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Report No: PAD1930

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF US$23.3 MILLION

TO THE

REPUBLIC OF DJIBOUTI

FOR A

DJIBOUTI: SUSTAINABLE ELECTRIFICATION PROGRAM

MAY 7, 2017

Energy and Extractives Global Practice
Middle East and North Africa Region

CURRENCY EQUIVALENTS

Exchange Rate Effective as of March 31, 2017

Currency Unit	=	Djibouti Franc (DJF)
DJF 178.88	=	US$1
US1	=	SDR 0.73700114

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ADDS	Djiboutian Agency for Social Development (*Agence Djiboutienne de Développement Social*)
ARAP	Abbreviated Resettlement Action Plan
CAPEX	Capital expenditure
CPS	Country Partnership Strategy
DA	Designated Account
DISED	National Agency for Statistics (*Direction de la Statistiques et des Etudes Démographiques*)
EBIT	Earnings Before Interest and Taxes
EDD	Djibouti's National Electricity Utility (*Electricité de Djibouti*)
EIRR	Economic Internal Rate of Return
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FIRR	Financial Internal Rate of Return
FM	Financial Management
FO	Financial Officer
ICR	Implementation Completion and Results Report
IFR	Interim Financial Report
IPF	Investment Project Financing
GoDj	Government of Djibouti
GRM	Grievance Redress Mechanism
HFO	Heavy-fuel Oil
LV	Low Voltage
MENR	Ministry of Energy and Natural Resources
MoF	Ministry of Finance
MTR	Midterm Review
MV	Medium Voltage
M&E	Monitoring and Evaluation
NPV	Net Present Value
PAD	Project Appraisal Document
PADSE	Power Access and Diversification Project
PCB	Polychlorinated Biphenyl
PDO	Project Development Objective
PFS	Project Financial Statement
PIU	Project Implementation Unit
PLR	Performance and Learning Review

POM	Project Operations Manual
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SAI	Supreme Audit Institution
SEP	Sustainable Electrification Program
SMS	Short Message Service
SOE	Statement of Expenditure
TOR	Terms of Reference

Regional Vice President:	Hafez M. H. Ghanem
Country Director:	Asad Alam
Senior Global Practice Director:	Riccardo Puliti
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DJIBOUTI

Djibouti: Sustainable Electrification Program

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PAD DATA SHEET

Djibouti

Djibouti: Sustainable Electrification Program (P158505)

PROJECT APPRAISAL DOCUMENT

MIDDLE EAST AND NORTH AFRICA
Energy and Extractives Global Practice

Report No.: PAD1930

Basic Information		
Project ID	EA Category	Team Leader(s)
P158505	B - Partial Assessment	Roger Coma Cunill, Frederic Verdol
Lending Instrument	Fragile and/or Capacity Constraints [ ]	
Investment Project Financing	Financial Intermediaries [ ]	
	Series of Projects [ ]	
Project Implementation Start Date	Project Implementation End Date	
5-June-2017	5-June-2023	
Expected Effectiveness Date	Expected Closing Date	
5-Oct-2017	5-Dec-2023	
Joint IFC		
No		

Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Erik Magnus Fernstrom	Riccardo Puliti	Asad Alam	Hafez M. H. Ghanem

Borrower: Ministry of Economy and Finance			
Responsible Agency: *Electricité de Djibouti*			
Contact:	Djama Ali Guelleh	Title:	Director
Telephone No.:	+253 21355368	Email:	djama-agza@edd-dj.com

Project Financing Data (in US$ Million)					
[ ]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[X]	Credit	[ ]	Grant	[ ]	Other

Total Project Cost:	28.15	Total Bank Financing:	23.3
Financing Gap:	0.00		

Financing Source	**Amount**
BORROWER/RECIPIENT	4.85
International Development Association (IDA)	23.3
Total	28.15

Expected Disbursements (in US$ Million)							
Fiscal Year	2018	2019	2020	2021	2022	2023	2024
Annual	0.25	0.75	3.75	5.25	8	5.3	0.00
Cumulative	0.25	1.00	4.75	10	18	23.3	0.00

Institutional Data
Practice Area (Lead)
Energy & Extractives
Contributing Practice Areas
Proposed Development Objective(s)
The proposed Project Development Objective (PDO) is to increase access to electricity in the targeted Project Area.

Components	
Component Name	**Cost (US$ Millions)**
Extension and Densification of Distribution Systems	22.60
Technical Assistance, Capacity Building and Program Management	0.70

Systematic Operations Risk- Rating Tool (SORT)	
Risk Category	**Rating**
1. Political and Governance	High
2. Macroeconomic	High
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	High
7. Environment and Social	Moderate
8. Stakeholders	Low
9. Other	
OVERALL	Substantial

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 [ ]
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

Name	Recurrent	Due Date	Frequency
EDD's commitment to procure and install household connections	Yes	N/A	continuous

Description of Covenant

EDD commits to procure and install the goods and works corresponding to the 'last mile' connection costs in a timely manner acceptable to the Association. EDD will finance the "last mile" connection costs ('*cout de branchement'*, in French), except for poor households included in the relevant registry of the State Secretariat for National Solidary, for which EDD will finance the "last mile" connection costs through the IDA credit.

Name	Recurrent	Due Date	Frequency
Establishment of the Steering Committee within 12 months after Effectiveness	No	October 5th 2018	N/A

Description of Covenant

The Ministry of Finance in collaboration with the Ministry of Energy shall establish, no later than twelve (12) months after the Effective Date, and thereafter maintain, throughout Project implementation, an Inter-Ministerial Steering Committee, with composition satisfactory to the Association. The Inter-Ministerial Steering Committee shall be chaired by a high level representative of the Ministry of Energy and include representatives from the Project Implementing Entity, the Ministry of Economy and Finance, the Ministry of Housing, the office of the Secretary of State for Social Affairs, ADDS and other stakeholders. The Inter-Ministerial Steering Committee shall be an advisory body that meets twice a year with respect to coordination of the National Sustainable Electrification Program.

Name	Recurrent	Due Date	Frequency
Tax exemption issuance within 6 months after effective date	No	April 5, 2018	N/A

Description of Covenant

The Ministry of Finance shall ensure that EDD (i) purchases imported goods and services for the Project on a tax exempt basis through an effective Tax Exemption issued not later than six (6) months after the Effective Date.

Name	Recurrent	Due Date	Frequency
Appointment of an independent auditor within 6 months after effective date	No	April 5, 2018	N/A

Description of Covenant

The Ministry of Finance shall ensure that EDD appoints a qualified independent external auditor both to audit the Financial Statements and the technical performance of the Project, with terms of reference and qualifications acceptable to the Association.

Name	Recurrent	Due Date	Frequency
Installation of an appropriate accounting software within 3 months after Effectiveness	No	January 5, 2018	N/A

Description of Covenant

The Ministry of Finance shall ensure that EDD purchases and installs an appropriate accounting software to ensure timely recording of financial information as well as timely production of quarterly and annual financial statements.

Name	Recurrent	Due Date	Frequency
EDD hires key PIU Staff within one month of Effective Date.	No	November 5, 2017	N/A

Description of Covenant

EDD hires key staff for the PIU with qualifications and experience satisfactory to the Association, including, not later than one (1) month after the Effective Date, a procurement specialist, an environmental safeguards specialist and a social safeguards specialist.

Conditions

Source Of Fund	Name	Type
IDA Credit	Subsidiary Agreement	Effectiveness

Description of Condition

Subsidiary Agreement has been executed on behalf of the Borrower and the Project Implementing Agency

Conditions

Source Of Fund	Name	Type
IDA Credit	Project Implementation Manual	Effectiveness

Description of Condition

The Recipient has caused the Project Implementing Agency to adopt a Project Implementation Manual in form and substance satisfactory to the Association

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Roger Coma Cunill	Team Leader (ADM Responsible)	Senior Energy Specialist		GEE05
Frederic Verdol	Team Leader	Senior Power Engineer		GEE04

Jean-Jacques Verdeaux	Procurement Specialist (ADM Responsible)	Lead Procurement Specialist		GGO05
Rock Jabbour	Financial Management Specialist	Financial Management Analyst		GGO23
Alain Jean-Francois Bourguignon	Team Member	Consultant		GEE05
Abdoulaye Keita	Team Member	Senior Procurement Specialist		GGO05
Aurelien Gabriel Pillet	Team Member	Jr Professional Officer		GEEES
Elisabeth Maier	Team Member	Operations Officer		GEE05
Fatou Fall	Safeguards Specialist	Senior Social Development Specialist		GSU01
Joerie Frederik de Wit	Team Member	Energy Economist		GEESO
Malcolm Cosgrove-Davies	Team Member	Lead Energy Specialist		GEEDR
Mark M. Njore	Team Member	Program Assistant		GEE05
Eric Ranjeva	Team Member	Finance Officer		WFALN
Mohamed Adnene Bezzaouia	Safeguards Specialist	Environmental Specialist		GEN05

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Djibouti	Djibouti	Balbala	X	X	
Djibouti	Ali Sabieh	Ali Sabieh	X		
Djibouti	Arta	Arta	X		
Djibouti	Dikhil	Dikhil	X		
Djibouti	Obock	Obock	X		
Djibouti	Tadjourah	Tadjourah	X		

Consultants (Will be disclosed in the Monthly Operational Summary)

Consultants required?	Consultants will be required

I. STRATEGIC CONTEXT

A. Country Context

1. **Djibouti is a small low-income country located in the Horn of Africa, facing multiple development challenges and ranking among the world's least developed countries**[1]**.** The country covers an area of 23,200 square kilometers (150 km from North to South) and has 888,000 inhabitants. Capital intensive projects, foreign borrowing, and rents from the port and foreign military bases have driven economic growth but have not helped generate enough jobs. Unemployment is estimated at 48 percent nationwide and above 70 percent among young people. Two thirds of Djibouti's population live in urban areas, mostly in the capital[2].

2. **The war in Yemen has intensified refugee pressures in Djibouti.** Only 28 km separate Djibouti's shores from Yemen. Since the beginning of the conflict in Yemen in 2015, an estimated 30,600 people of mixed nationalities have arrived in Djibouti. Of the 6,179 refugees registered, 2,829 are sheltered in the new Markazi refugee camp in the north and 3,350 live in the town of Obock and in the capital, Djibouti-City, as of September 2015.

3. **Despite enjoying high rates of economic growth in the past decade, high levels of poverty and unemployment are widespread.** Government data from 2013[3] indicate that more than one-fifth of the population lives in extreme poverty and cannot cover basic food needs. This situation is particularly acute in the western Dikhil and southern Ali Sabieh regions where over 75 percent of their inhabitants live in extreme poverty. When poverty calculations take into account both food and non-food necessities, the associated average poverty rates are estimated to be 40.7 percent nationally - and 62.5 percent for rural areas. These results reflect the meager progress achieved in social inclusion and the lack of mitigation measures in response to regional disparities.

4. **High poverty rates despite robust growth, reflect the dampening effect of high inequality in household consumption.** In 2013, a government study estimated the Gini index at 0.44[4], a slight increase from 0.40 in 2002. Inequality is higher in Djibouti than in lower-middle-income countries (0.414 on average for 2005–2012). The country has large differences in standards of living, where the top 20 percent of the population spend on average more than eight times the amount consumed by households in the bottom 40 percent. Owing to the scarcity of household-level poverty data, it is not yet possible to track the incomes of those in the bottom 40 percent and thus understand Djibouti's progress in promoting shared prosperity.

[1] Ranked 168 out of 187 countries. Source: Human Development Report 2015, United Nations Development Programme.

[2] Because of the high density of the population and the lack of space available in Djibouti-City for building new houses, household size increase when children create their own family and have to stay with their parents in the same house.

[3] These estimates are based on data from the *Enquête Djiboutienne Auprès des Ménages pour les Indicateurs Sociaux–Budget et Consommation* (EDAM-BC) 2013, and developed by the Directorate of Statistics and Demographic Studies and the African Development Bank. The poverty line is defined at DJF 77,843 per person per year, or about US$1.97 per day in terms of 2011 purchasing power parity. This per-capita figure was obtained using an adjustment factor, as Djibouti's official poverty line is based on an adult equivalent measure.

[4] The inequality in Djibouti is higher than in neighboring countries such as Ethiopia and Yemen, with Gini index of 0.33 and 0.35, respectively.

5. **The Government of Djibouti (GoDj) has adopted an ambitious long-term strategy to spur economic growth, create jobs, and reduce poverty**[5]**.** The objectives are to reduce unemployment to 10 percent, reduce extreme poverty by one-third, and provide access to basic services, such as energy and water to the entire population by 2035. In a first phase, the expansion of public sector investment in the modernization and strengthening of energy infrastructure and services is expected to be one of the key drivers for economic growth. In a second phase, the upgrade of critical infrastructure and improvement of business climate should scale up investments by domestic and international private sector.

6. **In October 2016, GoDj announced a program aimed at developing social housing for the poor.** This program is the cornerstone of the President's initiative for a 'zero slum' Djibouti-city to eradicate slum development around the capital. As part of this program, 10,000 social houses are expected to be built, out of which 400 are already under construction. The objective is to strengthen the resilience of vulnerable urban populations by ensuring decent housing in-line with minimum quality and safety requirements. The government's plan is to satisfy the demand for 2,000 social housing units per year through new construction. The Nassib area (40 ha) in the South of Balbala has been selected for implementing this program[6]. The Sustainable Electrification Program (SEP) aims at providing additional access to electricity for Balbala[7], including the Nassib area, as well as providing access to electricity to the poorest households in the interior regions of the country[8].

