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Report No: PAD2162

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED SCALE UP FACILITY CREDIT

IN THE AMOUNT OF EUR 54.9 MILLION  
(US\$60 MILLION EQUIVALENT)

TO THE

REPUBLIC OF BENIN

FOR AN

ENERGY SERVICE IMPROVEMENT PROJECT

JUNE 2, 2017

Energy and Extractives Global Practice  
Africa Region

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## CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2017)

Currency Unit = CFA Francs

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FCFA 600 = US\$1

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Euro 0.91424392 = US\$1

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SDR 0.7294 = US\$1

## FISCAL YEAR

January 1 - December 31

Regional Vice President: Makhtar Diop

Country Director: Pierre Frank Laporte

Senior Global Practice Director: Riccardo Puliti

Practice Manager: Charles Joseph Cormier

Task Team Leader(s): Franklin Koffi S.W. Gbedey, Alain Ouedraogo

## ABBREVIATIONS AND ACRONYMS

ABERME	Benin Rural Electrification Agency ( <i>Agence Beninoise de l'Electrification Rurale et de la Maitrise d'Energie</i> )
AFD	French Development Agency ( <i>Agence Française de Développement</i> )
ANADER	Renewable Energy Agency ( <i>Agence Nationale de Développement des Energies Renouvelables</i> )
ARE	National Authority for the Regulation of the Electricity Sector ( <i>Autorité Nationale de Regulation du Secteur d'Electricité</i> )
BP	Bank Policy
CEB	Benin/Togo Generation and Transmission Power Utility ( <i>Communauté Electrique du Bénin</i> )
COFORMO	Forest Community of Moyen Ouémé ( <i>Communauté Forestière du Moyen Ouémé</i> )
CPS	Country Partnership Strategy
DA	Designated Account
DSCR	Debt Service Coverage Ratio
EIRR	Economic Internal Rate of Return
ESDP	Energy Services Delivery Project
ESIA	Environmental and Social Impact Assessment
ESMAP	Energy Sector Management Assistance Program
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FCFA	Franc of the Financial Community of Africa ( <i>Franc de la Communauté Financière d'Afrique</i> )
FIRR	Financial Internal Rate of Return
FM	Financial Management
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoB	Government of Benin
GRS	Grievance Redress Service
GW	Giga Watt
GWh	Gigawatt hour
Ha	Hectare
HV	High Voltage
IAME	Increased Access to Modern Energy
IDA	International Development Association
IFC	International Finance Corporation
IFR	Interim Financial Report
IGM	Internal Audit Department of MEEM ( <i>Inspection Générale du Ministère de l'Energie</i> )
IPP	Independent Power Producer
kV	Kilovolt
KWh	Kilowatt hour
LDCs	Least Developed Countries
LED	Light Emitting Diode
LPG	Liquefied Petroleum Gas
LV	Low Voltage
MCC	Millennium Challenge Corporation
M&E	Monitoring and Evaluation

MEEM	Ministry of Energy, Water, and Mines ( <i>Ministère de l’Energie, de l’Eau et des Mines</i> )
MIP	Management Improvement Plan
MV	Medium Voltage
MW	Mega Watt
MWh	Megawatt hour
NPF	New Procurement Framework
NPV	Net Present Value
O&M	Operation and Maintenance
OP	Operation Policy
PCU	Project Coordination Unit
PDO	Project Development Objective
PEFA	Public Expenditure and Financial Accountability Assessment
PFM	Public Financial Management
PPSD	Project Procurement Strategy for Development
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SBEE	Benin Power Utility ( <i>Société Béninoise d’Energie Electrique</i> )
SDR	Special Drawing Rights
SG&A	Selling General and Administrative
SIDS	Small Island Developing States
SYSCOHADA	Accounting System of the Organization for the Harmonization of Business Law in Africa ( <i>Système de comptabilité de l'Organisation pour l'harmonisation du droit des affaires en Afrique</i> )
tCO <sub>2</sub>	Ton of carbon dioxide
ToR	Terms of Reference
WTP	Willingness To Pay

**BASIC INFORMATION**

Is this a regionally tagged project?	Country(ies)	Financing Instrument
No		Investment Project Financing

☐ Situations of Urgent Need of Assistance or Capacity Constraints

☐ Financial Intermediaries

☐ Series of Projects

Approval Date	Closing Date	Environmental Assessment Category
23-Jun-2017	31-Dec-2023	B - Partial Assessment

Bank/IFC Collaboration
No

**Proposed Development Objective(s)**

The project development objective is to improve SBEE's operational performance; expand electricity access in targeted areas; and promote community-based management of forest resources.

**Components**

Component Name	Cost (US\$, millions)
Component 1: Improvement of SBEE's Commercial Performance	10.00
Component 2: Distribution Network Strengthening in Targeted Areas	40.00
Component 3: Community-Based Management of Wood Fuels	5.00
Component 4 : Sector Development and Implementation Support	5.00

**Organizations**

Borrower : Government of the Republic of Benin



Implementing Agency : Ministry of Energy, Water and Mines

### PROJECT FINANCING DATA (IN USD MILLION)

<input checked="" type="checkbox"/> Counterpart Funding	<input type="checkbox"/> IBRD	<input checked="" type="checkbox"/> IDA Credit <input type="checkbox"/> Crisis Response Window <input type="checkbox"/> Regional Projects Window	<input type="checkbox"/> IDA Grant <input type="checkbox"/> Crisis Response Window <input type="checkbox"/> Regional Projects Window	<input type="checkbox"/> Trust Funds	<input type="checkbox"/> Parallel Financing
Total Project Cost: 61.00	Total Financing: 61.00 Of Which Bank Financing (IBRD/IDA): 60.00		Financing Gap: 0.00		

### Financing (in US\$, millions)

Financing Source	Amount
Borrower	1.00
International Development Association (IDA)	60.00
<b>Total</b>	<b>61.00</b>

### Expected Disbursements (in US\$, millions)

Fiscal Year	2017	2018	2019	2020	2021	2022	2023	2024
Annual	0.00	3.22	8.05	10.95	11.73	10.84	8.64	6.58
Cumulative	0.00	3.22	11.27	22.22	33.95	44.79	53.42	60.00



## INSTITUTIONAL DATA

### Practice Area (Lead)

Energy & Extractives

### Contributing Practice Areas

### Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

### Gender Tag

Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF

Yes

b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment

Yes

c. Include Indicators in results framework to monitor outcomes from actions identified in (b)

Yes

## SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

### Risk Category

### Rating

1. Political and Governance

● Moderate

2. Macroeconomic

● Moderate

3. Sector Strategies and Policies

● Substantial

4. Technical Design of Project or Program

● Moderate

5. Institutional Capacity for Implementation and Sustainability

● Substantial

6. Fiduciary

● Low

7. Environment and Social

● Moderate

8. Stakeholders

● Substantial



9. Other

10. Overall

● Substantial

**COMPLIANCE****Policy**

Does the project depart from the CPF in content or in other significant respects?

☐ Yes ☒ No

Does the project require any waivers of Bank policies?

☐ Yes ☒ No**Safeguard Policies Triggered by the Project**

Yes

No

Environmental Assessment OP/BP 4.01

✓

Natural Habitats OP/BP 4.04

✓

Forests OP/BP 4.36

✓

Pest Management OP 4.09

✓

Physical Cultural Resources OP/BP 4.11

✓

Indigenous Peoples OP/BP 4.10

✓

Involuntary Resettlement OP/BP 4.12

✓

Safety of Dams OP/BP 4.37

✓

Projects on International Waterways OP/BP 7.50

✓

Projects in Disputed Areas OP/BP 7.60

✓

**Legal Covenants****Sections and Description**

The Recipient shall ensure that no displacement (including restriction of access to legally designated parks and protected areas) shall occur before resettlement mitigation measures under a Resettlement Action Plan prepared pursuant to the requirements of the RPF, including, in the case of displacement, full payment to Affected Persons of compensation and provision of other assistance required for relocation, have been implemented. (Schedule 2, Section I.F.3(a) of the Financing Agreement.)





#### Sections and Description

The Recipient shall ensure that the PCU: recruits, no later than three (3) months after the Effective Date, a safeguard specialist, a procurement specialist, an electrical engineer, an energy efficiency engineer; and a Project accountant to the PIU, each with qualifications and under terms of reference satisfactory to the Association. (Schedule 2, Section I.A.2(a) of the Financing Agreement.)

#### Sections and Description

The Recipient shall recruit no later than three (3) months after the Effective Date, or such later date as the Association may agree, an internal auditor for the Project, with qualifications and under terms of reference satisfactory to the Association. (Schedule 2, Section II.B.5 of the Financing Agreement.)

#### Sections and Description

The Recipient shall, no later than three months after the Effective Date, update and thereafter maintain, in accordance with terms of reference acceptable to the Association, the Project Operational Manual ("POM"), containing detailed arrangements and procedures for: (a) institutional coordination and day-to-day execution of the Project; (b) monitoring, evaluation, reporting and communication; (c) eligibility criteria, detailed rules and procedures for identification, registration and selection of targeted areas, (d) administration, financial management and accounting; and (e) such other administrative, technical and organizational arrangements, and procedures as shall be required for purposes of implementation of the Project. (Schedule 2, Section 1.E.1 of the Financing Agreement.)

#### Conditions

##### Type

Effectiveness

##### Description

The Implementation Agreement has been executed on behalf of the Recipient and SBEE with terms and conditions satisfactory to the Association. (Article V, 5.01(a) of the Financing Agreement.)

##### Type

Effectiveness

##### Description

The Implementation Agreement has been duly signed and authorized by the Recipient and SBEE and is legally binding upon the Recipient and the SBEE in accordance with its terms. (Article V, 5.02(a) of the Financing Agreement.)

**PROJECT TEAM****Bank Staff**

Name	Role	Specialization	Unit
Franklin Koffi S.W. Gbedey	Team Leader(ADM Responsible)	Sr. Energy Specialist	GEE07
Alain Ouedraogo	Team Leader	Energy Specialist	GEE07
Mathias Gogohounga	Procurement Specialist(ADM Responsible)	Procurement Specialist	GGO07
Angelo Donou	Financial Management Specialist	Financial Management Specialist	GGO26
Abdoul Ganyi Bachabi Alidou	Environmental Specialist	Environmental Specialist	GEN07
Ali Ouattara	Team Member	Sr. Financial Specialist	GEE07
Allison Berg	Team Member	Sr. Operations Officer	GSDDR
Amadou Mamadou Watt	Team Member	Energy Specialist	GEE07
Issa Thiam	Team Member	Finance Officer	WFALA
Melissa Mirinda Pascaline Gbaguidi	Team Member	Administrative	AFMBJ
Natalie Tchoumba Bitnga	Team Member	Program Assistant	GEE07
Paivi Koskinen-Lewis	Safeguards Specialist	Sr Social Development Specialist	OPSPF
Pedro Antmann	Team Member	Lead Energy Specialist	GEE08
Saba Nabeel M Gheshan	Team Member	Legal Analyst	LEGAM

**Extended Team**

Name	Title	Organization	Location
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BENIN  
ENERGY SERVICE IMPROVEMENT PROJECT

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## I. STRATEGIC CONTEXT

### A. Country Context

1. Benin is located in West Africa, bordered by Nigeria to the east, Togo to the west, the Atlantic Ocean to the south, and Burkina Faso and Niger to the north. The country has a land area of 112,600 km<sup>2</sup> divided into 12 departments and 77 municipalities. In 2015, the population was 11 million, mostly concentrated in the southern areas, along the Atlantic coastline. The urban population accounts for forty-four percent of the population, and has been growing at an annual rate of 3.7 percent. Benin has significant agricultural potential and, in recent years, new agro-industries based on cotton, pineapple, and cashew have emerged. In contrast, the country has limited natural energy resources and thus, is heavily dependent on neighboring countries, particularly Nigeria and Ghana, for energy supply.

2. For more than three decades, Benin has enjoyed a democratic governance system. Since the 1990 National Conference, which laid the foundation for a democratic constitution, presidential elections have been deemed free and fair in general, and transfers of power have been peaceful. The last presidential election took place in March 2016, and the new Government has resolved to promote better political and economic governance and has plans for political and institutional reforms to consolidate democracy, reduce poverty, and attract investments.

3. The economy has been growing at above 4 percent over the past decade. Gross domestic product (GDP) growth averaged close to 6 percent between 2012 and 2015, but real GDP growth is estimated to have declined to 4.6 percent in 2016. Economic output has been driven by agriculture and services, particularly formal and informal import/export activities. The GDP decline in 2016 was mainly due to a slowdown of export activities to Nigeria and a drop in agriculture production. The informal service sector accounts for 56 percent of GDP and provides 90 percent of employment, whereas agriculture accounts for 23 percent of GDP. Cotton is the main export agricultural product. There is also a significant export activity of derivatives of pineapple, such as pineapple juice, in the West African sub region and particularly to the countries of the Sahel. Looking ahead, Benin's macroeconomic outlook remains sound, but it is vulnerable to exogenous shocks, such as terms of trade (cotton and oil prices), developments in Nigeria, and adverse weather conditions.

4. Benin's fiscal deficit has been increasing, constraining borrowing. Benin's budget deficit has grown from 2.4 percent in 2012 to 3.5 percent in 2014. The overall fiscal deficit for 2015, originally estimated at 6.4 percent of GDP, reached 8.4 percent of GDP. The fiscal deficit widened in 2015 in the run-up to the presidential elections because of measures implemented largely over the final six months of the previous administration's term. The new Government is trying to balance ambitious public investment plans with a fiscally responsible budget position. Discussions with the World Bank and International Monetary Fund are ongoing in this regard and the Government of Benin (GoB) appears fully committed to continuing with a responsible fiscal and debt management approach.

5. Despite economic growth, poverty remains widespread and is rising. With a gross national income per capita of US\$860 in 2015, Benin is one of the poorest countries in the world. The national poverty rate in 2015 was estimated at 40.1 percent, up from 36.2 percent in 2011, and 35.8 percent of the urban population is poor compared to 43.6 percent of the rural population. Female-headed



households constitute 23 percent of all households and 22 percent of rural households.<sup>1</sup> Interestingly, female-headed households experience lower levels of poverty (28 percent compared to 38 percent for male-headed households). However, women remain more vulnerable; continue to suffer from a lack of economic opportunities; and are underrepresented in high-level decision-making positions. Although Benin has made significant progress in reducing the mortality rate of children below five years and the proportion of people without access to safe drinking water, more needs to be done, including in the energy sector, to enhance economic growth.

## B. Sectoral and Institutional Context

6. Benin's power sector is unbundled and interlinked with that of Togo's. Power generation and transmission for both Benin and Togo have been under the responsibility of the joint, Benin/Togo Generation and Transmission Power Utility (*Communauté Electrique du Bénin*, CEB), headquartered in Togo. CEB has been importing about 95 percent of its power from neighboring countries—Nigeria (60 percent), Ghana (30 percent), and Côte d'Ivoire<sup>2</sup> (5 percent). In addition, some of CEB's self-generation output comes from thermal generation plants that are fueled by gas imported from Nigeria through the West Africa gas pipeline. CEB supplies both the Togo power distribution utility and the Benin national power distribution utility (*Société Béninoise d'Energie Electrique*, SBEE), the sole utility in charge of power distribution in Benin. Besides CEB supply, SBEE used to have thermal self-generation infrastructure with installed capacity estimated at 160 MW but this has been out of service for some time mainly due to lack of adequate maintenance. Peak demand for power in Benin amounted to 241 MW in 2015.

### **Sector Challenges**

7. Power imports have been unreliable, leading to severe outages. Low rainfalls in Ghana and lack of availability of natural gas have reduced power generation output during peak seasons. The price of power purchase from Côte d'Ivoire is much higher than that from Ghana, and almost double the price of imports from Nigeria. Nigeria's gas supply constraints (including sabotage of petroleum export infrastructure), combined with the instability of its transmission network, have been negatively affecting power transfer to Benin. Thus, over the last few years, the vast majority of CEB's power imports from Nigeria and Ghana have been unavailable during the peak seasons, leaving a significant demand-supply gap in Benin, estimated at 200 MW in 2015. As a result, the country has been experiencing severe load shedding, reaching 16 hours per day in March and December 2015, and 10 hours a day in 2016, with significant costs on businesses and the economy. The gap is expected to widen with the steady annual power demand growth rate of 8 percent observed over the past three decades. To help alleviate power shortages, the GoB signed an 80 MW emergency stopgap power rental in 2016.

8. SBEE's financial situation is precarious. Prior to 2011, SBEE had been running significant deficits—amounting, for instance, to US\$0.95 per kWh in 2007 and US\$0.74 per kWh in 2010—and has, therefore, been unable to undertake adequate infrastructure maintenance. The situation improved slightly following a 2010 tariff increase and the phase-out of thermal generation plants in Northern

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<sup>1</sup> 2012 Demographic and Household Survey and World Development Indicators.

<sup>2</sup> The low share of imports from Côte d'Ivoire is due to the fact that the price of power imports from Côte d'Ivoire is much higher than that from Nigeria (the cheapest) and Ghana.



regions (because of the interconnection between Benin's Northern network and CEB's Northern Togo transmission line), as well as network rehabilitation investments, both carried out under the World Bank-financed Energy Services Delivery Project (ESDP, P079633). Nonetheless, with persistent inefficiencies and recent recourse to rented thermal generation, SBEE's costs of service has been rising and only slightly surpassed revenues collected in 2015. Over the last few years, the deficit has been increasing, and SBEE has been struggling to clear account payables. Days in payable have soared from one year and a half in 2007 to three years in 2015. This financial situation negatively affects the financial viability of the power sector.

9. There are significant inefficiencies along the entire power sector value chain, in particular in the distribution sector. Commercial losses and technical losses are significant at about 24 percent. Forty percent of SBEE's billed amounts are uncollected, with the highest share coming from public facilities and other high-revenue customer segments, which significantly affects cash flow. Due to a lack of an operating budget, SBEE is unable to provide electricity connection kits to an expanding already long list of potential customers who have been waiting for an electricity connection for months. The network is aging, and maintenance has been inadequate. Some sub-stations run with defective protection systems and overloaded transformers. Illegal and unsafe electricity connections are rampant in high-density peri-urban areas of major urban centers—such as Cotonou, Porto-Novo, Abomey-Calavi, Parakou, and Natitingou—where many households remain in the dark.

10. Only 29 percent of Benin's households have access to electricity. This low rate, which is below Sub-Saharan Africa's average electrification rate of 35 percent, is compounded by deficiencies in quality of service. The vast majority of households with an electricity connection receive intermittent service due not only to unreliable power imports (as explained earlier) but also due to frequent breakdowns at substations and low voltage (LV) levels. In areas where the distribution network is overloaded, the quality of electrical voltage provided to households is so poor that it does not enable adequate operation of motorized equipment. The electrification rate also masks significant disparities between urban and rural areas. Fifty-six percent of the urban population has access to electricity, with the highest access rate in the coastal cities, such as Cotonou (capital city), and lower rates in medium urban centers where considerable proportions remain unconnected. Only 6 percent of the rural population has access to electricity.

11. With low and unreliable electricity access, Benin's energy sector is dominated by traditional biomass energy. The use of wood fuel and charcoal for cooking represents the highest share—49 percent—of the country's energy balance. However, the large majority of the wood fuel and charcoal is harvested/produced in an unsustainable manner to supply growing urban markets, which accelerates the decline of forest cover. Also, revenues from unsustainable wood harvesting do not benefit local rural populations as they are exploited by professional producers from urban centers. On the demand side, the vast majority of households cooks with wood fuel in inefficient and traditional stoves, leading to indoor air pollution, which negatively affects the health of mostly women and children. Liquefied petroleum gas (LPG) use has been limited by high refill costs of bottles (with recent reductions of subsidies), sporadic shortages, restricted distribution networks, and lack of consumer awareness.

### ***Government Plan***

12. Recognizing these challenges, the GoB has taken steps to establish and strengthen power sector



institutions. The Ministry of Energy, Water, and Mines (*Ministère de l'Énergie, de l'Eau et des Mines*, MEEM) is responsible for sector development planning, policy making, and the development and oversight of electricity expansion programs. However, over the last decade, its institutional capacity has eroded, as many qualified senior staff have retired without adequate replacement, leaving critical skills gaps in a number of areas, including transaction advisory, financial planning, and program monitoring. To expand electricity access in off-grid areas, the GoB established the Benin Rural Electrification Agency (*l'Agence Béninoise de l'Électrification Rurale et de la Maîtrise de l'Énergie*, ABERME). Despite efforts to improve ABERME's management and enhance capacity, progress on rural electrification has been below expectations. A Renewable Energy Agency (*l'Agence Nationale de Développement des Énergies Renouvelables*, ANADER), has also been established to promote, develop, and oversee the implementation of programs to scale up renewable energy. More recently, in 2014, a decree was issued to create the National Authority for the Regulation of the Electricity Sector (*l'Autorité Nationale de Régulation du Secteur d'Électricité*, ARE), but it has yet to become fully operational.

13. The new Government has put forward an Action Plan that aims at increasing domestic generation capacity on an urgent basis to enhance energy security, and improving the performance of the power distribution sub-sector. The Action Plan includes an ambitious power infrastructure investment program, under which four major, high-priority interventions are envisioned:

- (a) *Modernize and expand domestic thermal production to reduce dependency on external production and transmission.* As indicated earlier, the GoB negotiated an 80 MW emergency power rental contract based on thermal generation. In addition, it plans to commission a 360 MW heavy fuel oil generation plant at *Maria Gléta* in a phased manner, and another power rental of 60 MW with independent power producers (IPPs). Also, the construction of a liquefied natural gas terminal (to receive offshore gas) is envisioned.
- (b) *Develop renewable energy potential.* This includes the 147 MW Adjarala hydropower plant, solar photovoltaic plants, and biomass gasification plants.
- (c) *Restructure SBEE's governance and improve its operational performance.* Dialogue is ongoing to open the SBEE management to the private sector through a management contract.
- (d) *Develop and implement an energy efficiency program targeting public buildings and residential sectors.*

14. While the Action Plan has been adopted, it will need fine tuning to pave the way for a financially viable power sector, for instance by implementing a least cost generation plan. For the past few years, SBEE has been relying on stop-gap emergency power rentals, which has increased the cost of power delivery (for instance when comparing to hydropower imports) to end users, and widened the deficit. Adding more power rental and significant thermal production at *Maria-Gléta* will deteriorate SBEE's financial health, and require large public subsidies. Efforts to attract private independent power producers would ease the burden on public resources, and should play a greater role in the Action Plan. Also to be considered are measures to reduce commercial and technical losses and improve the quality of service to end users, which would contribute to improve SBEE's operational and financial performance, and pave the way for an effective dialogue on tariff increases. An actionable plan to





expand electricity access is also missing. The electricity master plan would need to be complemented by an investment prospectus that can provide a rallying framework for engaging and leveraging financing from the GoB, donors, and the private sector with a view to expanding access.

15. In addition, a management improvement plan (MIP) is required to provide a robust foundation to improve SBEE governance and performance. The GoB is strongly committed to involving the private sector in SBEE through a management contract. This will require a business plan that spells out the expected improvements and provides a monitoring and evaluation (M&E) framework. The World Bank's recent experiences in utility reforms (for example, Guinea and Liberia) have revealed the importance of developing an MIP followed by a business plan that can guide the management contractor. Such an MIP would need to be developed as a critical first step to better inform the GoB's efforts to improve SBEE performance and governance framework.

