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Report No: PAD1082

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$120 MILLION

TO THE

DOMINICAN REPUBLIC

FOR A

DISTRIBUTION GRID MODERNIZATION AND LOSS REDUCTION PROJECT

November 20, 2015

Energy & Extractives Global Practice
Latin America and the Caribbean Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective November 19, 2015)

Currency Unit = Dominican Republic Peso

DOP\$45.220 = US\$1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AES	Applied Energy Services
ASAI	Average Service Availability
BRP	Blackout Reduction Program
CAS	Country Assistance Strategy
CDE	<i>Corporación Dominicana de Electricidad</i> (Dominican Electricity Corporation)
CDEEE	<i>Corporación Dominicana de Empresas Eléctricas Estatales</i> (Corporation of Dominican State Electricity Companies)
CNE	<i>Comisión Nacional de Energía</i> (National Energy Commission)
CPS	Country Partnership Strategy
CRI	Cash Recovery Index
DR	The Dominican Republic
DOP	Dominican Republic Pesos
EDE	<i>Empresas Distribuidoras de Electricidad</i> (Electricity Distribution Companies)
EDE Este	<i>Empresa Distribuidora de Electricidad del Este S.A.</i> (Electricity Distribution Company of the East)
EDE Norte	<i>Empresa Distribuidora de Electricidad del Norte S.A.</i> (Electricity Distribution Company of the North)
EDE Sur	<i>Empresa Distribuidora de Electricidad del Sur S.A.</i> (Electricity Distribution Company of the South)
EGEHID	<i>Empresa de Generación Hidroeléctrica</i> (Hydroelectric Generation Company)
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
ENVP	Economic Net Present Value
ETED	<i>Empresa de Transmisión Eléctrica Dominicana</i> (Dominican Electricity Transmission Company)
ERI	Energy Recovery Index
FIRR	Financial Internal Rate of Return

FNPV	Financial Net Present Value
FM	Financial Management
GNI	Gross National Income
GDP	Gross Domestic Product
GRS	Grievance Redress Service
IBRD	International Bank for Reconstruction and Development
IDB	Inter-American Development Bank
ICT	Information and Communication Technology
IFI	International Financial Institution
IFR	Interim Financial Reports
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IT	Information Technology
LAC	Latin American and the Caribbean
LV	Low Voltage
MEM	Ministry of Energy and Mining
MV	Medium Voltage
OC SENI	<i>Organismo Coordinador del Sistema Eléctrico Nacional Interconectado</i> (Electricity Market Operator)
OFID	The OPEC Fund for International Development
OPEC	Organization of Petroleum Exporting Countries
PCB	Polychlorinated Biphenyls
PFM	Public Financial Management
PGASE	Deputy Attorney General's Office for the Electric Sector
PIU	Project Implementation Unit
PIE	Project Implementation Entity
PMU	Project Management Unit at EDEs
POA	<i>Plan de Operaciones Anual</i> (Annual Operations Plan)
P-RAMS	Procurement Risk Assessment and Management System
SEPA	<i>Sistema de Ejecución del Plan de Adquisiciones</i> (Procurement Plan Execution System)
SIE	<i>Superintendencia de Electricidad</i> (Superintendence of Electricity)
SOE	Statement of Expenses
TPP	Thermal Power Plants
UEPEX	Módulo para las Unidades Ejecutoras de Proyectos con Financiamiento Externo (module for executing units of externally funded projects).
WB	The World Bank

Regional Vice President:	Jorge Familiar
Acting Country Director:	Karin Kemper
Senior Global Practice Director:	Anita Marangoly George
Practice Manager:	Antonio Barbalho
Task Team Leader:	Sergio Gonzalez

DOMINICAN REPUBLIC
Distribution Grid Modernization and Loss Reduction Project

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PAD DATA SHEET

Dominican Republic

Distribution Grid Modernization and Loss Reduction Project (P147277)

PROJECT APPRAISAL DOCUMENT

LATIN AMERICA AND CARIBBEAN

ENERGY AND EXTRACTIVES GLOBAL PRACTICE

Report No.: PAD1082

Basic Information			
Project ID P147277	EA Category B - Partial Assessment	Team Leader Sergio Augusto Gonzalez	
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints []		
	Financial Intermediaries []		
	Series of Projects []		
Project Implementation Start Date 31-May-2016	Project Implementation End Date 31-Dec-2020		
Expected Effectiveness Date 30-Apr-2016	Expected Closing Date 31-Dec-2020		
Joint IFC No			
Practice Manager/Manager Antonio Barbalho	Senior Global Practice Director Anita Marangoly George	Acting Country Director Karin Kemper	Regional Vice President Jorge Familiar
Borrower: DOMINICAN REPUBLIC			
Responsible Agencies: CDEEE and SIE			
Contact:	Ruben Jimenez Bichara (CDEEE) Ing. Eduardo Quincoces (SIE)	Title:	Vicepresidente Ejecutivo Superintendente de Electricidad
Telephone No.:	(809) 535-9098(CDEEE) (809) 683-2500	Email:	rbichara@cdeee.gob.do equincoces@sie.gov.do

Project Financing Data(in USD Million)					
<input checked="" type="checkbox"/>	Loan	<input type="checkbox"/>	IDA Grant	<input type="checkbox"/>	Guarantee
<input type="checkbox"/>	Credit	<input type="checkbox"/>	Grant	<input type="checkbox"/>	Other
Total Project Cost:		120.00		Total Bank Financing: 120.00	
Financing Gap:		0			
Financing Source					
					Amount
Borrower					0.00
International Bank for Reconstruction and Development					119.70
Front End Fee					0.30
Total					120.00
Expected Disbursements (in USD Million)					
Fiscal Year	2016	2017	2018	2019	2020
Annual	10.00	20.00	30.00	30.00	30.00
Cumulative	10.00	30.00	60.00	90.00	120.00
Institutional Data					
Practice Area / Cross Cutting Solution Area					
Energy & Extractives					
Cross Cutting Areas					
<input type="checkbox"/> Climate Change					
<input type="checkbox"/> Fragile, Conflict & Violence					
<input checked="" type="checkbox"/> Gender					
<input type="checkbox"/> Jobs					
<input type="checkbox"/> Public Private Partnership					
Sectors / Climate Change					
Sector (Maximum 5 and total percent must equal 100)					
Major Sector	Sector	percent	Adaptation Co-benefits percent	Mitigation Co-benefits percent	
Energy and mining	Transmission and Distribution of Electricity	100			

Total	100
<input checked="" type="checkbox"/> I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.	
Themes	
Theme (Maximum 5 and total percent must equal 100)	
Major theme	Theme percent
Public sector governance	Public expenditure, financial management and procurement 60
Urban development	Urban Economic Development 20
Urban development	City-wide Infrastructure and Service Delivery 20
Total	100
Systematic Operations Risk-Rating Tool (SORT)	
Risk Category	Rating
1. Political and Governance	Moderate
2. Macroeconomic and Policies	Low
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Low
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Moderate
7. Environmental and Social	Moderate
8. Stakeholders	Moderate
9. Other	Moderate
OVERALL	Moderate
Proposed Development Objective(s)	
The Project development objective is to improve the financial viability of the electricity distribution companies (EDEs) by reducing energy losses and increasing revenue collections in the circuits rehabilitated under the Project and consequently increase the supply of electricity.	
Components	
Component Name	Cost (USD Millions)
Component 1 - Rehabilitation of Selected Distribution	103.63

Circuits and Upgrading of Metering Systems and Implementation of the Environmental Management Systems for the EDEs.			
Component 2 – Citizen Engagement and Community Participation	4.56		
Component 3 - Commercial Management and Project Management, Monitoring and Evaluation of the Distribution Grid Modernization and Electrical Losses Reduction Program.	11.16		
Component 4 – Complementary Tariff Study	0.35		
Compliance			
Policy			
Does the project depart from the CAS in content or in other significant respects?	Yes [] No [x]		
Does the project require any waivers of Bank policies?	Yes [] No [x]		
Have these been approved by Bank management?	Yes [] No [x]		
Is approval for any policy waiver sought from the Board?	Yes [] No [x]		
Does the project meet the Regional criteria for readiness for implementation?	Yes [x] No []		
Safeguard Policies Triggered by the Project			
	Yes	No	
Environmental Assessment OP/BP 4.01	x		
Natural Habitats OP/BP 4.04	x		
Forests OP/BP 4.36		x	
Pest Management OP 4.09		x	
Physical Cultural Resources OP/BP 4.11	x		
Indigenous Peoples OP/BP 4.10		x	
Involuntary Resettlement OP/BP 4.12		x	
Safety of Dams OP/BP 4.37		x	
Projects on International Waterways OP/BP 7.50		x	
Projects in Disputed Areas OP/BP 7.60		x	
Legal Covenants			
Description of Covenant			
Name	Recurrent	Due Date	Frequency
Schedule 2	Yes	Upon	Continuous

Loan Agreement Section I, A.1 and 2 Institutional Arrangements.		Effectiveness	
Description of Covenant: The Project Implementation Unit (PIU) shall be responsible for day to day administration of the Project and maintained within the structure of the Project Implementation Entity (PIE).			
Name	Recurrent	Due Date	Frequency
Schedule 2 Loan Agreement Section I, A.3 Institutional Arrangements.	Yes	Upon Effectiveness	Continuous
Description of Covenant: Borrower shall ensure that the SIE and each EDE are maintained with sufficient resources for the duration of the Project, so as to be able to carry out their respective obligations under the Project.			
Name	Recurrent	Due Date	Frequency
Schedule 2 Loan Agreement Section I, C.1	Yes	Upon Effectiveness	Continuous
Description of Covenant: The Borrower shall make the proceeds of the Loan available to the Project Implementing Entity under a subsidiary agreement between the Borrower and the Project Implementing Entity, under terms and conditions approved by the Bank (the "CDEEE Subsidiary Agreement").			
Name	Recurrent	Due Date	Frequency
Schedule 2 Loan Agreement Section I, C.3	No	Upon Effectiveness	Once
Description of Covenant: The Borrower shall cause the PIE to enter into an agreement with each EDE, under terms and conditions approved by the Bank (collectively referred to as "the EDE Agreements").			
Name	Recurrent	Due Date	Frequency
Schedule 2 Loan Agreement Section I, C.	Yes	Upon Effectiveness	Continuous
Description of Covenant: The Borrower shall cause the PIE to maintain throughout the implementation of Parts 1 to 3 of the project a PIU within its own structure with functions, staffing, and resources, satisfactory to the Bank. The Borrower shall make the proceeds of the Loan available to the SIE under a Subsidiary Agreement between the Borrower and the SIE, under terms and conditions approved by the Bank (the SIE Subsidiary Agreement)			
Name	Recurrent	Due Date	Frequency
Schedule 2	Yes	Upon	Continuous

Loan Agreement Section I, B 1 c.		Effectiveness	
----------------------------------	--	---------------	--

Description of Covenant:
The Borrower shall, and shall cause the Project Implementing Entity to carry out the Project in accordance with the Environmental Impact Assessment (EIA) and the Environmental Management Plan (EMP).

Name	Recurrent	Due Date	Frequency
Schedule 2 Loan Agreement Section II, C.1	Yes	Upon Effectiveness	Continuous

Description of Covenant:
The Borrower shall cause the PIE to carry out, report to the Bank on, and implement the recommended measures of the Technical Audit.

Name	Recurrent	Due Date	Frequency
Schedule 2 Loan Agreement Section II, D	Yes	Upon Effectiveness	Continuous

Description of Covenant:
The Borrower, through the PIE, shall cause each EDE to prepare and adopt a rolling five year business plan.

Conditions

Source Of Fund	Name	Type
IBRD	Operations Manual	Effectiveness

Description of Condition
The Project Operations Manual, in form and substance acceptable to the Bank, has been adopted by the Project Implementing Entity.

Source Of Fund	Name	Type
IBRD	CDEE Subsidiary Agreement	Effectiveness

Description of Condition
The CDEEE Subsidiary Agreement has been executed on behalf of the Borrower and the Project Implementing Entity.

Source Of Fund	Name	Type
IBRD	SIE Subsidiary Agreement	Effectiveness

Description of Condition
The SIE Subsidiary Agreement has been executed on behalf of the Borrower and the SIE.

Source Of Fund	Name	Type
IBRD	EDE Agreement	Effectiveness

Description of Condition

Each of the EDE Agreements has been executed on behalf of the parties thereto.

Team Composition

Bank Staff

Name	Title	Specialization	Unit
Sergio Augusto Gonzalez Coltrinari	Senior Energy Specialist	Team Lead	GEEDR
Ignacio Jauregui	Senior Counsel	Legal	LEGLE
Catherine Abreu Rojas	Procurement Specialist	Procurement	GGODR
Elizabeth Sanchez	Program Assistant	Program Assistant	GEEDR
Maritza A. Rodriguez	Senior Financial Management Specialist	Financial Management	GGODR
Ruth Tiffer-Sotomayor	Senior Environmental Specialist	Environment Safeguards	GENDR
Tatiana Cristina de Abreu	Finance Officer	Finance/Disbursement	WFALN
Laura Wendell Berman	Energy Specialist	Energy Economy	GEEDR

Non-Bank Staff

Name	Title	City
Elena Correa	Senior Social Scientist/Consultant	GEEDR
Charles Husband	Financial Specialist/Consultant	GEEDR
Surekha Jaddoo	Operations Officer/Consultant	GEEDR

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Dominican Republic		Distrito Nacional, Santo Domingo, San Cristóbal, Santiago, La Vega, Puerto Plata, Duarte and San Pedro de Macón			These are priority areas where interventions will take place.

I. STRATEGIC CONTEXT

A. Country Context

1. **Despite rapid growth over the past few decades, the Dominican Republic (DR) continues to experience high levels of poverty and inequality.** Between 1991 and 2014, the Dominican Gross Domestic Product (GDP) grew at an average annual rate of 5.3 percent, among the highest rates in Latin America and the Caribbean over the period, which led to sustained convergence in GDP with the rest of the region. GDP growth is projected to remain strong in 2015 (5 percent) and 2016 (4.7 percent). This sustained growth, however, did not translate into a reduction of poverty: in 2013, 41 percent of the country's population was living in moderate poverty, up from 32 percent in 2000, and above the average in the region. Moreover, inequality as measured by the Gini coefficient decreased from 0.51 in 2000 to 0.48 in 2010, a reduction equivalent to about half of that experienced across the region.

B. Sectorial and Institutional Context

2. **The energy sector is a critical engine for growth in the DR but important challenges remain despite the many reforms the sector has undergone.** The most important challenges include: (a) high levels of losses due to theft of electricity and low quality of distribution networks, (b) unreliability of service, (c) high cost of energy production due to the composition of the electricity generation matrix, (d) weak governance framework, (e) inefficient targeting of subsidies and (f) high vulnerability to external shocks (natural disasters and price of oil). Losses in the energy sector are above the Latin America and Caribbean (LAC) average, ranging between 30 to 36 percent of the energy served by the distribution companies. In spite of the reduction of blackouts, power outages are still six times higher than the regional average and energy costs are high. The cost of energy is also influenced by an inefficient energy matrix that relies heavily on expensive fuel oil costs. The governance of the sector has undergone several transformations but the reforms have been undermined by low levels of transparency and accountability.

3. **The DR's 1,875 MW electricity market comprises separate generation, transmission, and distribution companies.** Privately owned generation capacity accounts for 67 percent of the country's total installed capacity (2,800MW) with the remainder being public-private and solely public companies. Most of the electricity is generated using fuel oil (37.2 percent) and natural gas (30.9 percent). The remainder comes from coal (14.3 percent), hydro (13.2 percent) and wind (4.4 percent). The Electricity Transmission Company (ETED) is the public company in charge of electricity transmission, and there are three state-owned regional distribution companies (EDE Norte, EDE Sur, and EDE Este). The Corporation of Dominican State Electricity Companies (*Corporación Dominicana de Empresas Eléctricas Estatales* CDEEE) is the public holding company that coordinates these power companies. The Market Coordinator (OC-SENI) controls the contract and spot market, and the Superintendence of Energy (SIE) regulates the sector, including service quality and tariffs. The National Energy Commission (CNE) is responsible for energy planning and policy-making.

4. **A crucial factor in the performance of the Dominican electricity sector has been the governance of state-owned utilities.** To address the problems in the sector, reforms were implemented through unbundling and the adoption of a new Electricity Law in 2001. In the 1990's, the state owned Dominican Electricity Corporation (CDE) was unbundled into two

generation companies and three regional distribution companies (EDEs). The EDEs were originally privatized, but then sold back to the Government in 2009 because of their poor financial situation. More than half of the clients of the EDEs are not metered, and losses come primarily from unbilled energy rather than unpaid energy bills. In some neighborhoods where unbilled energy was due to theft, electricity has had to be cut back for whole neighborhoods. Each EDE controls about a third of the total market of electricity users. All three EDEs are financially unsustainable due to a combination of electricity retail tariffs set below cost recovery levels, high technical and commercial losses, and poor revenue collection. In addition, governance deficiencies remain. Recommendations for improvements were made in the Governance Study carried out by the World Bank in 2015¹. Significant potential for governance improvements lies in the enhancement of management processes at CDEEE and EDEs.

5. The Government has had to subsidize the power sector deficit to keep the EDEs afloat and enable them to pay ETED and the generators. The power sector deficit is a result of not adjusting tariffs to cover rising fuel costs, as well as due to poor commercial performance and high losses by the EDEs. The deficit has grown from US\$700 million in 2010 to US\$1.3 billion in 2014, about 2 percent of the country's GDP. This situation hinders the country's economic competitiveness and growth and electricity is considered the biggest obstacle to doing business². In 2009, the Government developed a comprehensive Power Sector Action Plan with support from the World Bank, the Inter-American Development Bank (IDB), and the International Monetary Fund (IMF) to implement needed reforms to achieve financial sustainability of the sector and address its structural problems. The Government implemented this intensive reform program from 2009-2012 and made significant progress such as: (i) investment to reduce technical and commercial losses in distribution networks; (ii) eliminating the Blackout Reduction Program (BRP) geographic subsidy and replacing it with the pro-poor targeted subsidy program for residential customers; (iii) replacing the management teams of the EDEs; (iv) designing and implementing new measures to enhance transparency and cost reductions; and (v) making tariff adjustments in 2009, 2010, and 2011 (resulting in tariff increases of 12.5 percent, 11 percent, and 8 percent, respectively).

6. Under the current administration, CDEEE developed a new Strategic Electricity Sector Plan (2013-2016) which focuses on three key pillars: (a) Modification of the Generation Matrix; (b) Loss Reduction; and (c) Management Efficiency. Since 2012, the Government has prioritized the implementation of the first pillar, by a) signing a new contract with AES Corporation, a private power company, to install additional natural gas power generation capacity; and b) the construction of two new coal plants (384.9 MW each), which began in 2014 and are expected to enter into operation by 2017. The Government also passed a new Electricity Law to create a Ministry of Energy and Mining (MEM), although CDEEE will retain its current functions to complete the actions under the Plan. CDEEE is now beginning to work on the second pillar, which was originally meant to achieve a 10.4 percent reduction in distribution losses (from 35.6 percent in 2013 to 25.2 percent in 2016). CDEEE has since reduced its loss reduction goal to a more achievable 6 percent due to insufficient funds to carry out all planned loss reduction measures. To achieve this goal, CDEEE has developed the

¹ World Bank (2015). Working Document on Governance of CDEEE/EDEs for consideration in the preparation of the proposed project for the rehabilitation of the distribution grid.

² World Bank Group Enterprise Survey (2010)

following investment plan: (a) rehabilitation of networks and installation of meters for existing clients and for those with illegal connections; (b) remote metering and macro metering program; (c) community outreach activities; (d) improvement of commercial management and infrastructure; and (e) institutional strengthening.

7. The Government issued a Presidential Decree to convene stakeholders to begin preparation of an Electricity Pact intended to achieve a broader political consensus on essential power sector reforms. The ‘Electricity Pact Initiative’ officially launched by the Government in January 2015, intends to achieve a broader political consensus on essential power sector reforms among stakeholders. CDEEE conducted a series of consultations with the major stakeholders involved in the electricity sector, including public and private electricity companies and business and industry groups, to determine the main topics to be included in the Electricity Pact. The agreed topics are: (a) Regulatory Framework; (b) Distribution; (c) Generation; (d) Transmission; (e) Finance and Tariffs; and (f) End-users and Non-regulated consumers. This Project is consistent with the topics proposed by CDEEE.

8. Based on the unaudited financial statements for 2014, the three EDEs continue to incur substantial operating losses. These losses arise from a combination of: (a) electricity sales tariffs that are substantially below full cost recovery levels; (b) high levels of technical and commercial losses; and (c) poor revenue collection performance. A summary of the key financial indicators for the three EDEs is provided in Schedule 5.2(c) of Annex 5. These indicators show that all three EDEs have substantial operating cash gaps as indicated by the Cash Recovery Index (CRI). Despite some gradual improvements in recent years, the CRI³ for all three EDEs remain significantly low and need to be improved. In the absence of realistic tariff increases, the distribution system is likely to increase without bound. As cash recovery improves with strengthened distribution systems and improved commercial management, it will be important to monitor and enhance overall operational efficiency in the EDEs so that the enhanced cash recovery can significantly reduce subsidies.

C. Rationale for the Bank’s Involvement

9. The World Bank has been involved in the DR electricity sector for over a decade, including the successful implementation of the following projects: (a) The Programmatic Power Sector Reform Loan-P082715 (US\$100 million); (b) the Energy Sector TA Loan-P0082712 (US\$7.3 million) and (c) from 2008-2013 an Electricity Distribution Rehabilitation Project-P089866 (US\$42 million) to focus on accelerating the EDEs’ efforts and prior successes under the ‘24 Hours of Light Program’ (Annex 7). The latest project’s achievements against its development objectives were: Average Service Availability Index (ASAI) above average for all three EDEs. While CRI targets at the EDEs level were not met due to the limited scope of the Project, they were still 14-28 percent above the original target levels in the rehabilitated distribution circuits.

10. It is important for the Bank to remain involved in the sector for the economic development of the country, given the high economic costs associated with an unreliable and poor electricity service and to complete this critical and challenging reform agenda. In addition, lessons learned from the Bank’s involvement include: (a) the crucial importance of

³ See definition in Annex 1.

citizen engagement and community participation to break the vicious cycles of poor recoveries and poor service delivery, and (b) the need to not just rehabilitate networks but convert users into clients and strengthen the commercial performance of the EDEs.

11. **The Project is part of the DR strategic ‘Distribution Grid Modernization and Electrical Losses Reduction Program’, which is supported by:** the World Bank (US\$120 million), the European Investment Bank (EIB) (US\$100 million), the IDB (US\$78 million); and the OPEC Fund for International Development (OFID) (US\$60 million). Details on contribution by international financial institutions (IFIs) are in Tables 4 to 6 of Annex 6. The overall objective of the Program is to reduce the levels of distribution system losses in the country from 32.1 percent to 25.2 percent in four years (2015-2020). The program has been designed by CDEEE to ensure complementary investments by development partners. Like the World Bank and because of the extent of the needs in the energy sector, other development partners will also provide support for rehabilitating priority distribution circuits in the EDEs, upgrading metering systems, social outreach efforts, and institutional strengthening. This will have a positive impact on the financial situation of the EDEs and increase the CRI by 25 percentage points on average in the rehabilitated circuits and thereby help reduce overall distribution system losses by an estimated 1.8 percent (Annex 6) out of a total of six percent all IFIs combined. In addition, the Project will improve the management of environmental waste generated by the rehabilitation works under this project. The World Bank-financed Project will be a stand-alone project.

12. **This Project is essential to help reduce commercial distribution systems losses in the DR to improve the financial situation of the EDEs, their ability to increase electricity service availability, and to reduce ‘programmed blackouts’.** Although other IFIs are also engaged in the program, the World Bank-financed Project is imperative as the distribution loss reduction investment requirements are substantial, estimated to be approximately US\$800 million. The Project will not directly tackle tariff issues as the Government plans to first lower electricity costs through modifying the generation mix and reducing distribution losses before making tariff adjustments so that the required adjustments will be lower and, if accompanied by better service quality, will become more socially acceptable. However, SIE, the regulator is currently working on a tariff study with financial support from the IDB. In the context of this Project, SIE will undertake a complementary study to assess the following: (a) affordability of electricity for end-users; (b) distributional impacts of electricity tariff increase; (c) feasibility of lifeline tariffs; and (d) advantages and disadvantages of proposed subsidy mechanisms from the perspective of economic distortions, costs and targeting of poor households.

D. Higher Level Objectives to which the Project Contributes

13. **The investments to modernize the electricity distribution networks will help reduce unserved demand and improve service availability in the rehabilitated circuits, which serves around one million people, 41 percent of them low-income population and 51.4 percent women.** Improvement of service availability will reduce the need for expensive power self-supply and facilitate business activity, thus improving the long-term competitiveness of the Dominican economy and quality of life of end-users. Improved data quality through IT investments, formulation of rolling five year business plans, and independent annual financial audits consistent with international financial reporting standards will contribute to better internal management, reporting and corporate governance of the distribution companies.

