated data. We have added a label to the graph indicating that IPP generation includes the rental generation. In Section VI.A of the report we recommend that MCA-B review the indicators included in the indicator tracking table (ITT) to ensure that the indicators are clearly defined and aligned with the compact program logic.
DCO M&E/PM	44	"These data show that in 2017, 25 percent of Benin's domestic generation output was from clean energy sources (solar and hydro). These figures are misleading. The 25 percent cited is 24 percent for hydro and 1 percent for solar. The hydro comes primarily from Nangbeto in Togo. Benin is still reporting this as domestic generation, which is contrary to IEA norms.. The solar likely comes from the very few solar mini-grids in the country. Please also refer back to "DGRE, Systeme d'Information Energetique du Benin, Bilan Energetique 2017 et evolution 2010-2017"	Thank you for this information. We have added clarification that the figure includes Nangbeto hydropower plant. We still report the data from the ITT but note that it may be misleading. As noted in the preceding response, we suggest that MCA-B review and update the ITT.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
EPG	46	Expected outcome – Please refer to earlier comments about the timeline for IPP transaction and what may be accomplished prior to the compact end date.	These changes have been made.
GSI	p.22 RQ D.3	On this part- We plan to collect data on consumer acceptance of tariffs and whether consumption has changed over the course of this evaluation and will present results in the interim and final evaluation reports.- Will the data be desegregated by gender and by income?	Data on consumer acceptance of tariffs will come from the baseline consumer survey that INSAE is currently conducting for MCA-B. This survey includes data that will allow us to disaggregate by household head gender and income. Data on electricity consumption will come from the telephone surveys we are conducting for our evaluation of the Electricity Distribution and Generation Projects. We confirm that we can disaggregate these data by gender and income.
M&E/PM	Page 19-20	It would be useful to add a note reminding the reader that this evaluation does not cover the Program's support to ARE in the off-grid sector.	This has been added as a footnote.
M&E/PM	Page 20	I would suggest adding Rethinking Power Sector Reform in the Developing World (Foster & Rana, 2019) as a reference.	We have added this reference.
M&E/PM	Page 22, RQ.D.9., first bullet point	According to ITT data, thirty-eight percent of positions in ARE's organigram are occupied. This was 17%, 28%, 31% in 2017, 2018, and 2019 respectively. Positive trend, but still some way to go.	Thanks for this point. We have added a sentence to this section.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
M&E/PM	Page 22, RQ.D.9., second bullet point	I hope comments on this report will help you clarify whether ARE is in fact being funded from levies and fees. I do think you should mention the 2019 decree allowing ARE to collect levies and fees in the 'early outputs' column. You can also use ITT data to state how much ARE is reporting to receive in fees. According to data ARE reported for the July – September 2020 ITT, ARE received (or should receive) 473 million CFA in 2020 from levies and fees from calendar year 2019.	Thank you for this information. During our interviews we asked a variety of respondents whether ARE was funded from levies and fees but were not able to get a clear answer whether ARE had actually *received* the funds. Unfortunately, we did not have the July-September 2020 ITT at the time of writing. However, we will continue to track the latest numbers and will include our findings in the interim report.
M&E/PM	Page 26	Replace 'solar production' with 'solar generation'. Global replace. Production in French. Generation in English.	We have made this change throughout.
M&E/PM	Page 28, Table III.4	Consider adding a column with the difference (as percentage or in real terms).	We have added the percentage difference as a new column.
M&E/PM	Page 29, Figure III.3.	This is a great chart. Early on, M&E considered tracking the number of ARE decisions.	Thank you.
M&E/PM	Page 35 "Reactions from workshops…"	Please clarify these were MCA-led workshops. Readers may think you facilitated these workshops.	This change has been made.
M&E/PM	Page 35	It's unclear who 'both' refers to in 'both firms'.	We have revised the text to clarify that this refers to the two interviewed firms.
M&E/PM	Figure III.4.	Good chart. Label for 'public administration' is missing. You may also want to use different colors for businesses and public admin, and add two lines for each of the averages.	We have made the suggested revisions to this chart.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
M&E/PM	Page 43, "As of March 2020, domestic electricity production.. "	I would replace the word 'consumption' with 'supply'. Reflect this in other similar sentences. Once electricity is supplied or injected onto the grid, it is not possible to distinguish its source. Similarly, I think RQC5 should read "What percentage of Benin's electricity ~~consumption~~ supply is ~~produced~~ from clean energy sources?"	We have replaced the word "consumption" with "supply" in the text and in RQC5. We suggest making the same change to RQC4.
M&E/PM	Page 45 RQC5	While the information presented here is interesting, I do not think it gets at the reason we included this evaluation question. We want to know how much of Benin's electricity supply comes from the MCC-supported Solar IPPs. For now, not much to say.	We agree and have added a sentence up front stating explicitly that the solar PV plants have not yet been constructed.
	Page 45, Next steps	Add a sentence that you will conduct postponed data collection (appliance survey and focus groups) before the interim data collection as laid out in Figure I.3.	This sentence has been added.
M&E/COR	45-46, logic assessment	This is a very helpful section. Are there not concerns about the medium and long-term outcomes, given concerns about some of the other outputs/outcomes? Same question for similar sections on other Activities?	Yes, there are certainly some concerns. We have not highlighted medium and long-term outcome risks in red in the figures because it is too early to say whether those outcomes are truly at risk – implementation may change and the risks may be mitigated in some way. But we do mention some potential risks to longer term outcomes in the text, or have added that text where it didn't already exist.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
Stakeholder	52	*Approfondir les pesanteurs face à la mise en œuvre du Contrat de gestion (CG): Le CG a démarré dans un contexte de surendettement de la SBEE (Dette supérieure à 35 milliard*) ;	Merci. Nous discutons les défis financiers de la SBEE dans la section 5, «The management services contractor and SBEE's financial health ». Nous ne sommes pas connaissant de la source de cette statistique. Donc, nous vous prions de nous informer d'où vient cette information.