### ***Development Partner Support***

16. The development community has been supporting the GoB's efforts to make the power sector an engine of economic development. The United States' Millennium Challenge Corporation (MCC) is financing the implementation of a US\$375 million power sector development compact<sup>3</sup> signed in 2015. The compact aims to expand business production and productivity, generate greater economic opportunities for households, and improve the capacity to provide public services by improving the quantity and quality of electricity supply. The compact comprises a number of projects to:

- (a) Improve SBEE's governance and management, including through the introduction of a private management contractor for the utility;
- (b) Increase generation capacity by adding up to 60 MW from renewable and thermal sources;
- (c) Increase the capacity and operation of the medium voltage (MV) network powering Cotonou; and
- (d) Support off-grid access scale-up through the provision of grants from an off-grid clean energy facility to be established.

17. SBEE's governance improvement includes the development and implementation of a performance contract between the GoB and SBEE, the establishment and competitive recruitment of board members and senior management (Managing Director, Deputy Managing Director), the revision of electricity tariffs, and support to set up an independent and professional regulator. Conditions for the compact's effectiveness are expected to be met by June 30, 2017. Also, the French Development Agency (*Agence Française de Développement*, AFD) is assisting SBEE to acquire a customer management platform and is financing the rehabilitation of the distribution network in one of Cotonou's high-density peri-urban areas (Abomey-Calavi).

18. Besides the MCC and AFD, the World Bank Group has been a major development partner in the energy sector. In 2005, the World Bank approved the ESDP, which was designed as the first in a series of

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<sup>3</sup> The US\$375 million was provided as a grant.



projects to initiate reforms, extend and improve parts of the transmission and distribution networks, and rationalize biomass fuel use. The ESDP, which closed in 2012, realized (a) the interconnection of CEB's northern Togo networks with that of northern Benin, allowing the transfer of 89 GWh of energy to Northern Benin in 2012 and the phase out of costly thermal generation; (b) the interconnection of Benin's southern network with Nigeria's southern grid; and (c) upgrades in selected high voltage (HV) and MV substations, which added 50 MW transformer capacity in the Cotonou and Porto-Novo networks. The ESDP did not succeed in involving the private sector in the distribution subsector mainly because of a lack of commitment from the Government and the inadequate regulatory and legal framework. Building on the ESDP, the Increased Access to Modern Energy (IAME) Project (P110075) was approved in 2009. It covers transmission extension, MV distribution network rehabilitation, rural electrification, energy efficiency, community-based forest management in the Moyen Ouémé region, and the commercial dissemination of charcoal and LPG cookstoves. In addition to International Development Association (IDA) financed energy operations, a development policy operation is under preparation (First Fiscal Reform and Growth Credit, P160700) and dialogue is ongoing to include a trigger to ensure the GoB's timely payment of electricity bills. Also, the International Finance Corporation (IFC) has recently expressed interest and is planning to support potential IPPs as part of the IFC Private Sector Window.

### ***Proposed Project Focus***

19. The energy sector needs are multifaceted, and a single operation is not able to address all aspects effectively. Given that past and ongoing World Bank-financed projects have placed a greater emphasis on expanding the transmission network and rehabilitating the MV distribution network, and in view of the GoB's strong commitment to improve the performance of the distribution subsector and its critical importance for the financial viability of the overall power sector, the project intends to primarily focus on improving SBEE's operational performance. This would provide a sound financial and technical basis for developing the power sector in a sustainable manner. SBEE's performance improvement would involve securing revenues and reducing technical losses by strengthening mainly the LV distribution network, which would lead, as a co-benefit, to increased and improved access to electricity. The project will also serve as a bridge to a follow-on energy access project by supporting the development of necessary plans and studies and maintaining the successful momentum of the biomass sector created under past World Bank-supported energy sector projects.

20. The proposed project would complement interventions from other development partners. SBEE's performance improvement will involve the development of an MIP that will inform the preparation of a business plan required for developing the management contract supported by the MCC. The MIP will include the installation of management information systems that will complement the customer management platform to be funded by the AFD. Also, the envisioned distribution network strengthening will mostly target the LV network—which will complement the MCC's planned rehabilitation on MV network—and be located in peri-urban areas in major urban centers other than the one benefiting from the AFD's financing.

### **C. Higher Level Objectives to which the Project Contributes**

21. The proposed project supports elements of the new Government Action Plan related to the energy sector, including the GoB's efforts to improve the performance of power distribution operations



and SBEE's governance and operational performance. The project is consistent with the World Bank's FY2013–2017 Country Partnership Strategy (CPS) for Benin.<sup>4</sup> One of the expected outcomes of the CPS's pillar on "sustainable growth, competitiveness, and employment" is increased access to, and quality of, infrastructure services. The achievement of this outcome will be directly supported by the proposed project, which aims at improving power distribution operations, including improvements in the quality of service and access expansion in targeted areas. The envisioned enhancements in the power distribution sector and electricity access expansion are also aligned with the objectives of the World Bank's Energy Directions Paper,<sup>5</sup> which advocates helping client countries secure affordable, reliable, and sustainable energy supply needed to meet the twin goals of poverty reduction and shared prosperity.

## II. PROJECT DEVELOPMENT OBJECTIVES

### A. PDO

22. The project development objective (PDO) is to improve SBEE's operational performance, expand electricity access in targeted areas, and promote community-based management of forest resources.

### B. Project Beneficiaries

23. The project is expected to reduce losses in the electricity distribution business, provide improved electricity service in rehabilitated network areas, and empower rural communities to better manage forest resources. The beneficiaries can be categorized in four groups. The first comprises households and small businesses in peri-urban areas of Cotonou, Porto-Novo, Parakou, and Natitingou. They will receive additional daily hours of electricity and a better voltage of electrical current that enables adequate running of motorized electrical equipment (for example, refrigerators, fans, and air conditioners). The second group includes men and women involved in community-based forest management practices in targeted rural areas. They are expected to benefit from the revenues generated from the management of forest resources, including income-generating activities. The third is SBEE, which would collect increased revenues resulting from the implementation of a revenue protection program and the regularization of informal electricity users. The fourth group are other key power sector stakeholders, including MEEM, ABERME, ARE, and ANADER, which will benefit from technical assistance and capacity-building activities.

### C. PDO-Level Results Indicators

24. The achievement of the PDOs will be assessed using the following project outcome indicators:
- Reduction of losses (percentage)
  - Increased revenues from targeted high-consuming customers (percentage)
  - People provided with new or improved electricity service (number) (Corporate Results

<sup>4</sup> Report No. 75774-BJ.

<sup>5</sup> World Bank. 2013. *Toward a Sustainable Energy Future for All: Directions for the World Bank Group's Energy Sector*.



Indicator)

- Hectares of forest covered by community-based forest management plans (number)

25. Section VII presents the project Results Framework.

### III. PROJECT DESCRIPTION

#### A. Project Components

26. Responding to the GoB's pressing needs to improve SBEE management and the reliability of electricity service and the longer-term goal to develop the energy sector in a sustainable manner, the project aims to (a) improve SBEE's operational performance, in complement to the MCC, by contributing to reduced commercial losses (Component 1) and technical losses (Component 2); (b) maintain positive momentum in the biomass subsector (Component 3); and (c) provide a road map for gradual and sustainable power sector development while strengthening the capacity of the key stakeholders (Component 4). The project's four components are described in the following paragraphs. More details are provided in Annex 1.

#### **Component 1: Improvement of SBEE's Commercial Performance (IDA US\$10 million equivalent)**

27. In complement to other donor efforts, the component will help SBEE reduce commercial losses and adopt a customer-oriented perspective. The component will finance the development and implementation of an MIP, which will inform the preparation of the MCC-supported SBEE business plan and management contract. The MIP will provide a comprehensive snapshot of SBEE's management and recommendations to improve key operational aspects (designed in coordination with and in complement to the MCC's activities in this area). The implementation of the MIP will focus on (a) protecting revenues from the high-consuming customer segment, which represents a large portion of energy consumption; (b) improving management information systems (designed in coordination with and in complement to the AFD's activities in this area); and (c) strengthening SBEE's capacity to manage newly acquired systems. Activities will include acquisition and installation of smart meters for high-revenue customers, establishment of a metering control center, acquisition and installation of associated advanced metering infrastructure and management information systems software (such as an outage management system and a geographic information system), updating of the customer database; establishment and training of a theft detection and inspection crew, and provision of technical assistance services. The assistance will include support for measures to ensure payment by the GoB of its electricity bills. An owner's engineer will be recruited to help SBEE oversee the activities.

28. The component will also support SBEE to gradually improve its customer relationships and better engage with current and potential customers. It will finance the installation and operationalization of a customer call center, which will enable customers to voice complaints/concerns and SBEE to track response time. A gender-sensitive approach will be used to design, install, and staff the customer call center to enable male and female customers to voice complaints/concerns, ensuring that women customers in particular feel comfortable with and are successful in submitting their complaints and concerns. This may include hiring female staff to respond to phone calls and training all



staff on how to interact with female customers. In addition, SBEE will be assisted to conduct customer satisfaction surveys and disseminate findings. The surveys will include a comprehensive diagnostic of the state of electricity access following the World Bank's Energy Sector Management Assistance Program (ESMAP) multitier energy access methodology<sup>6</sup> and will collect sex-disaggregated data to provide a baseline for monitoring female-headed households that would benefit from new or improved electricity service. Gender-informed communications and awareness campaigns will also be carried out to help facilitate the regularization of informal electricity connections and prevent residential and commercial electricity theft. The campaigns will use appropriate tools and approaches (for example, consulting women's groups) to ensure that key messages reach women effectively.

**Component 2: Distribution Network Strengthening in Targeted Areas (IDA US\$40 million equivalent. Government of Benin US\$1 million equivalent)**

29. Component 2 aims to reduce SBEE's technical losses while tapping into 'low-hanging fruit' opportunities to improve the reliability of electricity service and provide new access to dark pockets in peri-urban areas. A technical loss reduction study has been launched under the IAME Project. Preliminary estimates suggest that high loss areas are located in segments of the distribution grids in poorly served, high-density, peri-urban neighborhoods of the major cities of Cotonou, Porto-Novo, Parakou, and Natitingou, where electricity theft is rampant and pockets of households remain without electricity service. These areas will be targeted for network expansion and load balancing. The component will finance the expansion of the MV/LV network to rebalance the loads, regularize informal electricity connections, and provide new electricity connections to nearby, unserved neighborhoods. This will involve the construction of MV and LV lines, the installation of pole-mounted transformers and service drops, and the acquisition and installation of prepaid meters as well as spare parts in distribution substations. To help households afford a new electricity connection, the component will assist SBEE to roll out a model where payment of the electricity connection cost can be made in installments as new customers recharge prepaid consumption units.

30. The component will also seek to reduce the number of hours of power outages in northern towns that are supplied by HV and MV stations where key protections are outdated and malfunctioning. It will finance the upgrade of power stations with the highest impact in reduction of MV/LV power shortages. The upgrade will entail the acquisition and installation of key electrical protection systems and other related ancillary equipment. To facilitate daily operation and maintenance, the component will also finance the acquisition of critical installations and equipment, including a transformer repair workshop and associated spare parts, a fault detection vehicle, and various safety equipment and metering tools.

31. To help reduce peak electricity demand and unpaid electricity consumption from municipalities, the component will promote energy-efficient street lighting. It will replace the energy-intensive sodium vapor lamps that are in use with light emitting diode (LED) lamps in the same areas where network strengthening is being carried out. To facilitate scaling up or replication, a study will be undertaken to take stock of the current state of public lighting and provide recommendations to ensure sustainable

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<sup>6</sup> The multitier framework for energy access consists of six levels of electricity service from 0 to 5, with the highest level consisting of safe, reliable, unlimited 24-hour service from a grid system. See: Beyond Connections: Energy Access Redefined, Energy Sector Management Assistance Program, 2015.



management of street lighting and address barriers to large-scale sales of LEDs in the residential market.

### **Component 3: Community-Based Management of Wood Fuels (IDA US\$5 million equivalent)**

32. Component 3 will contribute to reducing the pressure on northern Benin forests by building on and expanding into new regions the successful gender-sensitive, community-based, forest management practices financed under the ESDP and IAME Project. The component comprises two subcomponents:

- (a) *Subcomponent 3.1 - Sustainable Management of Forestry Resources in the Moyen and Haut Ouémé Basin Regions.* The subcomponent will implement community-based forest management plans covering 300,000 hectare (ha) in the municipalities of Bassila, Bantè, and Djidja, prepared under the IAME Project. This will involve financing tree nurseries, tree plantings, logistical support, training of key actors on forest resource management and energy-efficient charcoal production, communication campaigns targeting local governments and households, and acquisition of equipment for income-generation activities such as beekeeping. Incorporating the lessons learned from the IAME-financed Moyen Ouémé experience, the subcomponent will also finance (i) the preparation of new participatory forest management plans covering 150,000 ha across three municipalities of the Ouémé Supérieur (Djougou, Ndali, and Pèrèrè); (ii) the development of income-generating activities, including a study to expand honey processing and commercialization value chain; and (iii) the establishment of an inter-municipality association and installation of local forestry management bodies and rural wood markets. The local management bodies will be trained and equipped to efficiently manage rural wood markets, seedlings production, and reforestation.
- (b) *Subcomponent 3.2 - Development of Quality Standards for Improved Cookstoves.* The subcomponent will finance a comprehensive study to take stock of quality assurance along the value chain of cookstove production and commercialization and recommend quality standards and associated institutional arrangements and a capacity-building plan required to implement and enforce the standards. It will also fund the development and rollout of a marketing and communication plan and the upgrade of an improved cookstove testing center.

33. The component will continue the implementation of the gender-related activities started in the IAME Project, which designed and implemented activities to address women's lack of access to income-generating and livelihood activities. Specific actions taken under the IAME Project included ensuring that a percentage of direct beneficiaries were women; ensuring that women were employed in planting, forest exploitation, honey production, processing, commercialization, and charcoal marketing; and providing the same training and resources to both women and men to increase their productivity and income. The same actions will be continued and scaled up under this project component. The component will also contribute to increasing women's voice by reserving a percentage of seats in local management bodies for women and conducting separate consultations with women and men to ensure that women's needs and priorities are reflected in local decision making. The consultations will be conducted by women facilitators and will be scheduled at times and in places where women can participate, to facilitate their participation.



#### **Component 4: Sector Development and Implementation Support (IDA US\$5 million equivalent)**

34. The component will contribute to better planning for electricity access rollout in the country, support the development of key power sector institutions, and ensure effective implementation of the project. The capacity-building activities will include the implementation of recommendations from studies funded under the IAME Project. The component comprises three subcomponents:

- (a) *Subcomponent 4.1 - Sector Planning.* This subcomponent will finance the development of a single, comprehensive, least-cost generation and access scale-up plan that will help achieve the goals set in the new GoB Action Plan and incorporate guidelines proposed in the 2015 Power Sector Master Plan. To leverage financing, including from the private sector, the generation and access scale-up Action Plan will be supported by an investment prospectus to be developed in close collaboration with development partners and private sector actors. The subcomponent will also finance the update of the sector financial model, detailed feasibility studies for priority investments from the prospectus and a least-cost generation and transmission plan (such as the strengthening of the Védoko substation), and other analytical studies as needs emerge over implementation.
- (b) *Subcomponent 4.2 - Institutional Strengthening.* This subcomponent will contribute to strengthening the capacities of MEEM, ABERME, ANADER, and ARE to help them better fulfill their respective roles, including power development planning, program coordination and oversight, rural electrification program supervision, renewable energy development, and regulations development and enforcement. Within MEEM, a number of institutional entities will be targeted, including the General Directorate of Energy, the General Secretariat, the Planning Department, the Administrative and Financial Department, the Information Technology Department, and other entities. The subcomponent will fund the update and expansion of a MEEM diagnostic (funded under the IAME Project) to other entities and the implementation of a capacity strengthening plan that will be derived from the diagnostic. Though the capacity plan is yet to be developed, it is expected to include (i) the provision of international advisory services to the Cabinet of the Energy Minister; (ii) support to competitively recruit a critical number of nationals for MEEM, ABERME, and ARE; (iii) delivery of identified training; and (iv) acquisition of vehicles and software, including an intranet system for MEEM. With regard to the newly established regulatory agency, the subcomponent will contribute to its operationalization by funding the elaboration of critical regulatory tools, a standard public-private partnership contract, and service rules.
- (c) *Subcomponent 4.3 - Project Management.* This subcomponent will fund the operationalization and running of the project implementation unit for the duration of the project. Operational services and goods to be funded would include (i) the recruitment of fiduciary, safeguard, and engineering staff; (ii) oversight of implementation of the environmental and safeguards instruments for the investments; (iii) external auditing; (iv) training; (e) office supplies and vehicles for project supervision; and (v) part-time consultants as needed.





## B. Project Cost and Financing

35. The lending instrument for the proposed project is Investment Project Financing in the form of a Euro-denominated IDA Scale-Up Facility Credit. The total project cost is estimated at US\$61 million equivalent. Cost estimates have been prepared in consultation with SBEE, CEB, and MEEM, and are in line with similar projects in Sub-Saharan Africa. The costs by component are detailed in Table 1. Funding from the GoB will support resettlement compensation (which is expected to be limited).

**Table 1. Project Costs and Financing**

Project Components	Cost (US\$, millions)	IDA Scale-up Facility Financing (US\$, millions)	Counter-part Funding (US\$, millions)	% IDA Financing
1. Improvement of SBEE's Commercial Operations	10	10	—	100
2. Distribution Network Strengthening in Targeted Areas	41	40	1	97
3. Community-Based Management of Wood Fuels	5	5	—	100
4. Sector Development and Implementation Support	5	5	—	100
<b>Total</b>	<b>61</b>	<b>60</b>	<b>1</b>	<b>98</b>

## C. Lessons Learned and Reflected in the Project Design

36. The design of the project has incorporated lessons from the World Bank's experiences in the energy sector across regions, including ongoing and past projects in Benin. More specifically, the lessons in the following paragraphs have been reflected.

37. The development and implementation of MIPs has been a critical tool for improving the performance of power utilities. Experiences from countries in Latin America and South Asia have revealed the major contribution of implemented MIPs in turning around the operational performance and financial sustainability of power utilities. Also, recent experience from World Bank-supported utility reforms in Guinea and Liberia have highlighted the effectiveness of MIPs to better inform the development of power utility management contracts. Hence, the design of the project has incorporated the development and implementation of this powerful tool, which usually involves the implementation of (a) management information systems; (b) a revenue protection program; and (c) organizational structure adjustments. These three elements have been analyzed and considering that the AFD is already funding the implementation of several management information systems, the proposed MIP will primarily focus on the implementation of a revenue protection program and training of capable staff to run the infrastructure to be installed.

38. The utilities' ownership of proposed governance and management improvement is indispensable. Experiences from Sub-Saharan African countries have highlighted the importance of high-level commitment from the Government and utilities. Taking into consideration these concerns, the project team has consulted extensively with MEEM, SBEE's management, and key development partners, such as the MCC, during the preparation of this operation. The consultations revealed the





need to improve the foundational aspects of high-revenue customer management, technical losses reduction, and service improvement. The consultations have also stressed the need to complement the MCC's efforts (through a management contract) to improve SBEE's governance structure and senior management appointment by looking at internal operational processes. The project has, therefore, adopted these foundational intervention areas, and SBEE has expressed full commitment to the proposed activities.

39. Access expansion requires a long-term, comprehensive approach supported by strong utilities. Experience in numerous countries shows that expanding access takes time, and the process tends to follow an 'S'-shaped growth curve—the initial stages are relatively slow as delivery models are locally adapted and the institutional framework and capacity are being built. Once the capacity is enhanced and the delivery models are proven, subsequent scale-up can be at a much faster pace. In light of this lesson, the project seeks to provide a platform for strengthening the capacity of the key stakeholders (SBEE, MEEM, and ABERME) while developing a comprehensive and agreed plan for increasing access in a sustainable manner. It is expected that this project will be followed by further support, which will implement parts of the access plan developed by this project.

## **IV. IMPLEMENTATION**

### **A. Institutional and Implementation Arrangements**

40. The project will be anchored within MEEM. MEEM's Project Coordination Unit (PCU), which was a key implementing agency for the ESDP and the sole implementing agency of the IAME Project, will assume the overall project coordination and implementation function in close collaboration with SBEE, ABERME, and CEB. SBEE will be closely involved in the implementation of Components 1 and 2, and will provide technical and oversight inputs, including drafting of terms of reference (ToR) for recruiting contractors, participating in procurement of works, goods, and consultant services, and supervising works. SBEE's role and responsibilities will be clarified in an implementation agreement signing of which is an effectiveness condition. ABERME and CEB will play a participatory role as beneficiaries of technical assistance activities. The proposed implementation arrangements have been in place over the last four years under the IAME Project and have been performing satisfactorily.

41. Though the PCU has a good track record in implementing World Bank projects and is familiar with World Bank procedures, its capacity will be strengthened to take on the extra work of this project as it is still implementing the IAME Project. Therefore, recruitment of additional staff is under way to reinforce its fiduciary and technical capacity. New positions envisioned include a Procurement Specialist, an Internal Auditor, an Accountant, a Social/Environmental (Safeguards) Specialist with gender experience, an Electrical Engineer, and an Energy Efficiency Engineer.

### **B. Results Monitoring and Evaluation**

42. The PCU will be responsible for the overall monitoring and reporting of project progress with inputs from SBEE and ABERME. Both SBEE and ABERME will be involved in the monitoring of their respective project activities and will provide inputs to project progress reports to the PCU, which will be responsible for consolidating and sending the progress reports in form and substance satisfactory to the



World Bank. As needed, the PCU will convene frequent meetings of all involved project entities (including SBEE, ABERME, and CEB) to review progress and address issues that arise.

43. Monitoring of results and outcomes, in accordance with the project Results Framework, will be reported in the project progress reports. Project outcomes related to service improvement will be assessed through surveys before (to establish a baseline), during, and after project implementation. The baseline survey will follow the multitier access framework to capture the current levels of electricity service in the targeted distribution network rehabilitation areas, and will collect and report sex-disaggregated data. The PCU's M&E Specialist will implement and coordinate all M&E activities under the project. Furthermore, the World Bank will supervise the project over its lifetime and monitor its results and outcomes on a regular basis to evaluate the achievement of the PDO and implementation performance.

44. A project midterm review will be conducted two to three years after project effectiveness. The midterm review will provide the opportunity to thoroughly assess the overall project performance in achieving the development objectives and ensure that lessons learned thus far are taken into consideration in implementation over the remaining period. Any adjustments will be discussed, agreed, and implemented as necessary.

### **C. Sustainability**

45. The project, which follows two previous World Bank-funded energy sector projects in Benin, intends to continue the World Bank's long-term engagement in the energy sector. The sustainability of the project's achievements will mainly depend on the financial viability of the power distribution utility, effective institutions, and affordability of electricity to customers.

46. **SBEE's financial viability.** Distribution is the main source of revenue in the power sector value chain. Investments in adequate power generation, transmission, distribution, and operation and maintenance of power assets critically depend on the financial viability of distribution utilities. Reflecting this necessity, the project supports SBEE to improve the collection of the highest revenue share by developing and implementing a revenue protection program that includes better metering and monitoring of high-revenue customers. In addition, the project intends to reduce SBEE's commercial and technical losses through network upgrades and prepaid meter installation and improve the utility's internal processes. Also, the MCC compact complements the project's efforts on SBEE's financial viability by providing technical assistance to the utility.

47. **Effective institutions.** Improving and expanding electricity access in Benin requires strengthening institutions at the strategic, planning, program coordination, and implementation levels. The creation of the electricity sector regulator (ARE) and the operationalization of the rural electrification agency (ABERME) constitute important steps. Equally important is to make these entities fully functional and well performing with clearly defined responsibilities, adequate human resources, institutional support, and accountability mechanisms. To this end, the project will identify skill gaps and other inefficiencies at MEEM, ARE, ABERME, and ANADER and provide tailored assistance, in coordination with other development partners.