B. Sectoral and Institutional Context

7. **Djibouti's energy sector is rapidly evolving from an enclaved country dependent on imported petroleum products to an interconnected country with access to affordable foreign (hydro) and future domestic (geothermal) baseload resources. This sectoral transformation paves the way for scaling-up electricity access to the poorest segments of the population.** During the past few years, US$14 billion have been invested in large infrastructure projects with the objective of becoming a regional commercial hub, centered on Djibouti's strategic location as a port city. The supply of affordable energy is required to sustain these investments and further economic progress. Despite being a non-firm supply, Djibouti currently imports affordable hydro-based power from Ethiopia, which covers 70 percent of the country's needs. To become more energy independent, the Government of Djibouti is spearheading the development of domestic renewable energies, i.e. solar, wind and geothermal, to meet its ambitious goals and transition towards a sustainable energy future. To ensure that the transformation of the energy sector is inclusive to all segments of the population, including the poorest, the expansion of the electricity distribution grid has become a national priority.

8. **The electricity sector is centered on Djibouti's National Electricity Utility (*Electricité de Djibouti*- EDD), the state-owned utility which operates under the oversight of the Ministry of Energy and Natural Resources (MENR).** EDD has about 52,000 clients and has the monopoly on the transmission and distribution of electricity. Every year EDD connects between 1,500 and 2,000 additional clients to the grid. EDD offers its clients the possibility to pay the connection fee in

[5] 'Vision Djibouti 2035', Government of Djibouti, 2014.

[6] According to Decree n°2015-296, criteria have been defined to attribute parcels to low income households. Prices range from US$2.8 to US$17 per m^2. They are reserved exclusively to households with revenues less than US$340 per month. Lower cost parcels are reserved to households living in slums. Parcels are reserved for auto-construction (DIY). Materials will be then delivered in three steps (3 x DJF 150,000) as construction progresses.

[7] The Balbala slum is composed of Balbala North where SEP builds upon the previous World Bank-funded Power Access and Diversification Project (PADSE) and Balbala South where the Government plans to develop social housing program for the poor.

[8] The interior regions of the country are: Ali Sabieh, Arta, Dikhil, Obock and Tadjourah.

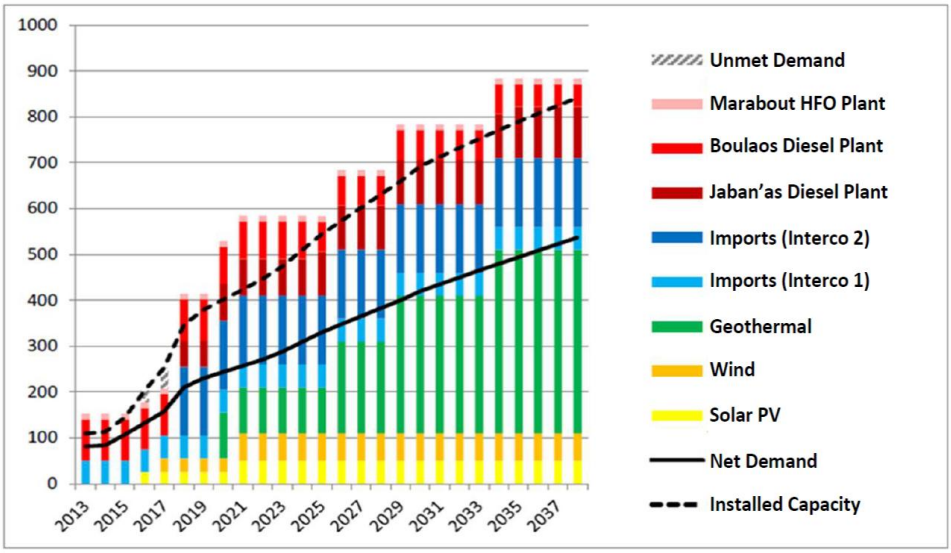
installments over 12 months through the electricity bill. A new law adopted in 2015 opens power generation to Independent Power Producers. A 50 MW solar power plant is expected to be the first Independent Power Producer delivering energy to EDD (single buyer).

9. **A high-voltage interconnection with Ethiopia and EDD's thermal capacity are the main sources of power supply.** The national utility has 18 generating units running on heavy fuel oil (HFO) in Boulaos and 6 diesel units in Marabout. EDD's effective generation capacity is limited to 67 MW. There are two off-grid solar panel systems, notably in Ali Addeh and Adailou, which are operated by the Agence Djiboutienne de Development Social (ADDS). The World Bank is supporting a US$31 million multi-donor Geothermal Power Generation Project that is under implementation to develop the country's significant geothermal resource potential. The development of this low cost baseload source of power could contribute to remove the main obstacle for business development in the country[9]. The interconnection between Ethiopia and Djibouti, in operation since 2012, provides a cost effective supply of hydroelectric energy throughout the year. However, power imports are not firm because Ethiopia regularly curtails supply, particularly during its dry season (September to February). During the rainy season (June to August), failures of the Ethiopian transport network often lead to unplanned interruptions, which requires restarting thermal gensets to provide electricity to the country.

10. **Electricity supply is expected to meet demand in the long term (see figure 1)**. According to EDD's capacity expansion plan (see figure 1 below), solar, geothermal, and wind energy will be the basis for the next decade's supply-demand balance. Oil-based generators in Marabout, Boulaos and Jaban'as will be used as backup units. The objective is to secure the supply before baseload geothermal power becomes available and to compensate the intermittency of hydro-power, solar, and wind generation. In the short term, EDD could experience a reduced reserve margin. This risk is mitigated by the recent increase capacity from 50 to 80 MW of power imports through the interconnection with Ethiopia. A second interconnection line is being constructed (140 MW) to benefit from the additional surplus which will be available in Ethiopia in the forthcoming years. On the demand side, electricity consumption growth rate is estimated between 5 percent to 10 percent, driven by the country's economic development.

Figure 1. Djibouti's Supply-Demand Balance 2017-2037

[9] 266 private sector firms identified the high cost of electricity as the main obstacle to business. Source: World Bank Group, Enterprise Surveys: www.enterprisesurveys.org/data/exploreeconomies/2013/djibouti



Source: EDD

11. **The proposed project will have a relatively modest impact on the national electricity demand when completed by 2024.** By then, the total consumption of the additional consumers connected by the project to the grid is expected to account for 69.7 GWh annually or 7.4 percent of the national consumption[10]. The country's peak load is expected to increase by 20 MW[11], or 6.7 percent forecasted demand. Djibouti is transitioning towards a green growth path, with a goal of 100 percent renewable energy by 2035.

12. **The transmission and distribution grids are limited and fragmented.** The power transmission grid is limited to the interconnection of the two power plants (Marabout and Boulaos in Djibouti-city), medium voltage (MV) links to Arta and to Ali Sabieh and the 230 kV link to Ethiopia in the South (see red line in Figure 2). Since 2012, Djibouti has been importing around 70 percent of its supply from its only transmission line with Ethiopia through an interruptible contract. A second interconnection line is under construction. The distribution grid is mainly concentrated around the power plants where people live: Djibouti-City, Tadjoura, Obock, Dikhill, and Ali Sabieh.

Figure 2. Djibouti's Electricity Transmission Network

[10] Based on the 2015 Djibouti Transmission Master Plan.
[11] Assuming a load factor of 60% and an expansion coefficient of 70%.

Source: World Bank own elaboration based on EDD data

13. **Vision Djibouti 2035 outlines the country's long-term development strategy to provide access to electricity to the entire population by 2035 to improve their living conditions and modernize the rural areas.** Only 50 percent of the population or 70,000 homes in urban areas are connected to the grid. The World Bank-funded Power Access and Diversification Project (PADSE), which closed in December 2014, added 2,828 new electricity connections in Balbala, a slum area near Djibouti-city. The project built the core infrastructure in the area for further grid expansion, allowing 1,700 additional connections from the project's closing date until September 2016[12]. These results showed the high demand for modern electricity services and the ability to pay the connection costs charged by EDD. Moreover, PADSE had important co-benefits, such as the revitalization of the local economy through new income-generating activities developed, for example, grocery stores, the opening of several medical care centers, and the improvement of safety and mobility for women and children because of new street lighting.

C. Higher Level Objectives to which the Project Contributes

14. **The proposed project is aligned with the World Bank Group's strategic goals of ending extreme poverty and boosting shared prosperity in a sustainable manner; the WBG's Djibouti Performance and Learning Review (PLR), which proposed adjustments to the Djibouti Country Partnership Strategy (CPS) FY 2014-2018 (Report # 83874) discussed by the board of Executive Directors on March 13, 2014; and with the Middle East and North Africa Strategy 'Economic and Social Inclusion for Peace and Stability'.** The PLR aligned the CPS with the World Bank's Middle East and North Africa Strategy, which puts emphasis on (a) renewing the social contract, (b) regional cooperation, (c) resilience to IDP/refugee shocks, and (d) recovery and reconstruction. Changes to the CPS are intended

[12] Source: EDD.

to strengthen the World Bank Group's response to emerging development challenges, such as growing refugee and youth populations and enduring service delivery deficits.

15. The project aims to provide access to electricity to a significant portion of Djibouti's population, contributing therefore to the MENA strategy of improving service delivery and renewing the social contract. The availability of electricity in poor areas targeted by the project will also pave the way for the emergence of small businesses, thus fostering private sector development, job creation, and indirectly contributing to the renewal of the social contract. Therefore, the project is in line with Djibouti's CPS, which is based on two pillars: (a) reducing vulnerability, and (b) strengthening the business environment. Furthermore, this project would support the Government's efforts to come closer to reaching the Sustainable Development Goal 7 on Affordable and Clean Energy by providing technical assistance to EDD to prepare for the implementation of the broader national energy program.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

16. The Project Development Objective is to increase access to electricity in the targeted Project Area[13].

B. Project Beneficiaries

17. **The project will provide electricity services to 13,960 households in Balbala and in the interior regions of Djibouti, representing around 100,000 people or over 11 percent of the Djiboutian population**[14]. The direct project beneficiaries will include (a) peri-urban and rural households provided with new or improved electricity services; (b) users of social infrastructure who will benefit from public lighting under the project; and (c) the government and national energy utility, EDD, which will benefit from the technical assistance and capacity enhancement activities under the project. In a first phase, the project will complete the electrification of the remaining population without basic access to electricity services in the peri-urban area of Balbala in the outskirts of Djibouti-city[15]. The poverty rate is between 70 percent to 90 percent in these areas[16]. Also, the project will support the expansion of Balbala southwards as per the country's urban development plan[17], by providing access to electricity for new social housing and public services (health care centers, schools). In a second phase, the Project will extend the electricity grid to the lagging interior regions of the country and connect the poorest populations of the country to the national grid. Once completed, the project is expected to increase EDD's customer base by 25 percent reaching a total of 70,000 customers. Following PADSE's experience, EDD plans to support this new customer base with the creation of decentralized commercial and technical support centers. In this regard, EDD will open a new customer service agency in Balbala.

[13] The targeted project area is composed of Balbala and the interior regions of Djibouti: Ali Sabieh, Arta, Dikhil, Obock and Tadjourah.

[14] Djibouti's population is estimated at 864,617 according to the World Bank's CPS 2014 - 2017. The average number of persons per household is seven.

[15] The World Bank funded PADSE closed in 2015 and provided access to 3,800 households or 26,600 people to EDD's grid.

16 DISED (*Direction de la Statistiqe et des Etudes Démographiques*) 2012, EDAM3-IS/2012; relative poverty is established at DJF 371,630 per year or US$2,090 per year.

17 Djibouti Urban Development Plan (*Schéma Directeur du Territoire et d'Urbanisme)* 2016.

C. PDO Level Results Indicators

18. The PDO level results indicators are:

(i) People provided with new or improved electricity service (Corporate);

(ii) People provided with access to electricity under the project by household connections (Number) – (Core);

(iii) People provided with access to electricity under the project by community connections (Number) – (Core);

(iv) Direct project beneficiaries (Number) –and

(v) People benefiting from public street lighting under the project (Number) – (Custom)

19. The PDO-level indicators capture the number of households and people who will directly benefit from the new electricity access delivered by the project. The number of people in community centers, such as schools, health centers, and mosques, that will benefit from the project will also be measured.

III. PROJECT DESCRIPTION

A. Project Components

20. **The project will increase access to electricity to the poorest segments of the Djiboutian population in two sequential phases**: Phase 1 will focus on completing the electrification of Balbala, the largest slum area in Djibouti-city, while supporting the Presidential housing initiative to eradicate slum development. Phase 2 will extend the MV grid to the interior regions of the country to allow the connection of a significant portion of the population to the national grid[18]. The project aims to connect over 11 percent of poor inhabitants in the Republic of Djibouti to the grid and to lay the foundation for scaling-up electrification in subsequent projects through a national electricity distribution master plan.

21. **The infrastructure investments and beneficiary areas have been selected to maximize the number of new connections and to minimize the cost of providing access to electricity**[19]. To further reduce the unit costs, the project includes a study to identify additional cost saving options. The cost of extending the grid for Phase 1 in Balbala is expected to be US$954[20] on average per connection, which is lower than the US$1,445 of PADSE[21] which closed in 2015. PADSE invested in MV infrastructure in Balbala which will also be used by the project's Phase 1, and thus will partially reduce its costs. In Phase 2, costs are estimated to be significantly higher due to the sparse distribution of the population, which requires longer extensions of MV lines and further development of the distribution grid to reach the beneficiaries in the interior regions of the country. The total cost per connection for all the project, including Phases 1 and 2 is US$1,833[22]. Just as the MV investments of PADSE were a stepping stone for

[18] The identification of the towns and villages to be connected in Phase 2 will be done at a later stage after completion of the required technical studies by EDD.

[19] This cost includes all MV/LV infrastructure required to provide an access to electricity. This is not a cost per connection ('last mile').

[20] Total cost of the Phase 1 (US$7 million for IDA plus US$1.580 million for EDD)/9,000 connection points.