14. **The Project is aligned with the country’s National Development Strategy for 2030 and with two of the main pillars of CDEEE’s Integral Electricity Sector Plan (2014-2017), (i.e. loss reduction and management efficiency).** The Project is consistent with the Electricity Pact and is aligned with the World Bank’s Energy Sector Directions Paper⁴, and in particular its objective to support client countries in securing affordable, reliable, and sustainable energy supply needed to end poverty and promote shared prosperity. It is also consistent with the objective of the Sustainable Energy for All Initiative to be achieved by 2030 of doubling the global rate of improvement in energy efficiency.

15. **The Project is consistent with the World Bank Group Country Partnership Strategy (CPS) (Report No. 89551-DO) for Dominican Republic (FY 2015-2018), discussed by the Board of Executive Directors on September 25, 2014, which is designed to support the Government’s effort to make growth sustainable and more inclusive.** Specifically, activities under this Project are well aligned with the second strategic results area of the CPS, which focuses on improving access to efficient and reliable electrical distribution networks, ICT, and other infrastructure. A core outcome in this results area is to ensure improved efficiency and reliability of the electricity sector, measured among others by a reduction of commercial losses.

II. PROJECT DEVELOPMENT OBJECTIVE

A. Project Development Objective

16. The Project Development Objective is to improve the financial viability of the electricity distribution companies (EDEs) by reducing energy losses and increasing revenue collections in the circuits rehabilitated under the Project and consequently increase the supply of electricity.

Project Beneficiaries

17. **The Project direct beneficiaries include:** (a) the EDEs, through the improvement in the commercial cycle (regular metering, billing, and collection), the recovery of business and operation performance, and better electricity supply and service, which in turn increases customer satisfaction; (b) the Central Government and the Public Sector, which will benefit from a reduction of subsidies to the power sector; and (c) residential, commercial, and industrial users in the public and private sectors connected to the rehabilitated circuits, who will benefit from better electricity supply with less outages and prompt fault restoration, improvements in the voltage profiles and increase in the hours of availability of electricity. Finally, availability of electricity will benefit all inhabitants served by the circuits (see expected impacts by gender and age, in paragraph 16). The table below presents the breakdown of the type of end-users that will directly benefit from the Project, by EDE.

⁴ World Bank. 2013. Toward a sustainable energy future for all: directions for the World Bank Group’s energy sector. Washington DC ; World Bank

Table 1- EDE Beneficiaries by Type

Type of End-user	EDE Norte	EDE Sur	EDE Este	TOTAL
Day-time Education Centers	116	329	36	481
Night-time Education Centers	29	29	-	58
Hospitals and Health Centers	21	60	5	86
Private Clinics	27	85	5	117
National Police and Armed Forces	16	23	4	43
Fire Fighting Brigade	4	5	2	11
Pumping stations	1	66	15	82
Residential	36,615	133,010	18,169	187,794
Commercial	4,502	9,441	250	14,193
Industrial	113	597	20	730

18. **On the social side, primary beneficiaries are the inhabitants and businesses in the circuits that will be rehabilitated where 41 percent of the inhabitants in those circuits belong to the low socioeconomic strata of which 51.4 percent are women.** This percentage is higher in the circuits of EDE Este and EDE Norte. In comparison with the 2008-13 Electricity Distribution Rehabilitation Project, this Project will benefit more low socioeconomic strata population in EDE Este (51 percent) and EDE Norte (47 percent) (Annex 7). In all three EDEs 39.6 percent of the households are headed by females.

19. **Other indirect benefits of the Project are to include:** (a) increased productivity and commercial activity; (b) savings to end-users who no longer have to purchase alternative power generation (generators and/or small inverters/batteries) systems; (c) an increase in the value of the land where electricity supply and public lighting is available; (d) reduction in expenses for repairs of equipment damaged by voltage drops/fluctuations; (e) declining levels of environmental contamination by lead resulting from reduction in the use of batteries following the increase in the hours of power supply; (f) reduction of environmental pollution levels due to better environmental management of Project residues and the use of diesel or gasoline generators; and (g) reduction in night time crime rate and increase in public safety which benefits mainly women.

PDO Level Results Indicators

20. **Achievement of the PDO would be monitored through the following key PDO indicators:** (a) Increase of Cash Recovery Index (CRI) at the rehabilitated circuits of each EDE; and (b) Increase of the Average Service Availability Index (ASAI) in the rehabilitated circuits.

III. PROJECT DESCRIPTION

A. Project Components

21. The Project comprises four components.

22. **Component 1: Rehabilitation of Selected Distribution Circuits and Upgrading of Metering Systems and Implementation of Environmental Management System for the EDEs (US \$103.63 million).** This component will support investments to rehabilitate circuits

selected by each EDE. Investments include: 1.1. Grid rehabilitation and modernization. (i.e. replacement of obsolete and overloaded Medium Voltage (MV) and Low Voltage (LV) overhead power lines and transformers, installation of anti-theft MV and LV network, installation of high multiple meter boxes and individual meters with remote metering and switching to existing and newly regularized unmetered end-users). 1.2 Macro and Micro metering systems and loss reduction monitoring (i.e. supply and installation of macro-metering equipment in mid-voltage branches and micro-metering in distribution transformers to better track and monitor power flows, overloads, energy balances, and commercial losses in the distribution grids). 1.3 Smart Grid Remote Metering Systems (i.e. supply and installation of remote metering with remote switching - disconnection and reconnection - systems as needed for end-users in low voltage residential and commercial circuits); and 1.4 Environmental Management System (development and implementation of an environmental management system and upgraded systems for monitoring and management of residue sites for the EDEs and CDEEE, following international best practices for hazardous waste management).

23. Component 2: Citizen Engagement and Community Participation. (US\$ 4.56 million). This component will implement a Social Management Strategy (SMS) aiming at restoring the confidence between users and EDEs, increase cash collection levels, and use electricity efficiently and safely. Through the implementation of the SMS, leaders and communities will be informed about the modernization of the networks, and will be invited to actively participate. Social Compacts will be signed between the EDEs and the communities to reflect agreements reached on the number of hours of electricity that the EDEs will deliver per day and the legalization of illegal users and payment of the electricity bills by the clients. Communities will be trained on the safe and efficient use of electricity, and their rights and duties as regular clients of the EDEs. All the activities of the SMS will be implemented with a differential approach based on gender and age (see details in Annex 2). Each EDE has a Social Management Unit and a team to implement the Strategy in each circuit to be rehabilitated, in accordance with the criteria set forth in the Project Operational Manual. The component will finance the activities related and resources needed for the implementation and evaluation of the Strategy. This evaluation includes pre and post Customer Service Satisfaction Surveys.

24. Component 3: Commercial Management & Project Management, Monitoring and Evaluation of the Distribution Grid Modernization and Electrical Losses Reduction Program (US\$ 11.16 million). This component will finance: 3.1 Commercial Management. Small works to refurbish and upgrade existing offices and provision of technical assistance to monitor the business cycle (meter reading, billing, collection and claims follow-up) in the intervened circuits. 3.2 IT platform for CDEEE and the EDEs, and Forecasting and Demand Analysis. Integrate corporate IT systems between CDEEE and EDEs through the acquisition and installation of fiber optic cable, other information technology (hardware and software) to support demand forecasting and analysis, and setup a Data Center at CDEEE. 3.3 Institutional Strengthening and Coordination, Monitoring of the Distribution Grid Modernization and Electrical Losses Reduction Program: (a) provision of technical advisory services to CDEEE and EDEs in the areas of project management, monitoring and evaluation, including: institutional analyses, preparation of policies and guidelines, development of information systems, communication, procurement, and financial management; and (b) support to the EDEs to develop financial accounting reports in accordance with best international financial reporting

standards (IFRS). Significant potential for governance improvements recommended in the World Bank Governance Study⁵ lies in the improvement of management process at CDEEE/EDEs through enhancement IT systems.

25. **Component 4: Complementary Tariff Study (US\$350,000).** The Electricity Market Regulator (SIE) is currently undertaking a Tariff Study (funded under a grant from IDB) to assess and update the levels of the current electricity tariffs in terms of cost-recovery. This component will finance a complementary study (to be completed by 2017) to weigh the social implications of the changes in the tariff rates and recommend mitigation measures and glide-path implementation of the tariff levels proposed in the ongoing Tariff Study supported by the IDB.

26. The IBRD Loan of US\$120 million will be implemented in five (5) years.

Table 2: Project Cost and Financing

Project Components	Project Cost (US\$)	IBRD Financing	Financing %
Component 1. Rehabilitation of Selected Distribution Circuits and Upgrading of Metering Systems - Implementation of Environmental Management Plan.	103,630,000	103,630,000	100%
Component 2. Citizen Engagement and Community Participation.	4,560,000	4,560,000	100%
Component 3. Commercial Management and Project Management, Monitoring and Evaluation of the Distribution Grid Modernization and Electrical Losses Reduction Program.	11,160,000	11,160,000	100%
Component 4. Complementary Tariff Study.	350,000	350,000	100%
Total Project Costs	119,700,000	119,700,000	100%
Front End Fee	300,000	300,000	100%
Total Financing Required	120,000,000	120,000,000	100%

B. Lessons Learned and Reflected in the Project Design

27. **The Project draws upon lessons learned from the first Loan (Electricity Distribution Rehabilitation Project P089866 (US\$42 million), approved in 2008).** The following key lessons have been reflected in the design of this Project: (a) *Commercial Management:* The need to complement distribution rehabilitation with support for improved commercial management, so as to convert users into regular clients. This Project incorporates a new commercial management component and the need to strengthen systems to monitor commercial performance. (b) *Contracts:* There will be better correlation between payment/deliverables to ensure contractors' commitment from start through completion instead of 80% upon shipment, plus a down payment of 10%; i.e. about 90% of contract payment before start of installation works; (c) *Contracts for Social Management Coordinators:* The national labor law No. 16-92 in the Dominican Republic requires that contracts of more than three-month duration include benefits and compensation in addition to salary. Contracts for this Project will include such benefits; (d) *Social:* The design of the 'Outreach to Community' component was innovative in that it demonstrated the effectiveness of participatory (citizen engagement) approaches to establishing trust between the consumers and Distribution Companies to increase consumers' willingness to pay. The 'Social Management

⁵World Bank (2015). Working Document on Governance of CDEEE/EDEs for consideration in the preparation of the proposed project for the grid rehabilitation of the distribution grid.

Strategy’ was an innovative and unique experience in the country and included ‘the design of the 24 Hours of Light Program.’ However, the strategy was short of the following: (i) information to communities on the country’s power sector and training on reading and understanding energy bills; (ii) conflict management with neighboring communities not included in rehabilitation works; and (iii) management of power outages during the construction of works. The ‘Community Outreach’ and ‘Social Management Strategy’ components will be included and enhanced in this project (Annex 7); (e) *Social and Environmental Safeguards*: The Project will ensure the application of preventive and mitigation measures during construction of works and the remediation of contaminated storages sites. It will improve supervision of works and maintain the integration of social and environmental requirements into contract design and project implementation; (f) *Implementation Structure*: The EDEs will replicate the implementation arrangements of the CDEEE (PIU) i.e. a management team will be dedicated for implementation activities of the Project in each EDE; (g) *Monitoring*: The Project incorporates adequate implementation monitoring and evaluation systems and capabilities. Project indicators will be measured at the circuit level for meaningful results.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

28. **CDEEE will be in charge of implementation of Components 1, 2 and 3 of the Project.** The Bank has assessed the implementation structure of CDEEE. The Project Implementation Unit (PIU) staff is qualified and has gained experience from implementation of previous Bank-financed projects. Furthermore, CDEEE is also responsible for implementing projects in the sector from other IFIs and it has the capacity to take on this new project. CDEEE has also been training its staff, as well as staff in the EDEs, in Project Management and is enhancing its overall structure. The EDEs are each setting up their own Project Management Units (PMU) to enable them to cope with the increase in activities from other IFIs and to implement this Project. Since the environmental aspects were not very well supervised before, CDEEE has agreed to set up and staff an environmental unit in the PIU to strengthen supervision of environmental aspects of the Project. SIE will be the implementing agency for Component 4 and a fiduciary assessment of SIE has been completed and recommendations were made to address the weaknesses identified.

B. Results Monitoring and Evaluation

29. **CDEEE and the EDEs will monitor progress against the agreed performance indicators in Annex 1.** CDEEE and the EDEs have already implemented systems for providing timely information set up under the previous Electricity Distribution Rehabilitation Project (P089866). CDEEE will provide consolidated reports on a quarterly basis on the project’s implementation progress in the Bank’s IFR format.

C. Sustainability

30. **This Project is building on the success of the previous Electricity Distribution Rehabilitation Project (P089866), and is part of a sector-wide approach to address the long-standing issues affecting the electricity sector. It is recognized that issues affecting the sector include:** (a) generation operating costs; (b) distribution losses; (c) tariffs; and (d)

management of the EDEs. The Government is addressing generation costs through different means. This Project addresses improvements of distribution losses, and management of the EDEs and analysis of social impacts.

V. KEY RISKS AND MITIGATION MEASURES

A. Overall Risk Rating and Explanation of Key Risks

31. **The overall risk rating for the proposed Project is Moderate. Even with upcoming Presidential Elections schedule for May 2016, it is not foreseen that political, governance, macroeconomic or sectorial risks could negatively impact the achievement of the Project Development Objective.** The need for reform and investments in the energy sector is recognized across the political spectrum in the DR. Nevertheless, to mitigate the governance risk, IT investments as well as management information systems, including a data center will be built for sharing information between CDEEE and EDEs to increase transparency and accountability. Institutional capacity for implementation and sustainability risk is rated Substantial as technical capacity to manage a large number of contracts, in terms of administrative monitoring and technical oversight, needs to be strengthened. To mitigate this risk, the Bank will work with CDEEE and EDEs to ensure that staff mobilized to reinforce project implementation units continue to receive adequate training to upgrade their management and technical skills. It is also envisioned that a coordinated effort among donors, in their implementation support to the project, will further enhance institutional capacity and thereby contribute to the sustainability of project interventions.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

32. **Economic and Financial Analysis.** Despite improvements from the earlier World Bank and IDB financed projects, the financial situation of all three distribution companies continues to deteriorate due to annual cash operating deficits that have resulted in negative net worth. The electricity sector is critically important to the economy and to the welfare of the population, and consequently it is vitally important that the distribution companies are strengthened to reduce energy losses, improve liquidity and become self-sustaining in the medium to long-term.

33. **Quantifiable economic and financial benefits arising from the Project comprise:** (a) a reduction in technical losses estimated at about 12 percent of power supplied, to about 10 percent as a result of the physical rehabilitation under the project. Absent an import price parity, these gains are valued at the long run marginal cost of energy⁶; (b) a reduction of 23 percent in non-technical losses that result from both theft and unmetered connections⁷; and (c) increased supply of energy as the cost recovery index is improved resulting in an increase in incremental sales of about 10 percent due to upgrading of the Project circuits to category A (service of 24

⁶ Long-run marginal cost was derived from an evaluation of the two Punta Catalina thermal power plants (TPPs), which are currently under construction by the government;

⁷ While much of these economic benefits are transfer payments (in cost/benefit terminology) from the consumers to the EDEs, there will be a reduction in demand by consumers at least 20 percent, which has been valued at the avoided cost of the EDEs' power purchases.

hours per day). The benefit arising from this is the net avoided cost to consumers of using backup generators and other vastly more costly forms of energy. Based on detailed financial and economic projections at the company and Project level, the investment is viable and estimated to yield the following financial and economic returns and net present value at a 10 percent discount rate. Details are presented in Annex 5.

	Economic	Financial
Net Present Value ¹	DOP\$1.129 million	DOP\$3,367 million
IRR	16.4%	27.5 %

34. **Project Sensitivity.** An analysis of the switching values indicate that the estimates of the EIRR, FIRR and their respective NPVs are robust and remain acceptable over a wide range of adverse changes in underlying parameters as demonstrated in schedule 5.3 (Annex 5).

35. **Financial Performance of Distribution Companies.** The consolidated financial status and projected performance of the EDEs is set out in detail in Annex 5 and summarized below. The lack of sufficient cash flow has severely affected the ability of the EDEs to adequately rehabilitate and maintain their existing assets in order to deliver acceptable levels of services to their end-users. This in turn has undermined their willingness to pay. As a result of accumulating annual losses, the three EDEs have a consolidated negative net worth estimated at about DOP\$96 billion (US\$2.1 billion) as at the end of 2014. The Government has had to allocate large subsidies, through CDEEE, to cover the EDEs’ operating deficits and enable them to purchase electricity from the private generators. In addition, the EDEs have financed their losses by increasing their accounts payable to the private generators and to CDEEE for the energy that is purchased through them. As of the end of 2014, the EDEs accounts payable totaled about DOP\$ 188.3 billion (USD2.6 billion).

36. **The Bank-financed Project is expected to reduce total energy losses in the rehabilitated circuits by 25 percent or 196.5 GWh per annum on average and increase the consolidated profits and cash flow of the EDEs by DOP\$1.7 billion per annum before incremental O&M and income tax. As set out in Schedule 5.3 (Annex 5).** These highly positive benefits are enhanced proportionately by the complementary investments proposed by the OFID, IDB and EIB. There will be coordination among partners led by CDEEE. The Government of the Dominican Republic (GoDR) has demonstrated its commitment to ensuring the financial viability of the EDEs. The scope of this support is estimated to be about DOP\$51.2 billion (US\$1.1 billion) per/annum. Despite the commissioning of the lower cost Punta Catalina TPP in 2017 and the positive impact of the project, it is apparent that, absent further loss reduction and adjustment in retail tariffs, significant support from the government will be required for the foreseeable future. This support can be reduced and eliminated by a moderate annual increase in tariffs over the next four to five years. This in turn would alleviate the pressure on the national budget, reduce the fiscal risk arising from the current state of the energy sector, place the sector on a more self-sustaining trajectory and to become more competitive in an open market. Bank support is a necessary, but insufficient step to turn around the sector; more will need to be done to put the sector on a self-sustaining trajectory.

37. **Financial Provisions.** Proposed financial provisions include: (a) CDEEE and EDEs to submit to the Bank a copy of their audited financial statements in a timely fashion and in a

manner acceptable to the Bank; and (b) by end April of each year the EDEs will prepare a rolling five-year business plan, including operating assumptions and projected financial statements, which the Bank will review and provide comments only, but not clear nor approve the business plan.

B. Technical

38. **CDEEE and the EDEs have gained experience from implementing the previous project. All key PIU staff from the Electricity Distribution Rehabilitation Project (P089866) will continue on this project.** CDEEE has strengthened the previous team with additional units and staff. This Project incorporates lessons learned from the first Project on commercial performance management, project management, procurement, environmental safeguards, and fiduciary management. Furthermore, the implementation arrangements at the three EDEs has been strengthened with additional well qualified teams for this Project to do design engineering, planning, and implementation of the investments. CDEEE will coordinate with the EDEs to ensure that resources, experiences and methodologies acquired from the previous Project continue to be used. The equipment and technologies for implementation and operation of Component 1 of the Project are commercially proven, have been widely used by utilities in developed and developing countries worldwide, and will be implemented according to internationally accepted technical standards and practices. During project preparation, the feasibility studies and reports for the identified investments were reviewed and field visits undertaken. The Bank is satisfied with the technical standards and criteria proposed for this project. The Bank has evaluated all technical and other aspects of this Project and is confident that the arrangements in place are adequate.

C. Financial Management

39. **The Bank carried out a Financial Management (FM) assessment of the CDEEE as fiduciary entity and overall coordinator for this Project.** The PIU of the CDEEE, which already has the required capacity and experience for implementing the World Bank-financed and other IFI operations, will handle fiduciary tasks for the Project for Components 1, 2, and 3. Its FM department is adequately staffed, and there are appropriate systems and controls in place. Overall FM arrangements for the Project, including organization and staffing, planning and budgeting, accounting and reporting, internal controls-including internal audit and funds flow, and external audit, are assessed as satisfactory. Therefore, based on the results of this assessment, working knowledge and the entity's track record, the Bank's conclusion is that the CDEEE has adequate capacity to carry out the FM tasks envisaged under this Project. SIE will be the implementing agency for Component 4 and there are a few actions the entity will have to take to strengthen its FM capability prior to processing disbursement: (a) designation of two FM officers to handle these aspects for the Project; (b) installation of the FM information system for recording and reporting on Project transactions; (c) training of the designated staff on the Bank's FM and disbursement guidelines and procedures; and (d) installation of the FM automated system for the country (UEPEX), and the corresponding training. This component will be audited for the period(s) under implementation. Quarterly unaudited financial reports will have to be submitted to the Bank, 45 days after the reporting period. The external audit will be performed by an independent audit firm, and its final audit report will be submitted to the Bank not later than four months after the audited period. The SIE will not open a Bank account for this

Component, and methods of disbursement will be direct payment and reimbursement through Statement of Expenditures (SOEs).

D. Procurement

40. **The CDEEE will be responsible for project coordination and execution, through its PIU, for all aspects of the Project except for the tariff study (Component 4).** An assessment of the procurement capacity of the PIU in the CDEEE was completed in May 2014, using the Procurement Risk Assessment and Management System (P-RAMS); its capacity was found acceptable to carry out procurement under the Project. EDEs will have a technical role in the preparation of bidding documents, participation in the evaluation committees, and supervising the implementation of the Project. Given the scope of the Project and the existing workload of the PIU and EDEs, both will be strengthened with additional procurement specialists and technical support. The procurement for the Project will be carried out in accordance with the World Bank ‘Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers’, dated January 2011 (Procurement Guidelines), revised on July 2014, and ‘Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers January 2011, revised on July 2014 (Consultant Guidelines)’ and in addition to the provisions stipulated in the Loan Agreement. The World Bank Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credit and Grants dated October 15, 2006, and revised on January 2011, will also apply. Detailed procurement arrangements and a summary of the procurement plan are in Annex 3. Reasonable operating costs for incremental expenses incurred on account of Project implementation will be financed under components 2, 3 and 4. SIE will be the implementing agency for Component 4. An evaluation of the capacity of the SIE to carry out procurement activities under Component 4 was conducted. Since SIE has no prior experience in Bank’s procurement, therefore, an experienced Procurement Specialist to provide support for the activities of this Component should be hired.

E. Social (including Safeguards)

41. **Regarding the safeguards policies, the Project does not trigger any social safeguard policies.** There is no involuntary resettlement, as technical works include grid rehabilitation and metering which do not require land acquisition. The availability of electricity 24 hours per day has a positive impact on the beneficiaries of the Project, as described in Annex 7. Therefore, this Project will contribute to improving the living conditions of households, business owners, and poor people. Focus groups were conducted with beneficiaries of the previous Project in November 2013 to identify specific issues related to gender and age. Women reported that they did not face any barriers or constraints on having access to the benefits of the project. Some positive impacts based on gender and age were identified: women can plan their housework better, which allows them to have more time for rest and leisure, and they can engage in other activities; and business owners can have their businesses open for extended hours, which increases productivity, sales and economic gains. Young people can spend more time at home (mainly boys) for studying and doing homework, and have ‘potential’ access to internet. All participants in the focus groups, regardless of gender and age, indicated that their quality of life improved. All stakeholders with a large majority being women highlighted the improvement in public safety due to lighting in public places.

F. Environment (including Safeguards)

42. **Environment Category and Proposed Works.** Based on the proposed activities, the Project was classified as B and the Environmental Safeguards Policies triggered are OP 4.01, OP 4.04, and OP 4.11. The sub-projects (circuits) are the investments which will be implemented by the three EDEs under Component 1 (US\$103.6 million), and include rehabilitation of MV and LV distribution circuits in targeted areas (18 circuits for the three EDEs representing the change of about 1,003 km. of cables, 3,401 transformers, 15,000 street lights) and the installation of metering systems (approximately 138,153 meters). The works will be mainly in the right of ways of the distribution lines and will not involve the construction of new distribution lines, only the rehabilitation (replacement of existing power lines and related equipment) of existing distribution lines and the installation of new meter systems. In case of other circuits not evaluated in the EIA of this project, the CDEEE and EDEs will evaluate potential impacts and apply the mitigation, prevention and compensation measures included in the Environmental Management Plan (EMP). No subproject or project activity that is considered as Category A under the Bank's definition would be eligible for financing from this project. During the EIA, it was found that the majority of circuits and planned works areas are located in urban areas and some in rural areas.

43. **Potential environmental impact of the project activities will be related mainly to the rehabilitation works of distribution power lines and include:** generation of electrical waste (e.g. old poles, transformers, insulators, cable lines, street lights, meters, and other related electrical equipment to be replaced), generation of hazardous electrical waste (e.g. old transformers, oils, cables, etc.), cutting of trees, perforations of sidewalks, interruption of electricity service to local communities during works, safety issues to manage contingencies (accidents, explosions), effects on normal traffic and access to project sites, among others. The positive impacts of this project include: (a) increased productivity and commercial activity; (b) savings to end-users who no longer have to purchase alternative power generation (generators and/or small inverters/batteries) systems; (c) declining levels of environmental contamination by lead resulting from reduction in the use of batteries following the increase in the hours of power supply; (d) reduction of environmental pollution levels due to better environmental management of Project residues and the use of diesel or gasoline generators.