48. **Affordability.** High connection charges prevent a sizeable number of households in Benin from



connecting to the grid. As a result, low-income households are likely to remain unconnected even after electricity arrives in their area. Building on experiences under World Bank projects in other countries, the project will help the GoB and SBEE develop and introduce mechanisms to help households afford an electricity connection. A particular focus will be on households most vulnerable to exclusion, such as female-headed households, taking into account the current level of their energy spending. A discounted/promotional electricity connection fee for a fixed period was initially considered. However, after further analysis and to ensure sustainability, a model where the electricity connection fees are paid in installments was retained.

## V. KEY RISKS

### A. Overall Risk Rating and Explanation of Key Risks

49. The overall project risk is rated Substantial mainly due to the absence of key sector strategies and inadequate institutional capacity. The main risks are discussed in the following paragraphs.

50. **Sector strategies and policies (Substantial).** The current piecemeal approach to sector development might erode the fragile financial situation of SBEE. The GoB's plan to pursue emergency thermal power rentals and commission a 240 MW heavy fuel oil plant at Maria Gléta does not represent the optimal option for least-cost power development. Also, Government arrears in bill payment and the lack of a framework for electricity tariff revision add further constraints to SBEE's financial health. The project, in consultation with MEEM, proposes to assess the impact of the envisioned investments on the sector financial viability, and reconcile the GoB's Action Plan with generation options to be recommended through the least cost generation plan. Adoption of the least cost plan and timely payment of electricity bill arrears are being considered as triggers under the planned development policy operation (P160700). Further assistance to facilitate the implementation of these measures is included in the project.

51. **Institutional capacity for implementation and sustainability (Substantial).** Though MEEM's PCU has a good track record in implementing World Bank-financed projects, more broadly MEEM, SBEE, and ABERME have inadequate implementation capacities. MEEM lacks critical skills and expertise in sector development planning, program development, coordination, and experience in evaluating proposals from the private sector for energy generation. SBEE's customer database, as well as data on technical and commercial losses (including metering and billing), has been unreliable. ABERME, since its inception, has gone through many top management changes but has not been able to independently implement major rural electrification projects. The project will provide technical assistance, including hiring of additional PCU staff and services from owners' engineers, to mitigate the risk.

52. **Stakeholders (Substantial).** The improvement of SBEE's overall governance and operational performance involves three major development partners (World Bank, MCC, and AFD), raising a risk of lack of coordination and potential overlaps among interventions. To mitigate the risk, the project team and the MCC, together with the GoB, have held consultations and information on the scope of the interventions has been shared to ensure complementarity. In particular, agreement was reached on the World Bank support to SBEE's development and implementation of the MIP to pave the way for the



preparation of the MCC-supported management contract. World Bank interventions in support of the revenue protection program have been coordinated with AFD's support to SBEE on management information systems.

53. **Climate and disaster risks (Substantial).** Potential climate and disaster risks that could affect the project's activities relate to expected changes in precipitation causing increased frequency and intensity of floods and droughts. These factors might damage or reduce the effectiveness of grid distribution. Grid power infrastructure generally has a long lifespan. The major risks for project investments are (a) flood-related physical damage to the generation and distribution infrastructure and (b) reduced effectiveness of off-grid power supply due to floods or droughts. Sensitive technical design and implementation should mitigate these risks.

## VI. APPRAISAL SUMMARY

### A. Economic and Financial Analysis

54. An economic and financial analysis was conducted, comparing the cost and benefits with and without the project. The analysis considered Components 1, 2, and 3.

55. The project will produce economic benefits to existing and new electricity customers through the provision of new or improved service with network expansion and load rebalancing; and will lead to increased revenues to SBEE through the implementation of the revenue protection program. The economic benefits to existing and new electricity consumers were evaluated using the willingness to pay. Given the lack of available information on household energy expenditures in Benin, the willingness to pay of households in Côte d'Ivoire, which was determined based on surveys, was considered. It was assumed that newly connected households will consume as much as households already connected to the grid.

56. The biomass fuel activities in rural areas will contribute to reducing growing pressure on Benin's forests by continuing past efforts (under the ESDP and IAME Project) to promote a sustainable production and management of wood fuels. Experiences in the IAME project show that the implementation of sustainable management practices will strongly reduce the degradation of the 300,000 ha forest in Bassila, Bantè and Djidja, saving around a tenth of a ton of charcoal per hectare. This would provide households extra revenue with coal priced in the market at around FCFA 50 per kilogram. The introduction of beekeeping will also help households increase their revenues. A hive produces around 25 liters of honey each year which sells for FCFA 2,000 per liter.

57. The key cost elements considered for these components are the capital investments and operational and maintenance costs. Given the long-term nature of the expected project impacts, a minimum 20-year time horizon was adopted for the evaluation of the project. In line with the World Bank's new Guidance on Discount Rates for the Economic Analysis of Investment Projects, the discount rate is set at twice the medium- to long-term real per capita GDP growth forecast for Benin, which yields a discount rate of 8 percent.

58. The improvement of operational performance combined with network expansion and densification investments has an economic net present value of around US\$147 million and a negative



financial net present value of around US\$(6) million. The biomass fuel in rural areas investments have an economic net present value around US\$32 million and a financial net present value of US\$37 million. Economic and financial internal return rates are respectively estimated around 15 percent and (1) percent for the operational and network investments and 50 percent and 61 percent for the biomass fuel in rural areas activities. The combined (Components 1, 2, and 3) financial internal rate of return is positive. The table below shows the economic and financial NPVs and IRRs of the projects.

**Table 2. Net Present Values and Internal Rate of Returns**

Elements	Unit	Components 1&2	Component 3
Economic Net Present Value	US\$ million	147.1	32
Economic Internal Rate of Return	%	15	50
<i>Financial Net Present Value</i>	US\$ million	(6)	34
Financial Internal Rate of Return	%	(1)	61

59. A sensitivity analysis shows that the biomass subcomponent's economic and financial viability are robust to variations in opportunity costs and forest area, two key parameters. A distributional analysis shows that the main beneficiaries are the households (increased revenues) and the environment. The table below summarizes the switching values of the projects.

**Table 3. Switching values of key parameters**

<b>Operational Performance combined with Network Expansion and Densification Switch Values</b>				
Parameters	Unit	Switching Value	Original	Change
Number of connections	number	2,000	10,000	-80%
Willingness to Pay	US\$ Cents	0.11	0.25	-56%

<b>Biomass Fuel for Rural Areas Switch Values</b>				
Parameters	Unit	Switching Value	Original	Change
Opportunity cost	%	44	12	266.7%
Forest areas	hectare	115,000	300,000	-61.7%

60. The operational performance, network expansion, and densification activities are somewhat sensitive to the level of customers' willingness to pay.

61. A greenhouse gas (GHG) accounting analysis shows that the project will avoid 418,394 tCO<sub>2</sub> emissions over its anticipated lifetime, achieved as follows. Through distribution network strengthening, it was assumed that the project will reduce the grid technical losses to 10.5 percent (assuming half technical losses and half commercial losses), which will save 541 GWh of electricity over 20 years as compared to the baseline scenario where the technical losses remains at 12 percent. Each MW will avoid 0.686 tCO<sub>2</sub>, which is a grid emission factor of Benin. With these assumptions, this project will avoid 371,000 tCO<sub>2</sub> over the economic life of 20 years. In addition, the project will provide new or improved electricity services to users through grid extension. It allows grid electricity to substitute for self-generation using GHG-intensive fuel-burning lighting devices like kerosene lamps, oil lamps, and candles. As per the World Bank's GHG guidance on energy access operations, the default Least



Developed Countries/Small Islands Developing States (LDC/SIDS) off-grid emission factor is 0.8 tCO<sub>2</sub>/MWh (a baseline scenario) and shifting to grid electricity will therefore avoid 0.114 tCO<sub>2</sub>/MWh. As the total generation required for new or improved connections is expected to be 413 GWh, the grid extension will avoid 47,000 tCO<sub>2</sub> over the economic life of 20 years. The Project will also avoid 92 tCO<sub>2</sub> from energy efficient lighting program. In total, the project will result in GHG avoidance of 418,394 tCO<sub>2</sub> over the project lifetime.

62. Details of the analysis are provided in Annex 4.

### ***Financial Analysis of SBEE***

63. A historical and projected analysis of the operating performance and financial position of SBEE during the period of 2007-2030 showed that SBEE's operation and financial conditions have deteriorated materially on the period 2007-2015 and are forecasted to stay poor and depressed. A full discussion of SBEE's financial situation is given in Annex 4.

64. SBEE's cost of service was relatively high on the period 2007-2015 and is forecasted to remain high on the projection period (2017-2030). It has historically moved from a low of FCFA 115 per kWh (US\$0.19 per kWh) in 2012 to a high of FCFA 145 per kWh (US\$0.24 per kWh) in 2008. It is expected to move further within a wider range on the projection period from a high of FCFA 162 per kWh (US\$0.27 per kWh) in 2017 to a low of FCFA 115 per kWh (US\$0.19 per kWh) in 2019.

65. The cost of rental power has been and will still be one of the main drivers of the relatively high cost of energy supplied until 2021 when it is expected to be discontinued. Although rental power was only 8 percent of total energy supplied on 2007-2015, its share of cost was above 19 percent of the total cost of supply. Rental power unit cost was excessively high ranging from FCFA 93 per kWh (US\$0.15 per kWh) to FCFA 213 per kWh (US\$0.36 per kWh). Furthermore, although rental power will represent only 6 percent of total energy supplied on the projection period, its share of cost will be above 29 percent of the total cost of supply. Rental power unit cost will be far more expensive ranging from FCFA 384 per kWh (US\$0.64 per kWh) to FCFA 417 per kWh (US\$0.70 per kWh).

66. While the Government provided only FCFA 20 billion (US\$33 million) as operating subsidy on the period of 2007-2015, it will unfortunately have a far larger financial responsibility over the period 2016-2019 as the projected operating subsidy is estimated to be FCFA 255 billion (US\$426 million). This subsidy will essentially be used to cover the cost of rental power. Without Government subsidy, SBEE cost recovery ratio will be between 71 percent and 75 percent on the period 2017-2019, largely due to the excessive cost of rental power. The cost recovery ratio will be above 100 percent thereafter, when the rental power contracts are discontinued.

67. SBEE's collection period (days), already not acceptable in 2007 (five months) deteriorated significantly to reach nine months in 2015. The collection period (days) is forecasted to decrease significantly from the current eight months to around one and half months over the forecasting period. Should that materialize, it will be an impressive achievement that would help SBEE cash flows situation. Particular attention should be paid to this metric, as deliberate action will be needed to improve the collection rate, especially when it comes to of Government services and the public administration.





68. SBEE Days in Payables, already high at 559 days (it takes on average 1.5 year to fully clear Account Payables) in 2008, grew exponentially to 1,083 days (it takes on average three years to fully clear Account Payables) in 2015. The growth in Account Payables is a sign of stress on the company financials (treasury) and delay in payment of the power purchased from CEB and potentially from IPP. Even though this metric is forecasted to improve (decreasing to 537 days in 2030), it is still far above the appropriate 90 days' threshold. The high days in Account Payables will remain a sign of stress on the company financials (treasury) and delay in payment of SBEE suppliers.

69. SBEE's operating charges coverage ratio (taking into account the subsidy provided by the Government) improved from below recovery level of 0.81 in 2007 to a level of 1.01 in 2015 (25 percent increase), showing that SBEE was at least recovering its operating costs with the revenue collected via its tariff and the subsidy received from the Government. The ratio is expected to fall to 0.61 (below recovery level of 1.0) and will only see a marginal improvement to a level of 0.86, which will still not be enough to allow SBEE to recover its operating costs with the revenue collected via its projected tariff. An additional tariff increase should be contemplated.

70. A simulation of SBEE's financial situation was conducted considering a realistic scenario in which the MCC-financed 60 MW of solar power is realized, as well as AFD-financed 20 MW solar and the World Bank's envisioned new energy access project as well as this currently proposed project. The implementation of these interventions will lead to a 30 percent increase of low voltage domestic consumption in 2020. The simulation results showed that the sector will see a material improvement in its cost recovery going from 80 percent in 2019 to 111 percent in 2020.

71. In the said scenario, SBEE's net margin will move into positive territory in 2020 with no subsidy needed after the discontinuation of rental power contracts, should that occur. The positive net margin will be on average US\$2.4 cents per kWh on the period 2020-2030.

## **B. Technical**

72. The selected network strengthening and access expansion approach draws from successful access experiences financed by the World Bank globally and in the country. Access expansion in the project is primarily pursued through existing grid rehabilitation, densification, and extension, which has been the least-cost means for rapidly scaling up access in countries that are nearing universal access (for example, Vietnam, Lao People's Democratic Republic, and Tunisia). The investments have incorporated a low-cost design and the cost of the proposed grid strengthening interventions are aligned with regional standards. Technical aspects of the project rely on well-known technologies, including those in use in Sub-Saharan Africa, and are not complex from a technical perspective. The biomass activities are a continuation of successful activities supported under the IAME Project. With regards to sector development, the proposed least-cost generation plan constitutes a relevant approach to ensure adequate planning of generation addition in a financially sustainable manner, whereas the investment prospectus for access roll out has been an effective tool in some countries (such as Rwanda and Kenya) to leverage financing from donors, private sector, and Government for electricity access scale up. Also, the MIP development and implementation will provide needed basis to measure improvements (irrespective of public or private management) and initiate SBEE's financial turn-around.



### **C. Financial Management**

73. The PCU of the ongoing IAME Project will have the overall fiduciary responsibility of the proposed project. The financial management (FM) arrangements for the project will be based on the existing arrangements in place under the IAME Project. The overall FM performance of the IAME Project is satisfactory. The PCU (located within MEEM) is staffed with a FM Specialist and an Accountant, who are experienced in the implementation of World Bank-financed projects. One additional Accountant will be recruited to reinforce FM capacity. In line with the use of country systems, it was agreed to assign, as Internal Auditor for the IAME Project, the Internal Audit Department of MEEM (*Inspection Générale du Ministère de l'Energie*, IGM). From 2013 to date, IGM has not submitted any internal audit report related to the IAME Project. However, the external audit for the year ended December 31, 2015, for the IAME Project was submitted on time and was unqualified. The unaudited interim financial reports (IFRs) for the IAME Project were also submitted on time with acceptable quality. To ensure the implementation of the internal audit function for the new project, as an interim arrangement, the PCU will recruit, within three months after effectiveness (or such later date as may be agreed), and based on ToR acceptable to IDA, an experienced Internal Auditor who will conduct ex post reviews to improve the overall internal control environment.

74. The overall FM risk for the project is rated Moderate. It is considered that the FM satisfies the World Bank's minimum requirements under OP/BP 10.00 and therefore is adequate to provide, with reasonable assurance, accurate and timely FM information on the status of the project required by the World Bank. To reinforce the internal control system and mitigate fraud and corruption risks, the following actions have been incorporated into the project design: (a) the recruitment of an external Financial Auditor who will express yearly an independent professional opinion on the project's financial statements; (b) the recruitment of one additional accountant to reinforce the FM team in light of the workload which the new project will generate; and (c) the update of the current FM manual of procedures for the IAME Project to include the new project specificities. Further details are provided in Annex 2.

### **D. Procurement**

75. MEEM's PCU will carry out procurement for the proposed project in accordance with the World Bank's 'Procurement Regulations for IPF Borrowers' (Procurement Regulations) dated July 2016 under the New Procurement Framework (NPF); the 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants', dated October 15, 2006, and revised in January 2011; and other provisions stipulated in the Financing Agreement.

76. As part of the preparation of the project, the Borrower has prepared a Project Procurement Strategy for Development (PPSD), which describes how procurement activities will support project operations for the achievement of PDOs and deliver value for money. The procurement strategies would be linked to the project implementation strategy ensuring proper sequencing of the activities. It considers institutional arrangements for procurement, roles and responsibilities, thresholds, procurement methods, and prior review, and the requirements for carrying out procurement. It also includes a detailed assessment and description of the state government's capacity for carrying out procurement and managing contract implementation, within an acceptable governance structure and accountability framework. Other issues considered include the behaviors, trends, and capabilities of the





market (that is, market analysis) to respond to the Procurement Plan. The analysis concluded that the proposed PUI has the capacity and the experience to handle the procurement of the ESIP project. However, the PIU will be reinforced by the recruitment of a new procurement specialist. The procurement risk is rated “substantial” and after implementation of the identified mitigation measures, the risk will be downgraded to “moderate”. The selection methods as well as the threshold for the prior reviews were determined. The detailed procurement description and institutional arrangements can be found in Annex 2.

#### **E. Social (including Safeguards)**

77. The proposed project activities under Component 2 on distribution network strengthening and expansion trigger OP/BP 4.12 - Involuntary Resettlement. This is because these works may require some small-scale private land acquisition and cause subsequent losses of assets and/or temporary restrictions of access to livelihoods. Since the locations and details of the civil works are not known at this point, the potential adverse impacts are addressed in the Resettlement Policy Framework (RPF) prepared by the Client. The RPF has been consulted upon with various stakeholder groups and has been disclosed in-country and by the World Bank on May 8, 2017. The RPF will guide the preparation of the Resettlement Action Plan (RAP) during project implementation as and when necessary. The RAP will also be reviewed and approved by the World Bank and disclosed both in-country and by the World Bank. The RAP will be implemented before starting civil works.

78. The types of civil works envisaged under the project are not expected to result in large numbers of foreign workers; however, the project will be mindful of this risk and take appropriate measures to prevent and address the negative consequences. This will be done by incorporating obligations in contracts, working with local governments, public employees, and community-based organizations, and non-governmental organizations working on human rights and on preventing gender-based violence, trafficking, and child abuse; adopting and enforcing a code of conduct for the workers and educating them, as well as the affected communities on the code; and building capacity among contractors and front-line staff to address these issues; and rigorously monitoring these issues and reporting on them among others.

79. Subcomponent 3.1. on community forest management may cause some limitations of access to forests; thus, OP/BP 4.36 - Forests has been triggered and, to manage impacts, a Process Framework has been prepared, consulted upon, and disclosed in-country and by the World Bank on May 8, 2017. During implementation, a specific action plan to assist the affected people will be prepared and approved by the World Bank before putting in place any restrictions or limitations to resources or livelihoods.

80. With regard to capacity on safeguards, the PCU has previous experience in managing World Bank-funded projects, including safeguards issues. However, to strengthen the capacity further, the PCU will hire designated specialists, as part of its staff, to cover both environmental and social safeguards issues. These staff members will be trained in World Bank safeguards policies and their implementation requirements and the World Bank safeguards specialists will provide guidance to the PCU and implementing entities. During implementation support missions, the World Bank’s team will assess the implementation of the safeguard documents and recommend additional strengthening, if required. The safeguards documents, along with the requisite attachments, will be shared directly with the involved stakeholders, including relevant ministries.



### ***Gender***

81. The project provides opportunities to reduce or prevent gender gaps and promote women's voice and agency. The gender gaps that the project will address are lack of (a) access and barriers to connection to electricity for poor female-headed households (Components 1 and 2); (b) employment and income-earning opportunities or livelihood for women (Components 1 and 3); and (c) voice and agency in participating in decision making at the community level and raising their concerns and problems with the connection and service (Components 1 and 3).

### ***Citizen Engagement***

82. Community engagement activities financed by the project will include a survey to analyze access to electricity under the multitier framework. SBEE is interested in measuring the degree of satisfaction among its customers. The survey will be repeated to measure the impact of the project, and thus the evolution of customer satisfaction levels. In an effort to promote transparency and accountability, key survey findings will be published. The survey will pay special attention to women's satisfaction with electricity service and women's awareness of available consumer feedback mechanisms (that is, call centers) that they can use to raise complaints and grievances. The survey sample will include married women, widows, and single mothers, and the survey will collect and report sex-disaggregated data. In addition to the survey, the project will finance the establishment and operationalization of a call center to improve SBEE's commercial management. The call center will serve to take note of the defaults and trigger the maintenance department to solve the problem within the determined time. The project will also finance the expansion of this service to document, monitor, and communicate improvements, while addressing customer complaints and informal electricity connections. This consumer feedback mechanism will be strengthened in a way that it will be accessible to women and will consider their particular concerns and needs.

## **F. Environment (including Safeguards)**

83. The environmental measures of this project are related to the activities of the Components 2 and 3 that have triggered the World Bank environmental and social safeguard policies: OP/BP 4.01 - Environmental Assessment, OP/BP 4.04 - Natural Habitats, OP/BP 4.11 - Physical Cultural Resources, OP/BP 4.12 - Involuntary Resettlement, and OP/BP 4.36 - Forests. The project is Category B. The overall environmental impact of the project is positive. However, some negative impacts may occur during the execution of the project, such as effects on the soil; air, water, and noise pollution; the resettlement of the surrounding communities; handling, storage, and elimination of waste; and congestions or deviation and temporary interruption of the traffic around building sites, mainly during the construction and/or exploitation phases. It is expected that these environmental and social impacts of the project are reduced, temporary, localized, and manageable and appropriate mitigation measures taken during the construction/rehabilitation and operation will be able to minimize or even eliminate them. None of the activities will have regional environmental effects or any large-scale impacts. The assessment of the natural habitats and the forests impact will be carried out in connection with the elaboration of an Environmental and Social Impact Assessment (ESIA) for all the activities during implementation, and the safeguard measures will be included in the Environmental and Social Management Plan (ESMP).

84. An Environmental and Social Management Framework (ESMF) has been prepared, approved by



the World Bank, and disclosed both in-country and by the World Bank on May 8, 2017. The ESMF explains, in detail, all measures that need to be taken during project implementation, including the realization of an ESIA and ESMP for sites/specific work, which must be prepared and published before the start of the works. These documents will be validated and disclosed by the GoB and the World Bank before the starting of works under the project.

85. The capacity of the Borrower with regard to environmental safeguards is good. The country's Environmental Protection Agency is familiar with the environmental safeguards policies of the World Bank and has developed good working partnerships with the World Bank under previous and ongoing World Bank-financed projects in Benin. In addition, the attenuation measures and environmental follow-up will be carried out by the PCU with the support of the affected entities (SBEE, municipalities, and so on). The PCU will recruit one Safeguard Specialist or will hire a consultant who will follow these issues and implement safeguard instruments. In addition, the environmental Safeguard Specialists of the World Bank will guide and provide specific support to the PCU through the regular missions to support the implementation of the project.

#### **H. World Bank Grievance Redress**

86. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).



## VII. RESULTS FRAMEWORK AND MONITORING

### Results Framework

COUNTRY : Benin

Energy Service Improvement Project

#### Project Development Objectives

The project development objective is to improve SBEE's operational performance; expand electricity access in targeted areas; and promote community-based management of forest resources.

#### Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
<b>Name:</b> Reduction of losses (%)		Percentage	24.00	21.00	Annual	PCU reports and SBEE data	PCU and SBEE
<b>Description:</b> This indicator measures the distribution losses (technical and commercial) of the distribution utility. It will be calculated using the total energy billed over the total energy supplied in percentage.							
<b>Name:</b> People provided with new or improved electricity service (number) (Corporate Results Indicator)		Number	0.00	125000.00	Annual	PCU reports and SBEE data	PCU and SBEE



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
<b>Description:</b> This indicator measures the number of people that have received an electricity connection under the project via new connections aimed at connecting households, and the number of people that have received improved electricity supply. It will be calculated using the number of Household connections times the average household size in urban areas in Benin							

<b>Name:</b> Increased revenues from targeted high-consuming customers (%)		Percentage	0.00	10.00	Annual	PCU reports and SBEE data	PCU and SBEE
<b>Description:</b> This indicator measures the percentage of increase of revenue from high-consuming customers. It will be calculated using the amount of increase of revenue due to the project over the baseline revenue of targeted high-consuming customers.							