[21] PADSE reached a cost per connection of US$1,445 (US$3.4 million for IDA plus US$1.665 million for EDD)/3,500 connection points.

[22] Total cost of Phase 1+2 (US$23.3 million for IDA plus US$2.3 million for EDD)/13,960 connection points.

SEP Phase 1, SEP Phase 2 will also be critical for allowing further connections to the grid in the interior regions of the country beyond the project.

22. **The distribution grid extension for Phase 1 will be implemented in the first three years and for Phase 2 in the following two years**. The connection of the new clients will be done over a four-year period for the Phase 1 and three years for Phase 2. Figure 3 presents the sequencing of the implementation of the grid extensions and the connection of new clients.

Figure 3. Implementation of Project's Phase 1 and 2

23. The project components are detailed in the following paragraphs.

Component 1: Extension and Densification of Distribution Systems (US$22.6 million from IDA for extending the distribution grid and US$4.57 million from EDD for 13,960 connections)

24. **Phase 1 will finance the required infrastructure to connect 9,000 households of Balbala to the electricity grid and install 790 new streetlights.** The first phase aims to consolidate and extend the LV/MV electricity network in Balbala through the construction of new substations and power lines to cover the areas without electricity service. In addition, street lighting will be constructed using the same poles as for LV wires. The Balbala neighborhoods which will have an access to the MV lines and where a LV distribution grid will be constructed are Dogley, Warabley 1 and 2 in Balbala North (4,000 new connections), and Layabley, Layabley bis, PK12 Zone Cinéma, and Nassib in Balbala South (5,000 connections).

25. **Phase 2 will focus on the electrification of the interior regions of Djibouti following the same technical design.** This phase will require larger investments in core infrastructure, that is, extension of the MV grid, but it is still expected to allow the connection of around 4,960 households. The precise identification of towns and villages benefiting from Phase 2 will be done at a later stage after completion of the on-going technical studies by EDD.

26. The project's Phase 1 involves the consolidation of existing LV/MV electricity network in Balbala and its extension through the construction of new substations and power lines to cover the areas without electricity service. Phase 2 involves the extension of the MV grid from Djibouti-City to the interior regions of the country and the construction of new substations and LV network. Most electricity lines are overhead and are built following EDD's technical standards.

27. EDD will be the project's technical project manager[23] and implement the project mostly through local subcontractors. International contractors will only be used for the supply of equipment and materials. In addition, EDD plans to organize the tasks so that the electrification of the various areas will be completed in sequence not to delay the connection of new clients until the end of the project.

28. EDD's connection costs will be shared by the company (40 percent)[24] and the final beneficiary (60 percent). The project integrates several measures to reduce the connection costs and facilitate access to electricity for the poor segments of the population. Therefore, poor households registered as such at the State Secretariat for National Solidarity will be eligible to be connected to the grid free of charge[25]. Ineligible households will be able to pay the connection costs in installments through their electricity bill, which will significantly reduce the upfront cost. Moreover, EDD and the Ministry of Finance (MoF) have agreed that all imported distribution material for the project will be exempted of taxes. EDD connection costs for the `last mile´[26] are in the midrange when compared with benchmark countries[27]. As experienced during PADSE, international prices for a small number of meters embedded in a turnkey project cannot be optimized. Thus, SEP proposes to separately procure equipment and services. Furthermore, the project includes a technical assistance component to achieve cost reductions through continuous improvement.

Component 2: Technical Assistance, Capacity Building and Program Management (US$0.7 million from IDA and US$0.28 million from EDD)

29. This technical assistance will finance the drafting of a National SEP and relevant technical studies, including an action plan to support the GoDj in its efforts to achieve (a) 100 percent electrification rate by 2035, (b) 100 percent renewable energy supply, and (c) reduce urban migration. For supporting this national electrification program, a distribution grid master plan will be produced, which will include renewable energy supply options. The objective is to provide a comprehensive vision of where and when the actual distribution grid should be extended and where other electrification techniques should be used (solar, wind mini-grids, and Single Wire Earth Return (SWER) line) for connecting the rural population. It has been proposed to set up an interdepartmental steering committee to pilot the national electrification program[28]. The distribution master plan will be built on the national urban plan ('*Schéma Directeur d'Aménagement Urbain'*), approved by the GoDj in 2015, and on the transmission master plan of June 2015. For each region, the electrification will help the GoDj to reduce internal migrations to urban centers. The assessment of local renewable sources of energy (wind, solar, geothermal) will be provided for each city and village to be electrified. An implementation

[23] Lesson learned from the previous PADSE and integrated in the project design.

[24] The US$356 (tax free) connections costs are shared between EDD (US$144) and the beneficiary client (US$212). The beneficiary will either pay this cost upfront or in installments through the electricity bill.

[25] Poor households registered at the registry managed by the State Secretariat for National Solidarity will be exempted of any connection charge, but will pay for regular electricity consumption. EDD will submit a list of eligible households for the World Bank's approval through the project's annual work plan.

[26] In French '*coût de branchement*', i.e. connection costs between customer houses and the low voltage distribution grid, which is composed of the following materials: drop lines, meter, fuse, circuit breaker and switchboard. Installation costs are financed by EDD.

[27] World Bank 2013 policy research working paper on "Connection Charges and Electricity Access in Sub-Saharan Africa".

[28] Under the leadership of the Ministry of Energy, this committee should ensure that all stakeholders (EDD, Ministries of Energy, Finances, Housing and Social Affairs) elaborate and validate the national priorities, present the electrification strategy to the donor community and the private sector and pilot the implementation of the program.

plan reflecting the GoDj's priorities will also be proposed. This component will also finance the cost of the project's implementation and oversight.

30. Moreover, this component will include citizen engagement activities providing a voice to the project beneficiaries, including women and youth, and therefore involve bottom-up communication approaches, such as community meetings and beneficiary outreach in remote locations. During preparation, EDD and the World Bank team met with a representative group of beneficiaries. With regard to monitoring, EDD understands the importance of citizen engagement. The social safeguards consultant to be employed part time by the Project Implementation Unit (PIU) will also ensure the follow-up on engaging with beneficiaries and Grievance Redress Mechanism (GRM) compliance. An indicator will measure citizen engagement achievements—the number and percentage of grievances registered related to the delivery of project benefits addressed. A feedback loop will be kept open throughout the implementation phase and the World Bank will monitor the dialogue and response provided by EDD.

31. Detailed technical studies for Phase 2 will review connection standards to poor households to further optimize costs, for example the use of electrical ready-boards. The technical design and the complete list of equipment used in Phase 2 will be provided at a later stage because the precise locations are not known yet.

32. EDD will contribute US$4.85 million to the total project to mainly finance the connection costs (meters and installation, except for eligible poor households), technical studies, acquisition of land parcels for the MV/LV distribution transformers, and social and environmental studies. EDD will finance technical studies to further streamline connection processes and identify cost savings on a regular basis to further reduce unit costs. These studies are also required to design the grid extensions under Component 1, that is, wiring between the LV grid and houses and installation of the fuses, meters, and breakers.

B. Project Financing

33. The proposed project will be financed by an Investment Project Financing (IPF) in the amount of SDR 17.2 million IDA credit (US$23.3 million equivalent) to the Republic of Djibouti.

C. Project Cost and Financing (US$ million)

34. Most of the project costs are for investments in the extension of the distribution grid in Balbala and the interior regions of the country with MV/LV lines, MV/LV distribution substations and street lighting. A small fraction of project costs is for technical assistance and capacity enhancement activities, including the development of the Djibouti National Electrification Strategy.

Project Components	Project Costs (US$ million)	IDA (US$ million)	%	EDD (US$ million)	%
Component 1. Extension and Densification of Distribution Systems	24.60	22.60	91.90	2.00	8.10
Sub-Component 1.1. Financing Infrastructure Investments	22.6	22.6	100	0.00	0.00

Sub-Component 1.2. Financing 'last mile' infrastructure[29]	2.00	0.00	0.00	2.00	100
Component 2. Technical Assistance, Capacity Building and Program Management	0.99	0.70	70.70	0.28	29.30
Sub-Component 2.1. Financing National Sustainable Electrification Program and PIU support	0.70	0.70	100.00	0.00	0.00
Sub-Component 2.2. Financing technical studies for distribution grid	0.28	0.00	0.00	0.28	100
Contingencies	2.57	0.00	0.00	2.57	100
Total	**28.15**	**23.30**	**82.70**	**4.85**	**17.30**

D. Lessons Learned and Reflected in the Project Design

35. **Five main lessons learned from PADSE[30] have been incorporated:** (a) international private companies tend not to be interested in small projects in small countries located far from their headquarters or business hubs, (b) system integrators which are not locally based may be slower and less flexible during project implementation, (c) project implementation should be carried out in parallel sub-tasks whenever possible to accelerate the connection of clients in commissioned parts of the grid, (d) clear project implementation responsibilities and fluid communications between the World Bank and EDD provides flexibility and increases effectiveness, and (e) significant demand growth rate should be factored in while sizing the grid.

36. **All tenders launched in the electrification components of PADSE resulted in a maximum of two offers.** To raise interest and increase competition, enhanced communication with the private sector and in-depth commitment by the Government are key. More precisely, the tender process should be prepared and executed by EDD and the World Bank rigorously and without major delays to attract and keep suitable suppliers.

37. **Qualified suppliers get interested in turn-key contracts if they are knowledgeable and familiar with the country.** On the contrary, if companies do not have a permanent local representative, there is a risk of underestimating the real project difficulties. During the last phase of PADSE, EDD decided to take over the responsibility of the electrification component in view of the underperformance of the international contractor responsible for integrating the different parts. To avoid a repeat of this situation, EDD's procurement strategy for the proposed project will consist of (a) requesting international competitive bids for bulk purchases of equipment and materials only and (b) issuing local competitive tenders to hire local subcontractors based on a roster of preapproved companies for services and consulting. In view of the companies' increased technical capacities, EDD will lead all technical studies required for implementing the project's Component 1.

38. **A clear distribution of co-financing responsibilities between the World Bank and the client provides more flexibility during implementation.** The construction of the extension of the distribution grid encompasses (a) the infrastructure itself (MV/LV wires, poles, transformers and street lighting)

[29] Except for the Project-financed last-mile connection materials for poor households, which shall be registered as such at the State Secretariat for National Solidarity and for which these materials will be financed under sub-component 1.1.
[30] See: Implementation and Completion Results Report (ICR), Power Access and Diversification Project, 2015, Report No 3363.

which is well defined and financed by the World Bank and (b) the 'last mile'[31] connection (drop line, meter, circuit breaker, and fuse) which is financed by EDD but with a perimeter which can be easily extended if appropriate. After the closing date of the World Bank-financed PADSE, the existing positive relationship between EDD and other donors such as *Agence Française de Développement*, led to an increase in the number of total grid connections built on the same infrastructure. Thus, over 20 percent of customers living in Balbala benefited from additional connections due to the donor coordination managed by EDD. The distribution grid master plan which is part of the Project's Component 2 (technical assistance) will provide a shared vision of the national electrification program among national stakeholders and donors.

39. **The sizing and capacity of the grid infrastructure should be designed taking into account the evolution of the electricity needs in a given period.** The experience acquired during PADSE in Balbala showed the rapid changes of electricity demand overtime. More precisely, several portions of lines and the associated MV/LV transformers were sized to satisfy only the electricity needs at the time of planning[32] with a reasonable security margin. However, electricity consumption skyrocketed and exceeded the forecasts. To cope with the additional demand, EDD had to replace costly portions of lines with higher-capacity conductors[33]. Moreover, the Djibouti-Arta MV line experienced the same issue after construction and a second line had to be built parallel to the first.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangement

40. **Borrower and executing agency:** The borrower will be the MoF, which will sign a subsidiary agreement with the implementing agency, EDD. The implementing agency will be EDD, which proved its technical capabilities by successfully executing an electrification project in Balbala under PADSE closed in December 2014, which provided electricity to over 26,000 people. PADSE's implementing agency was officially the Prime Minister's Office but the project's execution was carried out by EDD staff who learned from that experience and will constitute the core team of the proposed project. EDD is also currently implementing the multi-donor Geothermal Power Generation Project (P127143). EDD operates under the technical supervision of the MENR and the financial supervision of the MoF, which is the borrower of the project.

41. During project preparation, attention was given to EDD's technical and implementation capabilities. EDD's PIU will be led by a Project Director and Deputy Director who acquired in-depth on-the-job training as core staff of the previous PADSE. The substantial risks on fiduciary assessed during preparation will be mitigated by strengthening the PIU with experienced professionals in procurement and financial management (FM). Thus, the PIU will be staffed with four personnel from the parallel Geothermal Power Generation Project who shared the following responsibilities in both projects: procurements, FM, environment and social safeguards. The synergies sought between the two projects are expected to strengthen the country's project management and technical capacities.

[31] '*Branchement du client au réseau EDD*' in French.

[32] This has been the case for H61 type transformers (160 kVA, sit on top of a pole) which proved to be undersized to satisfy increasing population needs.

[33] Initially installed 35 mm^2 conductor (PADSE-1) have been replaced with 70 mm^2 conductor (PADSE-2).

42. Attention was also given to anti-corruption measures adopted by EDD within its own organization and in its dealing with consultants and other suppliers. It was noted that all contracts between EDD and its suppliers include anti-corruption language to be signed by the contractors. EDD procedures are in agreement with the provisions of the World Bank's Anti-Corruption Guidelines applicable to the project.