44. **Environmental Management.** \$2.4 million have been earmarked under Component 1 to undertake the following activities (a) strengthen the environmental management of EDEs and CDEEE for project operations (especially management of electrical residues and safety procedures); (b) implement an environmental management system to improve environmental and safety performance of EDEs, reduce and mitigate impacts, hire environmental-safety staff, increase space for storage sites needed for the large amount of electrical residues (including some hazardous waste such as transformers potentially contaminated with PCB's) the works will produce, (c) increase coordination among EDEs and CDEEE, and (d) have training opportunities for the environment and safety staff. The Bank team visited several project sites, reviewed the environmental documentation and the instruments approved by the previous operation (P089866) and results of the EIA. On this basis, it was thus determined that CDEEE and the EDEs present different levels of capacities to handle environmental, health and safety issues. EDE Este supervises more health and safety aspects while EDE Norte and EDE Sur need to strengthen their safety procedures and staff. EDE Sur is the only EDE with one professional

environmental specialist. During preparation, it was agreed that in all EDEs an environmental-safety unit will be created responsible for environmental management.

45. **Consultation, Disclosure and Participation.** A draft EIA, which includes the EMP, was published on March 17, 2015 on the three EDEs and CDEEE websites and the World Bank Infoshop on March 18, 2015. Consultations of the Project and EIA were held at the end of March 2015, in two locations in the country. Stakeholders included: local communities within a proposed circuit to be rehabilitated by this project, representatives from the National Environmental Agency (Ministry of Environment), municipalites, contractors, EDEs, CDEEE. Representatives of the EDEs, and CDEEE explained the Project scope, objectives, possible construction impacts, mitigation measures, monitoring protocols and grievance mechanisms. Stakeholders support the Project and no major issues were raised. The final EIA has been reviewed by the Bank team, found acceptable and was published on Sept. 21, 2015, on the EDEs' and CDEEE websites and the World Bank Infoshop.

Other Safeguards Policies Triggered

46. **No other safeguards are triggered.** The GHG accounting requirement is not applicable to this Project because it does not add to the current GHG footprint of the DR power grid.

G. World Bank Grievance Redress

47. **Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the World Bank'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 World Bank'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/GRS>. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org. The EIA/EMP defines different grievance mechanisms during the construction period of works which include: inclusion of EDEs contact name and website in the project signs, use of social media tools for dissemination of project information and the project social strategy (Component 3) which will have a close contact will all Project beneficiaries and specific grievance mechanisms.

Annex 1: Results Framework and Monitoring

DOMINICAN REPUBLIC: Distribution Grid Modernization and Loss Reduction Project

Project Development Objective (PDO): The project development objectives is to improve the financial viability of the electricity distribution companies (EDEs) by reducing energy losses and increasing revenue collections in the circuits rehabilitated under the project and consequently increase the supply of electricity.												
PDO Level Results Indicators*	Core	Unit of Measure	Baseline 2015	Cumulative Target Values**					Frequency	Data Source/Method	Responsibility for Data Collection	Description (indicator definition etc.)
				YR1 2016	YR2 2017	YR3 2018	YR4 2019	YR5 2020				
Indicator One: Increase of Cash Recovery Index (CRI) at the rehabilitated circuits of each EDE.	□	%	59.0	59.0	69.9	80.3	83.3	83.6	Quarterly / Annual	CDEEE's reports	CDEEE	The index measures the percentage of cash collected from the portion of the energy invoiced to customers by the EDEs of the total energy purchased from the generating companies. In other words, this index correlates energy sales and cash collections.
Indicator Two: Increase of the Average Service Availability Index (ASAI) in the rehabilitated circuits.	□	%	71.3	71.3	84.2	91.3	95.9	95.9	Quarterly / Annual	CDEEE's reports	CDEEE	This is a reliability index that measures the duration of power supply/service interruptions per customer in the rehabilitated circuits as a percentage of the total number of

Project Development Objective (PDO): The project development objectives is to improve the financial viability of the electricity distribution companies (EDEs) by reducing energy losses and increasing revenue collections in the circuits rehabilitated under the project and consequently increase the supply of electricity.

PDO Level Results	Core	Unit of Measure	Baseline	Cumulative Target Values**					Frequency	Data Source/Method	Responsibility for Data	Description (indicator)
												hours in a year.
INTERMEDIATE RESULTS												
Intermediate Result (Component One): Rehabilitation of Selected Distribution Circuits and Upgrading of Metering Systems. Implementation of Environmental Management System.												
<i>Intermediate Result indicator One:</i> Increase of the Energy Recovery Index (ERI) at the rehabilitated circuits of each EDE.	<input type="checkbox"/>	%	58.7	58.7	69.6	79.8	82.9	83.1	Quarterly / Annual	CDEEE's reports	CDEEE	This index measures the amount of energy remunerated as a percentage of the energy supplied to the rehabilitated circuit. That is, it reflects the effectiveness with which the company is compensated for the energy supplied to end-users in an area.
<i>Intermediate Result indicator Two:</i> Number of kilometers of rehabilitated distribution lines in the selected	<input checked="" type="checkbox"/>	kms	0	55	442	929	1,003	1,003	Quarterly / Annual	CDEEE's reports, supervision missions	CDEEE	Kilometers of rehabilitated circuits refers to the linear distance of a circuit measured as per representation in the corresponding single-line electrical diagram.

Project Development Objective (PDO): The project development objectives is to improve the financial viability of the electricity distribution companies (EDEs) by reducing energy losses and increasing revenue collections in the circuits rehabilitated under the project and consequently increase the supply of electricity.

PDO Level Results	Core	Unit of Measure	Baseline	Cumulative Target Values**					Frequency	Data Source/Method	Responsibility for Data	Description (indicator)
circuits.												It is not a per-phase length representation.
<i>Intermediate Result indicator Three:</i> Number of 'remotely metered' clients in the rehabilitated circuits for each EDE.	<input type="checkbox"/>	Thousands of remotely-metered clients	0	4.6	59.5	128.2	138.1	138.1	Quarterly / Annual	CDEEE's reports, supervision missions	CDEEE	"Remotely metered" clients are those clients with installed smart grid technology meters that allows the EDEs to remotely measure their electricity consumption and, also, remotely connect/disconnect their power supply/service.
<i>Intermediate Result indicator Four:</i> Development of an integrated environmental management system among the 3 EDEs and CDEEE		Units	0	Evaluations prepared	System Developed	System Installed	1	1	Quarterly / Annual	CDEEE's reports, supervision missions	CDEEE	All EDES have different levels of experience to manage risks and impacts of environmental and safety aspects. IT system will be developed to improve management, reporting and supervision of works and

Project Development Objective (PDO): The project development objectives is to improve the financial viability of the electricity distribution companies (EDEs) by reducing energy losses and increasing revenue collections in the circuits rehabilitated under the project and consequently increase the supply of electricity.

PDO Level Results	Core	Unit of Measure	Baseline	Cumulative Target Values**					Frequency	Data Source/Method	Responsibility for Data	Description (indicator)
												environmental management.
Intermediate Result (Component Two): Citizen Engagement and community participation.												
<i>Intermediate Result indicator One:</i> Number of 'Social Compacts' signed with the communities (to assess Citizen Engagement and Community Participation).	<input type="checkbox"/>	Units	0	2	7	12	18	18	Annual	CDEEE's reports, supervision missions	CDEEE	Social compacts are signed agreements by which the community and the EDEs mutually agree on actions to be undertaken by each party to achieve specified goals.
Intermediate Result (Component Three): Commercial Management and Project Management, Monitoring and Evaluation of the Distribution Grid Modernization and Electrical Losses Reduction Program.												
<i>Intermediate Result indicator One:</i> Number of illegal users converted to legitimate paying clients.	<input type="checkbox"/>	Thousands of Illegal Users	0	2.4	31.6	68.1	73.55	73.55	Quarterly / Annual	CDEEE's reports, supervision missions*	CDEEE	Illegal users are service users not registered as customers/clients in the database of the EDEs databases at Loan approval.

Project Development Objective (PDO): The project development objectives is to improve the financial viability of the electricity distribution companies (EDEs) by reducing energy losses and increasing revenue collections in the circuits rehabilitated under the project and consequently increase the supply of electricity.

PDO Level Results	Core	Unit of Measure	Baseline	Cumulative Target Values**					Frequency	Data Source/Method	Responsibility for Data	Description (indicator)
<i>Intermediate Result indicator Two:</i> Installation of IT Data Center.	<input type="checkbox"/>	Units	0	Evaluations prepared	System Developed	System Developed	System Installed	1	Quarterly / Annual	CDEEE's reports, supervision missions	CDEEE	A data center is a facility that centralizes an organization's IT operations and equipment, and where it stores, manages, and disseminates its data.
Intermediate Result (Component Four): Complementary Tariff Study.												
<i>Intermediate Result indicator One:</i> Completion of Complementary Tariff Study.	<input type="checkbox"/>	Units	0	-	1	1	1	1	Annual	CDEEE's reports, supervision missions	CDEEE	Tariff Study to weigh the social implications of the changes in the tariff rates and recommend mitigation measures.

PDO INDICATORS

1. The indicators that will be monitored during project implementation and after investment completion are listed below. The calculation of the Indicators and the accuracy of input data and indicators measurements is responsibility of CDEEE.

I. CRI (Cash Recovery Index).

2. This index combines two important performance indicators: a) **invoiced energy losses** in percentage, which indicates the proportion of energy purchased from the generators that is not billed and b) the percentage of the **invoiced energy actually paid for**. The index can be calculated globally for the whole company, or for selected substations, circuits, or even segments of circuits. For monitoring and control purposes, the CRI shall be calculated using the data of the selected circuits for this project and will be calculated on a quarterly (three-monthly) basis. The equation for the calculation of the CRI is.

$$\text{CRI (\%)} = (1 - \text{P\%}) \times \text{C\%}$$

Where the inputs are:

- **P% = Losses** = $(\text{EI} - \text{EF}) / \text{EI}$
- **C% = Collection** = CE / FE
- **EI = Energía Inyectada (Supplied Energy in Wh)**. It is the energy that the company purchased from the generators to deliver it to End-users. For this project, data for the calculation will be directly obtained from metering systems available at the substations.
- **EF = Energía Facturada (Invoiced Energy in Wh)**. This refers to the net invoiced energy sales⁸ * as registered by the commercial Wh-meters. Data for each circuit will be obtained directly from the commercial system database.
- **CE = Cobro de Energía (Collection in RD\$)** This refers to all payments associated with energy sales⁹ * collected by the company.
- **FE = Facturación de Energía (Billing in RD\$)**. Energy supply invoices sent to Clients in those rehabilitated circuits by the rehabilitation project.

II. ASAI (Average Service Availability Index).

⁸ Net Energy is the result of the algebraic sum of the billing concepts, such as: consumed energy, Rebilling of energy, and estimated energy returns.

⁹ The monetary charges associated to energy sales are the following: Fixed charges, Energy sales, Capacity, Capacity Charges, Energy Consumption discounts, Credit Letters for rebilling, voltage transformation energy losses, reimbursements for energy estimates variance, billing adjustments, advanced payments.

3. This index refers to the fraction of time that a customer has received power during the defined reporting period. In other words, it represents how much of the time a customer actually has available service. The ASAI index is the ratio of total hours of service that was available for customers divided by the total customer hours demanded in a time period. The unit of ASAI is percent and is generally carried out to four decimal points. For purposes of monitoring and control, the CRI shall be calculated using the data of the selected circuits for this project and will be calculated on a quarterly (three-monthly) basis. The equation for the calculation of the ASAI is:

$$\text{ASAI (\%)} = 1 - \left(\frac{\text{SAIDI}}{\text{Horas del Período de Análisis}} \right)$$

Where the inputs are:

- **SAIDI** (System Average Interruption Duration Index) refers to the average interruptions duration for customers served during a specified time period measured in hours and is calculated as:

$$\text{SAIDI} = \frac{\sum U_i N_i}{N_T}$$

- Where N_i is the number of customers and U_i is the annual outage time for location i , and N_T is the total number of customers served. In other words,

$$\text{SAIDI} = \frac{\text{sum of all customer interruption durations}}{\text{total number of customers served}}$$

INTERMEDIATE INDICATORS

Component 1: Rehabilitation of Selected Distribution Circuits and Upgrading of Metering Systems and Implementation of the Environmental Management Systems for the EDEs.

- 1) Increase of the Energy Recovery Index (ERI) at the rehabilitated circuits of each EDE;
- 2) Number of kilometers of rehabilitated distribution lines in the selected circuits;
- 3) Number of ‘remotely metered’ clients in the rehabilitated circuits for each EDE; and
- 4) Development of an integrated environmental management system among the 3 EDEs and CDEEE.

Component 2: Citizen Engagement and Community Participation

- 5) Number of ‘Social Compacts’ signed with the communities to assess the Citizen Engagement and Community Participation.

Component 3: Commercial Management and Project Management, Monitoring and Evaluation of the Distribution Grid Modernization and Electrical Losses Program.

- 6) Number of illegal users converted to legitimate paying ‘clients’; and
- 7) Installation of IT Data Center.

Component 4: Complementary Tariff Study

- 8) Completion of Complementary Tariff Study.

4. **Energy Recovery Index (ERI).** This index measures the amount of energy remunerated as a percentage of the energy supplied to the circuit. That is, it reflects the effectiveness with which the company is compensated for the energy supplied to customers in an area. The equation for the calculation of the ERI is:

$$\text{ERI (\%)} = \frac{\text{EC}}{\text{EI}}$$

Where the inputs are:

- **EC = Energía Cobrada (Energy Paid in Wh).** It is the amount of net energy sales (as explained in the CRI index) paid for through the invoices issued to Clients.
- **EI = Energía Inyectada (Supplied Energy in Wh).** *As explained for the inputs of the CRI index.*

5. **Number of Kms of rehabilitated distribution lines:** This indicator refers to the length of rehabilitated portions of the distribution networks as described in the corresponding distribution networks single line electrical diagram, measured in kilometers. In other words, it refers to number of kms of conductors of a circuit represented through a line (i.e., a rectilinear illustration), regardless of the number of conductors (3-phase or 1-phase), primary or secondary circuits or both, or the voltage level (MV or LV).

6. **Number of Remotely Metered Clients in the rehabilitated circuits:** This indicator refers to the number of Clients that, as a result of project interventions, have been supplied with remote-metering technology to remotely measure their electricity consumption and also remotely connect/disconnect their power supply/service. The term remote-metering refers to smartgrid Automatic Meter Infrastructure (AMI) technology with remote utility management connection-disconnection facilities from the Control Centers of the EDEs.
7. **Integrated environmental management system:** IT system to improve management, reporting and supervision of works and environmental management.
8. **Social Compacts:** Social Compacts are signed agreements by which the community and the EDEs mutually agree on actions to be undertaken by each party to achieve specified goals.
9. **Number of illegal users converted to legitimate bill paying clients.**
10. **IT Data Center:** A data center is a facility that centralizes an organization's IT operations and equipment, and where it stores, manages, and disseminates its data. Data centers house a network's most critical systems and are vital to the continuity of daily operations.
11. **Complementary Tariff Study:** Completion of Tariff study to analyze the social implications of the changes in the tariff rates to provide recommendations on mitigation measures and glide-path implementation of tariff adjustments.

Annex 2: Detailed Project Description

DOMINICAN REPUBLIC: Distribution Grid Modernization and Loss Reduction Project

1. The prioritization of investment and areas to be rehabilitated was made based on these criteria: (a) density of clients and users in circuits with low level of commercial activity; (b) circuits with high levels of technical and commercial losses; (c) circuits with high demand growth profiles; (d) circuits with high failure rates; (e) diverse mix of social strata and income levels; and (f) opportunities for higher energy payment collection, high return on investment and reasonable payback period.

2. **Component 1: Rehabilitation of Selected Distribution Circuits and Upgrading of Metering Systems and Implementation of the Environmental Management Systems for the EDEs (US \$103.63 million).** This component will support investments to rehabilitate distribution circuits selected by each EDE. Investments include: (a) the supply and installation of remote metering and remote switching (disconnection and reconnection) systems for residential and commercial end-users in low voltage circuits; (b) the installation of anti-theft MV and LV network, high multiple meter boxes, and individual meters; (c) the replacement of obsolete and overloaded MV and LV overhead power lines and transformers; and (d) supply and installation of macro-metering equipment in mid-voltage branches. The cost estimates for the sub-components to be financed under this component are:

- a. **Grid rehabilitation and modernization (US \$ 73.71 million):** the investments include: the replacement of poles and corresponding crossing and insulators, the replacement of overloaded or obsolete MV and LV overhead power lines and post transformers, identification and eradication of illegal connections, installation of anti-theft feeding service drop lines, installation of meters boxes and meters with remote connection-disconnection systems, updating of corresponding customer databases.
- b. **Macro and Micro metering systems and loss reduction monitoring (US \$ 4.55 million):** This sub-component includes the supply and installation of macro-metering systems in branches of medium voltage circuits and of micro-metering in distribution pole transformers. The combination of both systems will facilitate the calculation of the energy balances to monitor and control commercial losses.
- c. **Smart Grid Remote Metering Systems (US \$ 22.95 million):** this entails: the supply and installation of remote metering with remote switching (disconnection and reconnection) systems as needed for end-users in low voltage residential and commercial circuits with relatively high electricity consumptions.
- d. **Implementation of Environmental Management System (US \$ 2.40 million):** This sub-component will finance the development of a management system that will allow CDEEE and the EDEs improve management of environmental issues, health, and occupational safety aspects, associated with the type of works to be financed and also better management of hazardous electrical waste in order to reduce environmental and social impacts in the project areas. The system will allow for better management of environmental and safety information of each circuit or subproject in each EDE and CDEEE, to enable follow-up on non-conformities from contractors. This subcomponent will also finance the construction of at least one additional warehouse per EDE to store and handle hazardous wastes (e.g. transformers) and other electrical

waste that the project activities will generate (meters, cables, street lamps, etc.). It will, also, cover training of the environmental and occupational safety teams of the 3 EDEs and CDEEE to enhance capacity and share knowledge to improve management and response to anticipated environmental issues.

Table 2.1: Breakdown of investments for Sub Component Implementation of Environmental Management System

ACTION	CDEEE	EDE Sur	EDE Norte	EDE Este	TOTAL
1. Environmental coordinator for the PMU (\$3000/month x 3 years).	\$108,000				\$108,000
2. Environmental specialist at each EDE (\$2000/month).		\$72,000	\$72,000	\$72,000	\$216,000
3. Two environmental technicians in each EDE (\$1000/month x 3 years).		\$72,000	\$72,000	\$72,000	\$216,000
4. Integrated management system for the standardization and processing of project environmental information.	\$400,000	-	-	-	\$400,000
5. At least two transfers of equipment contaminated with PCBs for treatment.		\$40,000	\$40,000	\$30,000	\$110,000
6. Development of a warehouse for collection of project waste and/or building a new green point.		\$150,000	\$150,000	\$150,000	\$ 450,000
7. Rehabilitation of an existing waste collection site.		\$50,000	\$50,000	\$50,000	\$150,000
8. Diagnosis and monitoring of the current state of water quality, ground, and air at the current collection sites, warehouses, and sites remediation.	\$150,000				\$150,000
9. Training of EDE staff on environmental management, handling of electrical waste, occupational safety and handling of toxic waste. Participation in national and international courses and/or conferences.	\$40,000 4 years	\$40,000 4 years	\$40,000 4 years	\$40,000 4 years	\$160,000
10. Workshop on the project environmental management and occupational safety at the EDES, and annual meetings.	\$10,000	\$10,000	\$12,000	\$10,000	\$42,000
11. Hiring of auditors to support supervision and training.	\$30,000	\$50,000	\$50,000	\$50,000	\$180,000
12. Purchase of PCBs meters and analyzers and kits.		\$20,000	\$20,000	\$20,000	\$60,000
13. Field gear and outfit, tablets, equipment for the occupational safety and environmental management units.	\$20,000	\$20,000	\$20,000	\$20,000	\$80,000
14. One 4 x 4 vehicle for the PMU environmental unit at CDEEE.	\$25,000	\$25,000	\$25,000	\$25,000	\$100,000
TOTAL	\$783,000	\$549,000	\$551,000	\$539,000	\$2,422,000

3. The investment packages from Component 1, including the areas of intervention and the amounts to be financed by the Bank, are summarized below.

Table 2.2: Investments under Component 1 by EDE

UTILITY	Network Rehabilitation	Remote metering Costs	Macro and Micro Metering Costs	Environmental Management	TOTAL Costs
EDE Norte	\$23.60	\$12.07	\$0.25	\$0.42	\$36.34
EDE Sur	\$22.41	\$7.94	\$3.95	\$0.42	\$34.72
EDE Este	\$27.69	\$2.94	\$0.34	\$0.78	\$31.75
CDEEE				\$0.78	\$0.78
TOTAL	\$73.71	\$ 22.95	\$ 4.55	\$2.42	\$ 103.6

4. **Component 2: Citizen Engagement and Community Participation (US\$ 4.56 million)**. This component will implement a Social Management Strategy (SMS) aiming at restoring the confidence between users and EDEs, increase cash collection levels, and use electricity efficiently and safely. Through the implementation of the SMS, leaders and communities will be informed about the modernization of the networks, and will be invited to actively participate. Social Compacts will be signed between the EDEs and the communities to reflect agreements reached on the number of hours of electricity that the EDEs will deliver per day and the legalization of illegal users and payment of the electricity bills by the clients. Communities will be trained on the safe and efficient use of electricity, and their rights and duties as regular clients of the EDEs. All the activities of the SMS will be implemented with a differential approach based on gender and age (see details in Annex 2). Each EDE has a Social Management Unit and a team to implement the Strategy in each circuit to be rehabilitated. The component will finance the activities related and resources needed for the implementation and evaluation of the Strategy. This evaluation includes pre and post Customer Service Satisfaction Surveys.

5. The estimated cost breakdown of the above activities is as follows:

- a. Community Engagement Activities (US \$ 1.20 million)
- b. Communication Campaigns and dissemination materials (US \$ 0.67 million)
- c. Social Management Equipment (US \$ 0.46 million)
- d. Training and Capacity building (US \$ 0.14 million)
- e. Consulting Services (US \$ 2.08 million)

6. The Social Management Strategy that will be implemented in the circuits to be rehabilitated consists of seven stages. Through the implementation of the first four stages, leaders and communities will be informed about the modernization of the works in the network, and will be organized to participate actively in the implementation of the Project. In the third stage, Social Compacts will be signed between the EDEs and the communities to reflect. The Social Management Strategy is summarized in Table 3 below.

Table 2.3: Summary of Social Management Strategy

Social Management Strategy		
Stage	Activities	
1	Identification of technical, commercial and social characteristics of the circuits to be rehabilitated.	Identification of the neighborhoods of the circuits to be rehabilitated and their administrative organization. Identification of the areas that will not be covered in the rehabilitation program, and formulation of a management strategy for those areas.
		Identification of number of users, consumers, clients, level of cash recovery and electricity losses.

Social Management Strategy	
Stage	Activities
	Identification of community leaders and organizations.
2	Information and community organization for formulating and implementing the Distribution Grid Modernization and Loss Reduction Project.
	Introduction of the Social Management Team and the Distribution Grid Modernization and Loss Reduction Project to local authorities and community organizations.
	SWOT analysis regarding the perception of the electrical service in the communities.
	Dissemination of the Distribution Grid Modernization and Loss Reduction Project at individual and community levels.
	Creation of the Monitoring and Community Liaison Committees (<i>Comités de Seguimiento y Enlace –COSE-</i>) in the different sectors of the circuits.
3	Diagnosis of the socioeconomic characteristics of the neighborhoods.
	Baseline study about the socioeconomic characteristics of the neighborhoods involved.
	Participatory assessment of the status of the power distribution grids, public light, and connections.
	Participatory evaluation of the electricity delivered, Electricity measured and cash recovery.
	Classification of sectors according to the level of payment.
	Customer Service Satisfaction Survey
3	Diagnosis of the current status of the electrical service and other energy sources.
4	Participatory formulation of the Distribution Grid Modernization and Loss Reduction Project.
	Validation of findings of the diagnosis from the community organizations.
	Consensus among stakeholders, leaders, and community authorities regarding the content and scope of the Distribution Grid Modernization and Loss Reduction Project.
	Dissemination of the content and scope of the Distribution Grid Modernization and Loss Reduction Project to communities.
	Creation of grievance redresses and conflict resolution mechanisms.
	Agreements regarding the hours of energy to be delivered and the levels of customers' payments.
5	Implementation of the Distribution Grid Modernization and Loss Reduction Project.
	Community training on the following topics:
	<ul style="list-style-type: none"> • Legalization of electricity users. • Regularization of end-users in default. • Cash recovery campaigns.
	Power distribution infrastructure improvement works (power transformers, distribution grids, street light poles), support to the Environmental Unit in managing the social impacts of these works.
	Dissemination of activities carried out and results.
	Implementation of social solidarity activities to improve communities' living conditions (health, solid waste management, sports, recreation, etc.).
	Customer Service Satisfaction Survey
6	Monitoring and evaluation.
	Participatory monitoring of fulfillment of Social Compact (<i>Pacto Social</i>).
	Follow up on quality of service and level of payment.
	Evaluation of the 'Distribution Grid Modernization and Loss Reduction Project.
	Accountability reports from EDEs and communities

		Social Management Strategy
Stage	Activities	
7	Follow up of Social Compacts and maintenance of achievements reached	Joint monitoring with the technical areas of electricity delivered and payments collected.
		Participatory monitoring of fulfillment of Social Compact (<i>Pacto Social</i>).
		Support to the Commercial Offices activities with their activities on legalization of users and cash recovery campaigns.
		Ongoing training activities.
		Accountability reports.
		Community forums.
		Exchange of experience among EDEs and communities.