<b>Name:</b> Hectares of forest covered by community-based forest management plans (number)		Hectare(Ha)	0.00	300000.00	Annual	PCU reports	PCU
<b>Description:</b> This indicator measures the area of forest covered by community based management plan							

### Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
<b>Name:</b> Management Improvement Plan (MIP) developed and approved		Text	No MIP	MIP developed and implement	Annual	SBEE reports	PCU and SBEE



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
and implemented				ed			
Description: This indicator captures the fact that the MIP report is approved and the level of implementation of key measures included in the MIP							
<b>Name:</b> Average duration of power outages per year in HV/MV substations rehabilitated by the project (hours)		Text	TBD	50% of reduction is targeted	Annual	SBEE reports	PCU and SBEE
Description: This indicator measure the reduction in percentage of the number of hours of average outage per year in the rehabilitated substations. It will be calculated using the baseline number of hours of outage minus the number of hours of outage at the end of the project, and expressed in percentage.							
<b>Name:</b> Implementation of a revenue protection program (RPP)		Text	No RPF	RPF is implemented	Annual	SBEE reports	PCU and SBEE
Description: This indicator will measure (capture) the various steps of implementation of the revenue protection plan.							
<b>Name:</b> Call Center installed and running at SBEE		Text	No Call Center	SBEE possesses and runs a call center	Annual	SBEE reports	PCU and SBEE
Description:							



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
<b>Name:</b> SBEE customer satisfaction survey conducted and report by SBEE on how to address customers' feedback		Text	No Survey	Customer satisfaction survey conducted at project closure year	Annual	SBEE reports	PCU and SBEE
Description:							
<b>Name:</b> People provided with access to electricity services under the project by household connections (grid or off-grid).		Number	0.00	10000.00	Annual	PCU reports and SBEE data	PCU and SBEE
Description: This indicator measures the number of people that have received an electricity connection (grid or off grid) under the project via new connections. It will be calculated using the number of household connections times the average household size in urban areas in Benin							
<b>Name:</b> Households provided with improved electricity connection		Number	0.00	15000.00	Annual	PCU reports and SBEE data	PCU and SBEE
Description: This indicator measures the number of people that have received improved electricity under the project.							
<b>Name:</b> Female-headed households provided with		Percentage	0.00	10.00	Annual	PCU reports and SBEE data	PCU and SBEE



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
new or improved electricity connection							
Description: This indicator measures the number of female-headed households that have received an electricity connection under the project via new connections or improved electricity connection.							
<b>Name:</b> Prepaid meters installed in targeted project areas		Number	0.00	50000.00	Annual	PCU reports and SBEE data	PCU and SBEE
Description:							
<b>Name:</b> Average annual voltage supplied to households in rehabilitated areas		Volts	180.00	210.00	Annual	PCU reports and SBEE data	PCU and SBEE
Description: This indicator measures (in Volts) the voltage supplied to the household in the rehabilitated areas							
<b>Name:</b> HV/MV stations rehabilitated by the project		Number	0.00	3.00	Annual	PCU reports and SBEE data	PCU and SBEE
Description:							
<b>Name:</b> MV/LV sub-stations		Number	0.00	60.00	Annual	PCU reports and SBEE data	PCU and SBEE





Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
installed in the project areas							
Description:							
<b>Name:</b> New forest management plans developed in the municipalities of Djougou, N'Dali and Pèrèrè		Yes/No	N	Y	Annual	PCU reports	PCU
Description:							
<b>Name:</b> Support to income generating activities		Text	No support	8 honey production centers; 8 water boreholes; 800 bee hives constructed; and 280 trained beekeepers	Annual	PCU reports	PCU
Description: This indicator measures the realizations financed by the project to support income generating activities (such as bee-keeping) in the communities.							
<b>Name:</b> Increased revenues from beneficiaries of income		Percentage	0.00	30.00	Annual	PCU reports	PCU



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
generating activities funded by the project							
<b>Description:</b> The indicator measures in percentage the increased of revenue of beneficiaries of the income generating activities. It will be calculated using the baseline average income over the total average income of beneficiaries after the project (excluding eventual other new sources of income) in percentage.							
<b>Name:</b> Investment prospectus for acces scale up developed		Text	No investment prospectus	Donors conference on investment prospectus done	Annual	PCU reports	PCU
<b>Description:</b>							
<b>Name:</b> Institutional strengthening study conducted and capacity building plan implemented		Text	A former outdated study is available	Capacity building plan is fully implemented	Annual	PCU reports	PCU
<b>Description:</b>							
<b>Name:</b> Staff trained through the project		Number	0.00	100.00	Annual	PCU reports	PCU



Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Description: Number of staff trained through the project							



### Target Values

#### Project Development Objective Indicators

Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
Reduction of losses (%)	24.00	24.00	24.00	24.00	23.00	21.00	21.00
People provided with new or improved electricity service (number) (Corporate Results Indicator)	0.00	0.00	0.00	10000.00	80000.00	125000.00	125000.00
Increased revenues from targeted high-consuming customers (%)	0.00	0.00	0.00	0.00	5.00	10.00	10.00
Hectares of forest covered by community-based forest management plans (number)	0.00	0.00	150000.00	200000.00	300000.00	300000.00	300000.00

#### Intermediate Results Indicators

Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
Management Improvement Plan (MIP) developed and approved and implemented	No MIP	MIP approved by SBEE and the Ministry of Energy (MEWM)	MIP implementation began	About 75% of MIP key measures implemented	About 90% of MIP key measures implemented	MIP implemented	MIP developed and implemented
Average duration of power outages per year in HV/MV substations rehabilitated by the project (hours)	TBD	0%	0%	10%	30%	50%	50% of reduction is targeted



Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
Implementation of a revenue protection program (RPP)	No RPP	RPP developed	Smart meters and associated infrastructure acquired	Smart meters installed and metering control center constructed	Fraud detection and inspection system in place	RPP is implemented	RPP is implemented
Call Center installed and running at SBEE	No Call Center	No Call Center	No Call Center	Call Center installed	Reports on response time generated	Reports on response time generated	SBEE possesses and runs a call center
SBEE customer satisfaction survey conducted and report by SBEE on how to address customers' feedback	No Survey	Baseline survey conducted	Report on how SBEE will address customer feedback	Second baseline survey under preparation	Customer satisfaction survey on few areas	Customer satisfaction survey at large scale and Report on feedback	Customer satisfaction survey conducted at project closure year
People provided with access to electricity services under the project by household connections (grid or off-grid).	0.00	0.00	0.00	1000.00	6000.00	10000.00	10000.00
Households provided with improved electricity connection	0.00	0.00	0.00	2000.00	10000.00	15000.00	15000.00
Female-headed households provided with new or improved electricity connection	0.00	0.00	0.00	2.00	5.00	8.00	10.00
Prepaid meters installed in targeted project areas	0.00	0.00	0.00	10000.00	30000.00	50000.00	50000.00
Average annual voltage supplied to	180.00	180.00	180.00	200.00	210.00	210.00	210.00



Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
households in rehabilitated areas							
HV/MV stations rehabilitated by the project	0.00	0.00	0.00	1.00	2.00	3.00	3.00
MV/LV sub-stations installed in the project areas	0.00	0.00	0.00	10.00	40.00	60.00	60.00
New forest management plans developed in the municipalities of Djougou, N'Dali and Pèrèrè	N	N	N	N	Y	Y	Y
Support to income generating activities	No support	No support	Ongoing support	2 honey production centers; 2 water boreholes; 300 bee hives constructed; and 100 trained beekeepers	5 honey production centers; 5 water boreholes; 600 bee hives constructed; and 200 trained beekeepers	8 honey production centers; 8 water boreholes; 800 bee hives constructed; and 280 trained beekeepers	8 honey production centers; 8 water boreholes; 800 bee hives constructed; and 280 trained beekeepers
Increased revenues from beneficiaries of income generating activities funded by the project	0.00	0.00	0.00	10.00	12.00	15.00	30.00
Investment prospectus for acces scale up developed	No investment prospectus	Investment prospectus launched	Investment prospectus under development	Investment prospectus developed	Investment prospectus approved	Donors conference on investment prospectus done	Donors conference on investment prospectus done



Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
Institutional strengthening study conducted and capacity building plan implemented	A former outdated study is available	Study launched	Study report and capacity building plan approved	Implementation of capacity building plan initiated	Capacity building plan is half way implemented	Capacity building plan is fully implemented	Capacity building plan is fully implemented
Staff trained through the project	0.00	0.00	10.00	50.00	70.00	100.00	100.00



## **ANNEX 1: DETAILED PROJECT DESCRIPTION**

**COUNTRY:** Benin

### **Modern Energy and Renewable Access Project**

1. Responding to the GoB's pressing needs to improve SBEE management and the reliability of electricity service, and longer-term goal to develop the energy sector in a sustainable manner, the project aims to (a) improve SBEE'S operational performance, in complement to the MCC, by contributing to reduce commercial (Component 1) and technical (Component 2) losses; (b) maintain positive momentum in the biomass subsector (Component 3); and (c) provide a road map for gradual and sustainable power sector development while strengthening the capacity of key stakeholders (Component 4). The project comprises four components, as described in the following paragraphs.

#### **Component 1: Improvement of SBEE's Commercial Operations (IDA US\$10 million equivalent)**

2. The component seeks to contribute to improve the overall operational performance of SBEE supported by various development partners. It will complement the MCC-financed interventions to reform SBEE's governance and management by fostering private sector involvement through a management contract. It also will supplement AFD-financed efforts to improve SBEE's information management systems. The component will target improvements in revenues collection and corporate image among customers, critical to SBEE's financial viability and identified as priority by SBEE.

3. The component will finance the development and implementation of an MIP. The MIP will provide a comprehensive snapshot of SBEE management and recommendations to improve key operational aspects. The implementation of the MIP will focus on (a) protecting revenues from high-consuming customer segments; (b) improving management systems; and (c) strengthening capacity to manage newly acquired systems. This will involve the acquisition and installation of smart meters for high-revenue customers, establishment of a metering control center and associated advanced metering infrastructure, and management information systems software (such as an Outage Management System and a Geographic Information System), as well as the update of the customer database, implementation and training of a theft detection and inspection crew, and provision of technical assistance services, including an owner's engineer.

4. The component will also support SBEE to gradually improve its customer relationships and better engage with current and potential customers. It will finance the installation and operationalization of a customer call center, which will enable customers to voice complaints/concerns and will allow SBEE to track response times. A gender-sensitive approach will be used to design, install, and staff the customer call center to enable male and female customers to voice complaints/concerns, ensuring that women customers in particular feel comfortable with and are successful in submitting their complaints and concerns. This may include hiring female staff to respond to phone calls and training all staff on how to interact with female customers. In addition, SBEE will be assisted to conduct customer satisfaction surveys and disseminate findings. The surveys will include a comprehensive diagnostic of the state of electricity access following the World Bank's ESMAP multitier energy access methodology and will collect sex-disaggregated data to provide a baseline for monitoring female-headed households that would benefit from new or improved electricity service. Gender-informed





communications and awareness campaigns will also be carried out to help facilitate the regularization of informal electricity connections and prevent residential and commercial electricity theft. The campaigns will use appropriate tools and approaches (for example, consulting women's groups) to ensure that key messages reach women effectively.

**Component 2: Distribution Network Strengthening in Targeted Areas (IDA US\$40 million equivalent. Government of Benin US\$1 million equivalent)**

5. The component aims at reducing SBEE's technical losses while tapping into opportunities to improve the reliability of electricity service and provide new access to dark pockets. To reduce technical losses, SBEE has selected, within the major cities of Cotonou, Porto-Novo, Parakou, and Natitingou, segments of the distribution grids that are near poorly served, high-density, peri-urban neighborhoods, where electricity theft is rampant and pockets of households remain without electricity service. The component will finance the expansion of the MV/LV network to rebalance the loads, regularize informal electricity connections, and provide new electricity connections to nearby, unserved neighborhoods. This will involve the acquisition and installation of spare parts in distribution stations, the construction of MV and LV lines, the installation of pole-mounted transformers, and service drops, as well as the acquisition and installation of prepaid meters for formal, informal, and new households. To help new households afford new electricity connections, the component will support the identification and implementation of measures to enable new customers to pay up-front electricity connection fees in several installments as they recharge prepaid electricity units.

6. The component will also seek to reduce the number of hours of power outages in northern towns that are supplied from HV/MV stations where key protections are outdated and malfunctioning. A number of HV/MV stations in the northern cities, including Dassa, Glazoué, and Paouignan, have been under consideration given their advanced degradation status. The upgrade will entail the acquisition and installation of key electrical protection systems and other related ancillary equipment. To facilitate daily operation and maintenance, the component will also finance the acquisition of critical installations and equipment, including a transformer repair workshop and associated spare parts, a fault detection vehicle, and various safety equipment and metering tools.

7. Also, to help reduce peak electricity demand and unpaid electricity consumption (billing areas from municipalities), the component will promote energy-efficient street lighting. It will replace the energy-intensive sodium vapor lamps that are in use with LED lamps in the same areas where network strengthening is being carried out. To facilitate scaling up or replication, a study will be undertaken to take stock of the current state of public lighting and provide recommendations to ensure sustainable management of street lighting.

*Description of the Condition SBEE Network Equipment*

8. In the supply substations, there are circuit breakers that have suffered serious damage and are now out of service. Given their age, the upgrade is not always maintained by the manufacturers. There is also some metal-clad switchgear, for which the manufacturer had redesigned the circuit breakers. The distribution substations are usually equipped with bus bars at high risk for operation. This equipment will be renewed under this project.



9. On the overhead MV network, there are various types of insulators such as synthetic 20 kV glass or 33 kV glass. It would be better to use the right material to avoid weak points. The coordination of the insulations is no longer assured. Surge arresters are found on the network, but their use is not sufficiently deployed. The overhead lines are often not well tuned, resulting in significant sags. This situation may be due to uncontrolled repairs, as there are many in-line connections. These important sags can cause new incidents due to lower clearances and during high wind conditions, the sagging of the conductors could create flashover and faults. The current network of Cotonou has been designed with distribution stations equipped with circuit breakers. The selectivity of the incidents is made by the protections, and the digital protections have improved the settings. In the event of a fault, the breakers of the switching stations make it possible to locate the fault. Opening the circuit breaker at the source station would have a greater impact on customers. Given the structure of the Cotonou network, these stations and equipment must be maintained and renewed to sustain quality of service. Installing the circuit breaker after the switching substations makes it difficult to prioritize the selectivity of the protections. The installation of remote-controlled switches with fault detectors must enable the network operator to operate quickly. After a switching substation, the installation of remote-controlled switches will be favored.

10. By the geographical position of the country, the material used on the network encounters strong corrosion on the active parts, due to salt spray (near the ocean), high humidity, and dust. Under these conditions, waterproof or modular watertight compact metal-clad switchgear will be recommended for new installations. These problems are encountered throughout the country, with varying degrees of importance. Their standardization will make it possible to homogenize the material by trying to solve the problem as well as possible. In MV/LV substations, circuit breakers are placed on the walls or on the floor. The connections on the circuit breakers are often deficient (terminals melted, broken, and non-functional protections), with repair by bridging. There are LV panels, protected, with fuse. With a circuit breaker, after a fault it is enough to reset, but all the phases are affected. It is necessary to fix these problems and standardize the system of the connection of LV circuit breakers to eliminate the multiplicity of the connections at the output of the transformer and the problems of bad insulation of the circuit breaker terminals. The pole-mounted switches also suffer from external aggressions. They will be replaced by metal-enclosed devices to better withstand external aggressions. Devices of this technology have already been installed.

### **Component 3: Community-Based Management of Wood Fuels (IDA US\$5 million equivalent)**

11. This component will contribute to reduce the increasing pressure over northern Benin forests by building on and scaling up successful gender-sensitive community forest management practices financed under the ESDP and IAME Project. The component comprises two subcomponents:

- (a) *Subcomponent 3.1 - Sustainable Management of Forestry Resources in the Moyen and Haut Ouémé Basin Regions.* For the forests to be managed on a sustainable basis, the decentralization of forest resource management needs strengthening. The January 1999 Decentralization Law formally transferred natural resource management to the local governments. However, until now the GoB has not yet provided the human and financial resources necessary to exercise this management at the county level. To facilitate the process, the Forest Community of Moyen Ouémé (*Communauté Forestière du Moyen Ouémé*, COFORMO) was created in 2007. COFORMO was initially the association of local



governments of five counties in the Moyen Ouémé region (Dassa, Glazoué, Savé, Tchaourou, and Ouéssé) whose forests are the most exposed to pressure for wood energy. The association was later extended to municipalities of Bassila, Bantè, and Djidja. The subcomponent will implement community-based forest management plans covering 300,000 ha in the municipalities of Bassila, Bantè, and Djidja, prepared under the IAME Project. This will involve financing tree nurseries, tree plantings, logistical support, training of key actors on forest resource management and energy-efficient charcoal production, communication campaigns targeting local governments and households, and acquisition of equipment for income-generation activities such as beekeeping. In particular, it is expected that the project will result in the creation of a strong sense of community ownership regarding sustainable natural resources and their management and, further, will provide for considerable income diversification and generation opportunities at the village level.

The design and intervention methods of these activities are based on proven World Bank-funded experiences in other Sub-Saharan African countries, including Senegal ('Sustainable and Participatory Energy Management Project' – P108439), Burkina Faso ('Sustainable Energy Management Project' – P052442), and Niger ('Household Energy Project'<sup>7</sup>). In accordance with accumulated regional experience, the previous project in Benin (IAME) supported the transfer of responsibility for forest resource and wood fuel market management from the Central Government to COFORMO, the local government association, and included the participation of village communities. This approach is supported by the legal and institutional mechanisms already in place within the context of the administrative decentralization in Benin. Incorporating the lessons learned from the IAME-financed experience in the COFORMO area, this subcomponent will also finance (i) the preparation of new participatory forest management plans covering 150,000 ha across three municipalities of the *Ouémé Supérieur* (Djougou, Ndali, and Pèrèrè); (ii) the development of income-generating activities; and (iii) the establishment of an inter-municipality association and installation of local forestry management bodies and rural wood markets. The local management bodies will be trained and equipped to efficiently manage rural wood markets, seedlings production, and reforestation.

- (b) *Subcomponent 3.2 - Development of Quality Standards for Improved Cookstoves.* The subcomponent will finance a comprehensive study to take stock of quality insurance along the value chain of cookstove production and commercialization and recommend quality standards and associated institutional arrangements and a capacity-building plan required to implement and enforce the standards. It will also fund the development and rollout of a marketing and communication plan and the upgrade of improved cookstove testing center.

12. Continuing the implementation of the gender activities started under the IAME Project, the activities of the biomass component will be designed and implemented to consider and reduce the gender gaps and differences found in the ESDP areas. The main gender gap addressed by this component will be women's lack of access to and expertise for income-generating and livelihood activities. Continuing IAME Project actions include ensuring that a percentage of direct beneficiaries are women, providing the same training and resources to female and male beneficiaries, ensuring that

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<sup>7</sup> 1995. "Niger Household Energy Project." *Energy Note 4, Industry and Energy Department, Washington*



women are employed in planting and cultivating and forest exploitation and in managing and maintaining processing facilities, and providing support and capacity building to women to increase their productivity and income not only in marketing charcoal, where they are the main producers, but also honey and cashews. The component also will adopt new actions to increase women's voice and agency by reserving a percentage of seats in local management bodies for women and conducting separate consultations with women and men.

**Component 4: Sector Development and Implementation Support (IDA US\$5 million equivalent)**

13. The component will contribute to better plan access rollout in the country, support the development of key access related institutions, and ensure an effective implementation of the project. The component comprises three subcomponents:

- (a) *Subcomponent 4.1 – Sector Planning.* This subcomponent will aim at facilitating the development of power generation and transmission and access rollout by providing an agreed comprehensive Action Plan and selected feasibility studies. A high-level power master plan was developed and needs to be reconciled with the new Government's Action Plan. The subcomponent will finance the development of a single, comprehensive generation and access scale-up plan that will help achieve the goals set up in the new Government Action Plan and incorporate guidelines proposed in the 2015 Power Sector Master Plan. The generation and access scale-up action plan will be supported by an investment prospectus to be developed in close collaboration with all development partners and the private sector to leverage financing. The subcomponent will also finance detailed feasibility studies for priority investments from the prospectus and a least-cost generation and transmission plan, as well as other analytical studies as needs emerge over implementation.
- (b) *Subcomponent 4.2 - Institutional Strengthening.* This subcomponent will contribute to strengthen the capacities of MEEM, ABERME, ANADER, and ARE to help them better fulfill their respective roles, including power development planning, program coordination and oversight, rural electrification program supervision, renewable energy development, and regulations development and enforcement. Within MEEM, a number of institutional entities will be targeted, including the General Directorate of Energy, the General Secretariat, the Planning Department, the Administrative and Financial Department, the Information Technology Department, and other entities. The subcomponent will fund a comprehensive diagnostic of MEEM and its associated entities and the implementation of a capacity strengthening plan that will be derived from the diagnostic. Though the capacity plan is yet to be developed, it is expected to include (i) the provision of international advisory services to the Cabinet of the Energy Minister; (ii) support to competitively recruit a critical number of nationals for MEEM, ABERME, and ARE; (iii) delivery of identified training; and (iv) acquisition of vehicles and software including an intranet system for MEEM. With regard to the newly established regulatory agency, the subcomponent will contribute to its operationalization by funding the elaboration of critical regulatory tools, standard public-private partnership contract, and service rules.
- (c) *Subcomponent 4.3 - Project Management.* This subcomponent will fund the



operationalization and running of the project implementation unit for the duration of the project. Operational services and goods to be funded would include (i) the recruitment of fiduciary, safeguard, and engineering staff; (ii) implementation of the environmental and safeguards instruments for the investments; (iii) external auditing; (iv) training; (v) office supplies and vehicles for project supervision; and (vi) part-time consultants as needed.



## ANNEX 2: IMPLEMENTATION ARRANGEMENTS

### COUNTRY: Benin Modern Energy and Renewable Access Project

#### Project Institutional and Implementation Arrangements

##### Overview

1. The project will be overseen by and anchored within MEEM, as the Government entity with the responsibility for the policy oversight of the sector. Within MEEM, the PCU has been the implementing agency for past World Bank-financed projects and will continue to play this role for the proposed project. The PCU will work in close collaboration with SBEE, which is expected to provide inputs for procurement and be involved in the supervision of activities under Components 1 and 2. ABERME will participate in the preparation of an access scale-up plan in off-grid areas under Component 4.

##### Stakeholder Roles

2. **MEEM.** In line with its central responsibility for the energy sector development, MEEM will adopt a role that focuses on strategy, policy, and plan development, as well as overall monitoring of the project, with SBEE taking an active role in grid densification/expansion. To help MEEM adopt and mainstream these important, high-level activities, the project will provide technical assistance, channeled through the PCU. The assistance will include preparation of an access scale-up investment prospectus to promote donor participation, provision of critical expertise on specific areas (for example, transaction advisory, financial analysis, and hydropower development); training for staff; and implementation of other capacity strengthening activities.

3. **PCU.** The PCU has been the energy sector projects' implementation arm of MEEM and in this capacity has acted as the key energy sector stakeholder responsible for project preparation, implementation, and M&E of World Bank-financed energy sector projects. Consistent with its current functions, the PCU will be the implementing entity of the proposed project, responsible for procurement, FM, safeguards instrument implementation, monitoring, and reporting. As indicated earlier, the PCU will be strengthened to enhance its capacity to effectively implement additional activities. It will continue to rely on technical inputs from SBEE and foster the participation of ABERME and CEB.