B. Results Monitoring and Evaluation

43. Monitoring and evaluation (M&E) of the project will be the responsibility of EDD who will carry out M&E of the different components and activities in accordance with the indicators included in the results framework (annex 1) and will be complemented by World Bank supervision and technical support. The M&E will have the following core objectives, (a) improve project management, (b) ensure transparency in data sharing, (c) promote efficiency, and (d) provide timely and accurate information to adjust or modify activities in relation to the evolution of the context during implementation. There will be bi-annual project progress reports generated by EDD. A midterm review (MTR) and final ICR will be conducted in collaboration with the Government. During the MTR, progress towards reaching the project objectives will be evaluated and remedial action will be taken as needed. EDD will monitor the implementation progress and results of Components 1 and 2, through its existing monitoring system, and will communicate the results to the Ministries of Energy, Finance, and the World Bank.

44. Each semester, EDD will prepare project implementation progress reports that are in form, content, and substance satisfactory to the World Bank and submit the reports to the World Bank no later than 45 days after the end of the period covered. Furthermore, the World Bank will supervise the project over its lifetime and its results and outcomes on a regular basis to evaluate the project's achievement of the PDOs. If necessary, corrective actions will be discussed and agreed upon with EDD and the Government in the later stages of project implementation (during the MTR).

C. Sustainability

45. The project's sustainability will be achieved through an integrated and holistic approach that includes investments, technical assistance, and capacity enhancement activities, including maintenance of infrastructure in the target areas.

46. The project's investments are not expected to be jeopardized in the future by new technologies, different capacity requirements, or decreased quality of service with increasing load, due to the following:

(a) *Smart grids:* In the distribution grids, a global technological change would be the large uptake of smart grids[34]. However, this new technology does not replace the lines or the poles. Once the grids are in place, then communication equipment is added and control centers are introduced to manage real-time data and improve the overall flexibility and

[34] A 'smart' grid can be seen as made of components (lines, switches, and transformers) and having communication capabilities so that they can be managed and optimized in real-time. Compared to the traditional grids, smart grids are often compared to the land phone/mobile phone evolution.

capacity of the infrastructure[35]. With the construction of the basic distribution grids, the project is the first step required before moving to smart grids.

(b) *Appropriate sizing of infrastructure*: As learned from PADSE, the sizing of key infrastructure cannot be done to satisfy the present but the future needs. Thus, focusing on reducing total costs per connection with a short-term approach may lead to inadequate infrastructure technical features, which will not satisfy future needs. Moreover, this path is costlier in the long run because some of the equipment, for example, transformers need to be replaced before being fully amortized. To address this issue, EDD has a planning strategy where MV lines are constructed to support load for a reasonable period of time in the future and where 600/800 kVA transformers are progressively added to distribute power for 100–300 clients. For low-consumption areas, smaller capacity equipment is used instead.

(c) *Flexible infrastructure design*: To improve the flexibility of the infrastructure and the quality of service, EDD installs dual outgoing feeders, which is considered a good practice[36]. The goal is to introduce or close loops so that there are always two lines[37] to supply a consumption center. If a fault occurs on one line, the second one can be used. The additional cost of this solution is one additional LV circuit breaker, which is small compared to the increased reliability and capacity of the grid.

47. Achievement of the PDOs and enhancing energy access to rural and peri-urban areas hinge upon having appropriate institutional, financial, and operational mechanisms in place to ensure the long-term sustainability of the investments services. The PADSE has contributed to these efforts and there is evidence that investments have been sustainable and operational to date (see box 1, annex 2).

48. Lastly, to ensure sustainability of the project and increase its implementation readiness, the World Bank will closely monitor and obtain data required to operationalize the maintenance of investments and mechanisms put in place throughout project implementation.

V. KEY RISKS

Overall Risk Rating Explanation

49. **The overall risk is Substantial** . There are three main risks associated with the project. The conflicts in neighboring countries, refugee inflows, and difficult domestic social context due to widespread poverty indicates a high risk on the political and governance level. The macroeconomic context has not managed to accelerate growth to increase productivity and create jobs. Thus, the macroeconomic risk for the project is High. To manage the political/governance and macroeconomic risks, the team will dialogue closely with the Country Management Unit to address any arising problem during implementation that may have an impact on the project outcomes.

50. The fiduciary risk is rated high mainly due to the procurement risks of the project. The procurement specialist of the project will share responsibilities with the World Bank-funded Geothermal

[35] For instance, temperature sensors on the lines may allow going beyond the nameplate capacity.
[36] '*Montage en coupure d'artère*'
[37] Meshed grid.

Power Generation Project implemented in parallel by EDD. The procurement specialist has acquired significant technical capacity while working in the parallel project, but further specialized training will be required. To mitigate the procurement risk, EDD will integrate the lessons learned in the previous PADSE in the design and planning of the project's technical specification and qualification requirements. Moreover, the Bank's procurement specialist will provide advice and assistance on a regular basis.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

51. The project reflects the least-cost investment necessary to increase electricity service coverage. The economic analysis is based on a cost-benefit analysis methodology taking into account the difference between the project costs, that is, the marginal cost of producing, distributing, and supplying electricity by EDD and its benefits, that is, the value of the electricity for the newly connected households.

52. The project has an economic internal rate of return (EIRR) of 16 percent, with an estimated NPV of US$15.5 million at 7.4 percent social discount rate.

53. The economic costs are the marginal costs of supplying electricity to the additional clients that the project will bring to EDD. The marginal cost is based on provisional EDD 2015 financial data. These costs include fuel (HFO/diesel) costs, import costs (interconnection with Ethiopia[38]), staff costs, and maintenance costs.

54. The economic benefits of the project are conservatively assumed to be equal to the electricity expenditures that the newly connected households are expected to make.

55. The financial analysis illustrates EDD's profitability variations after 2014 under the assumption that non-operating income remains at 2014 levels and that investment costs are incurred upfront. Thus, operating revenues are expected to increase 8.6 percent while operating expenses are also expected to increase by 7.3 percent in the six-year timeframe of project implementation. The result is an increase of net income by 16.1 percent relative to 2014. This high rate arises only because the earnings margin is very slim. The impact of the electrification program, compared to the deterioration of the financial situation from 2013 to 2014, is small. Although most of the newly connected households will pay social tariffs, these tariffs are quite high and will for the most part cover the marginal cost of supply. Average revenue per kWh delivered declines 1.4 percent by Year 6.

B. Technical

56. The implementation of the proposed project does not involve complex or challenging technologies. The project's Phase 1 involves the consolidation of existing MV/LV electricity network in Balbala and its extension through the construction of new substations and power lines to cover the areas without electricity service. Phase 2 involves the extension of the MV grid from Djibouti city to the interior regions of the country, the construction of new substations and LV network. Most electricity

[38] The interconnection with Ethiopia satisfies about two third of the demand. Import capacity initially limited to 50 MW is close to 80 MW this year.

lines are overhead and built following EDD's technical standards[39]. Most conductors are Almelec (34.4 mm², 117mm², and 148 mm²). Poles (wooden and metal) should comply with standards NF C 67-100 or NF EN 14229. Streetlights are 250W every 30m and they share the same poles as distribution lines.

57. Table 2 summarizes the quantities and prices for EDD's contribution in Phase 1. This contribution contains in particular the equipment required for the connections. Costs are presented with and without taxes (33 percent). However, it has been assumed that costs for materials are tax free for the project.

Table 2. Quantities and Prices for EDD's Contribution in Phase 1

					US$	DJF
Connections	Unit cost for EDD	with tax	1 connection		473	83,995
	Unit price for client	with tax	"		281	50,000
	Remaining cost for EDD	with tax	"		191	33,995
	Unit price for client	tax free	"		212	37,594
	Remaining cost for EDD	tax free	"		144	25,560
	Total cost for EDD	**tax free**	**9,000**		**1,294,396**	**230,041,353**
EdD studies	12,500,000	DJF	70,335			US$
Parcels	64	m^2 for 1 transformer	1,500		96,000	DJF
Total	14	transformers			1,344,000	DJF
					7,562	US$

RAP[40]	**23,500**	US$				
RFP + selection	40	days	1,100	usd/d	**44,000**	US$
ESIA[41] (+ updates)		2 consultants part time during 5 years			**129,000**	US$
ESIA studies	**11,500**					US$
Operating costs						US$

58. **Beyond the MV/LV infrastructure, clients have to be physically connected to the grid to have an access[42] to electricity, which is often referred to as 'last mile infrastructure'.** For this project, EDD will implement the connections between the clients and the distribution grid. These connections include (a) Drop lines (2 to 90 meters for EDD) and anchors; (b) meters; (c) fuses, and (d) circuit breakers and switchboards. The cost of the connection may vary according to the distance to the grid and the capacity which is required. For Balbala, an average cost has been established by EDD. Further innovations to reduce costs such as ready boards will be studied for the more rural, low-income areas covered under Phase 2.

59. **The connection of 13,960 new clients should have a moderate impact on the generation capacity.** Even if this number of new clients represents a significate part of EDD's customer base (+25 percent) the impact on the peak load is expected to be modest. With a large proportion of clients subscribing to a 1 kVA contract, the maximal additional power capacity is close to 22 MVA (or 6.5 percent of the national peak load) taking into account the load factor (0.6) and an expansion coefficient

[39] EDD relies on international technical standards (International Electrotechnical Commission (IEC) and France's *Electricité de France* (EDF) standards). There are no specific Djiboutian standards.
[40] Resettlement Action Plan
[41] Environmental and Social Impact Assessment
[42] In this document, 'access' is used to designate both the distribution grid infrastructure (poles, MV/LV lines, transformers) which is required and the physical connection to the grid.

(0.7). The increase of generation needed to satisfy this new demand is about 70 GWh, or 7.4 percent of the demand forecast for 2024[43].

C. Financial Management

60. The proposed credit will be implemented in line with World Bank policies that are standard for project implementation, including the July 2016 'Procurement Framework'. EDD is an autonomous administrative public institution related to the Ministry of Energy and will be responsible for project management, FM and accounting. The FM assessment conducted during appraisal found the FM risk, as a component of the fiduciary risk, is rated Substantial. With the proposed mitigating measures EDD will have the FM requirements according to OP/BP 10.00 and will have an acceptable FM system and the residual FM risk rating would be Moderate.

61. A single segregated Designated Account (DA) in U.S. dollars will be opened at a commercial bank in Djibouti, acceptable to the World Bank. Payments and withdrawal of eligible expenditures will be accompanied by statements of expenditure (SOE), following the applicable procedures and the World Bank's Disbursement Guidelines EDD will be responsible for submitting replenishment requests on a monthly basis. All requests for withdrawals should be fully documented, maintained and made available for review by the World Bank and project auditors. All disbursements will be subject to the terms of the Financing Agreement and to the procedures defined in the Disbursement Letter.

62. The general accounting principles for the project will be as follows: (a) project accounting will cover all sources and uses of project funds, including payments made and expenses incurred; project accounting will be based on accrual accounting, and (b) project transactions and activities will be separated from other activities undertaken by EDD.

63. EDD will be responsible for preparing periodic reports and maintaining the project bookkeeping, and will produce annual PFS and quarterly IFRs.

64. The PFS will be audited annually and will cover all aspects of the project, uses of funds and committed expenditures. The audit will also cover the financial operations, internal control and FM systems and a comprehensive review of SOEs. The annual audit report will include (a) the auditor's opinion on the project's annual financial statements, (b) a management letter on the project internal controls, and (c) a limited yearly review opinion on the IFRs. The annual reports will be submitted to the World Bank within six months from the closure of each fiscal year and the limited review opinion will also be submitted to the World Bank with the IFRs.

D. Procurement

65. **General**. The proposed project will be implemented in line with the World Bank policies that are standard for project implementation. All goods, works, non-consulting services, and consultants' services required for the activities to be financed out of the proceeds of the project shall be procured in accordance with the requirements set forth or referred to in the 'Guidelines: Procurement of Goods, Works and Non Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 and revised in July 2014 (Procurement Guidelines) and in the

[43] EDD estimates the demand in 2024 at 300 MW. Generation capacity should be close to 500 MW at that time.

'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 and revised in July 2014 (Consultant Guidelines).

66. The Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants, dated October 15, 2006 and revised in January 2011 will also apply to this project.

67. **Project Implementation agency**. The project procurement activities will be administered by the implementing agency, EDD, as the PIU, with the responsibility of procuring all goods, works, consultants and non-consultant services required for the implementation of the project activities.

68. **PIU procurement capacity and risk assessment**. A procurement capacity assessment of the PIE was carried out in the context of the proposed project and the following principal procurement risks were identified: (a) limited procurement and technical capacity, (b) low participation by bidders and lack of local market capacity, (c) potential delays in procurement processes due to internal coordination with the National Commission for the Public Procurement and lack of harmonization of some procurement procedures, and (d) potential delays in evaluation of bids/proposals as the evaluation committee members are not familiar with international procurement procedures.

69. The following mitigation measures will be implemented: (a) prepare the procurement manual, (b) the procurement staff continue to receive training and participate in training in a specialized center, (c) hire engineers to assist the PIU in preparing designs, technical specifications, bidding documents, and bid evaluation reports and in contract supervision and management for highly specialized contracts; such as contracts for the construction of sub-transmission and distribution networks and supply of transformers, (d) take into account lessons from the previous contracts under the PADSE Project in setting out qualification requirements and planning, and (e) provide advice and assistance on a regular basis by the World Bank's procurement specialist.

70. Some of the PIU staff are already in place and the procurement planning is being prepared by the PIU in collaboration with the Geothermal Power Generation Project Procurement specialist who will also be responsible for the procurement activities of the new Project. The overall procurement risk is **High**.

71. **Procurement Plan**. A Procurement Plan for the initial 18 months of project implementation for contracts to be signed under the project has been prepared by the PIU and approved by the World Bank. It will be made available in the project's database and on the World Bank's external website. The Procurement Plan will be updated annually or as required to reflect implementation needs and improvements in institutional capacity.

72. **Review of procurement decisions by the World Bank**. The Procurement Plan shall set forth those contracts which shall be subject to the World Bank's prior-review. All other contracts shall be subject to post-review by the World Bank.