7. **Component 3: Commercial Management and Project Management, Monitoring and Evaluation of the Distribution Grid Modernization and Electrical Losses Program. (US\$ 11.16 million).** This component includes: consulting services to improve the commercial management of the EDEs; integration of the corporate IT systems of CDEEE and the EDEs to improve corporate processes; and strengthening of the coordination and monitoring of the rehabilitation projects. The integration of commercial, financial and accounting systems and standardization of reporting per recommendations of the Governance Study by the World Bank¹⁰, will help establish transparent processes for procurement of goods and services linked to the planning goals, facilitate quality business data to top management and market regulator, and access to real time operational information (Details of the Loss Reduction Program are in Annex 6).

8. The estimated cost breakdown for this component is as follows:

- a. **Commercial Management (\$3.61 million divided as follows: EDE Norte \$ 1.31 million; EDE Sur \$1.26 million and EDE Este \$1.04 million):** this entails: new offices, upgrading of existing offices, hiring staff to monitor the business cycle (meter reading, billing, collection and claims follow-up) in the intervened circuits.
- b. **IT platform for CDEEE and the EDEs, and Forecasting and Demand Analysis (US \$ 4.75 million):** this includes: development of the holding's communication structure supported by fiber optic and owned by CDEEE to guarantee safe communication channels. The goal is to develop a private IT cloud for CDEEE and the companies in the holding. Set up a new DATA CENTER.
- c. **Institutional Strengthening and Coordination and Monitoring of the Distribution Grid Modernization and Electrical Losses Program (US\$2.8 million):** will finance consulting services to: (a) assist the EDEs for the supervision and operational reception of the infrastructure investments funded under the project, (b) monitor the evolution of the technical and commercial indicators for the circuits rehabilitated under the Project as well as for the entire Program, (c) monitor the effective and perceived quality of electricity service for the circuits rehabilitated under the Project as well as for the entire Program, (d) support to the EDEs to develop financial

¹⁰ World Bank (2015). Working Document on Governance of CDEEE/EDEs for consideration in the preparation of the proposed project for the rehabilitation of the distribution grid.

statements according to international financial reporting standards (IFRS), and (e) strengthen the institutional capacity of the Project’s implementing entity.

9. Table 4 below summarizes the investments:

Table 2.4: Breakdown of investments

Project Management	Cost in US \$
Commercial Management	\$ 3,610,000.00
• Mobile Offices	\$ 464,444.11
• Upgrading of existing offices	\$ 205,080.69
• Type A Commercial Offices	\$ 200,000.00
• Type B Commercial Offices	\$ 300,000.00
• Hiring of Business performance and Client portfolio management teams	\$ 1,778,000.20
• Materials (service line drops, meter boxes, meters, panels, etc.	\$ 650,475.00
• Rotation Shift Management System	\$ 12,000
IT platform for CDEEE and the EDEs, and Forecasting and Demand Analysis	\$ 4,750,000
Institutional Strengthening and Coordination and Monitoring of the Distribution Rehabilitation Program	2,800,000\$
• Project Financial Audits	\$ 250,000
• Project Technical Audits	\$ 900,000
• Institutional Strengthening of the EDEs and CDEEE	\$ 710,000
• Specialist for technical design of the project Bid Documents for construction contracts	\$ 15,000
• Specialist for legal management of good and construction contracts and consulting	\$ 40,000
• Construction Supervision Vehicles (2 UEP, 6 EDEs)	\$ 300,000
• IT equipment	\$ 80,750
• Capacity Building	\$ 296,000
• Operating expenses	\$ 208,250
TOTAL	\$ 11,160,000.00

10. **Component 4: Complementary Tariff Study (US\$ 350,000):** The Electricity Market Regulator (SIE) is currently undertaking a Tariff Study (a grant from IDB) to assess and update the levels of the current electricity tariffs in terms of cost-recovery. This component will finance a complementary study to weigh the social implications of the changes in the tariff rates and recommend mitigation measures and glide-path implementation of the tariff levels proposed in the ongoing Tariff Study supported by the IDB. More specifically, the Study will:

- a. Assess affordability of electricity for end-users based on share of electricity expenditures from total household expenditures;
- b. Assess distribution including poverty, impacts of electricity tariff increase;
- c. Provide recommendations on social impact mitigation through existing benefit programs;
- d. Assess the feasibility of lifeline tariffs;
- e. Provide overview of advantages/disadvantages of proposed subsidy mechanisms from perspective of economic distortions, costs, targeting (how well subsidy targets the poor households) and coverage (% of the poor receiving subsidy), etc.

Annex 3: Implementation Arrangements

DOMINICAN REPUBLIC: Distribution Grid Modernization and Loss Reduction Project (P147277)

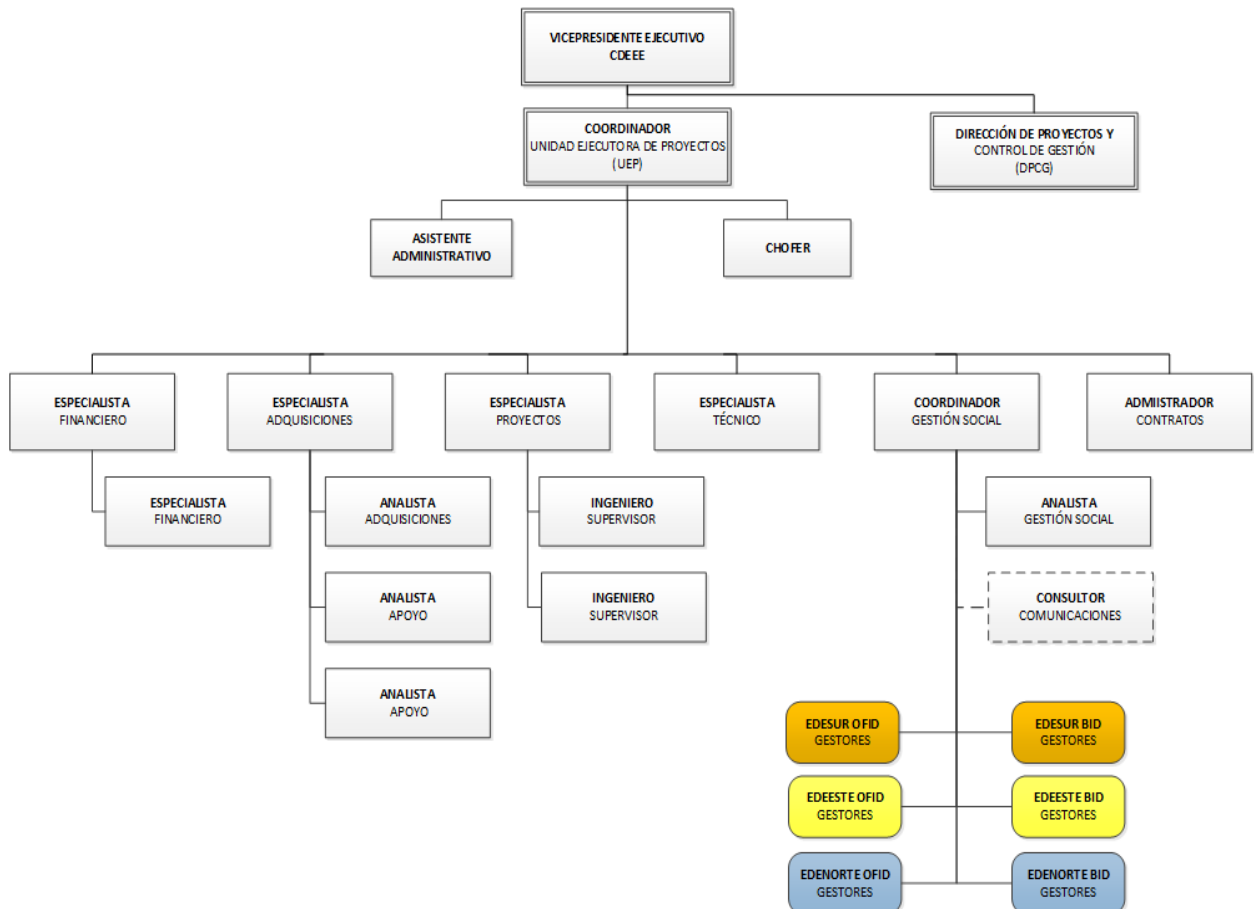
Project Institutional and Implementation Arrangements

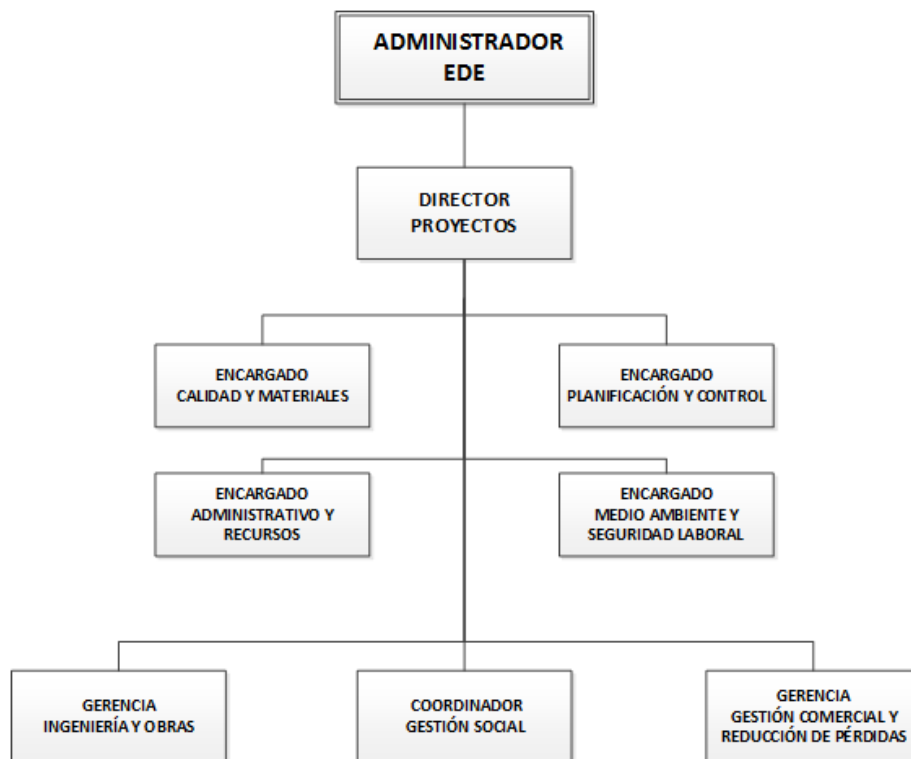
1. This Project is part of the Dominican Republic strategic Program to reduce energy losses in the distribution systems of the country’s electric utilities. As such, the Program is financed and supported by four IFIs, namely the World Bank, the EIB, the IDB, and OFID. The World Bank-financed project is a stand-alone project and has no financial contributions from the other IFIs.

Project administration mechanisms

2. The Project’s implementation builds on the experience of the recently closed Electricity Distribution Rehabilitation Project PO89866, which was financed by the World Bank. CDEEE will implement the project. The three EDEs will be directly responsible for planning, engineering and design of their sub-projects and will actively participate, in coordination with CDEEE, in procurement, supervision, contracts management and safeguards management. The organizational structure for the project is shown below:

Figure 3.2: EDEs Project Management





3. The Bankhas assessed the implementation structure of CDEEE. The PIU staff are well qualified and have gained experience from completed and ongoing projects. Furthermore, CDEEE is also responsible for implementing the projects of other IFIs in the sector, and therefore has the capacity to take on this new project. CDEEE has also been training its staff, as well as staff in the EDEs, in Project Management skills, and is enhancing the project overall structure with project management units (PMUs) in the EDEs to enable them cope with the increased workload. The only area identified where CDEEE needs strengthening is in the environmental management and supervision of works by the EDEs. An environmental management unit will be formed similar to that of the existing social unit. Each EDE has its own structure in place (PMUs) to manage its sub-projects.

4. EDE Sur has modified its structure for implementing its sub-projects with an overall project manager responsible for issues of each circuit. The team will be responsible for both commercial and technical aspects. In terms of staffing, a team working on a circuit with 8 percent losses consists of one Project Manager, three Supervisors and 18 employees. The performance of the project manager is closely monitored and there is a risk of losing the job if the target set is not achieved.

5. EDE Norte has a different approach in managing its sub-projects, as it assigns itself ‘polygons’ of areas, which includes partial circuits, rather than full circuits. While Ede Norte follows a project cycle from inception to closure, when addressing issues, it does not assign a specific project manager for each subproject. Instead, managers are assigned by sectors and phases of the project. There are five sectors, each sector has one manager, and the project is moved from one sector manager to the next upon completion of a sector in the cycle. Each

sector covers between 15-20,000 connections. Currently Ede Norte is fully staffed for all ongoing work, but will need to hire additional staff for the implementation of this project.

6. EDE Este's organization to implement the projects is similar to that of Ede Sur, in that it is a modular system, where each subproject has its own project coordinator. Each coordinator manages up to four circuits. Currently there are three teams in operation to cover works being undertaken by OFID and the IDB, and thus additional 'modules' would need to be added to implement the Bank's project.

7. An assessment of SIE was carried out and recommendations were made to address the weaknesses identified.

Responsibilities of Parties Involved in the Project

8. The main functions and responsibilities of CDEEE and the EDEs are listed below:

9. **CDEEE:** (a) CDEEE will be the Bank's main counterpart for the implementation of the project, and the Project Coordinator will be located in CDEEE. CDEEE will also be responsible for updating of the Project Operations Manual, with support from the EDEs, as well as preparing and updating, the project procurement plan based on information provided by the EDEs; (b) CDEEE will also be responsible for fiduciary aspects of the project and for preparing all procurement documents and processes in coordination with the EDEs and will be the entity responsible for signing contracts, while the EDEs will be responsible for overseeing contract implementation. CDEEE will also prepare all required progress reports for the project, including those for financial management, procurement, and environmental safeguards.

10. **Electricity Distribution Companies (EDEs):** (a) The EDEs will be responsible for the preparation of their specific detailed budget, economic evaluations, engineering and design, and technical specifications for their sub-projects. They will provide specific information for the preparation of the bidding packages (e.g. technical and environmental specifications) and the procurement plan, and will participate in specific bid evaluations and recommendations for award of contracts for the supply of goods, works and services; (b) While CDEEE will be responsible for the overall procurement, the EDEs will supervise the construction and supply contracts for installation of electrical facilities, civil works and other project investments. Furthermore, they will be responsible for approval of construction and supply certificates but CDEEE will be responsible for payment and for approval of final acceptance certificates for works, goods, and consulting services. EDEs will be responsible for the environmental supervision of the project activities, compliance with safeguards policies and the agreed EIA/EMP.

Financial Management, Disbursements and Procurement

Financial Management

11. This US\$120 million Project will be implemented over a five-year period. Overall coordination and implementation will be the responsibility of the CDEEE's Project Implementation Unit (PIU), including assuming all fiduciary responsibilities. The technical assistance in Component 4 for the US\$350,000 tariff study will be implemented by the

Superintendence of Electricity (SIE) by 2017. The CDEEE is an autonomous entity created by Law 125-01, promulgated in July 2001. Its regulations were approved in June 2002. EDE Sur, EDE Norte, and EDE Este are governmental entities privatized as part of the reform process, General Law of Public Enterprises Reform, 141-97 promulgated in 1997 and later on repurchased from Union Fenosa in 2003.

12. Details of other FM considerations, including flow of funds, were agreed upon with CDEEE/PIU. The operation will be implemented by the PIU of the CDEEE given its experience¹¹ in handling of projects financed by International Financial Institutions (IFIs), including Bank-financed operations. Correspondingly, except for the audit to be performed by external audit firms, although harmonizing with other IFIs, no ring-fencing is required for FM with the Project following the Bank's preferred approach of strengthening and using country systems wherever appropriate and feasible. The results of this assessment were discussed with the entity's officials.

13. The frequency of interim Project Financial Reports will be semi-annual, and should be submitted to the Bank 45 days after the end of the reporting period. The project financial audit will be carried out annually and should be submitted four (4) months after the end of the fiscal year. The EDEs will be required to submit audited financial statements to the Bank yearly, for review. The EDEs will also have to provide 5-year rolling Business Plans to the Bank yearly for review. The project will have two segregated accounts: (a) a designated account in the Central Bank of the DR denominated in US dollars (US\$) for the proceeds of the World Bank Loan; and (b) an operating account at the Reserves Bank (BANRESERVAS) denominated in local currency (Dominican pesos -DOP\$) for the PIU. Methods of disbursement will be advance, reimbursement and direct payment. Statement of Expenses (SOEs) will be used to document disbursement.

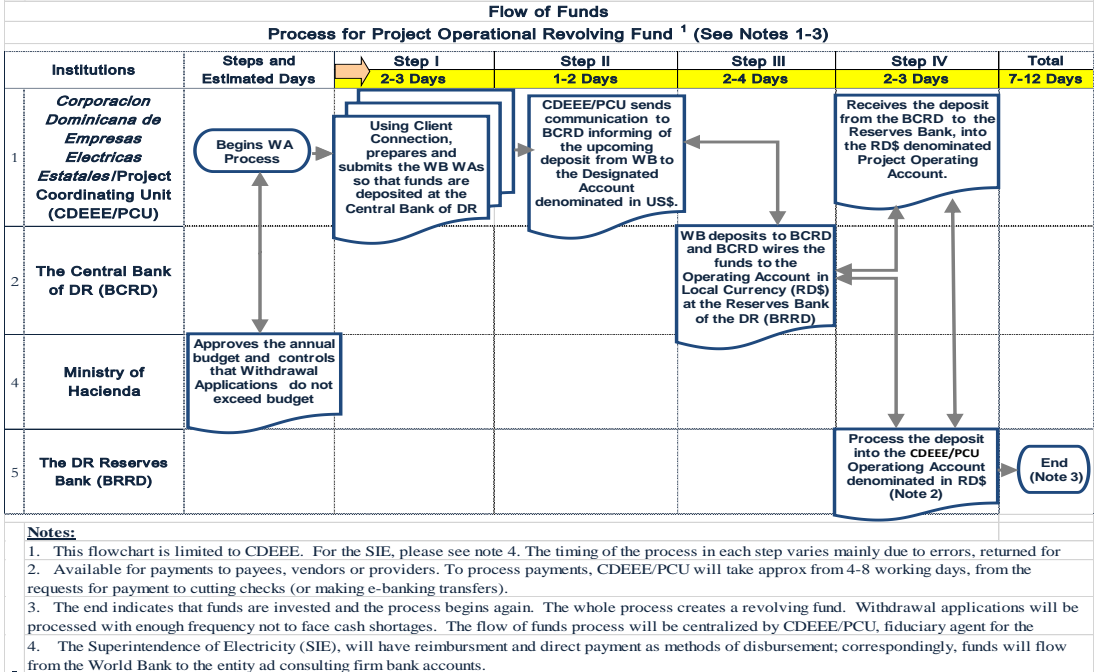
14. The CDEEE/PIU will follow established financial management (FM) procedures, which will be included in the Project Operations Manual. For country specific laws and regulations, the Project will follow those that are applicable, including:

- a. The CDEEE and SIE FM Manuals, which includes the entity's internal control system;
- b. DR Government Financial Guidelines;
- c. Ethics Code for public employees;
- d. DR Law 340 on Public Procurement;
- e. DR laws on taxes and duties, paying attention to exemptions applicable to programs and projects with external sources of funds;
- f. Organizational functions and roles;
- g. DR Access to Information Law, which is in line with Bank policy.

¹¹ The project currently managed by CDEEE is the US\$100 Million DO Emergency Recovery and Disaster Management, US\$80 Million for the original Project and US\$20 Million for an Additional Financing (P109932). It is co-implemented by the National Institute of Hydraulic Resources (*Instituto Nacional de Recursos Hidráulicos - INDRHI*), and its Completion Date is set for December 2015, Other projects recently implemented by CDEEE/PIU are the US\$100 Million Programmatic Power Sector Reform Loan (P082715); the US\$7.3 Million Energy Sector Technical Assistance (TA) Loan (P0082712); and the US\$42 Million DO Electricity Distribution Rehabilitation Project (P089866).

15. Overall, project financial management arrangements are highlighted below:

- a. The CDEEE PIU is staffed with seasoned FM professionals with experience in handling operations financed by IFIs and will be the sole entity coordinating all FM functions for component 1, 2 and 3 of the project. SIE will be responsible for component 4.
- b. As activities under the project increase, the CDEEE and the Bank may agree on additional FM staff in order to support incremental workload.
- c. The flow of funds is presented schematically below:



- d. The CDEEE/PIU will open two segregate accounts: (i) a Designated Account denominated in US Dollar (US\$) at the Central Bank of the Dominican Republic to process Bank proceeds; and (ii) an Operating Account denominated in Dominican Pesos (DOP\$) to process payments in local currency.

16. In the case of the Superintendence of Electricity (SIE), it has in place a financial management department with seasoned accounting professionals. Although this entity does not have experience in handling projects financed by IFIs, the FM staff will be trained on World Bank FM and disbursement matters customized for the component.

17. The SIE will coordinate with the Ministry of Hacienda to install the sub-system for implementing entities with external resources, a requirement for DR implementing entities. The staff designated for the Project will also be trained to handle the automated system. Unaudited Financial Reports will be submitted to the Bank semiannually, not later than 45 days after the reporting period.

18. The Project will be audited annually by an external audit firm, including this Component, and will be submitted to the Bank not later than 4 months after the audited period.

Disbursements

19. The proposed flow of funds will rely as much as possible on DR country system. The CDEEE/PIU will have a segregated Designated Account (DA) opened in US dollars at the Central Bank of Dominican Republic with a fixed ceiling of US\$2 million for advances.

20. The CDEEE will use Advance, Reimbursement, and Direct Payment as disbursement methods. The Minimum Application Size with respect of Reimbursements and Direct Payments will be equivalent to US\$100,000. Applications documenting expenditures paid from the DA should be submitted by the Borrower quarterly and must include reconciled bank statements, Statement of Expenditures Reports.

21. Methods of disbursement for SIE's Component will be Direct Payment and Reimbursement with full documentation, except for operating costs, prepared and submitted to the Bank with Statement of Expenditures (SOEs), as there would not be large amount of transactions. Therefore, there would not be a need to open a Designated Account for Component 4. No Counterpart Contribution is needed as the Loan will be 100 percent IBRD financed.

Financial Management Risks

22. Careful attention should be given to situations which may pose risks to project activities, including fiduciary, such as the following:

- a. Cash shortages may occur due to insufficient budget allocation as the entities receive their budget allocation when it is approved in the Annual Budget Laws. Limited fiscal availability has impacted budget allocations to Bank portfolio in the past few years. The Project teams in both entities will be proactive in timely defining of the Annual Operating Plan and will follow-up with high relevant officers.
- b. Inter-institutional coordination among public entities needed for the Project may add complexity as unique talents and soft skills needed are not always easily available in the public sector in DR. The CDEEE/PIU has demonstrated coordinating capacity beyond technical functions, formalizing fiduciary roles, communication protocols and coordination mechanisms in inter-institutional agreements signed prior to effectiveness, among the various entities intervening in the project. These agreements will broadly define entities' roles and responsibilities throughout the FM cycle, among other key areas. Furthermore, the Operations Manual to be adopted will incorporate a dedicated section for FM processes and procedures, to be validated by all Project key actors prior to its adoption.

23. The following measures were agreed as FM risk-mitigation and monitoring tools to complement FM arrangements, to be included in the Loan Agreement, the Disbursement Letter and the Operations Manual.

24. The scope of the Bank risk-based FM implementation support missions, with a frequency set as one per year, will be comprehensive, including training on Project specific FM considerations during the start-up phase, and full on-site visit plus desk reviews thereafter.
25. Period of reporting was set as quarterly, to be delivered 45 days after the reporting period, and the annual independent project audit, four (4) months after the audited period.
26. Disbursements processed by both entities will be made according to certified Statement of Expenditures (SOEs). Full documentation in support of SOEs will be retained by the implementing agency for at least two years after the World Bank has received the audit report for the fiscal year in which the last withdrawal was made. This information will be made available for review during supervision by World Bank and for annual audits, which will be required to specifically comment on SOE disbursements and the quality of the associated record-keeping.
27. To adhere to DR Law on Access to Information (Law number 200-04), annual audit reports will be posted on the entities' webpage www.cdeee.gov.do and www.sie.gob.do. Audit reports will also be sent to the Supreme Audit Institution (the Chamber of Accounts), to be publicly displayed at the SAI's website www.camaradecuentas.gob.do and for monitoring purposes. The audit report will also be classified as public in the Bank systems to comply with the Bank's Access to Information policy.

Procurement

28. Procurement will be carried out in accordance with the World Bank 'Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits and Grants, January 2011, revised July 2014', and 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers January 2011, revised July 2014' in addition to the provisions stipulated in the Legal Agreement. The various items under different expenditure categories are described below. For each contract to be financed by the Loan, the different procurement methods or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame are agreed between the Government of the Dominican Republic and the Bank in the Procurement Plan. There will be operating costs for components 2, 3 and 4. The Procurement Plan will be updated at least annually or as required to reflect the actual Project implementation needs and improvements in institutional capacity. The procurement procedures and standard bidding documents (SBDs) to be used for each procurement method, as well as model contracts are posted on the web site worldbank.org.