4. **SBEE.** SBEE is the Benin-owned power distribution utility. It is run by a Managing Director who reports to a Board of Directors that in turn reports to MEEM. As the national power distribution utility in Benin, SBEE owns and operates the entire distribution network in the country. The GoB, with financial support from the MCC, is taking steps to update the legal framework and improve SBEE's governance structure. The possibility of involving the private sector in SBEE management through a management contract is under discussion. SBEE will remain the indispensable, on-the-ground implementation arm for access expansion in the future. With regard to the project, SBEE will assist the PCU in the procurement and supervision of works, services, and goods under Components 1 and 2. An implementation



agreement is being prepared to clarify the respective roles of the PCU and SBEE.

5. **ABERME.** ABERME is MEEM's entity in charge of promoting and expanding electricity access in rural areas. Since its creation, ABERME has suffered from a lack of capacity and progress in the field has been below expectations. ABERME is expected to play a central role in off-grid electrification in future electricity access projects. Hence, under this project, ABERME will participate in the preparation of the access scale-up investment prospectus and will receive assistance to enhance its capacity.

## Financial Management

### *Country Issues*

6. The overall inherent risk of the public financial management (PFM) system in Benin is substantial. The Public Expenditure and Financial Accountability Assessment (PEFA), completed in 2014 in Benin, revealed mixed performances. Despite actions taken to improve the participatory process in budget preparation, great challenges remain in this area especially in aligning annual budgets to public policies. Budget execution and controls are also affected by the insufficient integration of the PFM information system; the frequent use of exceptional procedures; and the lack of human, financial, and material resources which limit the effectiveness of national oversight institutions. Some progress has been noted in respecting legal deadlines for public financial reporting and external auditing, but there is still a need for improvement on the quality of the work done. Major delays are also noted in the exercise of jurisdictional control and in examining budget execution reports by the National Assembly.

7. The GoB is implementing an Action Plan to address the main weaknesses identified by the PEFA assessment and support the implementation of the new organic budget law voted in 2013, which complies with the 2009 West African Economic and Monetary Union PFM directives that aim the modernization of the whole PFM system.

### *Financial Management and Disbursements Arrangements*

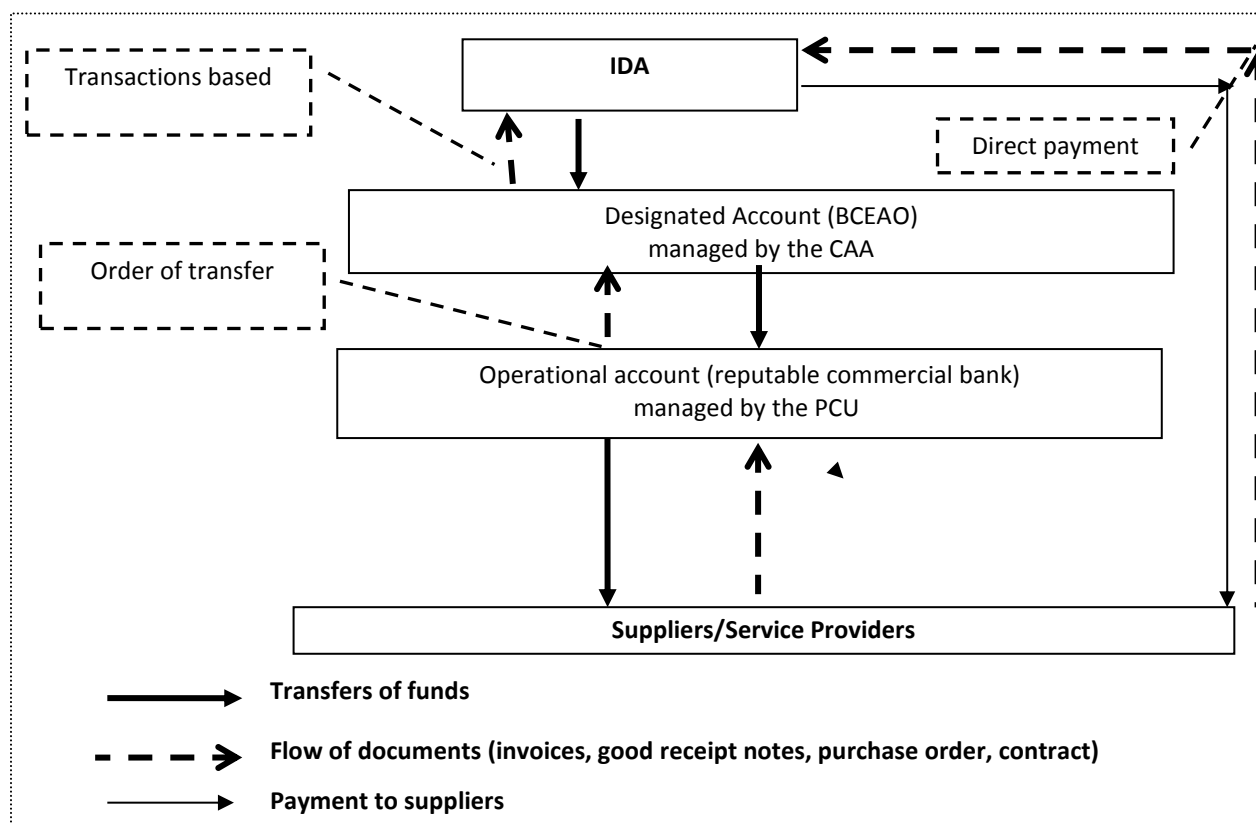
8. The PCU in MEEM will have the overall coordination of the FM and accounting activities. It will be responsible for the management of the project funds for the technical activities it implements, as well as those where SBEE, ABERME, and CEB have a role. These include budgeting, disbursement, FM, reporting, supervision, management of the Designated Account (DA), and auditing.

9. **Budgeting.** The budgeting arrangements designed for the ongoing IAME Project by the PCU will be applied for this project. The project will adopt a comprehensive cash-budgeting arrangement. The budget will include all planned project activities for the year. Each entity will prepare its budget under the supervision of the PCU, with the FM Specialist in the PCU in charge of all budget consolidation. The project's consolidated budget will be submitted for IDA's no-objection.



## Funds Flow and Disbursement Arrangements

Figure 2.1. Flow of Funds



Note: CAA = Autonomous Amortization Fund (*Caisse Autonome d'Amortissement*); BCEAO = Central Bank of West African States (*Centrale des États de l'Afrique de l'Ouest*).

## Disbursements

10. **Designated account.** One DA will be opened at the Central Bank of West African States (*Banque Centrale des États de l'Afrique de l'Ouest*, BCEAO). The funds will be released to an Operational Account to be opened in a reputable commercial bank. The Operational Account will be managed by the PCU. Cash withdrawal transactions from the Operational Account will be authorized by the Project Coordinator and the project's FM Specialist. The account is set up to fund eligible expenditures based on the approved annual activity plans. The DA's ceiling, for approximately four months of expenditures, has been determined.

11. **Disbursement methods and processes.** The Autonomous Amortization Fund (*Caisse Autonome d'Amortissement*) is the assigned representative of the Recipient for the mobilization of IDA funds. Withdrawal application requests will be prepared by the FM Specialist, signed by a designated signatory or signatories (the signature authorization letter is signed by the Minister of Finance), and sent to the World Bank for processing. This procedure applies to all World Bank-financed projects in Benin. The PCU will submit applications using the electronic delivery tool, 'e-Disbursements', available at the World Bank's Client Connection website/web-based portal. The Authorized Signatory Letter signed by the GoB





will include authorization for the designated signatories to receive Secure Identification Credentials from the World Bank for the purpose of delivering such applications by electronic means.

12. Disbursements under the project will be transaction based. In addition to making advances to the DA, other disbursement methods (reimbursement, direct payment, and special commitment) will be available for use under the project. Further instructions on the withdrawal of proceeds are outlined in the disbursement letter and details on the operation of the DA will be provided in the project financial and accounting manual.

13. Table 2.1 specifies the categories of eligible expenditures to be financed out of the proceeds of the Credit, the amounts under each category, and the percentage of expenditures to be financed for eligible expenditures in each category.

**Table 2.1. Categories of Eligible Expenditures to be Financed**

<b>Category</b>	<b>Amount of the financing allocated (expressed in EUR)</b>	<b>Percentage of expenditures to be financed (inclusive of taxes)</b>
(1) Goods, works, non-consulting services, consulting services, Training and Operating Costs under the project	54,762,750	100
(2) Front-end Fee	137,250	Amount payable pursuant to Section 2.03 of the Financing Agreement in accordance with Section 3.01(a) of the General Conditions
<b>Total Amount</b>	<b>54,900,000</b>	

### ***Accounting and Reporting***

14. The Accounting System of the Organization for the Harmonization of Business Law in Africa (*Système de comptabilité de l'Organisation pour l'harmonisation du droit des affaires en Afrique*, SYSCOHADA) is the assigned accounting system in West African Francophone countries. Project accounts will be maintained on a cash basis, supported with appropriate records and procedures to track commitments and safeguard assets. The annual financial statements will be prepared by the PCU in accordance with SYSCOHADA but taking into accounting specificities related to external financed investment projects. The accounting and control procedures will be documented in the FM Manual.

15. The PCU will prepare biannual project IFRs reflecting operations of the DA and submitted to the World Bank within 45 days after the end of the calendar semester. The IFR format under the IAME Project will be used, and will comprise the following: (a) report on the sources and use of funds cumulative (project-to-date, year-to-date) and for the period, showing budgeted amounts versus actual expenditures, including a variance analysis; and (b) forecast of sources and uses of funds.

### ***Internal Control and Auditing Arrangements***

16. **Internal control systems.** The updated version of the IAME Project's current FM and administrative procedures will document the FM and disbursement arrangements, including internal



controls, budget process, assets safeguards, and clarify roles and responsibilities of all the stakeholders. In line with the use of country system it was agreed to assign, as Internal Auditor for the IAME Project, the IGM in MEEM. From 2013 to date, the IGM has not submitted any internal audit report related to the IAME Project even though it has conducted two missions. To ensure the implementation of the internal audit function for the new project, as an interim arrangement, the PCU will recruit, within three months after effectiveness (or such later date as may be agreed, and based on ToR acceptable to IDA, an experienced internal auditor who will conduct ex post reviews to improve the overall internal control environment.

17. **Annual financial audit.** An external independent and qualified private sector auditor will be recruited to carry out the audit of the project's financial statements under the supervision of the supreme audit institution. Therefore, the annual audits will be conducted based on ToR agreed with the supreme audit institution and that are satisfactory to the World Bank. The Auditor will express an opinion on the Annual Financial Statements and perform his audit in compliance with International Standards on Auditing. The auditor will be required to prepare a Management Letter detailing observations and comments and providing recommendations for improvements in the accounting system and the internal control environment. The external auditor will, especially, review each year a reasonable sample of the subsidized concession operations to ensure that activities were completed pursuant to the agreed procedures and that funds were used for the purposes intended. The audit report on the annual project financial statements and activities of the DA will be submitted to IDA within six months after the end of each project fiscal year.

#### ***Implementation Support Plan***

18. Based on the outcome of the FM risk assessment, the implementation support plan, as shown in Table 2.2, is proposed. The objective of the implementation support plan is to ensure that the project maintains a satisfactory FM system throughout the project's life.



**Table 2.2. FM Implementation Support Plan**

FM Activity	Frequency
<b>Desk reviews</b>	
IFRs review	Quarterly
Audit report review of the project	Annually
Review of other relevant information such as interim internal control systems reports	Continuous as they become available
<b>On-site visits</b>	
Review of overall operation of the FM system	Once per year (Implementation Support Mission)
Monitoring of actions taken on issues highlighted in audit reports, auditors' Management Letters, internal audit, and other reports	As needed
Transaction reviews (if needed)	As needed
<b>Capacity-building support</b>	
FM training sessions	During implementation and as and when needed

### ***Fiduciary Risks and Mitigation Measures***

19. The FM risk assessment and mitigations measures are summarized in Table 2.3.

**Table 2.3. FM Risk Assessment and Mitigations Measures**

Risk	Risk	Risk mitigation measures	Residual
<b><i>Inherent Risks</i></b>	<b><i>S</i></b>		<b><i>S</i></b>
<b>Country</b> Poor governance and slow pace of implementation of PFM reforms	S	PFM actions plan in implementation to address the weaknesses identified in the PEFA	S
<b>Entity Level</b> Poor governance of the PCU and political interference	M	The PCU is familiar with IDA FM procedures and is well staffed.	M
<b>Project level</b> Misunderstanding of responsibility as the project involves several stakeholders	S	The updated version of the IAME Project's current FM procedures, internal controls, and a clear description of the roles and responsibilities of the various stakeholders will be taken into consideration with appropriate trainings.	S
<b><i>Control Risks</i></b>	<b><i>M</i></b>		<b><i>M</i></b>
Delays in budget preparation process of the project	M	Budget procedures clearly defined in the project FM manual of procedures	M
<b><i>Accounting</i></b>			
Risk of increasing the FM team's workload leading to some delays in the submission of the required reporting Lack of adequate accounting software	M	The current FM staffing arrangement is adequate but may be strengthened with one additional accountant recruited on competitive basis.  The existing accounting software will be	M



Risk	Risk	Risk mitigation measures	Residual
		customized to take into account the new project's specificities.	
<b>Internal Audit</b>			
Inadequate compliance with FM procedures manual and of circumventing internal control systems	S	The FM manual will outline approval and authorization procedures with clear segregation of duties. Appointment of the experienced internal auditor to strengthen the arrangement made with the IGM in MEEM to conduct ex post reviews.	S
<b>Funds Flow</b>			M
<ul style="list-style-type: none"> <li>• Risk of misuse of funds and use funds to pay non-eligible purposes or combined with other projects funds managed by the PCU.</li> <li>• Weak capacity in the disbursement procedures of the World Bank which could affect the disbursement rate.</li> </ul>	M	<ul style="list-style-type: none"> <li>• Organize frequent controls in each involved actor to help prevent and mitigate the risk of diversion of funds.</li> <li>• Payment requests will be approved by the Coordinator and the project FM Specialist before disbursement of funds.</li> <li>• Require the FM team to ensure monthly submission of the withdrawal application.</li> <li>• Perform external audit.</li> </ul>	M
<b>Reporting</b>			
Delay and difficulties in preparation of acceptable IFRs and financial statements	M	The IFR reports will be generated by the accounting software and support from the FM Specialist and the additional accountant to be recruited.	M
<b>External Audit</b>			
Project audit reports might be submitted with delay and unacceptable quality.	M	An independent, qualified financial external auditor will be recruited under the oversight of Benin Supreme Audit institution.	M
Risk of fraud and corruption			
<b>Overall Risk</b>	<b>M</b>		<b>M</b>

Note: H = High; S = Substantial; M = Moderate; L = Low.

### Conclusion of the FM Assessment and Mitigation Measures

20. An FM assessment of the implementing unit (PCU) of the IAME Project designated to manage the proposed project was carried out in November 2016. The objective of the assessment was to determine whether the PCU has acceptable FM arrangements in place to ensure that the project funds will be used only for intended purposes, with due attention to consideration of economy and efficiency. The FM assessment was carried out in accordance with the FM Practices Manual issued by the FM Board on March 1, 2010.

21. The FM arrangements are acceptable if they are capable of accurately recording all transactions and balances, supporting the preparation of regular and reliable financial statements, safeguarding the project's assets, and are subject to auditing arrangements acceptable to the World Bank. These



arrangements should be in place when project implementation starts and should be maintained as such during project implementation. The assessment concluded that the FM of the PCU satisfies the World Bank's minimum requirements under OP/BP 10.00 and therefore is adequate to provide, with reasonable assurance, accurate and timely FM information on the status of the project required by the World Bank.

22. The overall fiduciary risk rating is assessed as Moderate and mitigation measures proposed (see Table 2.4) will strengthen the internal control environment and maintain the continuous, timely, and reliability of information produced by the PCU and adequate segregation of duties.

**Table 2.4. FM Action Plan**

No.	Activity/Action	Target Completion	Responsibility
1	Recruit one additional accountant dedicated to the new project	Not later than three months after effectiveness	PCU
2	Update the financial and accounting manual of procedures to reflect the new project specificities	Not later than three months after effectiveness	PCU
3	Upgrade the existing accounting software version to reflect the new project specificities	Not later than three months after effectiveness	PCU
4	Appointment of the external auditor acceptable to IDA	Not later than three after effectiveness	PCU
5	Appointment of the experienced internal auditor acceptable to IDA	Not later than three after effectiveness	PCU

### **Procurement**

23. The procurement arrangements for this project will be based on the existing arrangements in place under the IAME Project. The PCU is staffed with a recruited Procurement Specialist of the ongoing IAME Project. The overall performance of the IAME Project in procurement is Satisfactory. One additional experienced Procurement Specialist will be recruited to reinforce the existing Procurement Specialist in the perspective of the workload which the new project will generate.

24. MEEM has established a Procurement Commission consisting of five members and chaired by the nominated person in charge of procurement. The person in charge of procurement has his secretary, who serves as a secretary to the Commission. The documents (bidding documents, requests for proposals, and bid evaluation reports) conjointly elaborated by the Procurement Commission and the PCU are submitted for decisions of the Procurement Control Commission of MEEM also consisting of five members or to the decisions of the National Procurement Control Directorate (*Direction Nationale de Controle des Marchés Publics*) under the Ministry of Finance depending on the competency of the procurement control threshold.

25. **Filing and record keeping.** The procurement procedures manual will set out the detailed procedures for maintaining and providing readily available access to project procurement records, in compliance with the Loan Agreement. The implementing agency will assign one person responsible for maintaining the records. The logbook of the contracts with unique numbering system shall be maintained.



26. The signed contracts, as in the logbook, shall be reflected in the commitment control system of the Borrower's accounting system or books of accounts as commitments whose payments should be updated with reference made to the payment voucher. This will ensure a complete record system whereby the contracts and related payments can be corroborated.

27. **PPSD.** As part of the preparation of the project, the Borrower (with support from the World Bank) prepared a PPSP, which describes how fit-for-purpose procurement activities will support project operations for the achievement of PDOs and deliver value for money. The procurement strategy is linked to the project implementation strategy at the country level, ensuring proper sequencing of the activities. It considers institutional arrangements for procurement, roles and responsibilities, thresholds, procurement methods, and prior review; and the requirements for carrying out procurement. It also includes a detailed assessment and description of the state government's capacity for carrying out procurement and managing contract implementation, within an acceptable governance structure and accountability framework. Other issues considered include the behaviors, trends, and capabilities of the market (that is, market analysis) to inform the Procurement Plan. The activities also require strong technical capability to prepare proper technical specifications to avert lack of, or inadequate, market response. This capability—or a plan to enhance it—is considered in the strategy. Also, special arrangements like direct contracting, use of statement of expenditures, third-party monitors, local nongovernmental organizations, force account, or civil servants needs, results-based arrangements, need for prequalification, if any, are addressed. The strategy includes a summary of the Procurement Risk, Mitigation Action Plan, and Procurement Implementation Support and Supervision plan. The analysis concluded that the proposed PIU has the capacity and the experience to handle the procurement of the ESIP project. However, the PIU will be reinforced by the recruitment of a new procurement specialist. The procurement risk is rated "substantial" and after implementation of the identified mitigation measures, the residual risk will be downgraded to "moderate". The selection methods as well as the threshold for the prior reviews were determined.

28. **Procurement Plan.** The Borrower and the implementing agency have prepared a detailed 18-month Procurement Plan which was agreed by the GoB and the World Bank. The Procurement Plan will be updated, in agreement with the World Bank's team, annually or as required to reflect the actual project implementation needs and improvements in institutional capacity. The Procurement Plan will be disclosed publicly.

29. Works to be procured under the project include contracts for rehabilitation, upgrade and extension of distribution system, and so on.

30. **Goods and non-consulting services** to be procured under this project will include contracts for supply and installation of substations and installation of the protection equipment.

31. The consulting services under this project are likely to include contracts of supervision of construction lines, implementation of the RAP and the ESMP response, and hiring of additional staff (Procurement Specialist and so on).

32. **Training, workshops, study tours, seminars, and conferences.** Training activities would comprise workshops and training, based on individual needs, as well as group requirements, on-the-job training, and hiring consultants for developing training materials and conducting training. The selection



of consultants for training services follows the requirements for selection of consultants. All training and workshop activities (other than consulting services) would be carried out on the basis of approved annual work plans/training plans that would identify the general framework of training activities for the year, including (a) the type of training or workshop; (b) the personnel to be trained; (c) the institutions which would conduct the training and reason for selecting the particular institution; (d) the justification for the training, how it would lead to effective performance, and implementation of the project and/or sector; (e) the duration of the proposed training; and (f) the cost estimate of the training. Report by the trainee(s), including completion certificate/diploma upon completion of training, shall be provided to the Project Coordinator, will be kept as part of the records, and will be shared with the World Bank if required.

33. A detailed training and workshops' plan providing the nature of the training/workshop, the number of trainees/participants, duration, staff months, timing, and estimated cost will be submitted to IDA for review and approval before initiating the process. The selection methods will derive from the activity requirement, schedule, and circumstance. After the training, the beneficiaries will be requested to submit a brief report indicating what skills have been acquired by them and how these skills will contribute to enhance their performance and contribute to the attainment of the project objective.

34. **Operational costs.** Operational costs financed by the project would be incremental expenses, including office supplies, vehicles operation and maintenance cost, maintenance of equipment, communication costs, rental expenses, utilities expenses, consumables, transport and accommodation, per diem, supervision costs, and salaries of locally contracted support staff. Such services' needs will be procured using the procurement procedures specified in the Project Operational Manual accepted and approved by the World Bank.

35. **Procurement manual.** Procurement arrangements, roles and responsibilities, methods, and requirements for carrying out procurement shall be elaborated in detail in the procurement manual, which may be a section of the Project Operational Manual. The Project Operational Manual shall be updated by the Borrower and agreed with the World Bank within three months from the project effectiveness.

36. **Procurement methods.** The Borrower will use the procurement methods and market approach in accordance with the Procurement Regulations.

37. Open National Market Approach is a competitive bidding procedure normally used for public procurement in the country of the Borrower and may be used to procure goods, works, or non-consultant services, provided it meets the requirements of paragraphs 5.3 to 5.6 of the Procurement Regulations.

38. The thresholds for particular market approaches and procurement methods are indicated in Table 2.5. The thresholds for the World Bank's prior review requirements are also provided in the table.

Table 2.5. Thresholds, Procurement Methods, and Prior Review

No.	Expenditure Category	Contract (C) Value Threshold <sup>a</sup> [equivalent US\$]	Procurement Method	Contracts Subject to Prior Review [equivalent US\$]
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No.	Expenditure Category	Contract (C) Value Threshold <sup>a</sup> [equivalent US\$]	Procurement Method	Contracts Subject to Prior Review [equivalent US\$]
1	Works	$C \geq 10,000,000$	Open Competition International Market Approach and Direct Contracting	$\geq 10,000,000$ All contracts at or above US\$10 million are subject to international advertising and the use of the bidding documents agreed with the World Bank.
		$200,000 < C < 10,000,000$	Open Competition National Market Approach	None
		$C \leq 200,000$	Request for Quotation	None
2	Goods, information technology, and non-consulting services	$C \geq 5,000,000$	Open Competition International Market Approach and Direct Contracting	$\geq 2,000,000$ All contracts at or above US\$10 million are subject to international advertising and the use of the bidding documents agreed with the World Bank.
		$100,000 < C < 1,000,000$	Open Competition National Market Approach	None
		$C \leq 100,000$	Request for Quotation	None
3	National short list for selection of consultant firms	$C < 100,000$	For consulting services	None
		$C \leq 200,000$	For engineering and construction supervision	None
4	International short list for selection of consultant firms	$C \geq 100,000$	For consulting services	$\geq 1,000,000$
		$C > 200,000$	For engineering and construction supervision	$\geq 1,000,000$
5	Selection of Individual Consultants	All values	All approaches	$\geq 300,000$
6	Direct Contracting	All values		As agreed in the Procurement Plan
7	Training, workshops, study tours	All values	Based on approved annual work plan and budgets	

*Note:* The thresholds are for all countries unless indicated otherwise for specific items.





a. These thresholds are for the initial Procurement Plan for the first 18 months. The thresholds will be revised periodically based on reassessment of risks. All contracts not subject to prior review will be post reviewed.