73. **Frequency of procurement supervision.** In addition to the periodic Bank Supervision missions, procurement post reviews will be carried out by the World Bank every 12 months.

E. Social (including Safeguards)

74. The population in the targeted districts is relatively large as compared to the population of the capital. Overall, communities tend to be poor with an estimated unemployment rate of 42 percent and low access to electricity (about 70 percent do not have access to electricity) and water (about 10 percent). Nearly 78 percent live in precarious homes and 80 percent live in temporary structures. Sources of employment are mostly informal; however, communities are eager to be connected to electricity and have raised that concern strongly during consultation. Connection costs seem less of an issue as a limited number of people have used the payment facility with monthly installment proposed by EDD for first time connection clients (under PADSE). The project is expected to enable access to electricity, strengthen existing systems and create some jobs among local inhabitants in particular youth.

75. **Gender.** Women are the most affected by illiteracy and unemployment, according to the public consultations conducted as part of the Environmental and Social Impact Assessment (ESIA). However, women are predominantly involved in the mostly informal economy in Balbala. This includes activities such as the sale of *khat*, small street restaurants, and sale of produce in the market. Besides literacy programs, women consulted during project design pointed out that (a) the lack of lighting discourages taxis to enter the neighborhoods, (b) there is a feeling of insecurity due to lack of lighting, i.e. women reported that family members were robbed at night when returning home, and (c) some women died in child birth due to lack of medical assistance.

76. To address youth and women unemployment, the project would seek to ensure as many employment opportunities as possible to them by paying particular attention to the tender process of key construction and service contracts. This gender-sensitive approach would improve their living conditions, and ultimately also benefit their family members. The focus on youth is important as Djibouti's Poverty Profile shows that 38.5 percent of the population is below 15 years (in Djibouti-City 36.8 percent and other regions 42.9 percent) and almost 73.5 percent is below 35 years old (Djibouti-City 73.6 percent and other regions 73.1 percent). The poverty profile also notes that 18.4 percent of households are headed by women, and a total of 13 percent of the households are headed by female widowers, who tend to be more vulnerable than other households. Extreme poverty for women has reached 49.2 percent (48.4 percent in Djibouti-City and 50.1 percent in other regions).

77. The project is expected to have significant positive socio-economic impacts on women and youth, according to the analysis conducted as part of the ESIA. The project is expected to have the following impacts: (a) increased electricity access of low-income households in peri-urban areas (area of Balbala), (b) improved efficiency and performance of electricity services to the densely populated areas, (c) employment creation, that is, during the construction phase, which is expected to have positive impacts on the community through the use of local skilled workers (masons, carpenters, steel fixers, plumbers, electricians, and so on), (d) improved income of workers involved in the works, (e) improved living conditions of 6,000 households benefiting from the project, (f) the development of income generating activities, that is, small businesses run by women selling food and drinks around the site, and so on, (g) training of skilled and unskilled male and female workers in different construction techniques following accepted standards, (h) better management of public spaces, improved safety of public spaces for women and men and reduced risk of gender-based violence by providing public street lighting, and (i) enhanced social cohesion by ensuring equal opportunities to women and men to participate in decision making regarding the project interventions.

78. Citizen engagement will be an important aspect of the project given its social scope. Initial consultations have taken place during preparation. Monitoring will be ensured by the social development team member of the PIU with a quantitative indicator of grievances received and addressed.

79. **The project will trigger OP 4. 12 on Involuntary Resettlement as the implementation of financed activities will require temporary and permanent** (that is, freeing rights-of-way for Phase 1 sites); physical and economic relocation of people, mostly occupying state land.

80. **Phase 1**. As the project sites are known and the impacts and persons affected by the project have already been identified (estimated to 64 persons), EDD has prepared an Abbreviated Resettlement Action Plan (ARAP) which was disclosed in-country and on the website of the World Bank Group on February 3, 2017.

81. EDD considers the negative social safeguards impacts to be low to moderate. In Phase 1 of the project, 64 people are expected to be affected mainly as a result of the dismantling of fixed and/or movable light assets (shelters, vending tables, and so on) made of metal (*'tôles'*) and/or wood. The total estimated ARAP budget is about US$40,000 including compensation for project affected people (PAPS).

82. **Phase 2.** EDD has elaborated a Resettlement Policy Framework (RPF) as the exact nature of impacts in the additional project sites (including in regions) will not be known by appraisal. The RPF will clarify resettlement principles and processes, institutional and funding arrangements, GRMs, estimated population affected, legal framework reviewing fit between borrower laws and World Bank policy requirements and methods of valuation of assets to be applied to subprojects to be financed during project implementation. Resettlement Action Plans (RAPs) will be prepared once detailed impacts are known according to World Bank requirements and before construction.

83. The RPF (and subsequent RAPs) has been prepared in consultation with affected communities, in French and will be locally disclosed (before appraisal and/or construction in the case of RAPs) in a form and manner accessible to project stakeholders among others. The RPF will be disclosed at the World Bank-related public accessible sites.

84. EDD will hire a social safeguards specialist whose tasks will include monitoring the implementation of the ARAP, such as ensuring the oversight of all resettlement and compensation processes, engaging with citizens, and ensuring the follow-up of GRM compliance.

F. Environment (including Safeguards)

85. The project's Component 1 includes the financing of sub-transmission and distribution networks, MV/LV transformers and street lighting. The project's Phase 1 involves the consolidation of existing LV/MV electricity network in Balbala and its extension through the construction of new substations and power lines to cover the areas without electricity service. Phase 2 involves the extension of the MV grid from Djibouti city to the interior regions of the country and the construction of new substations and LV network.

86. In accordance with the World Bank Safeguard policies on environment (OP/BP4.01), the project has been assigned 'Category B'. The rating is based on the conclusions of the preliminary assessment at the concept stage, confirmed after the ESIA for the project's Phase 1 and the Environmental and Social

Management Framework (ESMF) for the project's Phase 2 (because the exact localizations of the sub projects are not yet known).

87. **For Phase 1,** the ESIA was conducted and it considered all the areas and the infrastructures concerned by the project in the Balbala District. The project will facilitate the construction of new MV and LV lines, new MV/LV transformers and the connection of approximately 9,000 households to the grid.

88. **For Phase 2,** the ESMF has developed a negative list of situations excluded from financing the sub projects that may (a) have a high environmental or social risk (Category A subprojects), (b) affect any natural habitats or protected areas, (c) cause any significant deforestation or passing through classified forests, (d) have any impact on archeological or community cultural properties, or (e) involve the use of Polychlorinated Biphenyls (PCBs). Sub activities to be financed by the Project will follow the steps of environmental screening process through an Environmental and Social Diagnostic Fact Sheet, which will determine the magnitude of negative impacts of the activity on the human and bio-physical environment and the required safeguard tools. Based on the information included in the Fact Sheet, it will be possible to determine if an ESIA is required to identify expected risks and related measures aimed at reducing/avoiding them. Mitigation measures identified in this safeguard tool will be included in the terms and specifications documents (*Cahiers des charges*) for operators and entrepreneurs. At the implementation phase, and as dictated by the screening checklist, site-specific ESIAs will be prepared, reviewed, and approved by the environmental authority and the World Bank and disclosed in-country and on the Bank's external Website before commencement of any civil works.

89. Both the environmental assessment, ESIA for Phase 1 and ESMF for Phase 2 have come to the conclusion that the project has **moderate negative impacts,** easy to manage, with limited spatial influence.

90. Overall, the project has a positive impact that will lead to the enhancement of livelihood of the poor by improving the distribution services and extending these services to underserved communities.

91. The major environmental risks associated with installations are related to (a) electrical hazard lines LV/MV and transformer stations (b) site contamination at work by solid and liquid waste (c) accident during works on LV/MV networks, and (d) accidents during customer connection work.

92. The electricity transport and distribution component will be implemented in compliance with international standards and best practices for electric transport and distribution projects followed by the GoDj and EDD, due to the absence of national standards. Due consideration will be given to the safety aspects associated with the construction and operation of the distribution network and focusing specially on the connection of households. No connections will be executed if the security conditions are not fully met. In urban areas, the routing of MV/LV lines will be designed in such a way to minimize exposure to electric and magnetic fields and aligned with the main existing road. Construction will be effected in installments, using very limited areas for foundations of transport pylons.

93. All the components will be implemented in compliance with World Bank's environmental regulations, policies and procedures. **For Phase 1**, the ESIA have been reviewed and approved by the National Environmental Authority. As part of the ESIA, the populations affected by the project have been consulted and their requests have been considered. The disclosure of the ESIA was done on EDD's website and the Bank's external website on December 8, 2016. **For Phase 2**, the ESMF have been approved after the organization of a public consultation on February 22, 2017, with the participation of

representatives of key national institutions involved in the implementation and was posted on EDD's website and the Bank's external website on March 15, 2017.

94. Both the ESIA and ESMF documents (Phase 1 and 2) recommended (a) Environmental and Social Management Plans (ESMPs) with measures to mitigate the environmental risks, (b) a capacity building plan for EDD, some authorities, and neighborhood committees involved in the project, (c) an institutional arrangement for the management and follow-up of the environmental issues, and (d) a GRM.

95. Within the PIU, an environmental specialist will be recruited to follow up on the screening mechanism established in the ESMF and monitor the application of the mitigation measures contained in the site-specific ESIAs and ESMPs.

96. A responsible individual has been appointed in EDD to monitor the GRM.

97. **Climate and disaster risks.** The geographical area of the project location, is **highly** exposed to extreme temperature, drought and sea level rise and **moderately** exposed to extreme precipitation and flooding. The extreme temperature is the highest risk on the project's components and construction of new substations and new MV/LV power lines in Djibouti. Higher temperatures can decrease the efficiency of transmission systems as they tend to carry less current, thus reducing available transmission capacity. It can also cause sag of overhead transmission lines due to thermal expansion, which can increase fire and safety hazards as well as increase the risk of power outages due to lines coming in contact with trees or the ground. Extreme temperatures can affect power transformers, which can lead to substation or other distribution system failures. The non-physical components of the project, capacity building, technical assistance, feasibility/design studies and outreach will modulate and reduce the risks on the service delivery.

98. **Greenhouse gas analysis.** The project will entail an increase in 3,976 tons of CO_2 equivalent of emissions due to the access given to new consumers to the grid, which will require additional generation capacity[44]. Before the project, the 13,960 household beneficiaries would emit 7,176 tons of CO_2 equivalent through the use of candles, dry batteries, kerosene for cooking and lighting and diesel generators. After the project, these sources of energy would be substituted by the beneficiaries' electricity consumption from the grid, that is, 69,700 MWh. This additional consumption would entail 11,152 tons of CO_2 equivalent.

G. World Bank Grievance Redress

99. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level GRM or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World

[44] Despite the GoDj plans to reach 100 percent of renewable energy by 2030, a conservative approach has been used and it has been assumed that the current generation mix will remain almost constant in the future.

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.

Annex 1: Results Framework and Monitoring

Country: Djibouti

Project Name: Djibouti: Sustainable Electrification Program (P158505)

Results Framework

Project Development Objectives

PDO Statement

The proposed Project Development Objective is to increase access to electricity in the targeted Project Area.

These results are at	Project Level

Project Development Objective Indicators

Indicator Name	Baseline	Cumulative Target Values						
		YR1	YR2	YR3	YR4	YR5	YR6	End Target
People provided with new or improved electricity service (Number) - (Corporate)	0	0	0	14,000	43,750	73,500	97,720	97,720
People provided with new or improved electricity service - Female (Number - Sub-Type: Supplemental) - (Corporate)	0	0	0	6,440	20,125	33,810	44,951	46,951
People provided with access to electricity under the project by household connections (grid or off-grid). (Number - Sub-Type: Breakdown) - (Corporate)	0	0	0	2,000	6,250	10,500	13,960	13,960
People provided with access to electricity through Community electricity connections under the project. (Number - Sub-Type: Breakdown) - (Corporate)	0	0	0	4,060	8,625	13,190	18,265	18,265
People benefiting from public street lighting under the project (Number)	0	0	0	7,140	17,640	33,180	33,180	33,180
Direct project beneficiaries (Number)	0	0	0	21,140	61,390	106,680	130,900	130,900
Female beneficiaries (Percentage - Sub-Type: Supplemental)	0	0	0	46	46	46	46	46

Intermediate Results Indicators

Indicator Name	Baseline	Cumulative Target Values						
		YR1	YR2	YR3	YR4	YR5	YR6	End Target
Medium-Voltage lines constructed (Kilometers)	0	0	0	6	13	16.5	16.5	16.5
Low-Voltage lines constructed (Kilometers)	0	0	0	12	27	44	44	44
Number of substations constructed (Number)	0	0	0	5	10	12	12	12
Number of new street lights installed (Number)	0	0	0	170	420	790	790	790
National distribution grid master plan adopted (Yes/No)	No	No	No	Yes	Yes	Yes	Yes	Yes
Grievances registered related to delivery of project benefits addressed (%) (Percentage)	0	50	55	60	65	70	80	80