Procurement Arrangement

29. Procurement of Works, Goods and Non-Consulting services will be carried out based on ICB, NCB, Shopping and Direct Contracting procedures, as detailed below. Selection of Consultants will be carried out according to the following methods. Quality and Cost Base Selection (QCBS), Quality Based Selection (QBS), Least Cost Selection (LCS), Selection based on Consultants Qualifications (CQ), Single Source Selection (SS) and contracts with Individual Consultants (IC). Thresholds for procurement methods are provided in Table 2 below and in the Procurement Plan.

a. Procurement of Works. Works procured under this Project will be carried out using the Bank's SBD for all International Competitive Bidding (ICB) and National Bidding Documents and Shopping (Request for Quotations) documents satisfactory to the Bank. Further, depending on the cost estimate, procurement through Shopping (S) will be carried out through comparison of at least three quotations.

b. Procurement of Goods and Non-consulting Services (NCS). The larger procurement activity under the Project is related to the rehabilitation of power distribution grids under Component 1. Procurement of Goods and Non Consulting Services related to this Component would include the supply of all material needed to complete the work and will be procured through ICB or NCB as required. For large contracts, procurement will be carried out following International Competitive Bidding procedures (ICB) and using the Bank's Standard Bidding Documents (SBDs). All NCB will be carried out as per National SBD agreed with or satisfactory to the Bank. For other Goods, depending on the cost estimate, procurement will be carried through Shopping (NS), i.e., through comparison of at least three quotations.

c. Selection of Consultants. Consulting services under this Project would include: technical assistance and capacity building. The World Bank's Standard Request for Proposals will be used. The applicable selection methods will be as follows: Quality and Cost Based Selection (QCBS) method will be the preferred method for a majority of consulting assignments depending on the size and complexity of the assignments. Other procurement methods may be used as follows: Quality Based Selection (QBS) method will be used for specialized assignment where cost considerations are of less importance and costs are also not expected to differ substantially between consulting firms; Selection based on Consultants Qualifications (CQ) may be used for contracts estimated to cost less than US\$300,000 equivalent; Single Source Selection (SS) may be used in exceptional cases as per provisions of the Guidelines and with prior Bank approval. Contracts with individual consultants (IC) may be used for services where teams of personnel are not required and where the qualification and experience of the individual consultant are the paramount requirements. Short lists of consultants for services estimated to cost less than US\$500,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. All Single Source Selection (SS) will have to be agreed with the Bank prior to selection. For where it is expected that a large number of individual consultants will be contracted, the approach to be used is Service Delivery Contractors as per paragraph 3.21 of the Consultant Guidelines. The methodology will be described in the Operations Manual and

TORs including qualifications, contract models as well as the first two contracts for each EDE will be subject to prior review.

30. **Procurement Assessment.** The World Bank completed a capacity assessment of the CDEEE to implement procurement actions for the proposed Project in line with the P-RAMS Module. As EDEs have a role in contract administration, the assessment was extended to them as well. The risk assessment of the EDEs and ratings are based on the application of a toolkit assessing 8 categories. The following is a summary of the findings:

31. **Assessment at Country Level.** The latest Country Procurement Assessment Report (CPAR) for the Dominican Republic was published in April 2005. Since then the country passed Law 340-06 for Public Procurement of Goods, Works, Services and Concessions, approved in August 2006 and later modified by Law 449-06. This law is the first to comprehensively include all aspects of procurement of goods, works, services, the selection of consultants and concessions in the country, while also attempting to increase competition and transparency by allowing direct contracting only for limited circumstances specifically detailed in the law. Another important milestone in the procurement reform was the passing of Decree No. 490-07 that provided the enabling regulations for the new procurement law and the launching of the procurement portal “*compras dominicana*.” However, in practice, Law 340-06 is not being fully implemented and there is the need for considerably more transparency and efficiency in the system. The new administration that took office on August 16, 2012 has placed procurement reform in the center of the transparency agenda. The Bank is supporting the *Dirección General de Contrataciones Públicas* (DGCP) together with other donors in procurement reform; nevertheless, there are still important challenges ahead in order to improve the quality of public expenditures in the country as mentioned above.

32. **Assessment at Project Level.** An assessment of the procurement capacity of the CDEEE was completed in May 2014 using the P-RAMS. CDEEE has successfully implemented World Bank, IDB, and OFID projects. The current PIU has been in charge of the implementation of these projects and will implement this new operation. Both CDEEE and the EDEs have the capacity to implement and supervise the Project. However, there are risks related to the capacity of CDEEE and EDEs to carry out the large number of contracts under the Project (16). The number of service delivery contractors (gestores) will also be higher than in the previous project. As CDEEE carries out the bidding and pays contractors for the construction services while the three distribution companies supervise and certify the works, the Bank extended the fiduciary review to the three distribution companies in order to assess their capacity in contract administration. The overall risk in procurement processing was determined to be ‘Moderate’. On the other hand, the risk in contract administration and supervision of the contracts was determined to be ‘Substantial.’ An assessment was carried out for SIE, the implementing agency, for Component 4. The mitigation measures proposed include:

Table 3.1: Component 4 Risk Mitigation Measures

Risk	Rating	Mitigation	Rating
Procurement and contract management	Substantial	Both CDEEE and the EDEs have set up new support structures for Project implementation including	Moderate

capacity relative to the increase in workload under this project.		procurement. The project will recruit additional procurement staff, based on TORs, CVs acceptable to the Bank. Furthermore, the project will hire a supervision firm to supervise the works.	
Contracting incentives skewed towards the supply of goods rather than towards installation.	Moderate	Better correlation between payment/deliverables to ensure Contractors commitment throughout the project to completion.	Moderate
Lack of adequate planning.	Moderate	Update of the Procurement Plan to cover the first 18 months of the project.	Low
Insufficient guidance to staff on procurement guidelines and procedures.	Moderate	Preparation of an operations manual with a specific chapter on procurement detailing all the procedures and channels of responsibilities and flow of documentation.	Low
New staff understanding of Bank procurement policies.	Substantial	Training in procurement and contract management (project workshop) will be provided by the Bank to the PIU and technical staff as soon as the project is declared effective. Further training to be provided during implementation	Moderate

Risk Ratings: H: High; S: Substantial; M: Moderate and L: Low

Table 3.2: Action Plan for Contract Administration

No	Activity	When	Why	Need
1.	New Bidding Documents	Before Effectiveness	CDEEE has used Bidding Documents for goods adapted to installation under IDB project and have used Supply and Install bidding/contracts with payment of goods upon arrival under previous Bank project.	Payment to contractors to be made on the basis of installation of construction units (i.e., poles with elements by polygons that can be energized quickly).
2.	Procurement arrangements of the Grid Modernization	Before Effectiveness	Procurement Plan	Define packages, circuits, payment polygons, and schedule for each EDE clearly.
3.	Qualification of contractors	In Bidding Document	Significant payments upon installation of construction units and in restricted locations no throughout the	Required financial capacity of the contractors shall be higher as import of goods will not be paid immediately and there are restrictions in the

				works schedule, industrial health, etc. ¹²
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33. A General Procurement Notice (GPN) will be published in the UN "Development Business" on-line and on a national newspaper of broad circulation. For ICB goods and services contracts and large-value consultants contracts (more than US\$200,000), Specific Procurement Notices would be advertised in the Development Business on -line and in the case of NCB on national newspapers of broad circulation.

34. **Procurement Plan.** A draft procurement plan for implementation of the proposed Project for the first 18 months, which provides the basis for procurement methods, has been developed and provided by the Borrower. It includes the Bank review requirements and thresholds. The Plan will be available at the offices of CDEEE and on the Bank’s external website. The plan will be published on the System “Sistema de Ejecución de Planes de Adquisiciones” (SEPA) at www.iniciativasepa.org within 30 days of the signature of the Loan Agreement. It will be updated in agreement with the Bank annually or as required to reflect the actual project implementation needs and the revised plan will be disclosed on this site.

35. **Frequency of Procurement Supervision.** Supervision of procurement would be carried out through prior review supplemented by implementation support missions with post review at least once a year.

36. Table 3.4: Summary of Procurement Plan.

Table 3.3: Summary of Procurement Plan-Procurement Arrangements and Schedule

¹² Experience suggests that a three-day Workshop balancing dissertations and case studies would trigger the interest of attendees to care about contract administration on a systematic fashion.

No.	Contract Type	Description of Contract	Estimated Cost (US\$)	Procurement Method	Review by Bank (Prior/Post)	Estimated date of award
SI.1.1						
	Goods	Rehabilitation of medium and low voltage circuits in the targeted areas (4 processes for 4	101,790,000	ICB	Prior	December 2016 April 2016
SI.3.1	Works	Works for the implementation of Data Center	1,200,000	NCB	Prior	January 4, 2017
B.3.1	Goods	Equipment for Data Center	3,550,000	ICB	Prior	February 18, 2017
C.1.8	Consulting Services	Supervision of Works	800,000	QCBSI	Prior	January 17, 2017
C.3.4	Consulting Services	Institutional Strengthening of EDEs and CDEEE	686,000	QCBSI	Prior	January 17, 2017
C.2.7	Consulting Services	Hiring of 95 Service Delivery Contractors for Social Management in the EDEs	1,742,722.48	Service Delivery Contractors	Prior The first two contracts for each EDE	

Table 3.4: Thresholds for Procurement Methods and Prior Review

Expenditure	Contract Value	Procurement	Contracts Subject to
	US \$ thousands		
1. Works	>7.5.	ICB	All
	350-7.5.	NCB	First contract
	<350	Shopping	First contract
2. Goods and Non Consulting Services			
	>1.0	ICB	All
	<100	Shopping	First contract
	Pursuant to 3.7 of the Procurement Guidelines	DC	All
3. Consulting Services			
3.A Firms	>300	QCBS	All

Expenditure	Contract Value	Procurement	Contracts Subject to
	<300	QCBS, QBS, FBS, LCS, CQ	First contract
	Pursuant to 3.8 of the Consultant Guidelines	SSS	All
3.D Individuals	>50	Comparison of 3 CV	First
	Regardless of Value	SSS	All

Note: ICB = International Competitive Bidding - NCB = National Competitive Bidding
 QCBS = Quality- and Cost-Based Selection - QBS = Quality-Based Selection
 FBS = Fixed Budget Selection - LCS = Least-Cost Selection
 CQS = Selection Based on Consultants' Qualifications

37. The Bank conducted an evaluation of the capacity of the SIE to carry out procurement activities under Component 4aration. SIE has a Procurement Department with experience in the local procurement procedures under Law 340-06, however, the institution has no prior experience in Bank's procurement. The Bank recommends that SIE hires an experienced Procurement Specialist to provide support in for the activities of this Component.

Environmental and Social (including Safeguards)

38. **Social.** The project does not trigger any social safeguard policy. There is no involuntary resettlement. Technical works include grid rehabilitation and metering which do not require land acquisition.

39. **Environmental Category and proposed works.** Based on the proposed activities for this project, the project was classified as B and the Environmental Safeguards Policies triggered are OP 4.01, OP 4.04 and OP 4.11. The subprojects, named Circuits, are investments to be implemented by the three EDEs under Component 1 (US\$103.7 million) and include: rehabilitation of medium and low voltage distribution circuits in targeted areas (about 33 circuits) for the three EDEs representing change of about 1,003 kms of cables, 3,401 transformers, 15,000 street lights) and the installation of metering systems (approximately 138,153 meters). The works will not involve construction of new electrical distribution or transmission lines, only the rehabilitation (replacement of existing power lines and related equipment) of distribution lines and installation of new meter systems, since illegal connections and energy losses are a major issue in the country.

40. In case of other circuits not evaluated in the prepared EIA for this operation, CDEEE and EDEs will evaluate the potential impacts and apply all measures, agreed actions and procedures included in the EIA and EMP. No subproject that is considered as Category A under the Bank's definition would be eligible for financing from this project. During EIA preparation it was found that the majority of circuits and planned works areas are located in urban and in some rural areas.

Table 3.5: Safeguard Policies Triggered by the Project

Safeguard Policies Triggered by the Project	Yes	No
Environmental Evaluation OP/BP 4.01	x	
Natural Habitats OP/BP 4.04	x	
Forest OP/BP 4.36		x
Pest Management OP 4.09		x
Physical Cultural Resources OP/BP 4.11	x	
Indigenous Peoples OP/BP 4.10		x
Involuntary Resettlement OP/BP 4.12		x
Safety of Dams OP/BP 4.37		X
Projects on International Waterways OP/BP 7.50		X
Projects in Disputed Areas OP/BP 7.60		X

41. **Potential environmental impacts.** During the EIA preparation environmental and social impacts were identified for both construction and operation stages. Most of the impacts during construction can be prevented and mitigated by proper implementation of preventive and mitigation measures and increased on site supervision and coordination among the three EDEs and CDEEE. Existing contamination issues of current storage sites have been addressed per OP 4.01 (Annex C) in the EIA and Component 1 will include the implementation of an environmental management system under Component 1d, which is detailed in the EIA, in order to improve current environmental practices in the EDEs, increase coordination among the EDEs and CDEEE, hiring additional staff, standardization of capacities and responses related to health and safety and environmental issues around the proposed works of Component 1.

42. **Potential environmental impact of the project activities will be related mainly to the rehabilitation works of distribution power lines and include:** generation of electrical waste (e.g. old poles, transformers, insulators, cable lines, street lights, meters, and other related electrical equipment to be replaced), generation of hazardous electrical waste (e.g. old transformers, oils, cables, etc.), cutting of trees, perforations of sidewalks, interruption of electricity service to local communities during works, safety issues to manage contingencies (accidents, explosions), effects on normal traffic and access to project sites, among others.

43. **Borrower's Institutional Capacity for implementing Environmental Safeguard Policies.** The Bank team visited several project sites, reviewed the environmental documentation and instruments approved by the past operation (P089866) and results of EIA, and it was determined that CDEEE and the EDEs present different degrees of capacities to handle environmental, health and safety issues. For instance, EDE Este supervises more health and safety aspects while EDE Norte and EDE Sur needs to strengthen its safety procedures and staff. EDE-Sur is the only EDE with professional environmental specialists. EDE Norte is working on institutional reform to create an environmental department which will be combined with safety and health units. All three EDEs need to improve management of electrical residues and increase

space for storage sites for large amount of electrical residues (including hazardous waste such as transformers potentially contaminated with PCB's) the works will produce.

44. All EDEs have made efforts to have an environmental/ safety unit. The unit consists of 1-3 people who will be responsible for different tasks of safety and environmental supervision issues. However, environmental management has not been a pivotal topic in the execution of the Losses Program and the roles the environmental staff in the supervision of the works has been limited, especially because: (a) Environmental staff is placed within departments that have little or no connection with environmental matters (human resources, norms, energy losses); (b) in the past they have had little participation in the supervision or planning of new works; (c) lack of coordination in relation to environmental issues among the 3 EDEs and CDEEE; (d) the Environmental Guideline (approved by the Bank in previous operations) has had little enforcement. In contrast, EDEs have developed strong Social Units, working closely with technical teams and reporting activities and social achievements among the rehabilitated circuits.

45. During preparation, agreements were reached with CDEEE and the three EDEs to improve overall coordination and management of environmental issues and reduce residues and land pollution across the three EDEs and CDEEE.

46. For project implementation, it has been agreed that: (a) at each EDE an environmental-safety unit will be formed and will be responsible for overall project environmental supervision; (b) EDEs will implement an environmental management system as part of Component 1d. which will include indicators that will be closely monitored by periodic audits; (c) the PIU at the CDEEE will hire an environmental specialist to increase coordination among the three EDEs and CDEEE; (d) at the EDEs one or two environmental specialists will be hired with project funds of Component 1d. to strengthen each EDE and to provide support for project implementation and supervision. Also, through Component 1d. the project will support construction or rehabilitation of electrical residues storage sites, a diagnostic of land pollution in the current storage sites for transformers, and new instruments to improve supervision and records of the screening tests of transformers for PCBs (*Clor -N-Oil-50*). The Project Operations Manual to be prepared by the client will include the commitment to comply with the EMP agreed for the project, terms of reference for contracting environmental specialists in charge of the project and auditors.

47. **Environmental Safeguards Instruments.** Following the OP 4.01 requirements, an EIA with its EMP was prepared by the client, since geographical locations and scope of works were known. About 18 sub-projects (circuits) will be rehabilitated by the project. The EIA has evaluated the positive and potential negative impacts that the works might cause in the project areas which are mostly urban. The EMP includes detailed procedures for prevention and mitigation of impacts for the application of the EMP by the three EDEs; definition of responsibilities for environmental management (including health and safety) by the EDEs, and CDEEE; instruments to improve coordination among EDEs and CDEEE; procedures for the conservation of cultural resources or chance findings; actions for improvement of supervision and reporting and environmental clauses for the bidding documents. The EMP includes actions for the development of an environmental management system for strengthening safety and environmental practices in all EDEs. The agreed budget of \$2.4 million will finance the hiring of environmental staff in the EDEs and the CDEEE, purchase of equipment for testing transformers

for PCB, construction or rehabilitation of electrical residues storage sites, final disposal of contaminated transformers with recycling of electrical residues; training and capacity building of the environmental/safety units, among other activities.

48. **Project Environmental Legal framework.** The ministry of Environment (MINAmbiente) is responsible for the application of the country's current EIA legal framework. The EIA systems is defined by the Environmental Law 64-00 and the regulation 02-2011. According to the legislation, EDEs will need to obtain the required environmental permits (*Constancias ambientales*) and pay the required environmental fees by the Ministry of Environment. These fees will need to be paid by the Government. The Project legal environmental framework it must comply with, includes: (a) Institutional Environment policies current and future at EDEs and CDEEE; (b) national environmental legislation including: EIA, waste management, PCB's national legislation and international (including the Basilea Protocol), energy, health, safety, emergencies, municipal permits required (for digging, waste disposal, construction, cutting of trees, and other applicable legislation to the work; (c) the legal agreement of this project and the EIA/EMP prepared for the project; and (d) World Bank Safeguards Policies, Standards and Guidelines. The EIA/EMP of this project incorporates the application of this legislation, current environmental, health and safety procedures of EDEs where these exist, and requirements of the World Bank Environmental Safeguards Policies.

49. **Institutional arrangements for Environmental safeguards.** The project implementing Unit PIU) at the CDEEE will hire an environmental specialist with funds from the project to be responsible for the overall monitoring and supervising compliance of the EDEs and CDEEE with the EMP, agreed activities of Component 1d., national legislation, Bank environmental Policies and Guidelines and other environmental requirements that can be requested by the Bank during implementation. The PIU at CDEEE will send to the Bank a comprehensive safeguards reports on project environmental management by the EDEs, every six months. The environmental staff of CDEEE will serve as technical advisors for the EDEs and the Environmental Unit at the CDEEE, as needed. CDEEE and the EDEs will be responsible for implementing the EIA (and attached EMP) approved by the Bank.

50. The Environmental Safety Unit at each EDE may consist of a coordinator/manager and current and other environmental, health and safety staff and additional full time environmental/safety specialists (at least 1-2 for each EDE) to be financed by this project. These staff will be responsible for overall implementation of activities of Component 1d, development of the environmental management system, application of the EMP and supervision and monitoring of the project activities. Also, EDEs will be responsible for field supervision of contractors and works to be financed by the project, preparation of checklist and reports, and other duties described in the EIA/EMP of this project. EDEs and CDEEE will also contract environmental consultants or auditors as needed to support supervision. The Environmental-Safety unit of the EDEs will also coordinate with the coordinator of the Social Unit the CDEEE and EDEs for better implementation of communication plans as needed. Bidding documents will include environmental clauses and works preparation and mitigation will follow procedures and arrangements described in the EIA and EMP prepared for the project. During implementation, as needed the Bank might request additional mitigation measures to prevent, mitigate or remediate potential impacts that can occur.

51. The Project Operations Manual (POM) will indicate that the EIA and EMP of the project are an integral part of the POM. Any subsidiary agreement among the CDEEE and the EDEs shall include a clause describing the responsibility of the EDE project coordinators on the application of the Bank Safeguards policies and in the support of the environmental unit in each EDE for proper implementation of environmental safeguards, in accordance with the EIA and its EMP. In these subsidiary agreements and in the overall project budget plans (SEPA) the PIU coordinator will include a schedule and budget sources necessary for the cost of hiring environmental staff, capacity building activities, environmental studies, environmental management in each EDE and the implementation cost of the EMP measures as necessary.

52. **Project Implementation.** EDEs will be responsible for activities of Component, implementation of EMP and development of the environmental management system. CDEE environmental unit will support EDEs environmental management and will monitor compliance of project with safeguards policies. Each year the Project will prepare the Annual Operation Plan (*Plan de Operaciones Anual -POA*) and the CDEEE will make sure to include in such plan a budget (for EDEs and UEP) for the environmental supervision of the works to be financed by the Project, the hiring of additional environmental specialists, consultations, implementation of the proposed project's EMP, capacity building activities for the members of the environmental/health/safety units, maintenance units cost of equipment (camera, PCB' kits Clor-N-Oil, noise meters, etc.) and others as detailed in the EMP. The budget will be prepared by each EDE's Environmental Unit and will be sent to the CDEEE to be incorporated in the POA. Also each EDE will send along with the proposed budget, the Environmental Screening Checklist for each proposed subproject when requesting the 'No Objection' and include it in the EMP. All bidding documents related to the proposed rehabilitations works will be sent for review by the environmental units of the EDEs as described in the EIA. Environmental clauses will be incorporated in the project circuit's forms, bidding documents, and contracts to ensure contractors' application of the mitigation measures, and application of the environmental and health and safety guidelines. EDEs will be responsible for implementing the EMP as described in the EIA, supervised works, contractors and manage the electrical residues generated by the works.

53. **Reporting of environmental safeguards.** The model to be used for reporting on implementation of project safeguards is defined in the EMP of the project which is part of the Project Operation Manual. Reporting will include: (a) semi-annual safeguards report which will include the environmental audit reports of such period (6 months) and will be prepared by the environmental coordinator of each EDE's Environmental unit; (b) consolidated environmental annual reports and the Mid-Term review will be prepared by the 3 EDES and will be coordinated by the Environmental specialist in the PIU at the CDEEE.

54. The Environmental Unit of each EDE will maintain a database of project environmental reports and digital records (environmental assessment, mitigation plans, environmental permits (*constancia ambientales*), audit reports, trees cutting permits, contractors supervision reports, claims, etc.) of all sub-projects implemented and financed by this project. The prepared EIA, EMP and other safeguards documents will be published on the websites of the EDEs. This will

support the development of the environmental management system in each environmental unit of each EDE and information would be accessible to Bank supervision missions and external auditors.

55. **Risk Assessment.** The overall risk for Environmental management for the Project is considered moderate. The Environmental management risks identified during preparation and review of EDEs current environmental practices and audit reports from the previous project are: (a) weak environmental management system within each EDE's Management and organization structure and need for better coordination among the three EDEs and with the CDEEE; (b) limited knowledge of Bank's Safeguards policies, (c) lack of environmental standardized procedures among the EDEs to manage similar environmental, health and safety issues, (d) environmental legacies issues related to old electrical wastes, some from the previous Bank financed project, (e) subprojects (circuits) are planned to be procured in separated processes or bundled in large bidding processes (up to 4 with lots within) which can limit environmental supervision. It is estimated that about 4000 transformers will be replaced by the project and each circuit will deploy approximately 300-500 transformers. EDE Norte uses an area of about 625 m² to store only 250 transformers. Therefore risks are high in relation how works are procured and the availability of environmental staff to supervise several circuits from all EDES in different regions and the available space in each EDE to store temporarily or finally the deployed electrical equipment (cables, lamps, transformers). The Environment and Social risk is rated as Moderate. CDEEE and EDEs have agreed in the development of better environmental and safety practices for this project and a budget of US\$2.4 million in Component 1 have been agreed upon to implement several actions including hiring of new environmental and safety staff for EDEs, improvement of protocols to handle hazardous electrical waste (transformers) and purchasing of PCB testing toolkits and a capacity building plan for EDEs staff. CDEEE agreed to form a new environmental unit at the PIU and contract auditors to oversee the overall project implementation and safeguards application to reduce environmental and social risks.

56. The mitigation measures that have been agreed are: development of an environmental management system as part of Sub component 1 with a budget of \$2.4 million; which will ensure the implementation of the EMP, standardized environmental management procedures for EDEs and CDEEE, hiring of environmental specialists for the three EDE and the CDEEE, environmental audit, review and incorporation of budget and environmental clauses in the bidding documents of all bidding circuit documents, construction or rehabilitation of electrical waste storage areas and final disposition of contaminated materials (e.g. Transformers with PCB's) and training. Communication plans and grievance mechanisms for the works will be implemented by the Social Component (3) in coordination with the environmental teams. The environmental management risk of the EDEs and CDEEE would be reassessed once a year after the start of the Project in order to determine whether the safeguards risk rating should be modified.