39. **Procurement risk rating.** The project procurement risk before the mitigation measures is 'Substantial'. The risk can be reduced to a residual rating of 'Moderate' upon consideration of successful implementation of the mitigation measures.

40. The risks and mitigation measures are provided in Table 2.6.

**Table 2.6. Procurement Risk Assessment and Mitigation Action Plan**

Procurement Risk	Mitigation measure	Responsibility and Deadline	Risk level Initial/residual
<b>Benin</b>			<b>Substantial/Moderate</b>
<b>MEEM</b>			
Procurement workload	Recruit an additional Procurement Specialist	MEEM, within 3 months after signing of the Financing Agreement	
The procurement procedures of the current project will be reflected in the existing manual	Amend the existing manual to introduce procurement arrangement planned for this project	MEEM	
Inadequate capacity of the Procurement Specialist, the Procurement Commission, the Procurement Control Commission, and the National Procurement Control Directorate in NPF procedures	Capacity building will be provided by the World Bank on NPF procurement.	MEEM and World Bank, during project implementation	

### **Environmental and Social (including safeguards)**

41. The project will induce many positive impacts on the environmental and social side, including (a) improvement of livelihoods; (b) reduction of resource use conflicts; (c) strengthening of social cohesion; (d) reduction of unemployment rate among unqualified youth; and (e) increase of SBEE's performance and improvement of electricity production practices and quality.

42. The project is rated 'Category B' because the proposed interventions (small- to medium-scale civil works) are not likely to result in significant negative impacts. This is mainly due to the limited scale of the interventions, and the nature of the potential impacts, which are easily identifiable, mostly temporary and can be mitigated with known management techniques. Five safeguard policies were triggered to ensure the appropriate mitigation of the abovementioned issues, OP/BP 4.01 - Environmental Assessment, OP/BP 4.04 - Natural Habitats, OP/BP 4.36 - Forests, OP/BP 4.11 - Physical Cultural Resources, and OP/BP 4.12 - Involuntary Resettlement. The overall impact of the project is substantially positive.



43. **Environmental Assessment (OP/BP 4.01).** The project triggers OP/BP 4.01 due to potential negative impacts that might occur under activities financed in Component 2 and Subcomponent 3.1. An ESMF has been prepared to address these impacts. It was consulted upon and disclosed in-country and by the World Bank on May 8, 2017.
44. **Natural Habitats (OP/BP 4.04).** This policy is triggered because of activities in Subcomponent 3.1. The activities are expected to have positive impacts, overall, as they promote an improved and community-based approach of managing forest resources, to avoid abusive fuel wood cutting and promote conservation.
45. **Forests (OP/BP 4.36).** The policy is triggered because of potential impacts on protected forest areas. The project will finance interventions in biodiversity conservation in the forest reserves, accompanied by control and surveillance to help reduce human pressure on the forest reserve. By investing in community income-generating and sustainable livelihood micro-projects, the quality of life of inhabitants and communities bordering the forest reserves is expected to improve.
46. **Physical Cultural Resources (OP/BP 4.11).** The policy was triggered preventively and measures to address related negative impacts have been included in the ESMF. The ESMF states that if physical cultural resources are found during civil works, the 'chance find procedure' will apply in accordance with national regulation and OP/BP 4.11.
47. **Involuntary Resettlement (OP/BP 4.12).** Because the project locations at this stage are not known with utmost certainty, an RPF was prepared, consulted upon, and disclosed in-country and by the World Bank on May 8, 2017. Site-specific RAPs will be prepared, if and when necessary, during the project implementation phase. These will be reviewed, approved, and disclosed in-country and by the World Bank before the commencement of civil works.
48. Due to the works planned under the project, mainly under Components 1 and 2, there will likely be some limited land acquisition, as well as temporary restrictions in access to neighborhoods and homes. No physical resettlement is expected. These impacts are addressed through the RPF, which will guide the preparation of any potential RAPs during project implementation. The RPF includes the guidelines and procedures for compensation and/or resettlement in the event that future activities under the project should require land acquisition, involuntary resettlement, or cause restriction of access to livelihoods or assets and resources. The RPF contains (a) an assessment of the country regulatory and institutional framework for land acquisition and compensation, including a gap analysis; (b) likely categories of affected assets and parties, including an entitlement matrix, as well as the potential scope of impacts; (c) a compensation framework consistent with OP 4.12 and the national legislation; (d) measures to assist vulnerable groups; (e) a consultation framework to enable the participation of affected populations in the preparation of specific resettlement plans; (f) an institutional framework to implement the RPF; (g) a grievance redress mechanism; and (h) an M&E framework and budget.
49. With regard to Borrower capacity, the Borrower has already successfully managed similar activities in two previous projects. Also the PCU has previous experience in managing World Bank-funded projects, including safeguard issues. However, to strengthen the capacity further, the PCU will hire a Safeguards Specialist, as part of its staff, to cover both environmental and social safeguards issues.



These staff members will be trained in World Bank safeguards policies and their implementation requirements and the World Bank safeguards specialists will provide guidance to the PCU and implementing entities. During implementation support missions, the World Bank's Environmental and Social Specialists will assess the implementation of the safeguard instruments and recommend additional strengthening, if required.

## **Gender**

50. In addition to the PCU staff, the project will hire a Gender Specialist/Consultant to work with SBEE, the PCU, and other relevant parties to ensure that the gender Action Plan is implemented and to supervise and monitor the gender-related activities. The World Bank's Africa Renewable Energy and Access Program's gender and energy team will provide technical assistance to the Gender Specialist and the PCU as needed. The gender-responsive activities in Component 1 include the following:

- Integrating gender into the customer satisfaction survey, which will use the ESMAP multitier energy access methodology and provide sex-disaggregated data to help document improvements and target project activities to women's and men's specific situations and needs.
- Conducting communications and awareness campaigns in a gender-responsive manner to facilitate the regularization of informal electricity connections and prevent residential and commercial electricity theft, using appropriate approaches, means, and messages to transmit the message to women.
- SBEE's installation and operationalization of a customer call center, which will enable male and female customers to voice complaints/concerns and SBEE to track response time. It also will be done in a gender-sensitive manner to ensure that women customers feel comfortable with and are successful in submitting their complaints and concerns.
- Exploring engaging women's community groups and local nongovernmental organizations working with women to help reduce the residential and commercial (nontechnical) losses due to theft at the community level. This approach has proved successful in energy projects in other regions.
- The gender-targeted activities in this component will provide various employment opportunities for women, and the project will encourage implementers to train and hire them to increase the effectiveness and success of their activities.

51. Component 3 will contribute to reducing the pressure on northern Benin forests by building on and expanding into new regions, successful gender-sensitive and community-based forest management opportunities, and activities financed and implemented under the ESDP and IAME Project. The major gender gap addressed by this biomass component is women's lack of access to and expertise for income-generating and livelihood activities. Specific actions include the following:

- Ensuring that a percentage of direct beneficiaries are women, providing the same training and resources to female and male beneficiaries



- Ensuring that women are employed in planting and cultivating and forest exploitation and in managing and maintaining processing facilities
- Providing support and capacity building to women to increase their productivity and income not only in marketing charcoal, where they are the main producers, but also honey and cashews
- Contributing to increasing women's voice and agency by reserving a percentage of seats in local management bodies for women and conducting separate consultations with women and men
- Pending additional project funding, conducting a value chain study to identify the main barriers to successful and sustainable commercialization of women's products (including charcoal) and propose targeted and sustainable activities to overcome them
- Developing and implementing a capacity-building initiative to improve women's productive and business management skills, to increase the productivity and the income from their income-earning activities and make them sustainable

52. In the area of M&E, the project will adopt a number of gender-relevant outcome and output indicators to monitor the performance of the gender-targeted activities, assess their impact on the gender gaps, and report them as part of the regular project reporting under the M&E system. This entails disaggregating, by sex, current project indicators and including new indicators related to gender. The outcome indicators are included in the project's Results Framework, while most output indicators will be included in the Project Operational/Implementation Manual. The PCU staff will be responsible and accountable for monitoring and reporting the outcomes and outputs by gender, with assistance from the Gender Specialist/Consultant hired to support and supervise gender integration in the project.



### **ANNEX 3: IMPLEMENTATION SUPPORT PLAN**

**COUNTRY: Benin**

**Modern Energy and Renewable Access Project**

#### **Strategy and Approach for Implementation Support**

1. The implementation support plan includes periodic missions with regular client interaction from both field- and headquarters-based World Bank staff in between missions. During project supervision, the team will use the PDO and the Results Framework as the primary lens for monitoring progress, evaluating impact and effectiveness, and adjusting the project details.

#### **Implementation Support Plan and Resource Requirements**

2. Implementation support will initially focus on advancing the preparation and implementation of SBEE's revenue protection program, as well as finalizing the design of, and launching works for, distribution network strengthening. As a result, the World Bank expects an intensive agenda during the first two years of the project, after which the tempo should moderate, focusing on maintaining progress and addressing key bottlenecks. The World Bank team will include headquarters and country office-based staff, as well as consultants.

#### *Procurement and Technical Aspects*

3. World Bank Procurement Specialists will regularly participate in implementation support missions to assist in monitoring procurement procedures and plans. The Procurement Plan indicates contracts that are subject to prior review. All other contracts will be subject to post review. During the early phase of project implementation, more frequent support is envisaged to ensure that procurement guidelines are followed. Field supervision will be conducted whenever practical. Procurement Plans will be updated at least once each year (or more often as required to reflect the actual project implementation needs) and post procurement reviews will be carried out, at a minimum, annually.

#### *FM Aspects*

4. FM implementation support will start by assessing the progress of the PCU staffing and reviewing the plan in place to execute disbursements following FM guidance. This will take place before contracts are awarded in case improvement measures need to take place before disbursement. The FM specialist will also review quarterly progress and financial audits. In terms of resources, a country office-based staff is expected to be required for eight weeks. Based on the outcome of the FM risk assessment, the implementation support plan, as shown in Table 3.1, is proposed. The objective of the implementation support plan is to ensure that the project maintains a satisfactory FM system throughout the project's life.



**Table 3.1. FM Implementation Support Plan**

<b>FM Activity</b>	<b>Frequency</b>
<b>Desk reviews</b>	
IFRs review	Quarterly
Internal audit report review of the project	On a risk-based approach
External audit report review of the project	Annually
Review of other relevant information such as interim internal control systems reports	Continuous as they become available
<b>On-site visits</b>	
Review of overall operation of the FM system	Semiannually (Implementation Support Mission)
Monitoring of actions taken on issues highlighted in audit reports, auditors' Management Letters, internal audit, and other reports	As needed
Transaction reviews (if needed)	As needed
<b>Capacity-building support</b>	
FM training sessions	During implementation and as and when needed.

*Environment and Social Aspects*

5. Environment safeguards support will include visits to project areas and the monitoring of mitigation measures. During construction, monitoring is necessary to ensure compliance with environmental and social safeguards related to the infrastructure projects, including attention to gender differences and impacts.

*Overall Implementation Support Plan*

6. The overall implementation support plan would be as shown in Table 3.2

**Table 3.2. Overall Implementation Support Plan**

<b>Time</b>	<b>Focus</b>	<b>Skills Needed</b>	<b>Resource Estimate</b>
First 12 months	<ul style="list-style-type: none"> <li>Establish working arrangements (PCU, SBEE, ABERME, CEB, and so on)</li> <li>Capacity building (safeguard, FM, Procurement)</li> <li>Finalize investments design and bidding docs</li> <li>Procurement</li> <li>Safeguard assessments and implementation</li> </ul>	<ul style="list-style-type: none"> <li>Task management</li> <li>Power Engineer</li> <li>Biomass</li> <li>Safeguards</li> <li>FM</li> <li>Procurement</li> </ul>	US\$200,000
12–48 months	<ul style="list-style-type: none"> <li>Technical implementation support</li> <li>Social and environmental safeguard implementation support</li> <li>Gender mainstreaming activities support</li> <li>M&amp;E implementation support</li> <li>FM and procurement implementation support</li> </ul>	Specialists in <ul style="list-style-type: none"> <li>Energy</li> <li>Power</li> <li>Social</li> <li>Environment</li> <li>Gender</li> <li>M&amp;E</li> <li>FM</li> <li>Procurement</li> </ul>	US\$800,000



7. The skills mix expected is presented in Table 3.3.

Skills Needed	Annual Number of Staff Weeks	Annual Number of International Trips	Comments
Senior Energy Specialist/Power Engineer (Task Team Leader)	10	0	Field based
Energy Specialist	10	3	International
Senior Energy Specialist (biomass)	6	3	Region based
Procurement	4	0	Field based
Social	4	0	Field based
Environmental	4	0	Field based
Gender	2	1	Field based
FM	3	0	Field based
M&E	3	1	Field based

**Table 3.3. Expected Skills Mix**



## ANNEX 4: ECONOMIC AND FINANCIAL ANALYSIS

### I. Economic Analysis of Project Investments

1. Benin is characterized by low electricity access. As electricity access is critical for development, the project support provision of electricity to households. The project comprises two main investment activities:

- Operational performance enhancement with network expansion and densification
- Biomass fuel in rural areas

2. The operational performance combined with network expansion and densification components show strong economic net present values, but a negative financial net present value. Consequently, the economic internal rate of return is good, but the financial internal return rate is negative, around 15 percent and (1) percent respectively. The biomass fuel in rural areas activities show strong economic and financial net present values with around US\$32 million and US\$37 million respectively. In addition, the economic and financial internal return rates are good, with around 50 percent and 61 percent respectively. Moreover, this analysis is done without taking into account the (i) social; (ii) health; and (iii) education impact on the daily life of the populations. Nevertheless, the biomass fuel for rural areas is a robust activity, while the operational performance with network expansion and densification is sensitive to the level of the willingness to pay and the number of connections.

#### Summary characteristics

3. The economic and financial analysis focuses on the main investments activities under the project: operational performance combined with network expansion and densification and biomass fuel in rural areas. The availability of background data for these investments, particularly those implemented by SBEE, is sparse, creating significant challenges for the economic analysis.

4. **The biomass fuel in rural areas will help to reduce pressure on Benin's forests by continuing past efforts (under the ESDP and IAME Project) to promote a sustainable production.** The activities include:

- a. Finance tree nurseries, tree plantings, logistical support, and training of key actors on forest resource management and energy-efficient charcoal production, communication campaigns targeting local governments and households, and the acquisition of material and equipment to develop income generation activities such as bee keeping.
- b. Finance a market assessment study, draw lessons from previous interventions and develop and implement more sustainable models to disseminate improved (energy-efficient) charcoal cook stoves and LPG stoves.

5. **The operational performance combined with network expansion and densification activities aim to reduce SBEE's commercial losses and technical losses in the distribution networks of Cotonou and Porto-Novo, while contributing to regularizing informal electricity connections.** Activities include improvement of the collection rate, while the distribution activities finance the rehabilitation of portions of the distribution networks in Cotonou and Porto-Novo. This will include upgrade of MV/LV transformers, strengthening of limited underground medium voltage (MV) and low voltage (LV) networks, installation of service drops, replacement of post-paid meters by pre-paid ones for formal





customers, installation of pre-paid meters for new and regularized informal households as well as the replacement of current electricity-intensive public lighting by LED lights in selected zones, which will contribute to reduce peak demand and billing arrears. In addition, technical assistance will be provided, including supervision and control services from an owner's engineer and training for efficient use of the management information systems to be implemented.

### **Operational Performance, Network Expansion, and Densification Assumptions**

6. **The country base demand scenario is low and driven by the consumption of households and concentrated around Cotonou.** Electricity demand in Benin is growing around 10 percent per year. The country energy demand is characterized by an important low voltage demand coming from households, which are the main customers of the utility. There are also some medium and high voltage customers primarily based in Cotonou. Energy demand is focused primarily on Cotonou, where most industry is based.

7. **Energy supply is not meeting demand.** The country is facing recurrent power outages, and the GoB is using rental power to fill the gap. An energy demand/supply balance for Benin has been constructed for this analysis.

8. **The network is facing significant losses.** The network system is old and has not been well maintained. The level of losses is estimated around 24 percent.

9. **The billing non-collection rate is estimated at around 13 percent.** This is mainly due to the administration invoices which is around 15 billion FCFA in December 2016.

10. **Given the lack of information on Benin, the willingness to pay is based on a survey used in Côte d'Ivoire where households have similar characteristics to those in Benin.** Due to the lack of a detailed household energy survey, there is no information available regarding the spending of unconnected households on alternative sources of energy, such as candles, kerosene, and batteries. Moreover, to capture the benefits of first-time electricity supply to new households, it is assumed that the consumption of new households will be similar to that for households already connected to the grid.

11. **In line with the World Bank's new Guidance on Discount Rates for the Economic Analysis of Investment Projects, the discount rate for the economic analysis is around eight percent.** This was determined by examining the medium to long term real per capita GDP growth forecast for Benin and multiplying by two. The World Bank's latest Benin Macroeconomic Brief sees real GDP growth trending towards 6.5 percent over the period to 2018, while the United Nation's long-term population growth forecast for Benin is 2.5 percent. This gives a real per capita GDP of four percent and a corresponding discount rate of eight percent. A summary of key assumption for the economic analysis is shown in the Table below.

**Table 4.1. Main Assumptions for Component 1 and 2**

Elements	Units	Value
<b>Distribution</b>		
Investment cost	US\$ million	25
Losses	%	24
Losses improvement	%	3



Connection cost	US\$/month	1
Prepaid meter cost	US\$	125
<b>Existing connections</b>		
Number (in Cotonou and Porto Novo)	#	290,955
<b>New connections</b>		
Number (in Cotonou and Porto Novo)	#	10,000
Consumption per (in Cotonou-Porto Novo)	kWh/month	85-65
<b>Improved connections</b>		
Number (in Cotonou and Porto Novo)	#	15,000
Additional consumption per	%	6.48
<b>Tariff</b>	US\$/kWh	0.07
<b>Willingness to Pay (base case)</b>	US\$/kWh	0.25

### **Biomass Fuel in Rural Areas Assumptions**

12. **The economic and financial analysis is based on the revenues and cost induced by the project, in terms of woods fuels production gains and woods gains (through the use of charcoal and biofuels and the prices obtained by contrast with the situation "without the project").** The financial analysis takes into account the market prices distortions (taxes, etc.). With regards to supply, the charcoal taxes are five percent and the taxes on the estimation of financial prices are two percent.

13. **The analysis has focused on the productivity gain for the sustainable forest management (the supply activities).** In effect, the production of wood is estimated from an approach of “with and without” the project. However, the sustainable management of this patrimony strongly depends on the instruments of participative management that will be adapted to local populations. Experiences under the IAME Project show that the implementation of this sustainable management will strongly reduce the degradation of 300,000 hectares of forest in Bassila, Bantè, and Djidja. This sustainable management implies the saving around a tenth of a ton of sustainably produced charcoal per hectare. The price of the charcoal in the market is estimated around 50 FCFA per kilogram.

14. **In addition, the introduction of beekeeping will help households increase revenues while preserving the forest.** This economic analysis shows that the annual average production of a hive is around 25 liters and the price is around 2,000 FCFA per liter.

15. **The economic evaluation refers to a period of at least 20 years, with an opportunity rate of 12 percent.** The expected investments cost cover five years. After five years, there will be maintenance costs and expected results. It is estimated that from the sixth year until the twelfth year, the maintenance costs will be digressive. At the sixth year, costs are estimated to be 10 percent of the investments costs in the fifth year, and these costs will decrease 10 percent every year until the twelfth year.

### **Values added and Internal Rates of Return**

16. **The operational performance combined with the network upgrade and expansion investments will improve the SBEE quality of service.** These activities increase and improve access to SBEE grids while contributing to reducing technical and commercial losses. The distribution networks expansion in



Cotonou and Porto Novo, as well as the upgrade of investments selected to improve the quality of service and the losses rate.

17. **The profitability of these investments is exceeding the eight percent discount rate.** The implementation of these investments shows an economic net present value around US\$147.1 million and an economic internal return rate of 15 percent.

18. **The investments for the operational performance, the network upgrade and extension will be essentially done in Cotonou and Porto Novo areas.** Furthermore, the company will introduce prepaid meters for the clients and change the tariff package system with a tariff by kWh. The table below shows the economic net present values of the project.

Table 4.2. NPVs and IRRs for Component 1 and 2

Elements	Unit	Value
Present Value of Costs	US\$ million	(122.9)
Present Value of Benefits	US\$ million	270
Economic <i>Net Present Value</i>	US\$ million	147.1
Economic Internal Rate of Return	%	15%

19. **The prepaid smart meters will help not only to reduce non-payments but also to bill correctly the consumers and reduce the losses in SBEE network.** Consequently, the benefits from distribution network and prepaid meters will occur respectively from the reduction of technical losses and collection rate. Nevertheless, the implementation of these investments shows a negative financial net present value around US\$(6) with negative financial internal return rate estimated around (1) percent. The table below shows the financial net present values and return of the project.

Table 4.3. Financial Analysis of Component 1 and 2

Elements	Unit	Value
Present Value of Costs	US\$ million	(176)
Present Value of Benefits	US\$ million	169
Financial Net Present Value	US\$ million	(6)
Financial Internal Rate of Return	%	(1)

**Source:** Project model analysis

20. **The benefits quantification for network expansion and densification excludes a range of important benefits including (i) increased returns on education and wage income; (ii) improved access to modern communication and information devices; (iii) social benefits to the community (street lighting, increases safety, allowing women to participate in the community life and night); (iv) health benefits (reduced burn injuries from kerosene lamps); and (v) time savings (e.g. avoiding trips to battery charging).** These are all difficult to quantify and incorporate into the calculation, but they nevertheless represent a significant part of the social benefits of rural and peri-urban electrification. The table below shows the economic and financial returns of the project.



21. **The benefits supported by the biomass energy activities in (i) Bassila; (ii) Bantè; and (iii) Djidja on the supply side an increase in the expected charcoal production volumes with and without the project.** The additional benefits induced by the project on the demand side are a product of the increase in alternative energy sources consumption that contributes to charcoal gain and wood fuels preservation.

22. **The implementation of these investments shows an economic NPV around US\$32 million and an economic rate of return estimated at 50 percent.** The table below shows the economic net present values of the project.

Table 4.4. Economic Internal Rate of Return for Component 3

Elements	Unit	Value
Present Value of Costs	US\$ million	(21)
Present Value of Benefits	US\$ million	54
Economic Net Present Value	US\$ million	32
Economic Internal Rate of Return	%	50

**Source:** Project model analysis

23. **The financial net present value of these investments are estimated around million US\$34 and the financial internal return rate is estimated around 61 percent.** The profitability of these investments is very important with returns exceeding the eight percent discount rate. The table below shows the financial net present values and return of the project.

Table 4.5. Financial Analysis of Component 3

Elements	Unit	Value
Present Value of Costs	US\$ million	(17)
Present Value of Benefits	US\$ million	54
Financial Net Present Value	US\$ million	34
Financial Internal Rate of Return	%	61

**Source:** Project model analysis

24. **The main impact of the biomass activities in rural areas is the increase of alternative energy sources consumption that contributes to charcoal gain and wood fuels preservation.** Gains are obtained through the savings in charcoal and wood fuels consumption due to the extended use of alternative energy sources (improved stoves, charcoal, etc.). The obtained gains are evaluated in relation to the prices for charcoal and wood fuels. In the analysis the estimations are conservative.