Indicator Description

Project Development Objective Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
People provided with new or improved electricity service	Self-explanatory	Bi-annually	Project Implementation Entity (EDD) report	EDD
People provided with new or improved electricity service - Female	Self-explanatory	Bi-annually	Project Implementation Entity (EDD) report	EDD
People provided with access to electricity under the project by household connections (grid or off-grid).	This indicator measures the number of households that have been connected to the grid via a new connection. The first year is expected to be used to complete the procurement process of Phase 1 and to launch the Distribution Master Plan. The second year will be used for importing materials and completing the remaining technical studies (grid topology and design).	Bi-annually	Project Implementation Entity (EDD) report	EDD
People provided with access to electricity through Community electricity connections under the project.	A total of 18,265 people were estimated in the following communities: - Schools: 350 people (2 schools with 35 schoolboys per level and 5 levels) - Middle-school: 140 people (1 middle school with 4 levels) - Health Center: 6,000 people (2 centers and 1 maternity: 1 doctor, 20 visits/day, 300 days/year) - Mosque: 5,600 (2 mosques, 10% population on Friday). - Shops: 175	Bi-annually	Project Implementation Entity (EDD) report	EDD
People benefiting from public street lighting under the project	Number of people benefiting from public street lighting is calculated as follows: each street light will provide lighting for 6 households, while each household has 7 people (source: DISED).	Bi-annually	Project Implementation Entity (EDD) report	EDD
Direct Project Beneficiaries	People with new or improved electricity services and people benefiting from public street lighting.	Bi-annually	Project Implementation Entity (EDD) report	EDD
Female beneficiaries	Percentage of female beneficiaries in total population as per DISED data	Bi-annually	Project Implementation Entity (EDD) report	EDD

Intermediate Results Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Medium-Voltage lines constructed	Kilometers of Medium-Voltage lines constructed, including Overhead and Underground, 148 and 34.4 mm2	Bi-annually	Project Implementation Entity (EDD) report	EDD
Low-Voltage lines constructed	Kilometers of Low-Voltage lines constructed	Bi-annually	Project Implementation Entity (EDD) report	EDD
Number of substations constructed	Self-explanatory	Bi-annually	Project Implementation Entity (EDD) report	EDD
Number of new street lights installed	Self-explanatory	Bi-annually	Project Implementation Entity (EDD) report	EDD
National distribution grid master plan adopted	National Distribution Grid Master Plan approved by EDD and endorsed by the Inter-Ministerial Committee created by the Project.	Bi-annually	Project Implementation Entity (EDD) report	EDD
Grievances registered related to delivery of project benefits addressed (%)	GRM (Citizen engagement and Safeguards): Grievances registered related to delivery of project benefits addressed (%): " grievances addressed " means to: - Acknowledge receipt of the complaint (date, nature of, location, and so on); - Provide an answer to the complaint if relevant and related/ due to the project financed activities; - Respond otherwise to EDD 's inability to address the complaint if not related to project financed activities. The percentage value is the number of grievances which have been totally addressed in less than 6 months divided by the total number of grievances received (fully addressed or not).	Bi-annually	Project Implementation Entity (EDD) report	EDD

Annex 2: Detailed Project Description

DJIBOUTI: Sustainable Electrification Program

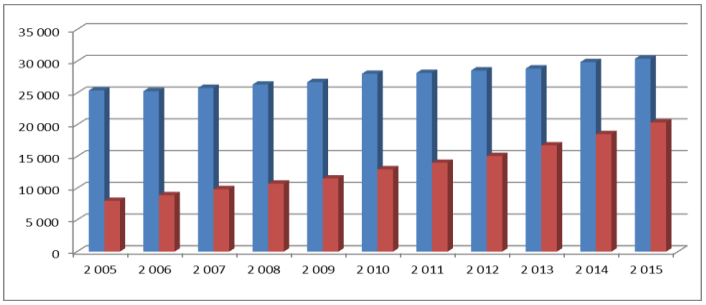
Project Context and Situation

1. **The project supports the country's long-term development strategy[45] to provide access to electricity to the entire population by 2035 to improve their living conditions and modernize the rural areas.** The project builds on the lessons learned from PADSE to address the pressing energy needs in the slum area of Balbala and provides the required in-country capacity building, for example, experienced PIU, to be able to continue the electrification of other areas. Moreover, the project will fund a National SEP to provide a cohesive and comprehensive vision on GoDj's concrete plans to achieve its long-term 100 percent electrification and renewable electricity supply goals.

2. **The project is the first step toward an integrated National Sustainable Electrification Program to be implemented by the national utility EDD[46] in coordination with the Government.** The Program will enhance coordination of all urban electrification and rural initiatives and help attract funding from other donors and the private sector in subsequent projects. EDD carried out a preliminary technical and cost assessment of the program and identified the following potential target areas: (a) Djibouti-Balbala[47], (b) Arta, (c) Loyada, (d) Southern Region (Hol Hol, Ali Adde, Ali Sabieh, and Dikhil), and (e) Northern Region (Obock and Tadjoura). The project financed by the World Bank will cover the region of Djibouti, including Balbala, as well as the other five interior regions of the country.

3. **The previous World Bank-funded PADSE provided significant knowledge and experience on the beneficiary population targeted by the proposed project.** In 2015, the electrification rate was 57 percent for Balbala. With a relatively high electricity cost in Djibouti, the acceleration of the electrification of the country, in particular in the poorest areas, might impact the collection rate. Figure 2.1. compares EDD's total number of clients in Djibouti-City and in Balbala. In 2015, more than 50 percent of EDD's clients resided in Balbala[48].

Figure 2.1. EDD's Total Number of Clients in Djibouti-City (blue), and Balbala (red).



Source: EDD

4. The electricity bill payment rate is monitored closely by EDD and is particularly high in Balbala, as shown in table 2.1.

[45] "Vision Djibouti 2035", page 70.

[46] EDD is the public owned utility for electricity. In 2016, EDD had 56,000 clients.

[47] Balbala's population is growing rapidly: 30,278 households in 2012 and 35,776 in 2015 (+18percent). The number of households having access to electricity increased by 35 percent during the same period. This is mainly explained by the acceleration of the electricity rate provided by PADSE.

[48] Source: EDD

Table 2.1. Electricity Bill Payment Rate

Year	Billing (kWh)	Billing (DJF)	Payments (DJF)	Payment rate (%)
DJIBOUTI				
2015	308,410,798	18,338,460,273	17,549,274,041	96
2016	291,976,541	17,004,758,960	14,724,226,093	87
BALBALA				
2015	65,368,393	3,138,906,193	3,493,295,860	111
2016	71,481,403	3,525,129,722	3,651,058,789	104

5. The electricity bill payment cycle established and implemented by EDD is the following:

(a) At the end of each month, on an alternating basis, EDD issues bills for half of its clients divided, for billing purposes, in Zone A and Zone B. Thus, EDD customers receive bills covering the consumption of two months.

(b) EDD sends individual notifications through short message service (SMS) (more than 50 percent of the clients have a mobile phone) to alert about the bill issuance. Upon reception, customers have one month to pay.

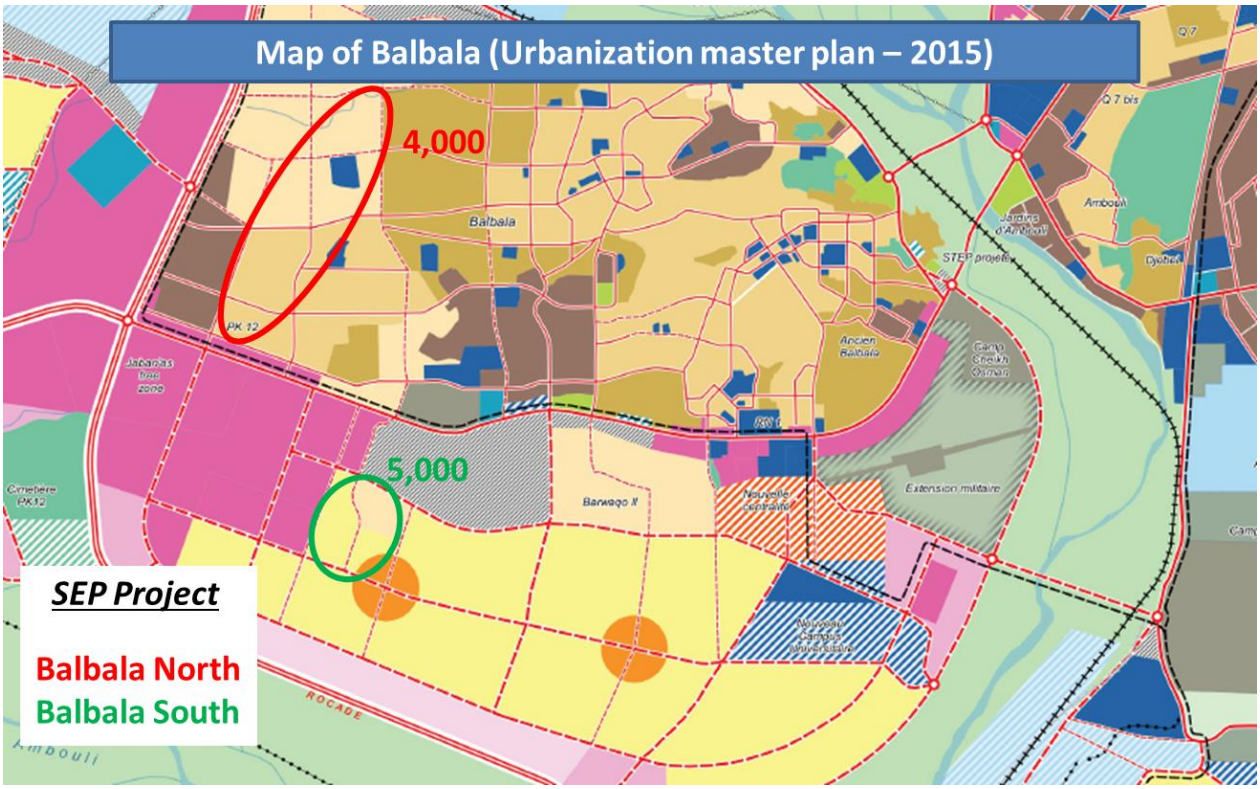
(c) Three days before the due date, EDD sends a new SMS notification to the customer warning that supply will be interrupted if payment is not received on the due date.

(d) Customers with Internet access may view their bills and consumption history online from EDD's website. EDD's customer management system is now interconnected with local banks and with Djibouti Telecom.

6. **The Project's Phase 1 targets Balbala, a suburb in the south-west of Dibouti-City**, including the areas of Balbala North and Balbala South, which are located on both sides of the high traffic road (Nationale 1) connecting Ethiopia and Djibouti. Because of the increasing number of clients in Balbala, EDD plans to build a new commercial shop[49] (one-stop shop) where clients will have access to all services provided by EDD. The Figure 2.2 shows the location of the expected new 9,000 electricity connections that will be created by the Project.

[49] A parcel has already been purchased. All services (new connection, modification of contractual conditions, billing, and maintenance) will be locally available.

Figure 2.2. Location of New Electricity Connections to be Created by the Project in Phase 1



Source: EDD

7. Balbala North is a very dense urban area where the electrification process leads to extending the existing MV lines along the main road and building MV/LV substations close to the consumption centers. The LV lines (feeders) are constructed around the MV/LV substation so that the length is minimized[50]. In this area, EDD estimates that the average distance between a house and the distribution grid is 50m. This is the main reason behind the fixed price proposed by EDD to its clients for the 'last mile' connection. All households are eligible to be connected to the grid if they fulfill EDD's connection criteria, which is: (a) be located in an area accessible to vehicles, (b) be located in a neighborhood or area with an existing EDD grid, (c) have a completed internal electrical wiring certified by the competent authorities, that is, the Housing and Fire Departments.

8. Balbala South (Nassib) presents a different reality because the area targeted by the project is practicallyuninhabited. This land (in yellow on figure 2.2.) belongs to the municipality. According to the urbanization master plan (see figure 2.2) housing will be developed for about 10,000 households. Health care centers, schools, mosques and social services will be developed. A commercial center is also planned. The electrification process is expected to be more traditional, that is, each parcel will be delivered with an access to water and electricity before constructing houses.

9. For both Balbala North and South, street lighting is critical for the communities. The design of the previous PADSE specified that one LV pole out of two should also support a street light. Security for women and children has been greatly improved with this. For this project, and to address population's requests, street lighting will be improved: every other MV pole and every LV pole will support streetlights. A pilot project has been launched by ADEME (Djiboutian energy efficiency agency) to use

[50] This architecture also minimizes the technical losses.

Light Emitting DIODE (LED) instead of traditional 250 W bulbs. Figure 2.3 illustrate one of the urban slums in Balbala North (top) and Nassib sector in Balbala South (bottom) where the 10,000 social housing program has been started.

Figure 2.3. View of Balbala North (top) and Balbala South -Nassib (bottom)

Source: EDD

10. **For connecting new clients to the distribution grid, EDD considers that the physical connection belongs to the household and charges a connection fee.** The connection fee depends on the distance[51] to the grid and should be paid by the client. The meter is maintained by EDD and is attached to the house. For Balbala, the connection fee is DJF 50,000 (US$ 282 including taxes). This fee can be paid in up to 6 installments. The previous PADSE, however, showed that a majority of new clients (97 percent[52]) in Balbala paid the connection fee upfront without the need to apply for an installment pay plan or credit. The main reason for this payment behavior is cultural because most Djiboutian households prefer requesting family and relatives for funds before accessing commercial credit or other sources of funding. ADDS (Djiboutian agency for social development) proposes micro-credits[53] for paying this fee for very low income households.

11. **The process followed by EDD to connect new clients to the network is as follows:**

(a) The customer brings the following document to EDD (customer service):

- The client's identity card
- The land title (or certificate of temporary occupation) of his or her home
- House building permit

[51] And the capacity (kVA) to be subscribed by the client.
[52] According to a survey done by EDD on the PADSE perimeter (1,200 interviews).
[53] 2,000 to 3,000 DJF per month (US$11 to US$17).

- The number of the delivery point (electrical support) closest to the house
- Contact phone number

(b) These documents are scanned by the customer service and forwarded to EDD's engineering office (*'bureau d'étude'*).

(c) The engineering office plans a field visit to carry out the connection study of this customer to the EDD network.

(d) The engineering office informs the customer of the day of the visit by telephone.

(e) Following this study, the engineering office draws up an estimate and sends it to the customer service department.

(f) Customer service sends the quote to the customer.