IV. Utility Strengthening Activity: Baseline situation and early outputs

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
DCO	47	"or contracts" should read "or performance contracts" as that is a better translation of contrat plan	This change has been made.
EPG	47	A. Utility Strengthening Activity. Please note that the effective start date for the management contract was November 2019 (not September 2019 as mentioned in the text).	We have made this correction.
EPG	48	Table IV.1. In the column headed Tasks completed prior to October 2019, please note thar the impetus behind the management contract came from the President himself, not the Ministry of Energy.	We have clarified that this was President Talon's request.
DCO	53	"This delay was resolved in 2019 as MCC made government arrears payment one of the requirements for disbursing $80 million in On-Grid Tranche funding." The reality is more nuanced because the GoB has for several years decided to conduct an annual reconciliation exercise wherein it assesses the net debt of SBEE and the GoB – with the former always owing money to the latter, that money being written off as a capital contribution notwithstanding the fact that the GoB does not pay its bills…but reportedly 2,000 GoB entities have pre-paid meters (out of about a total of 6,000 meters)	Thank you for this information. We will incorporate more analysis of the 'reconciliation' process in our interim report as well as information about the GoB entities' prepaid.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
DCO	54	**"The second contrat-plan"** The only reason for the second contrat plan was so that it would align with the management contract.	We have added some text to this paragraph emphasizing that the contrat-plan was intended to align with the MC.
DCO	54	The Contrat Plan has since been approved by the Council of Ministers.	That's great news. Since this report is meant to be a status update as of October 2020, we have decided not to include updated information. We will include these updates in the interim report.
DCO & EPG	57	"This assessment was affected somewhat by travel restrictions due to COVID-19, but MHI delivered the draft diagnostic assessment in August 2020; it is under review at the time of writing this report." Covid had a significant impact on MHI's ability to deploy staff from Canada – in fact MHI prohibited its staff travelling to Benin during much of 2020, so diagnostics of core functions that were supposed to take place in country took place remotely, which is an inadequate approach. In addition, some of the volets or initiatives that depended on the services of short to medium term specialized consultants from MHI (as opposed to the resident management team) had to be postponed due to travel restrictions.	We revised the language to indicate that COVID-19 had a major (rather than minor) impact on MHI's work. We've also clarified that at the time of writing, MHI was 3 months behind on some deliverables.
DCO	57	"an information technology (IT) director and a procurement director" MHI identified the need for an IT director; the Presidency identified the need for a procurement director. We are only funding the IT director, not the procurement director	We have added this information.
DCO & EPG	57	"Key informants noted that MCC and MCA-B" Inaccurate. MCC was never opposed to the idea but it is accurate to state that MCA-B initially was hesitant about the idea. During compact development, the assessment on the part of MCC was that Benin may not be ready for this form of reform and did not want to push an approach for which the country was not prepared but, with the request coming directly from the head of state, this changed the dynamics.	We have revised the text accordingly.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
		"particularly the communications team," It was really the transaction advisor and operations department that met with union and other staff reps	We have revised the text accordingly.
DCO	58	"At the highest levels of government, the new SBEE *Directeur Général* (DG) has formed a positive relationship with the Minister of Finance and is respected by the President." Things have changed since we last spoke. I would instead state that the GoB is currently critical of the MHI contract and the DG specifically for a number of reasons, including continuing outages, lack of corporate support, key staff turnover, and non-certification of the 2019 audit by the Comissaire des Comptes (Benin's supreme audit authority).	We have added a note in the text that the findings here reflect what stakeholders reported in summer 2020. In our interim report we will describe if and how perceptions of MHI's performance have changed.