57. **Consultation, disclosure and participation.** A draft of the EIA (and attached EMP) was published on March 17, 2015 on the websites of the three EDEs and CDEEE and in the Infoshop of the World Bank on March 18, 2015. Consultations were held on March 27, 2015 in two locations in the country. Invited stakeholders included: local communities within a proposed circuit to be rehabilitated within this project, representatives from the national environmental

agency (Ministry of Environment), municipality, contractors, EDES, CDEEE. Representatives of the EDEs, and CDEEE explained the project scope, objectives, possible construction impacts, mitigation measures, monitoring protocols and grievance mechanisms. Subsequently, there was a question and answer session and the results of the consultation have been included in the EIA. Stakeholders support the project and no major issues were raised. The final EIA has been revised and approved by the Bank and it was published on September 21, 2015 at the website of CDEEE, EDEs and at the Infoshop of the World Bank.

58. **Bank Environmental Support Plan.** An environmental specialist from the Bank will carry out a supervision mission prior to effectiveness to verify the environmental preparation arrangement described in the EMP of the EIA prepared for the project. After effectiveness, the environmental specialist will provide a capacity building workshop for the environmental staff of the EDEs and CDEEE, to ensure that they are familiar with the EMP procedures and the Bank safeguards policies. An environmental specialist will join project supervision missions (2SW).

Social

59. The project does not trigger any social safeguard policy. There is no involuntary resettlement, as technical works include grid rehabilitation and metering which do not require land acquisition. The availability of electricity 24 hours per day has a positive impact on the beneficiaries of the Project, as described in Annex 7. Therefore, this Project will contribute to improving the living conditions of households, business owners, and poor people. Focus groups were conducted with beneficiaries of the previous Project in November 2013 to identify specific issues related to gender and age. Women reported that they did not face any barriers or constraints on having access to the benefits of the project. Some positive impacts based on gender and age were identified: women can plan their housework better, which allows them to have more time for rest and leisure, and they can engage in other activities; and business owners can have their businesses open for extended hours, which increases productivity, sales and economic gains. Young people can spend more time at home (mainly boys) for studying and doing homework, and have 'potential' access to internet. All participants in the focus groups, regardless of gender and age, indicated that their quality of life improved. All stakeholders with a large majority being women highlighted the improvement in public safety due to lighting in public places

Monitoring & Evaluation

60. CDEEE will have the overall responsibility for monitoring and evaluation (M&E). CDEEE and the EDEs already have implemented systems for providing timely information as these were set up during the previous project. CDEEE will provide consolidated reports on a quarterly basis on the project's implementation progress in the Bank's IFR format. It is acknowledged that the interventions by this project alone cannot drastically affect the overall electricity sector numbers; however, attribution to improvements will be measured at the rehabilitated circuit level. CDEEE will also be responsible for: (a) preparing and updating of the Project Operations Manuals with support from the EDEs; (b) the procurement plan on the basis of information provided by the EDEs; (c) fiduciary and environmental aspects of the project; (d) all procurement documents and processes in coordination with the EDEs. CDEEE will be the entity responsible for signing all contracts for the project while the EDEs will be responsible for

overseeing contract implementation. CDEEE will also prepare all required project progress reports, including those for financial management and procurement.

61. The success of the project will be measured by the indicators in Annex 1. Building on lessons learned from the Bank's previous project, the Cash Recovery Index (CRI) alone was not seen as a good indicator, as its results would not accurately demonstrate improvements, as the problems faced in the DR are not that of insufficient billing. The recovery from billing is actually high. Thus, the Energy Recovery Index (ERI) would be added to measure how much energy is actually recovered through billing.

Annex 4: Implementation Support Plan

DOMINICAN REPUBLIC: Distribution Grid Modernization and Loss Reduction Project (P147277)

1. The Implementation Support Plan (ISP) addresses the need to support the Dominican Republic and will require the implementation of some of main mitigation measures identified in sections of this PAD. The Plan will make sure that major risks are addressed and that implementation can progress as planned. Project design already takes these issues into account and provides additional mitigation options that can be supported by the Bank. The ISP will be implemented by the World Bank team involved in the operation; it is indicative and flexible, and will be revisited during Project implementation.

Strategy and Approach for Implementation Support

2. The Bank has engaged with the Government through the following projects: (i) Programmatic Power Sector Reform Loan (US\$100 million); (ii) the Energy Sector Technical Assistance (TA) Loan (US\$7.3 million); and (iii) Electricity Distribution Rehabilitation Project (US\$42 million). A similar approach will be applied to project implementation, with particular attention to the coordination of actions between CDEEE and the EDEs.

3. Environmental and Social safeguards: The Bank will continue to provide regular support to the Client in tackling safeguards related issues during the project implementation and will closely monitor its compliance with the EMPs.

4. The Bank will undertake field visits on a regular basis and have discussions with all stakeholders as well as Project beneficiaries. During Project implementation it will also maintain a constant presence in the field with at least three supervision missions per year (and even more during the first year of implementation). The Bank will also support the strengthening of the CDEEE and the EDEs.

5. The Bank will also undertake regular and comprehensive fiduciary review, including thorough reviews of financial management reports and the findings of procurement reviews and audits. As needed, the Bank will work together with the implementing agency to maintain a viable delivery model, allocate adequate human resources – in quantity and quality – for and throughout the implementation period and continuously provide valuable guidance through local staff.

6. Implementation support will be carried out at the following levels:

- (a) Technical: Technical staff will be located in Washington offices. Additional technical experts may also be used, for the preparation of technical specifications for new technologies deployment (e.g. advanced metering).
- (b) Fiduciary: Bank staff will provide advice and support to CDEEE (as needed). Staff will be readily available in the World Bank Dominican Republic Country Office.

- (c) Governance and capacity building: Support will be coordinated from Washington, with strong involvement of locally based staff.
- (d) Safeguards: The Bank will support CDEEE with Washington-based staff experts and locally based consultants.

Procurement

7. CDEEE is responsible for preparing all procurement documents for the activities to be financed under this project and for signing contracts to be overseen by the three EDEs. The EDEs would also participate and coordinate on procurement matters, and be responsible for preparing technical specifications, managing the supply and construction contracts, and supervising the construction of works. CDEEE will be responsible for completing procurement bidding documents packages and managing the whole procurement process, including the preparation of supply and service contracts for signature by the EDEs. CDEEE and the EDEs will jointly be responsible for the evaluation of proposals and recommendations for award. Staff at the distribution companies already have experience in procurement from implementation of the previous project. Nevertheless, as required, the procurement related implementation support will include training for CDEEE staff and particularly for staff at the distribution companies, on both procurement procedures and contract management.

8. World Bank will play a strong role in providing implementation support for the Project. Moreover, if necessary, project supervision findings will be used to provide hands-on support to the PIU. It is important to have continuity of the staff working in the PIU.

Financial Management

9. The FM related implementation support will include periodic and on the job-training on Bank disbursement guidelines and FM practices. The Bank will conduct risk-based financial management supervisions, at appropriate intervals, more frequent during the first years of implementation. During project implementation, the project's financial management arrangements in all the four implementing units will be reviewed as follows: (i) review on a quarterly basis of the IFRs submitted by each implementing agency as well as the annual project's audited financial statements and auditor's management letter, and (ii) during the FM on-site supervision missions.

Operations

10. The Bank project team includes an experienced Task-Team Leader (TTL) based in Washington who will conduct periodic supervision of the project and coordinate with the client and other experienced project team members (some based in Washington and some in the field) to provide timely guidance and support to the Client. General administration, procurement and financial activities under the project will be carried out by CDEEE staff under its present organizational structure, especially the project planning, engineering, administration, finance, and construction/maintenance/operations directorates. CDEEE support directorates and units such as internal auditing, legal, administrative and technical controls, and information and technology will be available to support and meet overall project requirements. The three EDEs will be responsible for technical aspects of the project. Overall project coordination will be the

responsibility of the CDEEE. The CDEEE PIU will coordinate all project related activities within CDEEE and with the EDEs and will be the direct liaison with the Bank and other financiers.

Table 4.1: Implementation Support Plan

Time	Focus	Skills Needed	Resource Estimate
First twelve months	Leadership, guidance and monitoring from the World Bank	TTL	24 staff weeks
	Technical Review, procurement review, bidding documents	Procurement Specialist	12 staff weeks
	Social	Social Specialist	3 staff weeks
	Environment	Environmental Specialist	3 staff weeks
	Operations Officer	Operational tasks, guidance, AMs, ISRs, etc.	6 staff weeks
12-48 months	Management	TTL	24 staff weeks
	Construction, installation, management etc..	Procurement	6 staff weeks
	Environmental and Social monitoring	Environmental and Social Specialists	6 staff weeks
	Operational Officer	Operational tasks, guidance, AMs, ISRs, etc	6 staff weeks
	Financial Management	Financial Management Specialist	2 staff weeks

Table 4.2: Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Procurement specialist	6 annually	As required	Field Based
Financial management	2 annually	As required	Field Based
Social specialist	6 annually	As required	Field Based
Environment Specialist	3 annually	As required	HQ Based
Legal counsel	2 annually	As required	HQ Based
Operations Officer	12 annually	As required	HQ Based
Task team leader and rest of the team	24 annually	As required	HQ Based

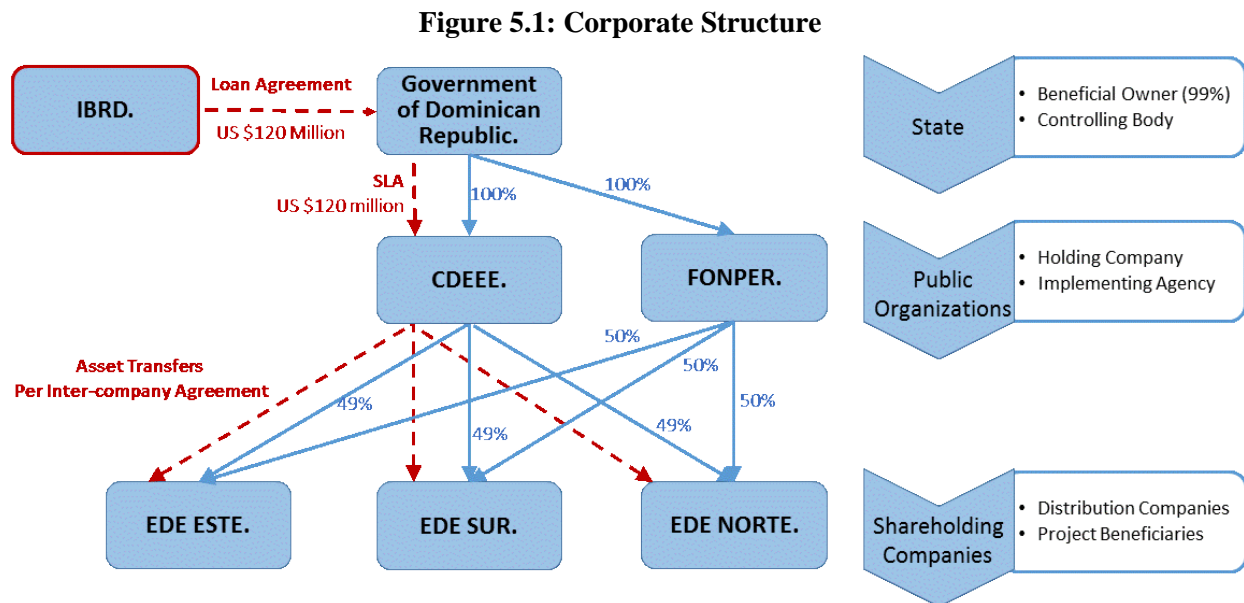
Annex 5: Economic and Financial Analysis

Dominican Republic Distribution Grid Modernization and Loss Reduction Project (P147277)

A. Overview and Summary

1. **State Ownership.** Electricity distribution in the Dominican Republic is carried out by three distribution companies, EDE Este, EDE Norte and EDE Sur, owned by the state through their wholly owned state enterprises CDEEE, the State Holding Company for the Electricity Sector¹³; and FONPER, the Endowment Fund of the Reformed Enterprises. Fonper is an institution of the Dominican State that was established under Law 124-01 to administer and hold the investments of the State. CDEEE was created by decree No. 647-02 under the general electricity Law No. 125-01 as an autonomous utility with its own assets and legal persona to lead and coordinate the country’s state owned power utilities.

2. The electricity distribution companies were formed by CDE (predecessor to CDEEE) as independent commercial shareholding companies under law no 14-97. They are owned 49 and 50 percent by CDEEE and Fonper respectively as illustrated in Fig. 5.1 below



3. The proposed Bank loan of US\$ 120 million will be made to the GoDR, through the Ministry of Finance, and on-lent under a subsidiary loan agreement to the CDEEE who will manage, implement, and account for the project on behalf of the three subsidiary distribution companies as illustrated by the dotted lines in Fig 5.1. On completion and commissioning of the project the assets and the associated liabilities established under the project will be transferred to each of the distribution companies.

¹³ Patrimonial de las Empresas Reformadas.

4. Rationale for Public Sector Investment. Recurrent financial crises in the past show a common pattern of (a) tariff freezes due to oil price shocks or exchange rate fluctuations with Government stepping in to compensate for the difference between the frozen tariffs and the tariffs required for full cost recovery; (b) failure by the Government to deliver adequate and timely compensation due to insufficient budgetary resources; (c) financial stress experienced by the distribution companies, resulting in inadequate maintenance, investment and a progressive deterioration in the level of service, (including blackouts) and growing arrears to private generators; (d) customer dissatisfaction reflected in increasing electricity theft and non-payment of bills. Despite some improvements resulting from the impact of the earlier World Bank and IDB financed projects, the current financial situation of all three distribution companies continues to deteriorate. Owing to considerable uncertainties in the present policy and governance framework, private sector investors are unlikely to take over these activities until the situation improves. At the same time, in view of the critical importance of the electricity sector to the economy and to the welfare of the population, it is important that the distribution companies are assisted to continue to improve their operations and financial performance. As described in Annex 6, phase II of the proposed Bank financed project, along with those being financed by the IDB, OFID, and EIB will rehabilitate another 12 percent of the network, and contribute towards eventual sustainability of the distribution sub-sector.

5. Rationale for Bank Involvement. The investment needs of the Dominican Republic electricity distribution sector are very large. The Government budgetary resources, and consequently its ability to finance the required levels of investment, are limited. While the resources facilitated by the IFIs such as the IDB and OFID have been significant for supporting some investments, additional financing resources are needed. The World Bank can play a significant role in helping to close the financing gap, leveraging additional financing from the EIB, and expand the policy dialogue with the Government. This is key to putting the sector on a more sustainable trajectory and reducing the fiscal risk to the country.

6. Project Impact. The project components will be implemented by well established, albeit weakened, revenue producing enterprises and therefore the performance, financial health and viability of each has been assessed individually to ensure the project is fully funded, financially justified and self-sustaining in the longer term. On the basis of the assumptions outlined below it is apparent that the project is viable providing a) real economic returns of 27.5 percent on the aggregate capital investment of US\$ 120 million and a combined net present value of US\$39.7 million; and b) a financial return of 27.5 percent and NPV of US\$ 73.2 million at 10 percent rate of discount as indicated in Table 5.1 below.

B. Financial Projections

7. Financial Status of the sector: The sector is in financial crisis arising from the failed privatization of the distribution companies, high technical and non-technical losses, poor revenue collections, inefficient management and low network density in the north and eastern regions of the country. By any metric the distribution companies are insolvent and continue to operate only with the significant and planned support of the Government and the forbearance of their suppliers. Key issues plaguing the sector include:

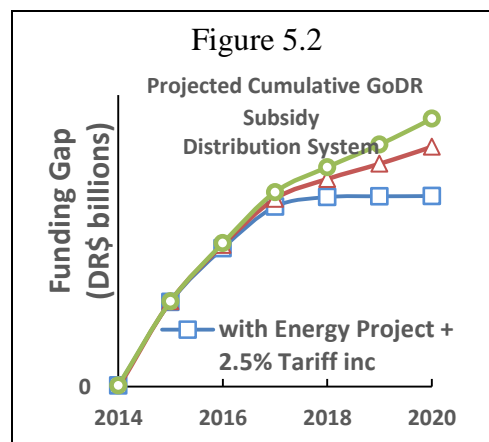
- (i) Electricity retail tariffs for the three EDEs are in effect set by the Government. In principle, they should to be indexed to adjust them for changes in the key underlying

parameters governing operating costs i.e., the cost of electricity purchases and exchange rates between the USD and the DOP\$. Under existing regulations, an indexed tariff is computed regularly by the Regulatory Authority based on a detailed underlying model. However, in practice, adjustments of the actual electricity sales tariffs to the levels indicated by the indexed tariff have lagged significantly resulting in a financing gap for the EDEs;

- (ii) Insufficient capital investments. In the absence of full cost recovery tariffs and limited budgetary resources, the distribution companies have been unable to settle their arrears to trade creditors nor finance critical investments to reduce high energy losses. Although losses in aggregate have been gradually declining in recent years, they are still high by international and regional standards. In 2014, the estimated losses of the EDEs ranged between 30 to 36 percent of the electricity purchased by them;
- (iii) Revenue collection of the EDEs is also affected by the extent of electricity losses, both technical and commercial, and poor service delivery; and
- (iv) Lack of sector liquidity. The main power participants in the market are technically insolvent and are unable to meet their obligations without the support of the Government. In the last four years GoDR subsidies have increased by 14.4 percent per annum from US\$ 700 million in 2010 to US\$1.2 billion in 2014. This is not sustainable and there is an urgent need to mobilize funds to:
 - rapidly inject liquidity into the system to ensure timely payments of inter-company obligations;
 - clean up the finances of the sector in order to restore viability, reduce arrears, and improve operational liquidity and creditworthiness of all market participants; and
 - restore commercial market practices and strengthen relationships with suppliers and lenders to sustain operations without budget support and provide access to domestic financial markets in the medium to long-term.

8. Based on the audited financial statements for 2012, and the unaudited statements for 2013 and 2014, the three EDEs continue to incur substantial operating losses. As mentioned, these losses arise from a combination of (a) electricity sales tariffs that are substantially below full cost recovery levels, (b) high levels of technical and commercial losses, and (c) poor revenue collection performance. A summary of the key financial indicators for the three EDEs is provided in Sch. 5.2(c). These indicators show that all three EDEs have substantial operating cash gaps. A key indicator of the operating viability of the EDEs is the cash recovery index (CRI). This is computed as the product of two ratios as follows: $CRI = \text{Energy billed/energy purchased multiplied by revenues collected/revenues billed}$. The CRI indicates the extent to which the EDEs are able to bill and collect the revenues in relation to the volumes of electricity that they purchase. For 2014, the CRI ratios for the three EDEs range from 60 percent to 67 percent. Despite some gradual improvements in recent years, the CRI ratios for all three EDEs are still significantly low and need to be improved substantially. In the absence of the project and realistic tariff increases the financing gap without bound as indicated the top chart in Fig. 5.2 below.

9. The lack of sufficient cash flow has severely affected the ability of the EDEs to adequately rehabilitate and maintain their existing assets so as to deliver acceptable levels of services to their end-users, which in turn has undermined their willingness to pay. As a result of cumulative annual losses, the three EDEs had a consolidated negative net worth of about DOP\$96 billion (USD2.1 billion as at the end of 2014 as indicated in Sch. 5.2(c)). The Government has had to allocate large amounts of subsidies, through CDEEE each year, to cover the EDEs' operating deficits to enable them to purchase electricity from the generators. The EDEs have in addition financed their losses by increasing their accounts payable the private generators and to CDEEE for the energy that is purchase through them. As of the end of 2014, the EDEs accounts payable totaled about DOP\$ 118.3 billion (USD2.6 billion).



10. *Project Financial Projections.* Financial projections for each of the EDEs have been prepared in real 2015 terms, with the resulting consolidated income statement, cash flow and balance sheets for the period to 2019 set out in detail in Schedule 5.2 (a)-(c). These projections and the resulting economic and financial evaluations were made on the basis of the financial statements and projections of the companies, and on assumptions regarded as realistic and reasonable by the Bank team. The project will be financed entirely from the long-term loan from the World Bank.

11. The GoDR has demonstrated its commitment to ensuring the financial viability of the EDEs under the formal tariff stabilization arrangements¹⁴ (FETE), sustaining capital expenditures, and energy losses to ensure the EDEs remain viable until such time as the loss reduction program begins to generate a positive cash flow. The scope of this support is estimate to be about DOP\$51.2 billion (USD1.1 billion)/annum as indicated by the cumulative subsidy given by the middle of the three charts in Fig 5.2 above. Despite the moderation in the slope of these curves and the positive impact of the project, resulting from the benefits flowing from the commissioning of the lower cost Punta Catalina thermal power plants in 2017, it is apparent that significant support from the government will be required for the foreseeable future absent any adjustment in retail tariffs.

12. It is further apparent, as can be seen from the top chart in Fig 5.2, that this support can be reduced and eliminated by a moderate annual increase in tariffs over the next four to five years, which will alleviate the pressure on the national budget, reduce the fiscal risk arising from the current state of the energy sector, place the sector on a more self-sustaining trajectory and to become more competitive in an open market.

The main assumptions inherent in the project technical and financial projections include:

¹⁴ Fondo de Estabilización de la Tarifa (FETE)

Table 5.1: Technical and Financial Projections Assumptions

Projected energy balance	The energy balance for the sector taking into account bi-lateral energy purchased by CDEEE and sold to EDEs, the commissioning of Punta Catalina in 2017 and residual energy required from the private generators.		
Exchange Rate (DR\$/US\$)	2015	46.4	
	2016	47.8	
	2017	49.8	
	2018	51.7	
	2019	53.5	
Capital Expenditure – EDE ESTE.	US\$ 36.7 million		
– EDE SUR	US\$ 40.7 million		
– EDE NORTE	US\$ 42.6 million		
Incremental O&M Costs	3% of Capex		
IBRD Loan Terms	Loan: US\$ 120 million		
	Interest rate: __ % pa		
	Front End Fee: 0.__%		
	Term: 20 years (incl. grace period of 4 years)		
Depreciation	Existing Assets: 30 yrs.		
	New Assets: 20 yrs.		
Total Energy Losses (%)		EDE Este	EDE Sur
	2015	33.4	25.6
	2016	30.9	24.9
	2017	28.4	22.5
	2018	25.9	19.7
	2019	23.4	18.2
Revenue Collections (%)	Increasing from 95 to 98 percent on average.		
Increased System Availability (%)	10.0%		
Income Tax	26% (only the EDEs are subject to income tax)		
Cost of Energy (RD\$/kWh)			
	- Gencos	6.55	
	- CDEEE	10.2	
	- EGEHID	5.22	
	- Punta Catalina	4.55	

13. *Financial and Economic Impact of the project:* The main quantifiable components of the economic and financial benefits arising from the project comprise (i) reduction in system technical losses, (ii) reduction in non-technical losses arising from theft and unmetered

connections, and (iii) an increase in system availability as the cost recovery index is progressively improved. That is

- *Reduction in technical losses:* While no precise measurements have been made, technical losses are estimated by the EDEs to be about 12 percent of power supplied. As a result of the physical rehabilitation under the project, the losses are expected to be reduced to about 10 percent. In the absence of any import price parity, the resulting gains are valued at the long run marginal cost of energy in the Dominican Republic. This price was determined by an evaluation of the Punta Catalina TPP, which is currently under construction by the Government;
- *Reduction in non-technical losses:* While much of the resulting economic benefit to the EDEs represent transfer payments (in cost/benefit terminology) from the consumers to the EDEs, there will be a reduction in demand by consumers who would now have to pay for their metered electricity consumption and therefore would likely use energy in a more rational and efficient way. Based on experience, the EDEs estimate that the reduction in demand will be at least at least 30 percent of the reduction in the non-technical losses for each of the rehabilitated circuits, which in turn has been valued at the avoided cost of the EDEs' power purchases; and
- *Increased system availability.* The increase in incremental sales will result from the upgrading of the targeted distribution circuits from categories C and D (less than 18 hours per day) successively to categories B (21 hours per day) and A (24 hours per day). This is expected to increase the power consumption by about 10 percent. Most of which will replace energy, and avoid the associated costs to consumers, of needing to use backup generators and other forms of energy such as candles and kerosene lamps that cost twice as much as that purchased from the grid. Again the benefit arising from this is the avoided cost of utilizing these higher cost sources of energy i.e., the difference between this cost and the long-run marginal cost.

C. Incremental Economic and Financial Analysis

- *Economic analysis:* The project analysis is based on the individual analysis of each EDE, which are then consolidated to provide the overall results for the distribution sector and total World Bank project investment. As mentioned the economic benefits of the project have been limited to significant quantifiable benefits that include the reduction of technical losses, and reduction of energy not served due to poor reliability of power supply. Consequently the resulting economic net present value (NPV) and the economic internal rate of return (EIRR) should be seen a lower bound relative to the actual economic benefits derived from the project. The economic costs of the project include aggregate investment costs, and incremental operation and maintenance (O&M) costs associated with the investments. The consolidate economic valuation of the project adjusted for taxes, interest and other transfers, is set out in detail in Annex 5.3 and summarized in Table 5.1 below. The economic analysis, based on technical losses, more prudent use of energy and improved availability of supply, yields an economic NPV of DOP\$1,129 million and EIRR of 16.4 percent. Higher economic returns in the southern region more than compensate for the much lower network densities—and thus lower economic returns—in the northern and eastern regions of the island, and allow for a more equitable distribution of project benefits and regional access to energy.