(g) The client pays the estimate and presents a certificate of conformity of the house's internal electric wiring.

(h) Customer service transmits the amount paid by the customer to EDD's technical department.

(i) EDD's technical department connects the house to EDD's network

12. **The connection fee charged by EDD is therefore not an obstacle for low-income households to get access to electricity.** As previously mentioned, only 4 percent of the population in Balbala – all poor households- requested a credit to during the previous PADSE project. However, for the proposed Project and with the support of the MoF, it has been decided to consider the purchase of connection equipment free of tax and pass this cost reduction to the final beneficiary, and therefore make the connection fee more affordable. Thus, the connection fee is expected to be reduced from DJF 50,000 to DJF 35,600[54] (US$212). To further reduce the connection fee, another possibility has been explored: the use of pre-equipped switching boards[55] with a few plugs and lighting appliances. The indoor wiring of the house would no longer be clearly separated from the supplier's equipment, which could lead to responsibility issues. Generally, the switching board is the clear boundary between the utility's responsibility and the client's responsibility. EDD's policy is to not enter inside the household[56] to avoid competing with local electricians. Another solution for reducing connection costs would be to downsize the equipment used, but EDD already had a negative experience with this approach during the previous PADSE[57].

13. **The comparison of connection costs across projects worldwide could be misleading because costs differ widely.** Based on the World Bank's 2013 policy research working paper[58] on "Connection Charges and Electricity Access in Sub-Saharan Africa", the following issues are raised:

[54] Tax for this type of equipment is 33 percent.
[55] *Tableau électrique prémonté avec prise de courant et luminaire.*
[56] During PADSE, another approach has been used for smart metering deployment: the new switching boards have been equipped in advance by the local workforce so that the installation of the new meters has been reduce to replace the old board with the new one. The same will be done for the new connections of the project.
[57] As already stated in this document, a large majority of customers subscribed a higher capacity after a few years.
[58] Golumbeanu, Raluca, Douglas, Barnes. 2013. "Connection Charges and Electricity Access in Sub-Saharan Africa." Policy Research Working Paper WPS6511. World Bank, Washington, DC.

(a) What are connection charges? It is not possible to compare projects where the distribution grid already exists with others where it has to be built or extended before connecting new clients. In the proposed project, the following is taken into account: (i) the grid cost as being the total cost for building and extending the distribution grid (MV lines, MV/LV transformers, LV lines, poles, public lighting and (ii) the connection cost for the 'last mile' equipment. The grid access cost therefore includes (i) and (ii).

(b) How are connection charges and costs compared between utilities? From the utility perspective, the grid cost could be calculated by dividing the capital expenditures (CAPEX) by the number of potential number of connections (capacity) the grid can handle. For the proposed project, 18,000 social-1 clients might be connected to the grid. By adding a new MV/LV transformer, this capacity might be extended beyond this potential. In the economic analysis, a conservative cost has been adopted by considering only 9,000 new clients. For the connection cost and always from a utility perspective, the density and the type of population should be considered to take into account the distance to the grid and the power capacity which is offered. For Phase 1 of the project (Balbala) and with a focus on low-income population, the average cost for EDD is US$143. Total grid access cost for the project is then US$887[59]. From a customer perspective, instead, the connection fee (US$212) should be added as well as a part of the tariff related to distribution costs. EDD's standard connection fee is not subsidized. EDD's 2016 tariff reflects a cross subsidy from residential and industrial clients to the social tariff.

(c) As shown in the table 2.2 the proposed project's connection and grid access cost (total cost) are close to the average of the comparator countries.

Table 2.2. Comparison of Proposed Project's Connection and Grid Access Cost with Benchmark Countries

Country	Connection fee (US$)	Grid Access Costs (US$)	Comments
Djibouti (SEP)	212	143 + 744	Total cost for less 100 m from grid
Tanzania	297 to 871		For 20-70 meters from grid
Ethiopia	110		Rural
Côte d'Ivoire	615		For less 500 m from the grid
Kenya		300	Connection only
Liberia		950	Total cost
Botswana		615	Connection only
Zambia		160	Connection only
Senegal		720	Total cost

14. **The demand for electricity is growing very rapidly among clients who were recently connected to the grid.** A survey done by EDD with clients connected with PADSE[60] showed that 88 percent of them increased the capacity to which they initially subscribed. This is of paramount importance when designing a distribution grid. For this reason, EDD sized the connection hardware for residential customers on 6–9 kVA. Only the circuit breaker may be changed when the subscribed capacity is higher.

Description of the Project

15. The proposed project financed by the World Bank comprises of two components: the extension of the distribution grid (Component 1), and Technical Assistance (Component 2). Component 1 is composed of two sequential phases: Phase 1 focusing on the electrification of Balbala and Phase 2

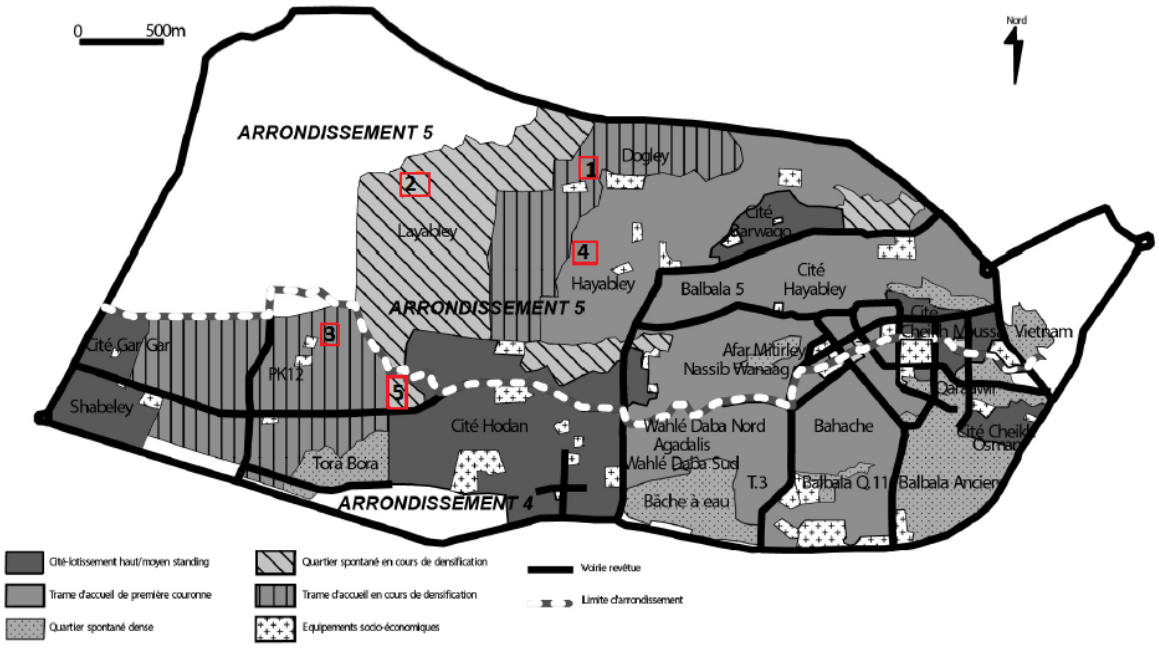
[59] This cost does not take into account the project technical assistance, capacity development.
[60] Representing 7 percent of the clients in Balbala.

focusing on the electrification of the interior regions of the country in locations to be confirmed. The part of the project financed by EDD corresponds to the equipment and materials needed for the customer connection to the grid[61], as well as technical studies and partly the connection costs.

16. **Component 1: Extension and Densification of Distribution Systems (US$22.6 million from IDA for the MV/LV infrastructure and US$4.57 million from EDD for 13,960 connections).** Phase 1 will finance the required infrastructure to connect 9,000 households to the grid and install 790 streetlights in Balbala. This component aims to consolidate the existing LV/MV electricity network in Balbala and its extension through the construction of new substations and power lines to cover the areas without electricity service. Phase 2 will focus on the electrification of the southern areas of Djibouti following the same technical design as the previous phase.

17. **Phase 1 includes the construction of MV lines (16.5 km), LV lines (53.5 km), MV/LV distribution substations (14) and street lighting (790 poles).** The extension of the distribution grid in Balbala capitalizes on the MV infrastructure that was recently built under the World Bank-supported PADSE. Thus, only a few kilometers of MV lines will be needed to reach the selected areas in Balbala North and South. Figure 2.4 illustrates the area covered by the project.

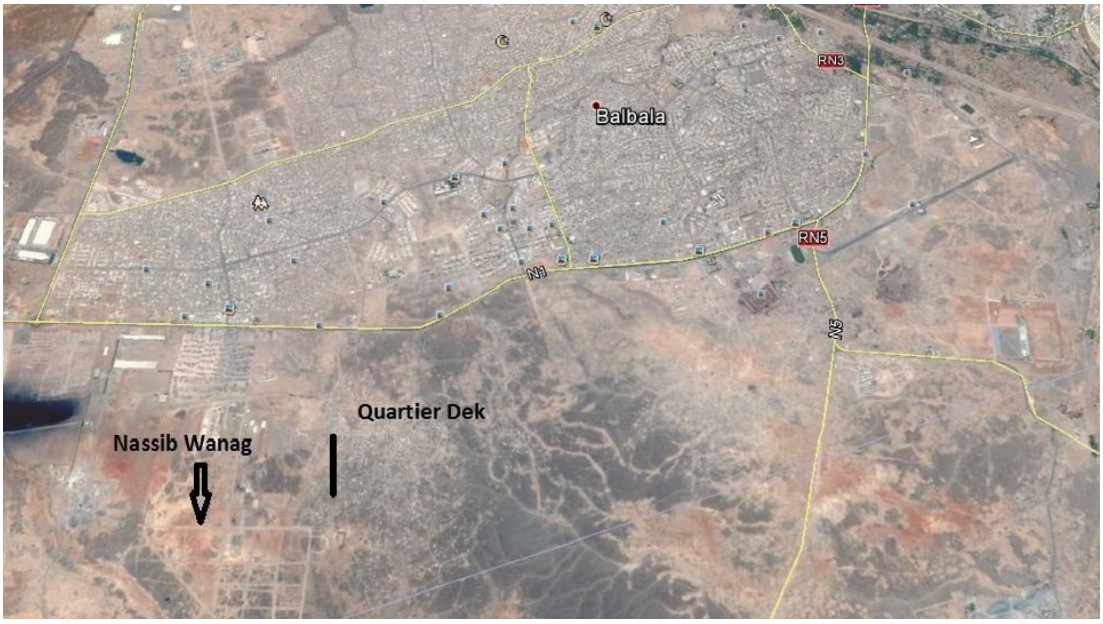
Figure 2.4. Map of Balbala North and Targeted Neighborhoods (Red Squares)



Source: EDD

[61] Except for the Project-financed last-mile connection materials for poor households, which shall be registered as such at the State Secretariat for National Solidarity and for which these materials will be financed by the IDA credit. The eligible poor households will be exempted of paying any connection charges to be connected to the grid.

Figure 2.5. Balbala South map and targeted neighborhoods



Source: EDD

18. The MV components (20 kV) of the project are lines, poles and distribution substations:

(a) MV lines are overhead conductors (Almelec, 34.4 and 148 mm^2).

(i) Two 148 mm^2 lines will be built for Balbala: Dogley (1,200 m), Warabley 1 (1,300 m).

(ii) Five 34.4 mm^2 lines will be built for Balbala : Warabley 1 (200 m), Layabley (300 m), Layabley bis (350 m) and PK12 Cinema area (150 m)

(b) Poles are metallic for angle (where the route changes direction), and terminal (where the lines connect with substations or transition to underground lines). Wooden poles are used for suspension (used for straight line sections).

(c) Fourteen 20 kV/0.4 kV distribution substations. Each substation will have gas isolated 24 kV bays (circuit breaker and transformer protection). Nominal transformer capacity will be 630 or 400 kVA.

19. Fourteen new MV/LV distribution substations will be built in Balbala. Transformers will have a capacity of 630 and 400 kVA and will not contain PCB. Conformity with CCTP n°6410 (Schneider - August 11th 2011), HN 52-S-27 (eRDF), NF EN 50464-1, and NF 60076-1 to 10 will be required. The localization of the substations is shown in table 2.3.

Table 2.3. Localization of MV/LV Substations in Balbala (North and South)

MV/LV Substations	Latitude	Longitude	Location
N° 1	293441,66mE	1279881,38mN	Dogley
N° 2	293088,50mE	1279551,89mN	Hayabley
N° 3	292471,28mE	1279398,00mN	Layabley
N° 4	292189,22mE	1278801,86mN	Layabley (line 4)
N° 5	292171,37mE	1279799,14mN	Warabley 1

N° 6	291354,55mE	1279835,59mN	Warabley 2
N° 7	290137,56mE	1278654,31mN	Pk12 cinema
N° 8	291959,56mE	1279461,63mN	Warabley 1 (line 2 bis)
N° 9 to N° 14	TBD	TBD [a]	Nassib (2000 cells)

Note: a. TBD: to be defined.