DCO	58	"Most of MHI's staff have stayed in Benin and continued to work during the COVID-19 pandemic;" Three out of eight key staff have been replaced within the first year. The Technical Director for health reasons, Commercial Director because he left in March and never returned, and the DAF because of performance issues. This is serious because these are core posts. A new DT is in place and there are interim DCC and DAF.	Thank you for this information. Since we did not have this information at the time of writing, we will plan to include these updates as part of the interim report.
DCO	60	"in the early years of the compact" In late 2014/early 2015 more specifically. The real point is that the root cause analysis may have changed since then	We have added the specific years.
DCO		"900 largest customers" Double check this number. I think it is closer to 1,000 (998)	We have confirmed this and revised the text accordingly.
M&E/PM	P 52, Contrat-plan text box	It would be useful to clarify MCA's role in the contrat plan, as they are not a party to that agreement.	We have added to the text box that MCA led development of the second contrat-plan.
M&E/PM	P 59, Figure IV.1. SBEE cost recovery 2016–2019	What is the source of this figure? I'm having trouble reconciling the data presented and what is included in the ITT for 'operating cost-recovery ratio'. Please also note the 'cost-reflective tariff regime' indicator, which is similar to 'cost-recovery rate' presented in this report.	These data are from MHI's diagnostic of SBEE. We have added the source to the figure and have changed the terminology, referring now to the percent of the average cost of service covered by SBEE's average tariff. This is consistent with how the numbers are described in MHI's diagnostic.

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
M&E/PM	P 62, SBEE personnel perceive…	All other evidence suggests the billing processes are not effective. How should the reader interpret that SBEE staff think these processes work?	We don't have evidence to determine why this disconnect exists, but we added text noting that SBEE employee perceptions are not in line with MHI's diagnosis.
M&E/COR	61	Footnote 9 should be in superscript	This change has been made.

V. Public Information and Education Activity: Baseline situation and early outputs

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
MCC/M&E	P 73, Para 5. Measuring results	Thank you for highlighting the M&E gap for PIEA. I do not necessarily think the problem is the complexity of PIEA. Rather, it is the lack of visibility related to the PIEA timing, targeting, and approach, which makes it difficult to measure the effects.	Thank you for your thoughts on this. Our experience evaluating education and communications campaigns has shown that the complexity of these efforts (that is, the variety of audiences and their lack of definition) makes it hard to identify the campaigns' audiences, which therefore makes it hard to measure change. We will continue to track developments in the PIEA implementation plan to better determine if the challenge is complexity, lack of visibility, or something else.

VI. Evaluation data needs and administration

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response

Appendix A Study Design and Data Sources

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response

Appendix B Overview of Primary Data Sources

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response
M&E/PM	General	This section should address why the SBEE customer survey was not completed for this report, as well as plans for its inclusion.	We have included a short section at the end of this appendix describing how we will use customer data from INSAE's survey and from our infrastructure survey.

Appendix C List of Documents Reviewed

Reviewer division	Page or Paragraph Reference	Comment	Evaluator Response

Mathematica

Princeton, NJ • Ann Arbor, MI • Cambridge, MA
Chicago, IL • Oakland, CA • Seattle, WA
Tucson, AZ • Woodlawn, MD • Washington, DC

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