- *Financial Analysis:* Again the financial analysis is carried out from the perspective of the sector as a whole. The main financial benefits of the project for the sector are the savings from lower imports and power purchase costs as a result of incremental loss reduction and additional sales from the portion of non-technical losses that will be converted to additional billing. The main financial costs of the project are capital investment, and incremental O&M costs and income tax.
- All three sub-projects are financially viable and contribute to an improvement in both corporate and sector liquidity. The aggregate project returns, based on the consolidated incremental cash flows derived from the financial projections, are set out in detail in sch. 5.3 at the end of this annex and summarized in Table 5.1 below. Based on conservative assumptions listed above, the analysis demonstrates that the projects are robust and show a net present value at a 10 percent rate of discount of DOP\$3,367 million and financial rate of return of 27.5 percent.

Table 5.2: Incremental Financial and Economic Return

	Economic	Financial
Net Present Value	DOP\$1.129	DOP\$3,367 million
IRR	16.4%	27.5%

- *Sensitivity Analysis - Switching Values.* Switching values shown in Table 5.2 below demonstrate the sensitivity of the return on the aggregate investment due to a percentage change in each of the more significant assumptions and/or variables underlying the financial projections and economic assessment. The values given represent the percentage change in the respective variables required to reduce the economic internal rate of return of the projects to the required hurdle rate of return of 10 percent. From this analysis it is clear that the project economically and financially robust over a wide range of assumptions, which is not surprising given the state of the sector, the selection of the circuits, which are to be rehabilitated, and the low base against which the benefits of the project are measured.

Table 5.3: Switching Values

	Switching Values (%)	
	Economic	Financial
Energy Losses	n/a	-42.4
Capital expenditure	21.0	66.5
Incremental O&M costs	113.6	426.8
System Reliability	-28.0	n/a

14. Financial projections for the three EDEs supporting the above analyses including income statements, cash flows and balance sheets are set out in detail in the project file and consolidated into the financial projections set out in Schedule 5.2 (a)–(c)

Dominican Republic Distribution Grid Modernization Project
CDEEE Energy Balance (2015-2019)

(GWh)

	Actual	Projected				
	2014	2015	2016	2017	2018	2019
Gencos deregulated Sales (GWh)		1,580	1,612	1,644	1,677	1,710
ETE Est		2,881	3,139	3,415	3,711	4,028
ETE Sud		3,508	3,710	3,956	4,187	4,430
ETE Norte		2,819	3,048	3,289	3,551	3,800
Regulated Tariff Sales		9,208	9,897	10,660	11,449	12,259
ETE Est		1,445	1,404	1,355	1,297	1,231
ETE Sur		1,205	1,230	1,148	1,027	986
ETE Norte		1,146	1,088	999	910	840
Total Distribution Losses		3,796	3,721	3,502	3,234	3,056
Transmission Losses		263	274	285	294	306
Total CDEEE Own Consumption		0	0	0	0	0
TOTAL CDEEE ENERGY DEMAND		14,846	15,504	16,090	16,654	17,332
HPP Generation - EGEHID	1,251	1,040	1,100	1,606	1,606	1,606
Net HPP Generation	1,251	1,040	1,100	1,606	1,606	1,606
Other Hydros	0	0	0	0	0	0
Net Hydro Generation	1,251	1,040	1,100	1,606	1,606	1,606
Thermal Power Plants - Punta Catalina 1&2 (670 MW)	0	0	0	1,328	5,320	5,282
less Own consumption	0	0	0	133	532	528
Net Thermal Generation	0	0	0	1,195	4,788	4,754
Purchases of JVs by - EDE Este		213	213	216	218	220
- EDE SUR		232	232	231	227	226
- EDE Norte		195	194	194	194	194
JVs/PPAs		640	640	640	640	640
Gross CDEEE Generation		1,680	1,740	3,441	7,034	7,000
Energy Exchanges						
Imports		0	0	0	0	0
Exports		0	0	0	0	0
add Net Exchanges		0	0	0	0	0
Gencos deregulated Sales		1,580	1,612	1,644	1,677	1,710
Purchases by - EDE Este		3,855	4,054	3,707	2,710	2,960
- EDE SUR		4,199	4,408	3,966	2,821	3,049
EDE Norte		3,533	3,691	3,332	2,413	2,612
EDE Purchases from Gencos		11,586	12,152	11,005	7,943	8,621
Net Injection to Transmission System		14,846	15,504	16,090	16,654	17,332

**Dominican Corporations of State Electrical Companies (CDEEE)
Consolidated Income Statement - Distribution**

Schedule 5.2 (a).

(DR\$ million)

	Actual	-----Projected-----				
	2014	2015	2016	2017	2018	2019
Sales of Energy - ETED (transmission losses)	0	0	0	0	0	0
- Tariff Customers	69,855	65,975	71,661	78,867	86,263	94,315
CDEEE Hlds/(Spot Trading)	0	0	0	0	0	0
Other	6,048	8,380	8,380	8,380	8,380	8,380
Sales of Electricity	69,855	65,975	71,661	78,867	86,263	94,315
Access and use of distribution system	0	0	0	0	0	0
Consumer subsidies	0	0	0	0	0	0
Capitalized own work	0	0	0	0	0	0
Other - Ancillary Services	0	1,169	1,205	1,255	1,303	1,348
- Revenues	1,366	0	0	0	0	0
Total Operating Revenues	71,221	67,144	72,866	80,122	87,566	95,663
<i>Operating expenses:</i>						
Purchase of imported electrical energy	0	0	0	0	0	0
Purchases from	0	11,690	12,364	18,051	18,051	18,051
- EGEHID	0	0	0	0	0	0
- PUNTA CATALINA 1&2 TTP	0	0	0	0	0	0
- ETED (Transmission)	0	0	0	0	0	0
- GENCO/PPPs	0	75,853	82,223	72,964	51,949	57,453
- JVs	0	3,934	4,053	4,222	4,383	4,536
- Tariff Customers	0	0	0	0	0	0
- Other	84,855	0	0	0	0	0
Purchase of Domestic Energy:	84,855	91,477	98,640	95,238	74,384	80,040
Staff Costs - wages	3,951	4,065	4,065	4,065	4,065	4,065
- benefits	0	0	0	0	0	0
Cost of electricity - activities	0	0	0	0	0	0
- own account	0	0	0	0	0	0
Purchase of Fuel - coal	0	0	0	0	0	0
- liquid fuel and gas	0	0	0	0	0	0
Maintenance	331	0	0	0	0	0
Purchase of raw materials	2,530	6,626	6,626	6,626	6,626	6,626
Depreciation of Fixed Assets	888	1,628	1,666	1,877	2,296	2,493
Supply and services - Transmission Fees	0	6,034	6,509	7,053	7,591	8,193
- distribution fees	0	0	0	0	0	0
- Other	0	0	0	0	0	0
Supply and services		6,034	6,509	7,053	7,591	8,193
Self-constructed assets	0	0	0	0	0	0
Regulatory Institutional Fees	0	648	702	774	847	928
Provision for bad debts	719	0	0	0	0	0
Insurance	0	87	94	110	114	109
Other office Expenses (telecoms, bank charges, services etc)	7,307	793	696	696	696	696
Municipal Compensation	0	1,945	2,105	2,323	2,542	2,784
Total Operating Expenses	100,582	113,303	121,102	118,762	99,161	105,935
Gross Operating Profit	(29,360)	(46,159)	(48,236)	(38,641)	(11,595)	(10,272)
EBITDA	(28,472)	(44,532)	(46,570)	(36,763)	(9,299)	(7,779)
<i>Financial Revenues:</i>						
Interest income	0	0	0	0	0	0
Exchange rate gains	233	0	0	0	0	0
Other financial and non financial income	3,449	0	0	0	0	0
Total Financial Revenues:	3,682	0	0	0	0	0
<i>Financial Expenses:</i>						
<i>Interest Payments - EPS Hld Co.</i>						
- World Bank	0	0	0	0	0	0
- Other	0	153	253	335	371	398
- Overdraft	0	0	0	0	0	0
Interest Payments		153	253	335	371	398
Exchange Losses/(gains)	2	0	0	0	0	0
Other financial and non financial expenses	1,966	0	0	0	0	0
Total Financial expense	1,968	153	253	335	371	398
Net Financial Expenses	(1,714)	153	253	335	371	398
Profit before taxes and extraordinary items	(27,646)	(46,312)	(48,489)	(38,976)	(11,965)	(10,670)
Extraordinary income/(expense)	204	0	0	0	0	0
Government Susidy (FETE etc)	1	0	0	0	0	0
Profit before taxes	(27,441)	(46,312)	(48,489)	(38,976)	(11,965)	(10,670)
Tax on Profit	4	0	0	0	2,416	3,340
Profit of the year	(27,445)	(46,312)	(48,489)	(38,976)	(14,381)	(14,010)
Less Dividend (10%)	0	0	0	0	0	0
Net Distributable Profits	(27,445)	(46,312)	(48,489)	(38,976)	(14,381)	(14,010)

Schedule 5.2 (b).

Dominican Corporations of State Electrical Companies (CDEEE)
Consolidated Cashflow Statement - Distribution

(DRS million)

	Actual	Projected				
	2014	2015	2016	2017	2018	2019
A. Operating activities:						
Net income		(46,312)	(48,489)	(38,976)	(14,381)	(14,010)
add						
Depreciation of Fixed Assets		1,628	1,666	1,877	2,296	2,493
Releases of grants		0	0	0	0	0
Provision for Bad Debts		0	0	0	0	0
Other non monetary items		0	0	0	0	0
Cash generated by operating activities	0	(44,684)	(46,823)	(37,099)	(12,086)	(11,517)
Adjustments for:						
(Increase)/Decrease in inventory		0	0	0	0	0
(Inc)/dec in Accounts Receivable - EGEHID		0	0	0	0	0
- JVs		0	0	0	0	0
- Punta Catalina (1&2) TPP		0	0	0	0	0
- ETED(Transmission)		0	0	0	0	0
- Distribution - EDE ESTE		0	0	0	0	0
- EDE SUD		0	0	0	0	0
- EDE NORTE		0	0	0	0	0
- Tariff Customers		(2,303)	(2,707)	(2,683)	(2,836)	(2,855)
- CDEEE Corporate(incl Trading)		0	0	0	0	0
- Gencos		0	0	0	0	0
(Inc)/dec in Accounts Receivable	0	(4,606)	(5,414)	(5,366)	(5,673)	(5,710)
(Increase)/Decrease in Prepaid expenses		0	0	0	0	0
(Increase)/Decrease in State Receivables		0	0	0	0	0
(Increase)/Decrease in Other Receivables		0	0	0	0	0
Inc/(Dec) in payables to suppliers		(11,549)	0	0	0	0
(Inc)/dec in Accounts Payable - EGEHID		1,441	83	701	(0)	0
- JVs		0	0	0	0	0
- Punta Catalina (1&2) TPP		0	0	0	0	0
- ETED(Transmission)		744	59	67	66	74
- Distribution - EDE ESTE		0	0	0	0	0
- EDE SUD		0	0	0	0	0
- EDE NORTE		0	0	0	0	0
- CDEEE Corporate (incl Trading)		485	500	521	540	559
- Gencos		(12,645)	785	(1,141)	(2,591)	679
Increase/(Decrease) in Accounts Payable	0	(9,975)	1,427	147	(1,984)	1,312
(Inc)/Dec in allowances for foreign transactions, net		0	0	0	0	0
Increase/(Decrease) in taxes payable		0	0	0	0	0
Increase/(Decrease) in due to personnel		0	0	0	0	0
Increase/(Decrease) in short-term due to state		0	0	0	0	0
Increase/(Decrease) in accrued expenses		0	0	0	0	0
Increase/(Decrease) in Provisions		0	0	0	0	0
Increase/(Decrease) in short-term payables	0	0	0	0	0	0
Net cash flow from/(used in) operating activities	0	(70,815)	(50,810)	(42,318)	(19,743)	(15,914)
B. Investment activities:						
(Increase)/Decrease in financial investments		0	0	0	0	0
(Increase)/Decrease in intangible assets		0	0	0	0	0
(Increase)/Decrease in Other Assets		0	0	0	0	0
Purchase Fixed Assets(-)		(764)	(4,223)	(8,370)	(3,947)	(468)
Sales of fixed assets and disposals		0	0	0	0	0
Cash flow used in investment activities	0	(764)	(4,223)	(8,370)	(3,947)	(468)
C. Financing Activities:						
Increase in Phase II loans due to banks financial institutions(+)						
OFID		299	1,208	1,061	361	0
IDB		465	1,999	1,302	0	0
World Bank loan		0	317	2,305	3,015	468
EIB		0	699	3,702	571	0
Other		0	0	0	0	0
Long-term Loan Drawdowns(+)		764	4,223	8,370	3,947	468
OFID		0	0	0	0	0
IDB		0	0	0	0	0
World Bank loan		0	0	0	0	0
EIB		0	0	0	0	0
Other		(5,444)	0	0	0	0
Long-term Loan Repaments(-) - World Bank		(5,444)	0	0	0	0
Other Non Current Liabilities(-)		0	0	0	0	0
Dividends paid(-)		0	0	0	0	0
Capital stock increase/decrease		0	0	0	0	0
Cash flow from financing activities	0	(4,680)	4,223	8,370	3,947	468
Generated/(absorbed) cash flow	0	(114,638)	(89,791)	(58,309)	(9,667)	12,484
Cash and bank at the beginning of the period		1,010	(113,628)	(203,420)	(261,729)	(271,396)
Cash and bank at the end of the period	1,010	(113,628)	(203,420)	(261,729)	(271,396)	(258,912)

Dominican Corporations of State Electrical Companies (CDEEE)
Consolidated Balance Sheet - Distribution

(DR\$ millions)

	Actual		Projected			
	2014	2015	2016	2017	2018	2019
ASSETS						
Non-current assets						
Property, Plant and Equipment	38,997	43,593	44,357	48,580	56,950	60,898
Work in Progress	4,596	764	4,223	8,370	3,947	468
Cumulative Depreciation	7,781	9,408	11,075	12,952	15,247	17,740
Financial Receivables	0	0	0	0	0	0
Net Fixed Assets	35,812	34,949	37,505	43,999	45,650	43,625
Intangible assets	0	0	0	0	0	0
Financial Investments	0	0	0	0	0	0
Other Assets	588	588	588	588	588	588
Total non-current assets	36,400	35,536	38,093	44,586	46,238	44,213
Current assets						
Inventory	2,313	2,650	2,650	2,650	2,650	2,650
Accounts Receivable	15,151	17,455	20,161	22,845	25,681	28,536
Provision for bad debts	0	0	0	0	0	0
Prepaid expenses and advance payments	366	366	366	366	366	366
Cash and Bank	3,162	0	0	0	0	0
State	10,808	10,808	10,808	10,808	10,808	10,808
Other	6,567	6,567	6,567	6,567	6,567	6,567
Allowance for foreign transaction	0	0	0	0	0	0
Total Current Assets	38,367	37,846	40,552	43,235	46,072	48,927
Total Assets	74,767	73,382	78,646	87,822	92,310	93,139
EQUITY AND LIABILITIES						
Equity						
Share Capital	49,487	49,487	49,487	49,487	49,487	49,487
Registered Unpaid Capital	0	0	0	0	0	0
Revaluation Reserve	1,704	1,704	1,704	1,704	1,704	1,704
Reserves	0	0	0	0	0	0
Retained Earnings/(accumulated losses)	(131,695)	(147,138)	(193,450)	(241,939)	(280,915)	(295,296)
Net Retained Profit/(loss) of the year	(15,443)	(46,312)	(48,489)	(38,976)	(14,381)	(14,010)
Total Equity	(95,947)	(142,259)	(190,748)	(229,724)	(244,105)	(258,115)
Non-current liabilities						
Financial loans	36,682	37,447	41,670	50,040	53,987	54,455
Government Grant	0	0	0	0	0	0
Others	8,142	8,142	8,142	8,142	8,142	8,142
Total non-current liabilities	44,825	45,589	49,812	58,182	62,130	62,597
Current-Liabilities						
Financial Loans	5,444	0	0	0	0	0
Bank Overdraft	2,152	73,284	121,387	161,021	177,927	190,987
Payables - Suppliers (goods & materials)	12,378	828	828	828	828	828
Energy Accounts Payable	0	1,441	1,524	2,226	2,226	2,226
- EGEHID	0	0	0	0	0	0
- JVs	0	0	0	0	0	0
- Punta Catalina (1&2) TPP	0	0	0	0	0	0
- ETED(Transmission)	0	744	803	870	936	1,010
- Distribution - EDE ESTE	0	0	0	0	0	0
- EDE SUD	0	0	0	0	0	0
- EDE NORTE	0	0	0	0	0	0
- CDEEE Corporate(incl Trading)	0	485	985	1,505	2,046	2,605
- Gencos	21,997	9,352	10,137	8,996	6,405	7,083
Payables Energy Purchases	21,997	12,022	13,449	13,596	11,612	12,924
Taxes payable	0	0	0	0	0	0
Personnel	0	0	0	0	0	0
State/CDEEE	45,070	45,070	45,070	45,070	45,070	45,070
MoF	0	0	0	0	0	0
Accrued Expenses	0	0	0	0	0	0
Other	38,847	38,847	38,847	38,847	38,847	38,847
Provisions	0	0	0	0	0	0
Account Payable	118,292	96,767	98,194	98,342	96,357	97,669
Total Current Liabilities	125,888	170,051	219,581	259,363	274,285	288,656
Total Liabilities	170,713	215,640	269,393	317,545	336,414	351,254
Total Liabilities and shareholder's equity	74,766	73,381	78,645	87,821	92,309	93,139
Overall Financial Indicators:						
ERI	66.6%	69.1%	71.6%	74.1%	76.6%	
CRI	84.8%	86.2%	87.8%	89.0%	90.4%	
Working Ratio	0.8	(0.7)	(0.6)	(0.5)	(0.1)	(0.1)

**Dominican Republic Distribution Grid Modernization Project
Incremental Economic and Financial Evaluation 2015-2030**

Distribution System

(DR\$ million)

	Incremental Economic Benefits								Incremental Financial Benefits							
	Billed Sales (GWh)	Loss Reduction (%)	Project Benefits			Capital Investment ⁵	O&M Costs	Net Economic Benefits	Billed Sales (GWh)	Loss Reduction (%)	Project Benefits		Capital Investment	O&M Costs	Income Tax	Net Financial Benefits
			Technical Losses ²	Reduced Consumption ³	Inc in Availability ⁴						Energy Losses ²	Improved Collections				
1	607	0.0%	0	0	0	0	0	0	607	0.0%	0	0	0	0	0	0
2	607	0.0%	0	0	149	317	10	(178)	607	0.0%	0	0	317	10	0	(327)
3	614	0.5%	25	187	595	2,305	79	(1,577)	614	11.9%	688	34	2,305	79	0	(1,662)
4	625	1.0%	52	308	587	3,015	169	(2,238)	625	21.4%	1,414	68	3,015	169	1	(1,704)
5	640	1.5%	80	319	621	468	183	370	640	25.0%	1,776	72	468	183	292	905
6	655	2.0%	110	322	639	0	183	887	655	25.3%	1,848	74	0	183	433	1,307
7	671	2.0%	112	331	654	0	183	913	671	25.4%	1,895	76	0	183	445	1,343
8	687	2.0%	115	339	668	0	183	939	687	25.4%	1,939	78	0	183	456	1,377
9	704	2.0%	118	349	684	0	183	968	704	25.4%	1,987	80	0	183	469	1,414
10	721	2.0%	121	358	700	0	183	996	721	25.4%	2,036	82	0	183	482	1,453
11	739	2.0%	124	369	716	0	183	1,025	739	25.4%	2,088	84	0	183	495	1,493
12	757	2.0%	127	379	734	0	183	1,056	757	25.4%	2,139	86	0	183	508	1,533
13	775	2.0%	130	390	751	0	183	1,087	775	25.4%	2,191	88	0	183	522	1,574
14	775	2.0%	130	390	751	0	183	1,087	775	25.4%	2,191	88	0	183	522	1,574
15	775	2.0%	130	390	751	0	183	1,087	775	25.4%	2,191	88	0	183	522	1,574
								NPV ¹								NPV ¹
								DR\$	1,129							DR\$
								million								million
								EIRR	16.4%							FIRR
																27.5%

¹ Net present value at a 10 percent social rate of discount

² Calculated at avoided cost of standgy generators

³ Savings of reduced consumption due to reduction of non-technical losses

⁴ Power required at long-run marginal (Punta Catalina) to avoid standby generation/load shedding

⁵ No import duties or other levies imposed under the project

Annex 6: Detailed Overview of the Sectoral Background and Electricity Distribution System and ongoing Rehabilitation Program

DOMINICAN REPUBLIC: Distribution Grid Modernization and Loss Reduction Project (P147277)

Sectoral Background

1. In 2001, an Electricity Law was passed to create a modern legal and regulatory framework, including the creation of a new policy making institution the National Energy Commission (CNE) and an energy sector regulatory institution, the Superintendence of Energy (SIE).

2. **Policy and Regulatory Institutions:** The CNE is in charge of energy policy-making and advising the executive branch on matters related to the energy sector. However, in practice many of the policy-making roles have been assumed by the CDEEE. The roles and responsibilities of the CNE are expected to be taken over by the Ministry of Energy and Mines once the energy arm of this ministry is established (probably in 5 years' time). The SIE is in charge of setting and adjusting electricity tariffs, ensuring service quality, and provides technical support to Procuraduria General Adjunta para el Sector Electrico -PGASE (Deputy Attorney General's Office for the Electric Sector) to combat electricity theft and fraud. The Consumer Protection Office (PROTECOM) also falls under the SIE.

3. **Generation-Transmission:** The DR's 1,875 MW electricity market comprises separate generation, transmission, and distribution companies. Privately owned generation capacity accounts for 67 percent of the country's total installed capacity (2,800MW) with the remainder being public-private and purely public companies. Most of the electricity is generated using fuel oil (37.2 percent) and natural gas (30.9 percent). The remainder comes from coal (14.3 percent), hydro (13.2 percent) and wind (4.4 percent). There are also two joint-venture companies that are public-private partnerships, which account for 28 percent of total capacity (883 MW) and run on mostly fuel oil and some coal. There is one state owned hydroelectric company, EGEHID, which accounts for 13.21 percent of total installed capacity (603 MW). ETED is the publically owned company in charge of electricity transmission, maintaining the national interconnected transmission network, and preparing the country's transmission expansion plan. Both EGEHID and ETED are controlled by CDEEE. The electricity market include two markets; the Contract Market and the Spot Market. The Market Coordinator of the Interconnection National Electric System (OC-SENI) controls and reconciles the physical and financial energy transactions in the Contract and Spot market.

4. The main challenges faced by the power sector that affect economic growth in the DR are the high generation costs. Around 57 percent of the energy purchased in the DR is linked to expensive fuel oil costs. Consequently, the marginal cost of electricity purchased was high at 18 cents/kWh in June 2014. In January 2014, peak demand was 1,875 MW. Despite high generation costs, electricity tariffs have not been consistently adjusted to reflect increases in international oil prices. For instance: (a) in 2012, average tariffs charged were about 20.4 cents/kWh; well below the average indexed tariff of 30 cent/kWh, increasing the country's power sector deficit; (b) high

distribution system commercial losses were incurred due to weaknesses in billing and collections and illegal connections. In June 2014, total distribution losses in the DR were 32.7 percent, far above the average for LAC that is between 12-15 percent; (c) tariffs fixed below cost recovery levels; and (d) deteriorating efficiency and quality of service provided by the EDEs due to high levels of losses and resulting poor financial situation, which increases resistance from end-users to pay for electricity.

5. Because of this situation, the revenues obtained from electricity sales are significantly below the cost of power purchases, which undermines the financial sustainability of the country's three distribution companies (EDEs) making it difficult for the EDEs to pay both ETED and generators on a regular basis. This has caused so-called 'financial blackouts' as generators cut off power supply when they are unable or unwilling to finance fuel purchases and whenever the EDE's lag behind on their payments to the generators.

Distribution System

6. The distribution system in the Dominican Republic is divided into three regions that are similar in size with respect to average energy consumption, yet differences are observed in the composition of the distribution users with higher industrial consumption in the South and higher residential share in the North. Losses' due to uncollected bills average US \$57.8 million, with the highest losses observed in Ede Sur and the lowest in Ede Norte.

7. A description of each EDE's system is given below:

8. **EDE Norte Dominicana, S.A. (EDE Norte):** EDE Norte has the franchise for the commercialization and distribution of electric power in the 14 provinces of the Dominican Republic's Northern Region, including: Santiago Sector (Santiago), La Vega Sector (La Vega, Monseñor Nouel, Espaillat), Mao Sector (Valverde, Monte Cristi, Santiago Rodriguez, Dajabón), Puerto Plata Sector (Puerto Plata), and San Francisco Sector (Duarte, Sánchez Ramírez, Hermanas Miralba, María Trinidad Sánchez, Samaná).

9. **EDE Sur Dominicana, S.A. (EDE Sur):** EDE Sur has the franchise for the commercialization and distribution of electric power in the southern region of the Dominican Republic, from the west side of the Máximo Gómez Avenue in the Distrito Nacional to the border province of Elías Piña, including: Distrito Nacional (Distrito Nacional, Santo Domingo), San Cristóbal Sector (San Cristobal), San Juan Sector (San Juan, Elías Piña), Barahona Sector (Barahona, Batoruco, Pedernales, Independencia) and Azua Sector (Azua, Peravia, San José de Ocoa). The Company serves customers in 21 commercial offices and in 40 local express offices throughout the region.