### **Sensitivities analysis**

25. The operational performance combined with network expansion and densification is sensitive to the level of the willingness to pay and the number of connections. The sensitivity analysis shows the willingness to pay and a number of customers are the critical parameters. With a willingness to pay around US\$0.11/kWh, the economic internal rate is equal to zero. Moreover, when the switch value of number of customer connected is 2,000, the economic internal rate is equal to zero.



26. The biomass fuel for rural areas activities is robust in terms of positive impact on households and the environment. Results of the economic analysis might be affected by variables during project implementation. Thus, a sensitivity analysis has been conducted to assess the strength of the results for certain risks parameters, including those that are more sensitive and random, and that can have an influence on the performance of the obtained results, including price, charcoal production, and use of alternative energy sources. The critical value of a parameter is the value at which the updated net value calculated for the opportunity cost of the capital or the forest areas become zero. The analysis shows that the switching value of the opportunity cost is around 44 percent and the switching value of the forest areas is around 115,000 hectares which mean that the project is robust and will provide value to the economy. The tables below show the sensitivity analysis of the projects.

**Table 4.6. Sensitivity Analysis for Component 1 and 2**

Sensitivities Analysis - Switch values					Increase/Decreased
Parameters	Unit	Switch Value	Original	Change	
Number of connections	number	2,000	10,000	-80%	Decreased by 80%
WTP	US\$	0.11	0.25	-56%	Decreased by 56%

**Table 4.7. Sensitivity Analysis for Component 3**

Sensitivity Analysis - Switch values					Increase/Decreased
Parameters	Unit	Switch Value	Original	Change	
Opportunity cost	%	44	12	266.7%	Increased by 266.7%
Forest areas	hectare	115,000	300,000	-61.7%	Decreased by 61.7%

### **GHG Accounting**

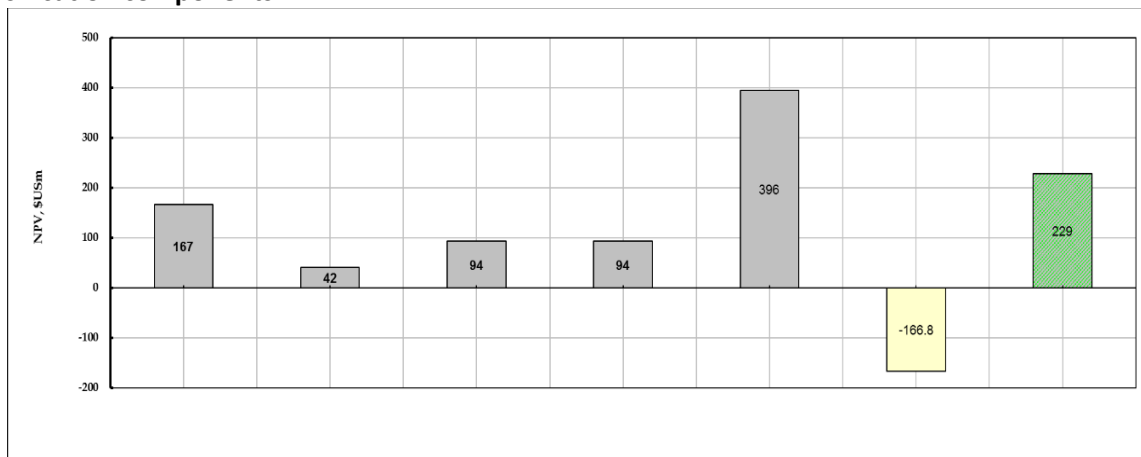
27. GHG accounting has been undertaken for the Project, which will result in GHG emission reductions. Through distribution network strengthening, the Project will reduce the grid technical losses to 10.5percent, which will save 541 GWh of electricity over 20 years as compared to the baseline scenario where the technical losses remain at 12 percent. Each MW will avoid 0.686 tCO<sub>2</sub>, which is a grid emission factor of Benin. With these assumptions, this project component will avoid 371,000 tCO<sub>2</sub> over the economic life of 20 years. In addition, the project will provide new or improved electricity services to users through grid extension. It allows grid electricity to substitute for self-generation using GHG-intensive fuel-burning lighting devices like kerosene lamps, oil lamps, and candles. As per the World Bank's GHG guidance on energy access operations, the default LCD/SIDS off-grid emission factor is 0.8 tCO<sub>2</sub>/MWh (a baseline scenario) and shifting to grid electricity will, therefore, avoid 0.114 tCO<sub>2</sub>/MWh. As the total generation required for new or improved connections is expected to be 413 GWh, the grid extension will avoid 47,000 tCO<sub>2</sub> over the economic life of 20 years. The project will also avoid 92 tCO<sub>2</sub> from energy efficient lighting program. In total, the project will result in GHG avoidance of 418,394 tCO<sub>2</sub> over the project lifetime.

### **Distribution Analysis**



28. The distribution analysis shows that the households and the Ministry of Finance are the main beneficiaries of this project. In addition, the distribution analysis of the biomass fuel for rural areas shows that the main beneficiaries are the environment and the targeted households who will benefit from increased revenue (expected to lead to improvement of living conditions). The project will also help SBEE improve its quality of service and reduce the losses and improve the collection rate. The table below summarizes the distribution of benefits around the different beneficiaries of the project.

**Figure1: Distribution analysis of operational performance combined with network expansion and densification components**



**Source:** Project model analysis

## II. UTILITY (SBEE) FINANCIAL ANALYSIS

29. A historical and projected analysis of the operating performance and financial position of SBEE during the period of 2007-2030 showed that SBEE's operation and financial conditions **have deteriorated materially and will stay poor**.

### A - Historical Operational performance analysis

30. SBEE's cost of service, while relatively high, has fluctuated over the last eight years. From a low FCFA 127.56 per kWh in 2007, the cost of service has significantly jumped in 2008; gradually decreased from 2008 to 2012; and went back up since 2013 to end up, in 2015, at FCFA 127.27 per kWh, almost the 2007 level. The main drivers of such stability are the slow growth of the cost of energy supplied, the Operation and Maintenance/Selling General and Administrative (O&M/SG&A) cost, and the financial charges.



**Table 4.8. Cost of Service**

	Energy Sold	Energy Supplied Costs	T&D + SG&A Costs	Finance Charges	Total Cost Service	Unit Cost Service	Unit Cost Service	Growth rate
	GWh	million FCFA	million FCFA	million FCFA	million FCFA	FCFA/kWh	USc/kWh	%
2007	580	42,343	27,523	4,130	73,996	127.56	21.26	
2008	671	58,072	34,980	4,051	97,103	144.77	24.13	13
2009	713	63,018	33,792	1,614	98,424	138.03	23.00	-5
2010	770	62,292	37,535	2,250	102,078	132.50	22.08	-4
2011	796	57,373	37,369	1,276	96,018	120.59	20.10	-9
2012	841	60,659	35,447	816	96,921	115.31	19.22	-4
2013	865	64,355	34,661	951	99,967	115.61	19.27	0
2014	867	67,964	34,296	1,118	103,378	119.24	19.87	3
2015	924	73,957	42,225	1,358	117,540	127.27	21.21	7

31. SBEE's unit cost of energy supplied already high in 2007 has marginally increased (**1 percent** annual growth) during the last eight (8) years, going from FCFA 60 per kWh in 2007 to FCFA 62 per kWh in 2015.

**Table 4.9. Unit Cost of Energy Supplied**

	Energy Supplied	Total Costs of Energy supplied	Unit Cost of Energy Supplied	Unit Cost of Energy Supplied	Growth rate
	GWh	million FCFA	FCFA/kWh	USc/kWh	%
2007	705	42,343	60.09	10.02	
2008	810	58,072	71.66	11.94	19
2009	921	63,018	68.42	11.40	(5)
2010	965	62,292	64.56	10.76	(6)
2011	1,018	57,373	56.34	9.39	(13)
2012	1,074	60,659	56.50	9.42	0
2013	1,099	64,355	58.55	9.76	4
2014	1,139	67,964	59.65	9.94	2
2015	1,189	73,957	62.20	10.02	4

32. One of the main drivers of the relatively high cost of energy supplied is the cost of rental power plant from Aggreko. Although rental power represents only 8 percent of total energy supplied, its share of cost is above 19 percent of the total cost of supply. Rental power unit cost is excessively high ranging between FCFA 93 per kWh and FCFA 213 per kWh (US\$0.15 per kWh – US\$0.36 per kWh).



**Table 4.10. Unit Cost of Rented Power Plant**

	<b>Energy Generated</b> GWh	<b>Fuel Costs</b> million FCFA	<b>Rental Costs</b> million FCFA	<b>Total Costs</b> million FCFA	<b>Unit Cost of Generation</b> FCFA/kWh	<b>Unit Cost of Generation</b> USc/kWh
2007	74	4,152	2,668	6,895	<b>92.59</b>	<b>15.43</b>
2008	131	13,110	7,004	20,245	<b>154.87</b>	<b>25.81</b>
2009	73	8,594	6,904	15,571	<b>212.78</b>	<b>35.46</b>
2010	68	6,921	4,953	11,942	<b>176.44</b>	<b>29.41</b>
2011	0	0	234	234	<b>0.00</b>	<b>0.00</b>
2012	0	0	0	0	<b>0.00</b>	<b>0.00</b>
2013	0	0	0	0	<b>0.00</b>	<b>0.00</b>
2014	19	2,211	0	2,230	<b>117.35</b>	<b>19.56</b>
2015	81	9,657	0	9,737	<b>120.84</b>	<b>20.14</b>

33. SBEE T&D O&M and SG&A<sup>(3)</sup> costs per kWh sold have also remained stable from FCFA 48 per kWh in 2007 to FCFA 46 per kWh in 2015, a modest decrease of **4 percent**.

(3) SG&A: Selling, General and Administrative

34. SBEE Financial charges per kWh sold have materially decreased from FCFA 7 per MWh in 2007 to FCFA 2 per MWh, a significant fall of close to 79 percent.

**Table 4.11. Financial Charges**

	<b>Energy Sold</b> GWh	<b>T&amp;D + SG&amp;A Costs</b> million FCFA	<b>Finance Charges</b> million FCFA	<b>Unit T&amp;D + SG&amp;A Cost</b> FCFA/kWh	<b>Unit Finance Cost</b> FCFA/kWh	<b>Unit T&amp;D + SG&amp;A Cost</b> USc/kWh	<b>Unit Finance Cost</b> USc/kWh
2007	580	27,523	4,130	47.45	7.12	7.91	1.19
2008	671	34,980	4,051	52.15	6.04	8.69	1.01
2009	713	33,792	1,614	47.39	2.26	7.90	0.38
2010	770	37,535	2,250	48.72	2.92	8.12	0.49
2011	796	37,369	1,276	46.93	1.60	7.82	0.27
2012	841	35,447	816	42.17	0.97	7.03	0.16
2013	865	34,661	951	40.09	1.10	6.68	0.18
2014	867	34,296	1,118	39.56	1.29	6.59	0.21
2015	924	42,225	1,358	45.72	1.47	7.62	0.25





35. Total energy losses have averaged around 21 percent over the last eight (8) years. The total losses have been slowly rising (3 percent per year), suggesting a potential power fraud and/or poor network condition, and lack of adequate maintenance.

**Table 4.12. Energy Losses**

	<b>Energy Supplied</b>	<b>Energy Sold</b>	<b>T&amp;D Losses</b>	<b>Losses rate</b>
	GWh	GWh	GWh	%
2007	705	580	125	17.67%
2008	810	671	140	17.23%
2009	921	713	208	22.58%
2010	965	770	194	20.16%
2011	1,018	796	222	21.80%
2012	1,074	841	233	21.70%
2013	1,099	865	234	21.33%
2014	1,139	867	272	23.90%
2015	1,189	924	265	22.32%

36. The revenue from energy sold has not kept pace with the increase in the cost of providing energy. SBEE net margin per energy sold has oscillated between a positive value of FCFA 9 per kWh to a negative value of FCFA 32 per kWh, with a healthy operating subsidy from the Government. Without Government's support, the margin would have ranged between a positive value of FCFA 9 per kWh to a negative value of FCFA 45 per kWh.

**Table 4.13. Unit Margin**

	<b>Energy Sold</b>	<b>Total Cost Service</b>	<b>Total Revenues</b>	<b>Operating Subsidy</b>	<b>Unit Cost Service</b>	<b>Unit Revenue Collected</b>	<b>Unit Margin</b>	<b>Unit Margin</b>
	GWh	million FCFA	million FCFA	million FCFA	FCFA/kWh	FCFA/kWh	FCFA/kWh	USc/kWh
2007	580	73,996	59,943	10,737	127.56	121.85	-5.72	-0.95
2008	671	97,103	67,207	8,341	145	112.63	-32.14	-5.36
2009	713	98,424	76,899	0	138	107.84	-30.19	-5.03
2010	770	102,078	98,671	0	133	128.08	-4.42	-0.74
2011	796	96,018	99,560	0	121	125.04	4.45	0.74
2012	841	96,921	103,609	0	115	123.26	7.96	1.33
2013	865	99,967	107,868	0	116	124.75	9.14	1.52
2014	867	103,378	107,856	0	119	124.40	5.17	0.86
2015	924	117,540	116,118	951	127	126.76	-0.51	-0.09



## **B - Historical financial position analysis**

37. As expected from SBEE operational performance analysis, the financial position of the company, poor between 2007 and 2011, has seen a slight improvement since 2011. SBEE profitability, liquidity, and leverage while better, were all negatively impacted by its poor operating performance.

### **Profitability**

38. SBEE profitability has stabilized just above zero (0) and has actually seen a small uptick in a positive territory since 2011. All profitability metrics have improved from a mediocre and poor position in 2011 to just a weakened position. The table below summarizes the profitability situation of SBEE.

**Table 4.14. Profitability**

	Profitability					
	Net Margin	Operating Margin	Operating Charges Coverage Ratio <sup>(1)</sup>	Operating Charges Coverage Ratio <sup>(2)</sup>	ROE <sup>(3)</sup>	ROCE <sup>(4)</sup>
<b>2007</b>	-5.97%	1.70%	0.81	0.97	-456%	-4%
<b>2008</b>	-27.20%	-20.36%	0.72	0.87	171%	-18%
<b>2009</b>	-22.94%	-20.07%	0.81	0.95	-127%	-20%
<b>2010</b>	-1.41%	1.64%	0.99	1.16	-10%	-2%
<b>2011</b>	1.42%	3.66%	1.01	1.21	7%	1%
<b>2012</b>	2.57%	4.96%	1.03	1.19	8%	2%
<b>2013</b>	1.67%	3.26%	1.02	1.19	5%	2%
<b>2014</b>	4.21%	6.01%	1.04	1.21	11%	4%
<b>2015</b>	1.97%	6.18%	1.01	1.18	5%	2%

(1): Including all operating and financial charges

(2): Excluding Deprecation, Tax and financial charges

(3): Return on Equity

(4): Return on Capital Employed

39. SBEE net margin has gone from negative 5.97 percent in 2007 to positive 1.97 percent, an increase of 133 percent while its operating margin has followed the same trend increasing from 1.70 percent to 6.18 percent, an improvement of 264 percent.

40. The operating charges coverage ratio has itself gone from below recovery level of 0.81 to a level of 1.01 (25 percent increase), showing that SBEE is at least recovering its operating costs with the revenue collected via its current tariff.

41. As results of improvements in cost recovery discussed above, SBEE's return on capital employed has enjoyed a positive upward trend, increasing from negative 4 percent in 2007 to 2 percent in 2015, growing by 148 percent. Similarly, SBEE's return on equity has also experienced the same fate going from negative 460 percent in 2007 to 5 percent in 2015, a major improvement.

### **Liquidity**



42. SBEE's liquidity position, relatively poor already in 2007, has seen a downward spiral that has led to a poor liquidity situation. While the quick and current ratios have improved, all other short-term liquidity metrics have seen a significant deterioration. The table below provides a quick summary of the main metrics and their trends.

**Table 4.14. Liquidity**

	Liquidity (Short-term)					
	Quick Ratio	Current Ratio	Collection Period	Days in Payable	Cash Conversion Cycle	Days Cash On hand
			Days	Days	Days	Days
<b>2007</b>	1.06	1.15	146		0	48
<b>2008</b>	0.97	1.15	175	559	-384	38
<b>2009</b>	0.81	0.97	185	1948	-1,763	48
<b>2010</b>	0.83	0.97	236	1497	-1,260	48
<b>2011</b>	0.88	1.09	175	1013	-838	40
<b>2012</b>	1.02	1.21	221	1435	-1,214	25
<b>2013</b>	1.25	1.45	250	1582	-1,331	54
<b>2014</b>	1.24	1.42	286	1411	-1,125	47
<b>2015</b>	1.17	1.31	264	1083	-818	34

43. Except between 2008 and 2011, SBEE's quick and current ratios have been strong and above 1.0. They have been above this threshold since 2011, suggesting that the company is able to pay for its short-term obligations without outside financial support. The upward trend in these metrics, if kept, is a welcome sign that some improvements have materialized on the company liquidity position.

44. SBEE's collection period (days), already not acceptable in 2007 (5 months) has deteriorated significantly to reach nine (9) months. A particular attention should be paid to this metric, as it is not only already worrisome, but also a worsening trend is developing.

45. As it can be seen from current ratio discussed above, the Achilles heel of SBEE is its Days in Payables, already high at 559 days (it takes on average 1.5 year to fully clear Account Payables) in 2008, has grown exponentially to 1,083 days (it takes on average 3 years to fully clear Account Payables) in 2015. The growth in Account Payables is a sign of stress on the company financials (treasury) and delay in payment of the power purchase from CEB.

46. A negative and growing cash conversion cycle is a sign that SBEE is relying on its suppliers to finance its operations (working capital needs) which could lead in the end to a supply of energy and/or fuel cut.

47. The average Days Cash on hand of around 48 days (for operating expenses cover, higher number is good) is low (and decreasing) compared to the average expected from typical of electric utilities cash management, which is around 90 days. This is a clear signal that SBEE liquidity problem is worsening and swift actions need to be entertained. This metric needs to be followed-up.



### **Leverage**

48. SBEE capital structure and leverage have experienced an unpredictable pattern with all leverage metrics going against a strong capital structure and financial soundness. Ignoring the implied financial obligations, the company has taken via expensive power rental contracts, the capital structure (total liabilities/Total Assets) of the company is above 50 percent (borderline for electric utilities), which is relatively high, especially when there is no flexibility to adjust the tariff without Government's approval. The table summarizes the trends in the main metrics.

**Table 4.15. Solvency**

	<b>Solvency (Leverage)</b>				
	<b>Leverage (Debt/Equity Ratio)</b>	<b>Indebtedness (Liabilities/Assets)</b>	<b>Interest Coverage Ratio (TIER)</b>	<b>Interest Coverage Ratio (TIER) - Incl. Interest Income</b>	<b>Debt Service Coverage Ratio (DSCR)</b>
	(LT Debt/Equity)	(Liabilities/Assets)	(EBIT/Interest Exp.)	(")	(CFADS/Debt Service)
<b>2007</b>	120.5	0.98	0.24	0.25	0.26
<b>2008</b>	-11.0	1.05	-3.06	-3.34	-0.38
<b>2009</b>	5.8	0.92	-6.21	-9.45	0.75
<b>2010</b>	5.4	0.93	0.66	0.71	1.54
<b>2011</b>	4.1	0.90	2.47	2.83	0.93
<b>2012</b>	2.3	0.83	5.07	6.46	0.51
<b>2013</b>	2.6	0.84	2.97	3.76	-0.04
<b>2014</b>	2.0	0.82	4.53	5.68	13.69
<b>2015</b>	1.5	0.79	3.91	4.81	8.36

49. SBEE's capital structure (LT debt/Equity) has been trending down from a high of 1.21 in 2007 to 1.5 (150 percent) in 2015, still above acceptable ratio, creating thus a higher financial cost to the company via the service of higher interest expenses. A credit worthy power utility (BBB rating) should have this ratio below 100 percent.

50. Total indebtedness (Liabilities/Assets) on the other hand has fallen from 98 percent in 2007 to 79 percent in 2015 but is still relatively high. The Account Payables has grown steadily (94 percent between 2007 and 2015) to finance working capital needs. A typical US regulated power utility has a ratio below 50 percent, commonly between 35 percent and 40percent.

51. Interest Coverage Ratio while inadequate between 2007 and 2010 has improved as the company earnings before interest and taxes (EBIT) has jumped to positive territory since then, releasing the burden on the company to find another source of funding for interest expenses and debt repayment.

52. Except in 2010, 2014, and 2015, SBEE's debt service coverage ratio has been erratic and inadequate (below 1.0) for all remaining years as cash flow available for debt service has not been



enough to cover the cash needed for debt repayment and interest expenses. Without new borrowings and/or capital infusion, the company would have not been able to finance its growing capital expenditure as cash flow from operations became increasingly insufficient to cover the additional capital needs.

### **Asset Efficiency**

53. Prior to 2010, SBEE's asset utilization ratios were relatively stable. The trend witnessed since 2011 -2015 indicates that the company has changed its asset utilization strategy, maybe reverting from using more IPP (and power imports) to supply its energy needs to investing in its own producing assets. The table below provides a summary of the metrics followed.

**Table 4.15. Asset Efficiency**

Asset Efficiency					
Working Capital Turnover (Sales/Working Capital)	Tangible Asset Turnover (Sales/Tangible Assets)	Assets Turnover (Sales/Assets)	Inventory Turnover (COGS/Inventory)	Receivables Turnover (Sales/Receivables)	Payables Turnover (Purchases/Payables)
4.21	0.65	0.39	2.33	2.49	
3.70	0.66	0.36	1.61	2.08	0.65
185.48	0.75	0.42	1.03	1.98	0.19
162.77	0.97	0.48	0.60	1.54	0.24
9.09	0.99	0.53	0.11	2.09	0.36
5.74	1.01	0.53	0.08	1.65	0.25
3.09	1.09	0.52	0.07	1.46	0.23
2.76	1.08	0.50	0.13	1.27	0.26
3.55	1.13	0.52	0.09	1.38	0.34

54. SBEE's inventory and receivables turnover ratios were all following a downward trend, reflecting on a positive change in asset development and operation strategy that is using efficiently the company assets.

55. However, the fall in payables turnover ratio is a sign that the company was not paying its bills on time, particularly, its energy from IPP and Import from CEB. This trend should obviously be reversed as soon as possible, as its will eventually lead to a severe interruption of service and/or poor reliability.

56. The increase in tangible assets turnover may be an indication that the company is shifting its asset development strategy from IPP focus toward developing its own assets.

### **C - Projected Operational performance analysis**

57. SBEE cost of service while relatively high is projected to decrease to a low of FCFA 115 per kWh in 2020 (large drop of 29 percent) before starting a slower average growth close the inflation rate (2 percent) on the period 2016-2030. It is expected to move within a wider range from a high of FCFA 178 per kWh in 2016 to a low of FCFA 117 per kWh. The main drivers of such wider range are the



exponential growth of the forecasted financial charges and the O&M/SG&A cost mitigated by the decrease in the unit cost of energy supplied.