10. **EDE Este Dominicana, S.A. (EDE Este):** EDE Este has the franchise for the commercialization and distribution of electric power in the Eastern Region of the Dominican Republic, from the east side of the Máximo Gómez Avenue in the Distrito Nacional to the province of La Altagracia, including: Central Sector (Distrito Nacional), Norte Sector (Santo Domingo Norte, Monte Plata), Oriental Sector (Santo Domingo Este), and Este Sector (San

Pedro de Macorís, La Romana, La Altagracia, Seibó, Hato Mayor). The Company serves customers in 13 commercial offices and in 52 local express offices throughout the region.

11. Table 6.1 below summarizes the main features of the DR electricity distribution system.

Table 6.1: Description of the distribution system in the Dominican Republic

	EDE Norte	EDE Sur	EDE Este	TOTALS	Average
System					
Average Monthly Energy (GWh)	315	376	336	1,027	342
Number of Consumers	744,584	591,369	608,211	1,944,164	648,055
Revenue collection for Energy (GWh)	210	267	215	692	231
Average monthly energy loss (%)	33%	29%	36%		33%
Commercial energy losses' costs (Mill USD)	53.2	63.5	56.8	173.5	57.8
Average revenue collection (%)	96%	98%	94%		96%
Regulated Consumer Share by Type					
Residential	52%	39%	38%		43%
Commercial	10%	5%	10%		8%
Industrial	15%	29%	23%		22%
Government and City Halls	11%	12%	14%		12%
Distribution System					
Number of Substations	79	50	43	172	57
Transport Capacity (MVA)	1,089	1,388	1,376	3,853	1,284
Number of Circuits	192	194	164	550	183
Coverage area (sq.km)	16,274	11,700	11,700	39,674	13,225
Network Length (medium voltage) (km)	11,000	6,890	6,691	24,581	8,194
Number of Distribution Transformers	45,689	40,336	34,462	120,487	40,162
Number of Distribution Posts	185,504	122,010	222,981	530,495	176,832

Commercial Losses and Deficit of the Distribution Companies

12. Sectoral studies of the Dominican electricity sector estimate that around 32.1 percent of electricity sold by the generators to the distribution companies (EDEs) and supplied to end-users through the distribution networks is not invoiced for. In addition, the internal sources that contribute to the deficit include: high operating costs of the distribution companies, ineffective business management by the EDEs, deficient metering, inaccurate billing, poor collection, and long-standing frozen tariffs rates.

Business Performance

13. If the EDEs had acceptable commercial losses, i.e., within the region average of 12 percent, then they would be able to recover around 2,121 GWh/year, or the equivalent of US\$347 million/year. However, of the country's more than 10 million inhabitants, about 2,002,985 are clients with contracts, of which approximately 1.2 million (i.e., 55 percent) are

paying customers. These include 548,440 (i.e 27 percent) clients with contracts, but have no meters and are billed a flat rate, which leads to the squandering of energy and increasing losses. Only 1,050,319 (52.4 percent) receive 24-hr electricity supply. Approximately 385,683 (i.e 19 percent) contracted clients do not pay their bills, are unsatisfied with the poor service they receive and nearly 500,000 end-users (25 percent) have illegal connections.

14. This insolvency has left the distribution companies without the resources to make the necessary improvements to business performance. More importantly, the distribution companies do not collect enough money to pay their operating costs, especially payments to generators for contracted capacity, thus burdening the Dominican state to provide millionaire subsidies annually.

15. The deficit is so great that, in 2014, the distribution companies required approximately US \$1.2 billion in taxpayers subsidies. The deficit has been growing in the last years. In 2010 the subsidy was US \$700 million while, in 2014, it was US \$1.2 million, which represents between 2 and 3 per cent of the country's GDP. While the government's subsidies to the sector have allowed the EDEs to honor their contracts with the private sector generators, this arrangement is not sustainable in the long run. Investment in other sectors such as health and education are affected due to heavy subsidies in the electricity sector.

Description of the planned 'Distribution Grid Modernization an Electrical Losses Reduction Program'.

16. In 2009, the 'Action Plan to Modernize the Power Sector of the Dominican Republic' was developed by CDEEE. The plan identified the sector's main problems and became the strategy for guiding sectorial policies and decisions to restore the sustainability of the Transmission and Distribution companies.

17. The Distribution Grid Modernization an Electrical Losses Reduction Program (DGMELRP) was a central component of the above plan and it outlined a fundamental strategy to rehabilitate the distribution systems given their financial shortcomings resulting from poor management, inadequate maintenance, and commercial losses. The adopted strategy was to rehabilitate the MV and LV networks, expand remote metering of high consumption end-users, and bring end-users back into a disciplined commercial cycle (regular metering, billing, and collection).

Phase I of Distribution Grid Modernization an Electrical Losses Reduction Program

18. For execution of the first stage of the DGMELRP, CDEEE sought financing support from the World Bank, the Inter-American Development Bank, and the OFID. Contributions of a US \$42 million IBRD loan PO89866 plus the US \$40 million Inter-American Development Bank (IDB) loan, and the US \$30 million OPEC Fund for International Development (OFID) loan, helped reduce the national distribution losses from 40.5 percent in 2008 to 35.6 percent in 2012. However, only 10 percent of the distribution system's circuits were rehabilitated.

19. During Phase I, CDEEE and the EDEs reduced commercial losses in the rehabilitated areas to an average of around 12 percent to 18 percent and about 210,000 illegal end-users in 45 circuits were converted to regular customers. The contribution of the World Bank to this first phase resulted in an average reduction of commercial losses by 27 percent, achieving remarkable results in some sectors, as follows:

- Reduction of commercial losses from 81 percent to 25.5 percent in the section El Palmar - Este (EDE Sur) where approximately 0.9 GWh are supplied monthly;
- Reduction of commercial losses from 25 percent to 18 percent in Ciudad de la Vega, La Cigua, Guarrionex (EDE Norte) where approximately 2.1 GWh are supplied monthly;
- Reduction of commercial losses from 21 percent to 14.7 percent in the Alma Rosa, Los Mina, La Italia etc (EDE Este) where approximately 4.1 GWh are supplied monthly.

Additional achievements of the World Bank supported Phase I Distribution Networks Rehabilitation include:

- Cash collections increased in the rehabilitated circuits by an average of 10.7 percent to achieve approximately of 95.4 percent;
- the CRI increased by 30.5 percent points to achieve an average of 67.9 percent;
- 74,827 metered points were technically upgraded (normalized);
- 353 kilometers of distribution networks were rehabilitated;
- 99,352 customers in the rehabilitated circuits increased the hours of electricity supply to 24 hours;
- Increase in the Citizens Satisfaction Levels from 20 percent at the beginning of the project to 90 percent at the end of the project;
- Training of 370,000 citizens in the Efficient Use of Electricity;
- Contact with 180,000 families to raise awareness on educated on efficient energy use aspects.

Phase II - Distribution Grid Modernization and Electrical Losses Reduction Program.

20. The new Government that took office in mid-2012 defined in its 2013-2016 Comprehensive Plan for the Electric Power Sector a new DGMELRP that covers the entire business cycle (i.e network rehabilitation, metering, billing, and collection for energy delivered), as well as institutional strengthening of the EDEs. The overall objective was to reduce the levels of losses in the rehabilitated circuits from the 32.1 percent to 25.2 percent in four years. The Specific Program Objectives included:

- ✓ Remote-metering of 490,000 clients;
- ✓ Deployment of 31,693 Macro-meters and totalizers across the three EDEs;
- ✓ Rehabilitation of 4,837 km of networks in areas identified and prioritized by the three EDEs, in a period of 4 years;
- ✓ Decrease of total commercial losses by approximately 10.4 percent in the 3 EDEs;
- ✓ Normalization of 766,500 metered points in different communities with vulnerable networks;

- ✓ Training of communities in the rehabilitated circuits;
- ✓ Rehabilitation of meter panel boards with anti-theft technology.

Table 6.2: Summary of the Distribution Grid Modernization and Electrical Losses Reduction Program for the period 2014-2017

Activity	2014	2015	2016	2017	Objectives for 2017
Remote metering	170,000	200,000	65,000	55,000	490,000
Macro-metering and Totalizers	11,013	12,933	4,200	3,547	31,693
Rehabilitated networks (kms)	883	1,203	1,375	1,374	4,837
Normalized End-users	128,371	175,000	200,000	200,000	703,371
Loss reduction (%)	1.6	2	3.2	3.2	10.4
Loss Reduction (%)	34	32	28.8	25.6	25.2
Program Total Investment Cost (USD million)	\$ 118	\$ 156	\$ 152	\$ 151	\$ 576

21. The table below summarizes the estimated program costs:

Table 6.3: Investment Cost of the Rehabilitation works

	Remote-Metering (in US \$ millions)	Macro-Metering and totalizers (in US \$ millions)	Rehabilitation of networks and normalization of end-users (in US \$ millions)	Total (in US \$ millions)
Conceptual and Final Design	0.245	0.175	2.46	2.88
Equipments	35.77	25.55	359.16	420.48
Installation	11.515	8.225	115.62	135.36
Supervision	1.47	1.05	14.76	17.28
Sub-Totals	49	35	492	576

Multilateral Development Bank Support to Phase II.

22. The current financial constraints of the three EDEs did not allow them to assume the necessary investment envisioned under the planned DGMELRP. For this reason, the Dominican government sought financial support from International Finance Institutions (IFIs).

23. The total amount committed by the IFIs to support the Distribution Grid Modernization and Electrical Losses Reduction Program in the DR amounts to US \$358 million. This amount falls short of the DGMELRP estimated costs of US \$576 million originally envisioned by CDEEE. Accordingly, the DGMELRP will end up having a lesser scope and the corresponding loss reduction impact will be a more modest and achievable 6 percent instead of the 10 percent originally anticipated. However, this reduction of losses by 6 percent is not trivial. Phase II contemplates an investment of US \$358 million that will help intervene in 103 circuits of which a total of 64 circuits will be rehabilitated with support from the World Bank, the IDB, the OFID and the EIB. This second phase will benefit from a contribution of US \$120 million by the World

Bank, US \$100 million by the European Investment Bank, US \$78 million by the Inter-American Development Bank, and US \$60 million by OFID. Phase II of the World Bank Distribution Grid Modernization and Loss Reduction Project complements the network rehabilitation efforts initiated under Phase I.

24. Phase II includes the rehabilitation of 3,668.8 kilometers of distribution network; the replacement of 16,637 Medium Voltage and Low Voltage post transformers, the technical upgrade (normalization) of the electrical interconnection for 432,966 end-users; the conversion of 227,420 illegal connections to regular clients; and the installation of 334,556 remote meters to an equal number of end-users.

25. The World Bank will finance the rehabilitation of 18 distribution circuits; the replacement of conventional meters with remote meters; the installation of remote metering systems; and the increase of the number of hours of electricity supply to 24hr service in all circuits rehabilitated, as follows: a) technical upgrade (normalize) the electrical interconnection of 123,270 customers; b) conversion of 73,550 illegal users to regular clients; c) rehabilitation of 1,003 km of distribution networks, d) installation of remote meters to 138,153 end-users; e) installation of 9,002 micro-meters; f) installation of 114 macro-meters, g) replacement of 3,401 MV/LV post transformers and h) increase of the hours of electricity supply service to all clients in the rehabilitated circuits. The second phase of the DGMELRP will be supported by four IFIs providing resources as described in the table below:

Table 6.4: Financing arrangements for second phase of the DGMELRP

Component	Component Description/IFI	OFID	IDB	World Bank	EIB*	TOTAL
Component 1	Networks Rehabilitation (in US \$ million)	54.2	67.2	101.2	95.0	317.6
Component 1.1	Strengthening of the EDE's environmental management plan (EMP) (in US \$ million)	0.0	0.0	2.4	0.0	2.4
Component 2	Social Management (in US \$ million)	3.0	3.0	4.56	1.1	11.66
Component 3	Business performance management and demand management (in US \$ million)	0.0	2.3	3.61	2.9	8.8
Component 3.1	Monitoring and evaluation of Distribution Grid Modernization and Electrical Losses Reduction Program (in US \$ million)	2.8	5.5	8.24	1.0	17.54
Component 4	Complimentary Tariff Study	0.0	0.0	0.35	0.0	0.35
Front End Fee				0.30		
TOTAL Loan amount by IFI (in US \$ million)		60.0	78.0	120.00	100.0	358.35

*Note: * the European Investment Bank was approached by the World Bank to partake in this investment program.*

26. The Project will also help raise awareness on the rational use of electricity and will help encourage energy efficiency actions. A total of 150,000 families will be educated on efficient energy use aspects and the project will sponsor lectures for 28,000 adults and 33,000 children. The goal is to reduce the commercial losses in the rehabilitated circuits by an estimated 25 percent, from an average of 39 percent for the 18 circuits down to 13.5 percent. This will

positively impact the financial performance of the EDEs. The table below shows the rehabilitation investments by IFI.

Table 6.5: Investments supported by IFIs

Investments / IFI	OFID	IDB	WB	EIB	TOTAL
Conventional MV Network (km)	1	117	15	304	437
Anti-Theft MV Network (km)	511	838	988	894	3,232
Conventional LV Network (km)	0	0	0	319	319
Anti-Theft LV Network (km)	510	853	1,011	899	3,273
New MV/LV transformers	3,086	4,060	3,401	6,090	16,637
Macro-metering	79	114	114	213	520
Micro-metering	6,053	8,161	9,002	9,848	33,064
Remote metering	55,932	68,771	117,396	82,648	324,747
Remote Connection/disconnection	8,252	9,476	20,757	NA	38,485
Remotely Metered Clients	64,184	78,247	138,153	82,648	363,232
Upgraded Metered Points	69,385	97,152	123,270	143,159	432,966
Remotely metered Energy (MWh/month)	20,091	29,354	28,847	23,061	101,353

27. The contribution to the reduction of losses by IFIs is illustrated in the table below:

Table 6.6: IFIs contribution to the reduction of losses

Item / IFI	OFID	IDB	WB	EIB	TOTAL
Loss Reduction	1.09	1.42	1.82	1.7	6.03

Program Beneficiaries

28. The Program direct beneficiaries will be the country's residential, commercial and industrial electricity consumers in the public and private sectors. Improved distribution networks would have the following effects on households, businesses and industry: (a) improve the quantity of electricity delivered as new more efficient and higher capacity overhead power lines and transformers, as well as normalization of illegal connections, will increase the amount of energy available for commercial and productive uses and decrease the system's average interruption duration; (b) improve the quality of the electricity service by reducing outages, improving the voltage profiles, and increasing the availability of the service in the rehabilitated circuits to 24-hour per day electricity supply service; (c) the country's population and economy and the sector will benefit from energy efficiency gains resulting from the reduction of electricity consumption after all investments are completed. This in turn will displace superfluous generation since reduction in demand and losses requires that less electricity be generated, thus leading to the reduction of ambient emissions associated with hydrocarbon fuel combustion by generators; (d) improve customer satisfaction and the EDEs image through the provision of better service and the EDEs improved performance; (e) improve the commercial cycle (regular

metering, billing and collection) leading to the increase of the EDEs' cash flow, as well as the recovery of business and operation performance; and (f) contain costs through reducing losses and improving the EDEs collection performance. Table 6.7 below summarizes Beneficiaries by type.

Table 6.7: WB financed EDE Este's Beneficiaries by Type

Type of End-user	EDE Norte	EDE Sur	EDE Este	TOTAL
Day-time Education Centers	116	329	36	481
Night-time Education Centers	29	29		58
Hospitals and Health Centers	21	60	5	86
Private Clinics	27	85	5	117
National Police and Armed Forces	16	23	4	43
Firefighting Brigade	4	5	2	11
Pumping stations	1	66	15	82
Residential	36,615	133,010	18,169	187,794
Commercial	4,502	9,441	250	14,193
Industrial	113	597	20	730

29. Indirect social benefits include: (a) reduction in night time crime rate and increase in public safety; (b) increased productivity and commercial activity; (c) end-users economic savings resulting from purchase of alternative generation (generators and/or small inverters) systems; (d) increase in the surplus value of the lots of land where electricity supply and public lighting is available; (e) reduction in expenses for repairs of equipment damaged by voltage drops/fluctuations; (f) declining levels of environmental contamination by lead resulting from reduction in the use of batteries following the increase in the available hours of service; (g) reduction of environmental pollution levels, caused by the use of diesel or gasoline generator.

AREA OF INFLUENCE, INVESTMENT SELECTION CRITERIA, AND TARGET BENEFICIARY GROUPS

30. The beneficiaries of the DGMELRP are distributed in different locations at the EDEs geographical jurisdiction. However, the priority geographic areas are mainly located in the following provinces: Distrito Nacional, Santo Domingo, San Cristóbal, Santiago, La Vega, Puerto Plata, Duarte (San Francisco de Macorís). The selection criteria for prioritizing the investments include:

- a) Selection of circuits with higher levels of losses and population density;
- b) Selection of circuits with higher social impact after the investment;
- c) Selection of circuits with diverse mix of social strata and income levels;
- d) Selection of circuits with high return on investment and reasonable payback period;
- e) Selection of circuits with opportunities for higher energy payment collection.

31. The project will have an impact on different types of social groups, including:

- a) Areas with high incidence of low income residents. These are districts that have the largest number of deteriorated networks, highest wasteful use of energy, and lowest electricity supply service availability. The network rehabilitation component focuses on those areas.
- b) Areas with more affluent sectors where end-users can pay for the electricity supply service and energy consumption, but have had long-lasting power cuts due to power lines deterioration and the culture of non-payment. The investments in these areas include: macro-metering, remote-metering, anti-theft panels, and some networks rehabilitation works; and
- c) Areas with high income residential, commercial and industrial End-users. In these areas energy is lost mainly due to theft, although comparatively to the previous groups this represents a smaller group of end-users, the amount of energy lost in these areas is significant. The investments in these areas mostly include: macro-metering and remote-metering.

Annex 7: Social Impact

DOMINICAN REPUBLIC: Distribution Grid Modernization and Loss Reduction Project (P147277)

1. According to a study conducted by the CEPAL and the Government of the Dominican Republic in 2009 named ‘Dominican Republic in 2010: Towards a cohesive nation’, one of the main bottlenecks for the country to achieve greater development is the electricity sub-sector. In national surveys in the country, the problems of the electricity sub-sector are ranked as the fourth major one and are even higher than delinquency and insecurity.
2. The prolonged crisis of the electricity sector resulted in lack of trust from the citizens in the EDEs and created a vicious circle. The fact is that EDEs do not have the capacity to provide energy for 24 hours and therefore some consumers do not want to pay the electricity bills, and others turn to theft through illegal connections. All this has led to a ‘culture of no service with a culture of no payment.’
3. To overcome the vicious circle described above, the ‘Outreach to Communities’ Component was included in the ‘Electricity Distribution Rehabilitation Project PO89866’, financed by the Bank and implemented from 2009 – 2013. The component complemented the rehabilitation of power distribution grids, and was aimed at reestablishing trust between EDEs and consumers, and thereby increasing the consumers’ willingness to pay. To this end, a Participatory Social Management Strategy was designed and implemented in all circuits rehabilitated by the Project. The Social Management Strategy comprised seven stages: (a) diagnosis of the socioeconomic characteristics of the neighborhoods and their use of electricity; (b) census of users of electricity service, with a breakdown of regular clients, customers in default, and illegal users; (c) design of the ‘24 Hours of Light Program’, based on the social and technical diagnoses; (d) information dissemination about the costs of power generation, transmission and distribution; the rights and obligations of consumers and EDEs; payment of bills, meter reliability, and consequences of electricity theft; (e) education about rational, efficient and safe use of energy; (f) signing of a ‘Social Agreement’ (*Pacto Social*) between the EDEs and the communities; and (g) monitoring and evaluation. Through the Social Agreement, the EDEs committed to providing electricity for additional hours, aiming for 24 hours per day as soon as feasible, and the communities committing to pay for electricity and the EDEs to regularize illegal connections
4. To implement the ‘Outreach to Communities’ Component, the EDEs strengthened the Social Management Units and hired 20 social development specialist and 96 community workers to work in the field. Additionally, a Social Management Interagency Committee of the Power Sector (*Comité Interinstitucional de Gestión Social del Sector Eléctrico – CIGES -*) was created to follow up on implementation of the ‘Outreach to Communities’ Component, exchange experiences and lessons, enhance the Social Management Strategy and methodologies, and prepare initiatives jointly. The Committee is comprised of the CDEEE, EDEs, the Office of the Superintendent of Electricity (*Superintendencia de Electricidad*) and the CNE.

5. The outputs and outcomes of the ‘Outreach to Communities’ Component were positive, as found by independent evaluators who conducted the ‘Social Management Strategy Evaluation’, and the ‘Impact Evaluation of the 24 Hours of Light Program’ in 2013, as well as by the Implementation Completion Report prepared by the Bank. Some of the main results and conclusions of these studies are as follows:

(a) The improved design of the ‘Community Outreach Component’ was innovative in that few Projects at the time had considered and demonstrated the effectiveness of participatory approaches to establish trust between the consumers and distribution companies with an aim to increase billing and promote demand side management. Ultimately, this component proved instrumental to the achievement of the PDOs as stated in the ICR.

(b) The ‘Community Outreach Component’ was extremely effective not only in enhancing customer understanding of the service (cost of service, reliability, and demand side management) and directly contributing to increased billing collection in the areas raised in the Project, but also in delivering other benefits or unanticipated impacts as stated in the ICR.

(c) One of the key issues to achieving the positive impacts of the ‘24 Hours of Light Program’ was the ‘Social Management Strategy’ through community organization, the ‘Social Agreements,’ the educational campaigns about the rights and duties of customers, and the support to households and business for adaptation to the new situation of having more electricity per day but to pay bills too (Impact Evaluation).

(d) The ‘Social Management Strategy’ was an innovative and unique experience in the country and in the concept of public services. It concluded that the strategy was relevant because of the need to restore trust between end-users and EDEs, and that participation and education have been key issues in the program. Efficacy was positively evaluated because the strategy achieved the stated objectives such as increasing the levels of payment, reducing theft and using energy more efficiently. It also stated that efficiency is good because of the positive relationship between inputs and outputs. The study concluded that the strategy’s activities that played a key role in the program are: information; motivation to the community; participation; training; empowerment through the Monitoring and Community Liaison Committees (*Comités de Seguimiento y Enlace – COSE*) and the Social Agreements; intervention in regularization of end-users; development of social solidarity activities; and community organization. The implementation of the strategy has led to less conflicts and has increased institutional trust (Social Management Strategy Evaluation).

6. Regarding the impact of the ‘24 Hours of Light Program’, some of the findings of the independent ‘Impact Evaluation of the 24 Hours of Light Program’ conducted in 2013 were the following:

(a) After the implementation of the ‘24 Hours of Light Program’, households reported reduced use of alternative sources of energy as follows: candle 100 percent, power

inverters 90 percent, oil lamps 85 percent and electric generators 50 percent. Data from businesses in terms of reduced usage was along the same lines: power inverters 95 percent, electric plants 90 percent, batteries 96 percent, candles 78 percent, oil lamps 86 percent. Improvement of the level of voltage was also reported as 74 percent, which in turn decreased damages in electrical equipment (84 percent).

(b) Households and businesses informed that they learned how to use energy efficiently (91 percent of households and 88 percent of businesses), and as a result they had monthly savings in electricity bills ranging from RD\$500 to RD\$1,000.

(c) Households reported the following benefits from availability of electricity 24 hours: (i) able to develop more activities at home (housework, study, recreation and work); (ii) conservation of food from refrigeration, less losses in food, possibility of buying more food at better price, and conservation of meals; (iii) knowledge about how to use electricity efficiently; (iv) better public safety due to public light; (v) control of fraudulent practices. In addition to these benefits, single female households highlighted the increased safety in public areas.

(d) Businesses reported the following benefits of having electricity 24 hours: (i) extended opening hours of operation for businesses; (ii) possibility of longer working hours; (iii) increased productivity; (iv) higher sales; (v) more customers; (vi) less damages in electrical equipment; and (vii) less use of alternative sources of energy. All the above had a direct impact on economic gains.

(e) Both households and business attested to better relationships with the EDES, and to a better community life with safety in public places and new opportunities to develop community activities. They also appreciated the role of community workers in the implementation of the Project. The majority of households and businesses were satisfied with the electricity service (94 and 88 percent, respectively).

7. The EDEs also conducted satisfaction customer surveys before implementing the ‘24 Hours of Light Program,’ during the implementation of the program and after completion. The results of the satisfaction surveys are presented in the next Table. It can be seen that the percent of customers satisfied after the implementation of the Program increased significantly. Ede Sur is the company that obtained the highest level of satisfaction.

Table 7.1: Percent of Customers Satisfied with the Service

Distribution Company	Before	During	After
Ede Este	26	28	74
Ede Norte	18	17	93
Ede Sur	23	54	97
Average	22	33	88

8. In addition to the activities included in the Social Management Strategy, the EDEs also supported the formal training of 122 young people (male and female) as electrical technicians to work actively in their communities to improve in-house electrical installations, repair electrical

equipment and provide training about the efficient use of energy. Another innovative activity was the improvement of the in-house electrical installations of 120 houses for vulnerable families.