**Table 4.16. Projected Unit Cost of Service**

	<b>Energy Sold</b>	<b>Energy Supplied Costs</b>	<b>T&amp;D + SG&amp;A Costs</b>	<b>Finance Charges</b>	<b>Total Cost Service</b>	<b>Unit Cost Service</b>	<b>Unit Cost Service</b>	<b>Growth rate</b>
	GWh	million FCFA	million FCFA	million FCFA	million FCFA	FCFA/kWh	US\$/kWh	%
2016	1,204	139,621	72,824	2,166	214,611	178.19	<b>29.70</b>	38
2017	1,267	129,980	75,592	3,947	209,518	165.34	<b>27.56</b>	-7
2018	1,322	135,124	77,012	7,457	219,594	166.10	<b>27.68</b>	0
2019	1,376	135,505	80,495	10,486	226,486	164.65	<b>27.44</b>	-1
2020	1,428	99,977	55,588	12,348	167,913	117.58	<b>19.60</b>	-29
2021	1,521	104,743	59,537	13,721	178,002	117.06	<b>19.51</b>	0
2022	1,620	115,171	68,282	16,032	199,485	123.18	<b>20.53</b>	5
2023	1,725	127,814	73,526	18,649	219,989	127.50	<b>21.25</b>	4
2024	1,839	137,866	80,166	21,516	239,548	130.28	<b>21.71</b>	2
2025	1,960	141,918	89,251	24,826	255,995	130.60	<b>21.77</b>	0
2026	2,090	157,769	97,315	29,669	284,753	136.24	<b>22.71</b>	4
2027	2,229	180,351	110,685	33,300	324,336	145.48	<b>24.25</b>	7
2028	2,379	189,631	118,950	37,472	346,053	145.48	<b>24.25</b>	0
2029	2,539	211,302	129,000	42,181	382,484	150.65	<b>25.11</b>	4
2030	2,711	215,129	138,724	46,856	400,709	147.83	<b>24.64</b>	-2

58. SBEE's unit cost of energy supplied expected to be very high in 2016 will follow a downward trend starting from FCFA 90 per kWh to reach a level of FCFA 54 per kWh in 2020 before reversing the trend to grow annually by 2 percent up to 2030.



**Table 4.16. Projected Unit Cost of Energy Supplied**

	<b>Energy Supplied</b>	<b>Costs</b>	<b>Unit Cost of Energy Supplied</b>	<b>Growth rate</b>
	GWh	million FCFA	FCFA/kWh	%
2016	1,546	139,621	90.32	46
2017	1,624	129,980	80.05	(11)
2018	1,690	135,124	79.94	(0)
2019	1,753	135,505	77.30	(3)
2020	1,817	99,977	55.02	(29)
2021	1,930	104,743	54.27	(1)
2022	2,051	115,171	56.16	3
2023	2,180	127,814	58.64	4
2024	2,317	137,866	59.50	1
2025	2,464	141,918	57.59	(3)
2026	2,622	157,769	60.18	5
2027	2,790	180,351	64.65	7
2028	2,969	189,631	63.86	(1)
2029	3,162	211,302	66.83	5
2030	3,368	215,129	63.88	(4)

59. The main driver of the relatively high cost of energy supplied will still be the cost of rental power plant from Aggreko. Although rental power will represent only 6 percent of total energy supplied, its share of cost will be above 29 percent of the total cost of supply. Rental power unit cost is excessively high ranging between FCFA 384 per kWh and FCFA 417 per kWh (US\$0.64 per kWh – US\$0.70 per kWh).

**Table 4.17. Projected Unit Cost of Generation**

	<b>Energy Generated</b>	<b>Fuel Costs</b>	<b>Rental Costs</b>	<b>Total Costs</b>	<b>Unit Cost of Generation</b>	<b>Unit Cost of Generation</b>
	GWh	million FCFA	million FCFA	million FCFA	FCFA/kWh	USc/kWh
2016	98	11,603	25,937	37,637	383.61	63.93
2017	98	11,951	26,663	38,712	394.56	65.76
2018	98	12,309	27,409	39,816	405.82	67.64
2019	98	12,679	28,176	40,953	417.40	69.57

60. SBEE T&D O&M and SG&A<sup>(3)</sup> cost per kWh sold will slowly decrease from a high of FCFA 59 per kWh in 2016 to FCFA 50 per kWh in 2030, an appreciable decrease of **15 percent**.



(3) SG&A: Selling, General and Administrative

61. SBEE Financial charges per kWh sold will materially increase from negative FCFA 2 per MWh in 2016 to FCFA 17 per kWh, an exponential growth of close to 8x.

**Table 4.18. Projected Unit Cost of Finance**

	<b>Energy Sold</b>	<b>T&amp;D + SG&amp;A Costs</b>	<b>Finance Charges</b>	<b>Unit T&amp;D + SG&amp;A Cost</b>	<b>Unit Finance Cost</b>	<b>Unit T&amp;D + SG&amp;A Cost</b>	<b>Unit Finance Cost</b>
	GWh	million FCFA	million FCFA	FCFA/kWh	FCFA/kWh	USc/kWh	USc/kWh
2016	1,204	72,824	2,166	60.47	1.80	10.08	0.30
2017	1,267	75,592	3,947	59.65	3.11	9.94	0.52
2018	1,322	77,012	7,457	58.25	5.64	9.71	0.94
2019	1,376	80,495	10,486	58.52	7.62	9.75	1.27
2020	1,428	55,588	12,348	38.92	8.65	6.49	1.44
2021	1,521	59,537	13,721	39.15	9.02	6.53	1.50
2022	1,620	68,282	16,032	42.16	9.90	7.03	1.65
2023	1,725	73,526	18,649	42.61	10.81	7.10	1.80
2024	1,839	80,166	21,516	43.60	11.70	7.27	1.95
2025	1,960	89,251	24,826	45.53	12.67	7.59	2.11
2026	2,090	97,315	29,669	46.56	14.20	7.76	2.37
2027	2,229	110,685	33,300	49.65	14.94	8.27	2.49
2028	2,379	118,950	37,472	50.01	15.75	8.33	2.63
2029	2,539	129,000	42,181	50.81	16.61	8.47	2.77
2030	2,711	138,724	46,856	51.18	17.29	8.53	2.88

62. Total energy losses will not see a significant improvement. It will only fall from around 21 percent in 2016 to 18 percent in 2030, still far below what is expected had some deliberated actions been taken to address this operational performance metric. The level of total losses suggests that a potential power fraud and/or poor network condition and lack of adequate maintenance will still be ongoing.





**Table 4.19. Projected Energy Losses**

	<b>Energy Supplied</b>	<b>Energy Sold</b>	<b>T&amp;D Losses</b>	<b>Losses rate</b>
	GWh	GWh	GWh	%
2016	1,546	1,204	341	22.09%
2017	1,624	1,267	357	21.96%
2018	1,690	1,322	368	21.79%
2019	1,753	1,376	377	21.53%
2020	1,817	1,428	389	21.40%
2021	1,930	1,521	409	21.22%
2022	2,051	1,620	431	21.03%
2023	2,180	1,725	454	20.84%
2024	2,317	1,839	479	20.65%
2025	2,464	1,960	504	20.46%
2026	2,622	2,090	531	20.27%
2027	2,790	2,229	560	20.08%
2028	2,969	2,379	591	19.89%
2029	3,162	2,539	623	19.70%
2030	3,368	2,711	657	19.51%

63. The revenue from energy sold will not keep pace with the increase in the cost of providing energy. SBEE net margin per energy sold will oscillate between a positive value of FCFA 14 per kWh (2018) to a negative value of FCFA 3 per kWh (2016), even with a healthy operating subsidy from the Government on the period 2016-2019. Without the Government's support, the margin is expected to range between a positive value of FCFA 2 per kWh to a negative value of FCFA 52 per kWh.



**Table 4.20. Projected Unit Margin**

	<b>Energy Sold</b>	<b>Total Cost Service</b>	<b>Total Revenues</b>	<b>Operating Subsidy</b>	<b>Unit Cost Service</b>	<b>Unit Revenue Collected</b>	<b>Unit Margin</b>	<b>Unit Margin</b>
	GWh	million FCFA	million FCFA	million FCFA	FCFA/kWh	FCFA/kWh	FCFA/kWh	USc/kWh
2016	1,204	214,611	151,717	59,460	178.19	175.34	-2.85	<b>-0.48</b>
2017	1,267	209,518	153,895	63,191	165.34	171.31	5.97	<b>1.00</b>
2018	1,322	219,594	173,893	64,040	166.10	179.97	13.87	<b>2.31</b>
2019	1,376	226,486	168,906	67,621	164.65	171.95	7.30	<b>1.22</b>
2020	1,428	167,913	168,925	0	117.58	118.29	0.71	<b>0.12</b>
2021	1,521	178,002	184,598	0	117.06	121.40	4.34	<b>0.72</b>
2022	1,620	199,485	202,749	0	123.18	125.19	2.02	<b>0.34</b>
2023	1,725	219,989	223,863	0	127.50	129.75	2.24	<b>0.37</b>
2024	1,839	239,548	243,387	0	130.28	132.37	2.09	<b>0.35</b>
2025	1,960	255,995	258,337	0	130.60	131.80	1.20	<b>0.20</b>
2026	2,090	284,753	285,372	0	136.24	136.54	0.30	<b>0.05</b>
2027	2,229	324,336	318,394	0	145.48	142.82	-2.67	<b>-0.44</b>
2028	2,379	346,053	342,808	0	145.48	144.11	-1.36	<b>-0.23</b>
2029	2,539	382,484	378,855	0	150.65	149.22	-1.43	<b>-0.24</b>
2030	2,711	400,709	397,839	0	147.83	146.77	-1.06	<b>-0.18</b>

64. A simulation of SBEE's financial situation was conducted considering a realistic scenario. The following assumptions were considered:

- (1) Solar power plant of 60 MW financed by MCC (Millennium Challenge Corporation) will come online in 2020. The financing of the plant is a grant.
- (2) Solar power plant of 20 MW financed by AFD with average power price of 75 FCFA/kWh will also come online in 2020
- (3) The current project will reduce overall losses by 3 percent
- (4) A new energy access project (to be financed by the World Bank) will be effective in 2019, with the objective of increasing the electricity access rate
- (5) Domestic consumption growth rate is forecast to be 6 percent in 2019 and 30 percent in 2020 and will be the same as in the base case (8 percent).
- (6) Medium voltage consumption is forecast to double in 2020 and will grow by 8 percent on average.

65. The results of the simulation showed that the sector would see a material improvement in its



cost recovery going from 80 percent in 2019 to 111 percent in 2020. SBEE net margin would move in positive territory in 2020 with no subsidy needed after the discontinuation of rental power contracts. The positive net margin will be on average US cent 2.4/kWh on the period 2020-2030.

66. The table below summarizes the results of the scenario described above.

**Table 4.21. Results of Simulated Scenario**

	Energy Sold	Total Cost Service	Total Revenues	Operating Subsidy	Unit Cost Service	Unit Revenue Collected	Unit Margin	Unit Margin	Cost Recovery Ratio	Cost Recovery Ratio with Subsidy
	GWh	million FCFA	million FCFA	million FCFA	FCFA/kWh	FCFA/kWh	FCFA/kWh	USc/kWh	%	%
2016	1,159	211,459	154,231	59,148	182.52	184.18	1.66	<b>0.28</b>	73	101
2017	1,234	211,487	159,729	62,846	171.32	180.30	8.98	<b>1.50</b>	76	105
2018	1,308	223,564	183,194	63,686	170.94	188.76	17.83	<b>2.97</b>	82	110
2019	1,380	225,844	180,390	67,930	163.63	179.91	16.28	<b>2.71</b>	80	110
2020	1,970	211,368	233,739	0	107.29	118.65	11.36	<b>1.89</b>	111	111
2021	2,294	241,037	269,843	0	105.09	117.65	12.56	<b>2.09</b>	112	112
2022	2,458	267,538	297,722	0	108.84	121.11	12.28	<b>2.05</b>	111	111
2023	2,628	294,338	329,802	0	111.98	125.47	13.49	<b>2.25</b>	112	112
2024	2,809	318,055	358,649	0	113.25	127.70	14.45	<b>2.41</b>	113	113
2025	3,000	334,830	378,147	0	111.59	126.03	14.44	<b>2.41</b>	113	113
2026	3,205	370,601	418,657	0	115.64	130.63	15.00	<b>2.50</b>	113	113
2027	3,422	420,562	467,630	0	122.88	136.63	13.75	<b>2.29</b>	111	111
2028	3,654	444,040	503,502	0	121.51	137.78	16.27	<b>2.71</b>	113	113
2029	3,902	488,852	557,309	0	125.30	142.84	17.55	<b>2.92</b>	114	114
2030	4,165	504,395	581,997	0	121.11	139.74	18.63	<b>3.11</b>	115	115

67. The scenario shows that the operating performance of SBEE will improve materially with an average positive net margin of US cent 2.4 per kWh and cost recovery ratio above 1.11

#### **D - Projected financial position analysis**

68. As expected from SBEE operational performance analysis, the financial position of the company, historically poor will not see a material improvement. SBEE profitability, liquidity, and leverage while better, will all be negatively impacted by its poor operating performance and its high cost of service.



### Profitability

69. Without vigorous proactive actions, SBEE profitability metrics will all see material deteriorations. Positive ROE (Return on Equity) and ROCE (Return on Capital Employed) are actually signs of worse financial performance as negative margin over negative equity is leading to false positive returns. The table below summarizes the forecasted profitability situation of SBEE on the period 2016-2030.

**Table 4.22. Profitability**

	Profitability					
	Net Margin	Operating Margin	Operating Charges Coverage Ratio <sup>(1)</sup>	Operating Charges Coverage Ratio <sup>(2)</sup>	ROE	ROCE
<b>2016</b>	-24.11%	-21.90%	0.61	0.67	-147%	-35%
<b>2017</b>	-17.32%	-13.97%	0.63	0.70	-901%	-25%
<b>2018</b>	-12.08%	-6.74%	0.66	0.75	161%	-23%
<b>2019</b>	-18.15%	-11.06%	0.63	0.73	79%	-50%
<b>2020</b>	-14.85%	-6.61%	0.87	1.11	43%	-45%
<b>2021</b>	-13.34%	-4.93%	0.88	1.13	34%	-56%
<b>2022</b>	-14.95%	-6.01%	0.87	1.12	34%	-96%
<b>2023</b>	-14.35%	-4.94%	0.87	1.14	29%	-203%
<b>2024</b>	-14.30%	-4.33%	0.87	1.15	26%	1562%
<b>2025</b>	-15.19%	-4.38%	0.87	1.17	25%	192%
<b>2026</b>	-15.48%	-3.81%	0.87	1.19	24%	105%
<b>2027</b>	-17.08%	-5.32%	0.85	1.17	24%	73%
<b>2028</b>	-16.14%	-3.84%	0.86	1.19	21%	55%
<b>2029</b>	-15.77%	-3.23%	0.86	1.20	20%	46%
<b>2030</b>	-15.94%	-2.66%	0.86	1.22	18%	40%

(1): Including all operating and financial charges

(2): Excluding Deprecation, Tax and financial charges

70. SBEE expected net margin would go from negative 24 percent in 2016 to negative 16 percent without being above negative 13 percent on the forecasting period even after adjusting for potential subsidy from the Government.

71. The operating charges coverage ratio will itself be below recovery level of 1. It will start from a low level of 0.61 in 2016 to 0.86, yet an improvement, but still not enough to allow SBEE to recover its operating costs with the revenue collected via its projected tariff.

72. As results of degraded expected financial conditions described above, SBEE's return on capital employed (ROCE) and return on Equity (ROE) will not improve on the forecasting period. SBEE equity will be wiped out. Starting with a positive equity of FCFA 24 billion in 2016, SBEE will end up with an astonishing negative equity of FCFA 330 billion in 2030, which means technically a bankrupt company.



The Government would have to provide a subsidy of the same magnitude to keep the company operating.

### Liquidity

73. SBEE's liquidity position, already poor in 2016, will not improve and actually will follow a downward spiral that will lead to a poor liquidity situation. While the collection period, days payable, and cash conversion cycle metrics are expected to improve partially they will still be not enough to provide SBEE a sustainable and healthy liquidity position.

**Table 4.23. Liquidity**

	Liquidity (Short-term)					
	Quick Ratio	Current Ratio	Collection Period	Days in Payable	Cash Conversion Cycle	Days Cash On hand
			Days	Days	Days	Days
<b>2016</b>	0.83	0.93	246	1908	-1,662	62
<b>2017</b>	0.72	0.83	162	2436	-2,274	62
<b>2018</b>	0.56	0.66	89	1344	-1,255	64
<b>2019</b>	0.46	0.54	80	1314	-1,234	62
<b>2020</b>	0.36	0.39	67	1335	-1,268	62
<b>2021</b>	0.32	0.35	64	509	-446	63
<b>2022</b>	0.29	0.32	62	543	-481	63
<b>2023</b>	0.27	0.30	60	547	-488	63
<b>2024</b>	0.25	0.28	57	546	-488	63
<b>2025</b>	0.22	0.24	55	532	-477	63
<b>2026</b>	0.21	0.23	52	538	-486	63
<b>2027</b>	0.20	0.22	50	554	-504	63
<b>2028</b>	0.19	0.21	47	546	-498	63
<b>2029</b>	0.18	0.20	45	554	-509	63
<b>2030</b>	0.17	0.19	42	537	-495	64

74. SBEE quick and current ratios will weaken further and will follow a downward trend to reach very low level (0.7-0.19). They provide a clear indication that short-term liabilities (trade payables) will be accumulating on the forecasting period without any abating signs. This suggests that the company will not able to pay for its short-term obligations without outside financial support.

75. SBEE's collection period (days) are forecasted to decrease significantly from eight (8) months to close to one and half (1.5) months. Should that materialize, it will be an impressive achievement and will certainly help SBEE cash flows situation.

76. As it can be seen from table above, the Achilles heel of SBEE will still be its Days in Payables, high at 1908 days (it will take on average 5 years to fully clear Account Payables) in 2016, will experience a significant fall to 537 days (it will take on average 1.5 years to fully clear Account Payables) in 2030.



Even with this forecasted achievement, the metric is still not acceptable (90 days would be appropriate). The high days in Account Payables will remain a sign of stress on the company financials (treasury) and delay in payment of the power purchase from CEB.

77. A negative and growing cash conversion cycle is a sign that SBEE will still be relying on its suppliers and/or short-term loan to finance its operations (working capital needs) which could lead in the end to a supply of energy and/or fuel cut.

78. The average Days Cash on hand of around 63 days (for operating expenses cover, higher number is good) is low compared to the average expected from typical of electric utilities cash management, which is around 90 days.

### Leverage

79. SBEE capital structure and leverage will experience an unpredictable pattern with all leverage metrics going against a strong capital structure and financial soundness. Ignoring the implied financial obligations, the company has taken via expensive power rental contracts, the capital structure (total liabilities/Total Assets) of the company is above 50 percent (borderline for electric utilities), which is relatively high, especially when there is no flexibility to adjust the tariff without Government's approval. The table summarizes the trends in the main metrics.

**Table 4.24. Solvency**

	Solvency (Leverage)				
	<b>Leverage (Debt/Equity Ratio)</b>	<b>Indebtedness (Liabilities/Assets)</b>	<b>Interest Coverage Ratio (TIER)</b>	<b>Interest Coverage Ratio (TIER) - Incl. Interest Income</b>	<b>Debt Service Coverage Ratio (DSCR)</b>
	(LT Debt/Equity)	(Liabilities/Assets)	(EBIT/Interest Expenses)	(")	(CFADS/Debt Service)
<b>2016</b>	4.3	0.93	-14.95	-14.95	2.06
<b>2017</b>	43.4	0.99	-5.38	-5.38	-1.54
<b>2018</b>	-10.1	1.04	-1.47	-1.47	-0.12
<b>2019</b>	-3.3	1.14	-1.74	-1.74	0.65
<b>2020</b>	-2.2	1.22	-0.88	-0.88	1.10
<b>2021</b>	-1.8	1.25	-0.64	-0.64	0.80
<b>2022</b>	-1.5	1.29	-0.74	-0.74	0.81
<b>2023</b>	-1.3	1.32	-0.57	-0.57	0.88
<b>2024</b>	-1.2	1.35	-0.47	-0.47	0.97
<b>2025</b>	-1.0	1.36	-0.43	-0.43	0.98
<b>2026</b>	-0.9	1.40	-0.35	-0.35	1.16
<b>2027</b>	-0.8	1.45	-0.48	-0.48	1.03
<b>2028</b>	-0.7	1.49	-0.33	-0.33	1.08
<b>2029</b>	-0.7	1.52	-0.27	-0.27	1.13
<b>2030</b>	-0.6	1.56	-0.21	-0.21	1.10



80. With negative equity, SBEE's capital structure (LT debt/Equity) is and will remain meaningless. Unless a capitalization is pursued, the company will technically be bankrupt.

81. With the recourse to suppliers and revolving debt to finance its working capital, SBEE's total indebtedness (Liabilities/Assets) will increase with the corollary of delay in payment of IPP and power imported as well as higher and increasing financial charges. A typical US regulated power utility has a ratio of liabilities/assets below 50 percent, commonly between 35 percent and 40 percent.

82. With negative operating income on the forecast period, Interest Coverage Ratio is also meaningless as SBEE will not be able to pay its financial expenses without using short-term borrowings (revolvers).

83. SBEE's debt service coverage ratio will be erratic and inadequate (oscillating around 1.0) far below healthy ratio of 1.25x. Without new borrowings and/or capital infusion, the company will not be able to finance its growing capital expenditure as cash flow from operations became increasingly insufficient to cover the additional capital needs.

#### **Asset Efficiency**

84. Prior to 2015, SBEE's asset utilization ratios were relatively stable. If the number of 2015 indicates a trend that will continue, this will suggest that the company has changed its asset utilization strategy, maybe using more IPP (and power imports) to supply its energy needs instead of investing in its own producing assets. The table below provides a summary of the metrics followed.

**Table 4.25. Asset Efficiency**

	<b>Asset Efficiency</b>					
	<b>Net Working Capital Turnover</b>	<b>Tangible Asset Turnover</b>	<b>Assets Turnover</b>	<b>Inventory Turnover</b>	<b>Receivables Turnover</b>	<b>Payables Turnover</b>
	(Sales/Working Capital)	(Sales/Tangible Assets)	(Sales/Assets)	(COGS/Inventory)	(Sales/Receivables)	(Purchases/Payables)
<b>2016</b>	21.45	0.98	0.45	3.53	1.48	0.19
<b>2017</b>	7.59	0.89	0.49	4.09	2.25	0.15
<b>2018</b>	5.09	0.94	0.60	4.78	4.12	0.27
<b>2019</b>	6.35	0.92	0.60	5.69	4.58	0.28
<b>2020</b>	7.93	0.90	0.65	3.53	5.43	0.27
<b>2021</b>	7.89	0.89	0.64	2.93	5.72	0.72
<b>2022</b>	8.35	0.88	0.64	2.83	5.91	0.67
<b>2023</b>	8.75	0.89	0.65	2.74	6.12	0.67
<b>2024</b>	9.17	0.88	0.64	2.64	6.37	0.67
<b>2025</b>	9.17	0.79	0.60	2.55	6.66	0.69
<b>2026</b>	10.63	0.82	0.62	2.46	6.96	0.68
<b>2027</b>	11.57	0.86	0.64	2.37	7.29	0.66
<b>2028</b>	12.34	0.84	0.64	2.28	7.69	0.67
<b>2029</b>	13.81	0.87	0.66	2.19	8.14	0.66



<b>2030</b>	15.64	0.85	0.65	2.10	8.68	0.68
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85. SBEE's asset, receivables, and payables turnover ratios will follow an upward trend up to 2021 and will stabilize thereafter, reflecting on a positive change in asset development and operation strategy that SBEE will be using efficiently the company assets.

86. A decreasing Inventory turnover ratio as forecast, if materialized is a negative sign, as it will indicate that SBEE will keep higher inventory (probably fuels) to sustain the same level of energy generated, which will increase the cost of energy generated and/or higher working capital needs.

87. However, net working capital turnover is forecasted to fall from a high 22 (2016) to 8 (2021) before revert to 16 (2030) which implies that the level of net working capital will fall as SBEE is forecast to turn to banks to secure short-term loans to reduce the size of its Account Payables.