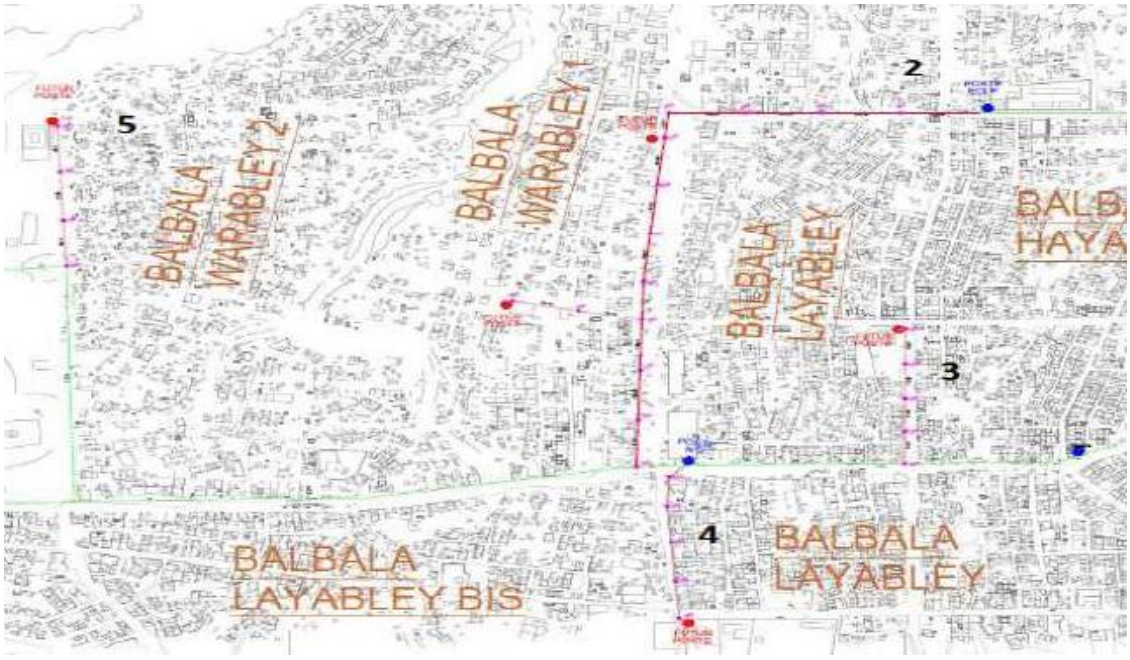
20. An extension of 7.25 km of MV lines will be constructed in Balbala as detailed in Table 2.4.

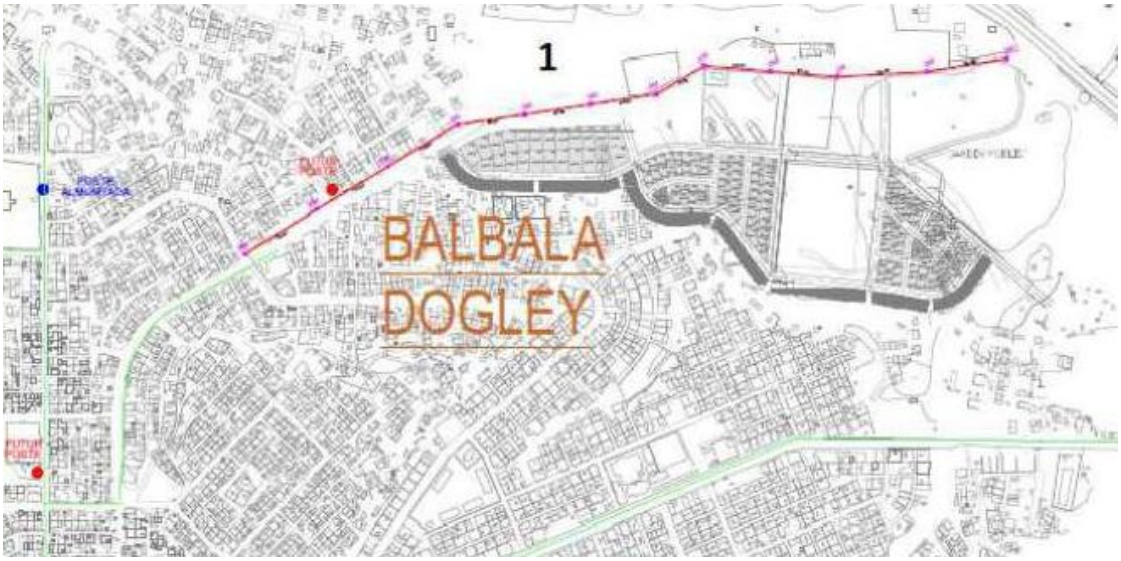
Table 2.4. Planned MV Lines in Balbala (North and South)

MV Lines	Location	MV Lines (m)		Poles (metal)	Poles (wood)
		Section 148mm²	Section 34.4mm²		
1	Dogley	1200		14	
2	Warabley 1	1500	0	17	1
3	Layabley1		300	3	3
4	Layabley Bis	350		3	3
5	Warabley 2	350		2	2
6	pk 12 zone cinema		150	2	1
7	NASSIB (2000 cells)	3850	3520	15	4
Total		**7, 250**	**3 970**	**56**	**14**

21. The detailed routing of MV lines in Balbala for the neighborhoods of Warabley 1/2, Layabley/Layabley bis and Dogley is shown in figure 2.6.

Figure 2.6. Routing of MV Lines in Balbala North





22. The LV components of the project are lines, poles and street lighting:

(a) 43.9 km of LV lines with isolated twisted 3-conductor with neutral carrier and street lighting conductor will be constructed (see table 2.5);

(b) Poles are metallic for angle and terminal, or wooden for suspension: 486 metallic poles and 512 wooden will be used.

(c) Street lighting: 790 fixtures (250 W) – one for every two poles.

Table 2.5. Planned LV Lines in Balbala (North and South)

Location	Cable length (m)		Poles				Street lights
			Metal			Wood	
	$3x70^2+54.6^2+16$	$3x150^2+50^2$	1800 daN	1400 daN	2500 daN	190 daN	
Warabley1	7000	450	45	50	3	110	110
Warabley 2	9000	300	10	44	1	91	118
Layabley Bis	3300	250	27	26	1	40	60
PK12-Cinéma	3000	0	27	16	1	41	48
PK12-Arhiba2	2000	250	14	13	0	8	25
Nassib (2000 cells)	17345	672	110	92	4	222	414
Layabley	0	180	0	0	1		
Dogley	0	180	0	0	1		
Total	**41645**	**2282**	**233**	**241**	**12**	**512**	**775**

23. The localization of LV lines for Warabley 1 and 2 are shown in figure 2.7.

Figure 2.7. Localization of LV Lines in Warabley 1 Neighborhood in Balbala North

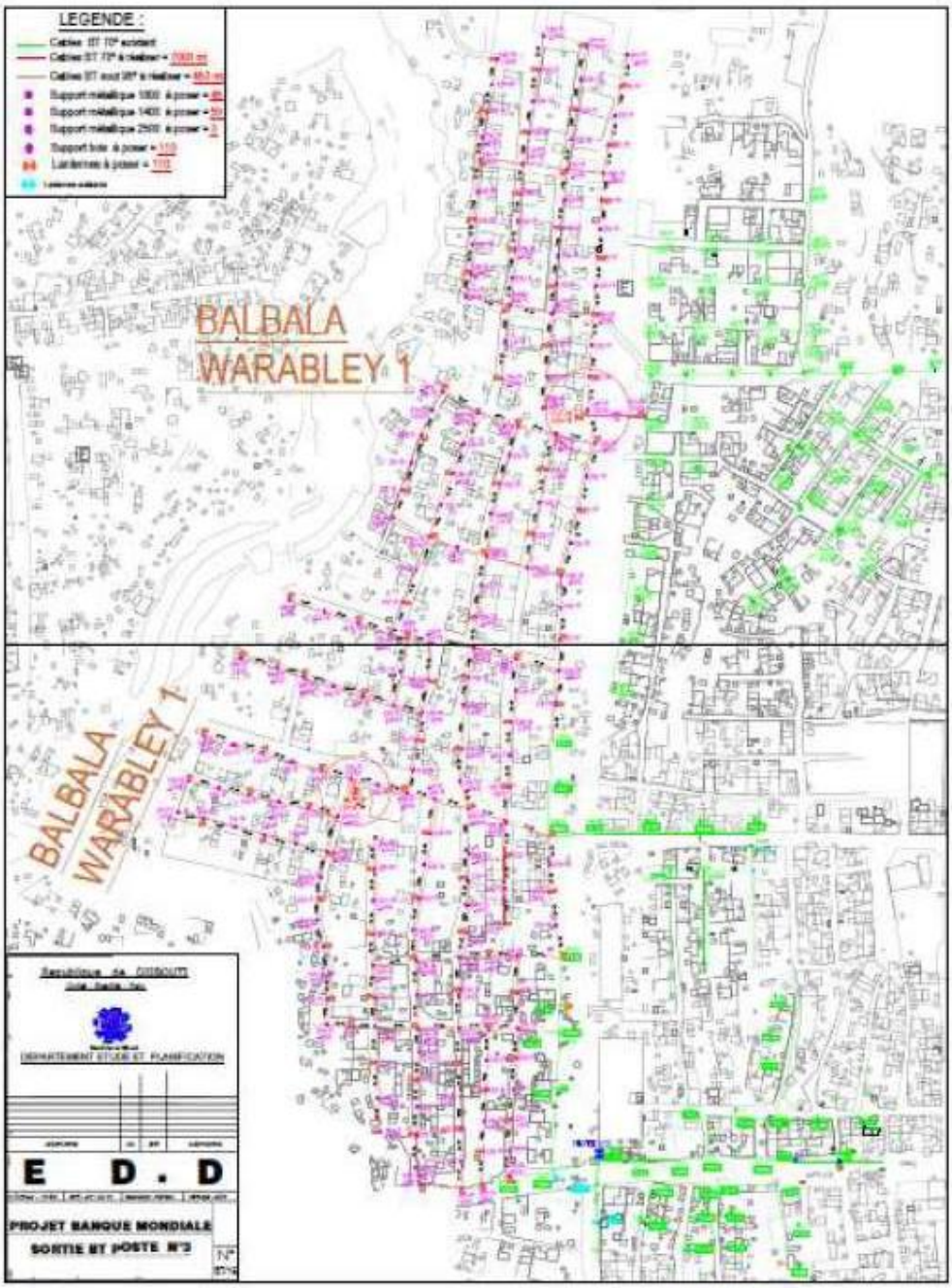


Figure 2.8. Localization of LV Lines in Warabley 2 Neighborhood in Balbala North

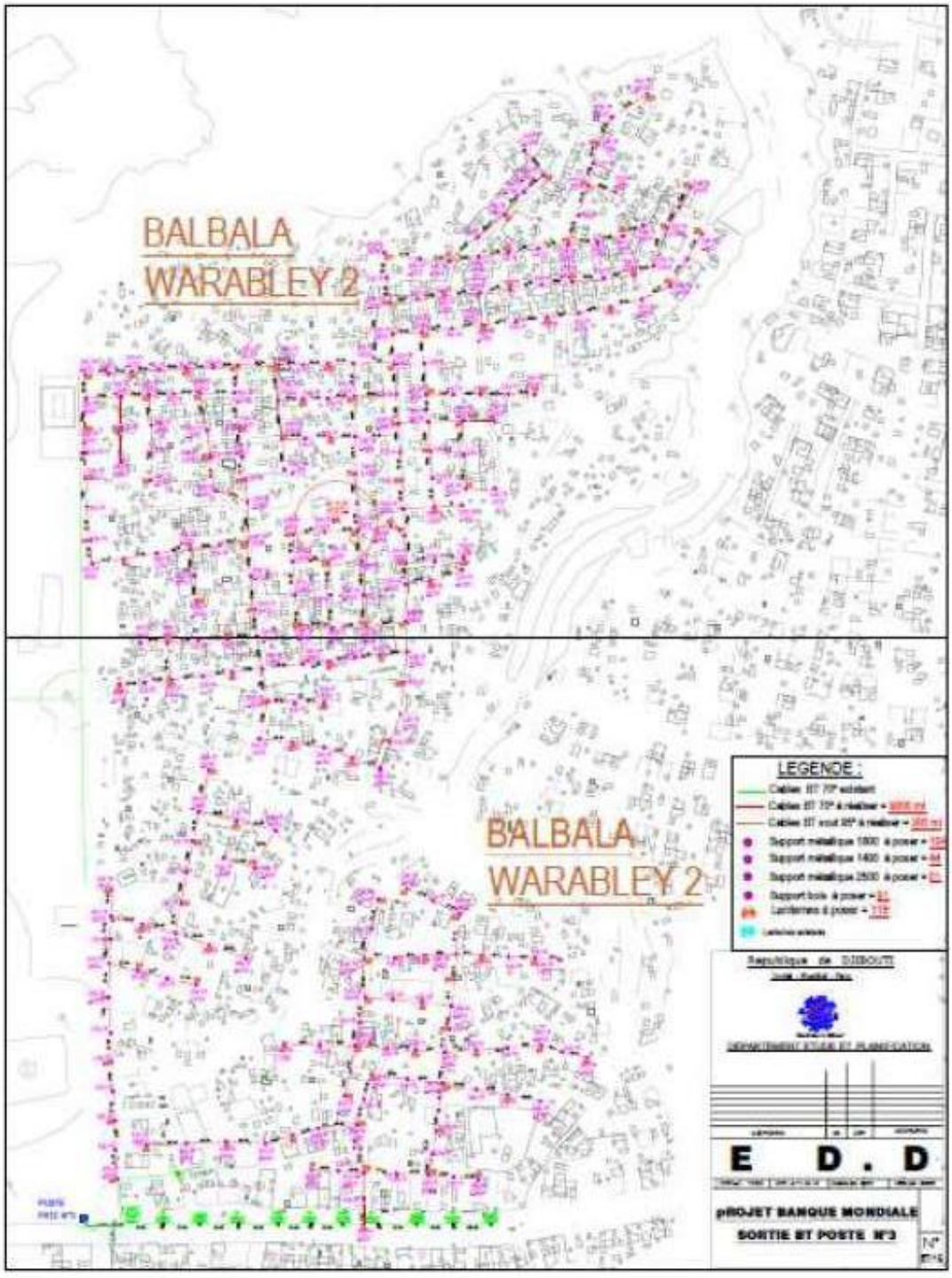
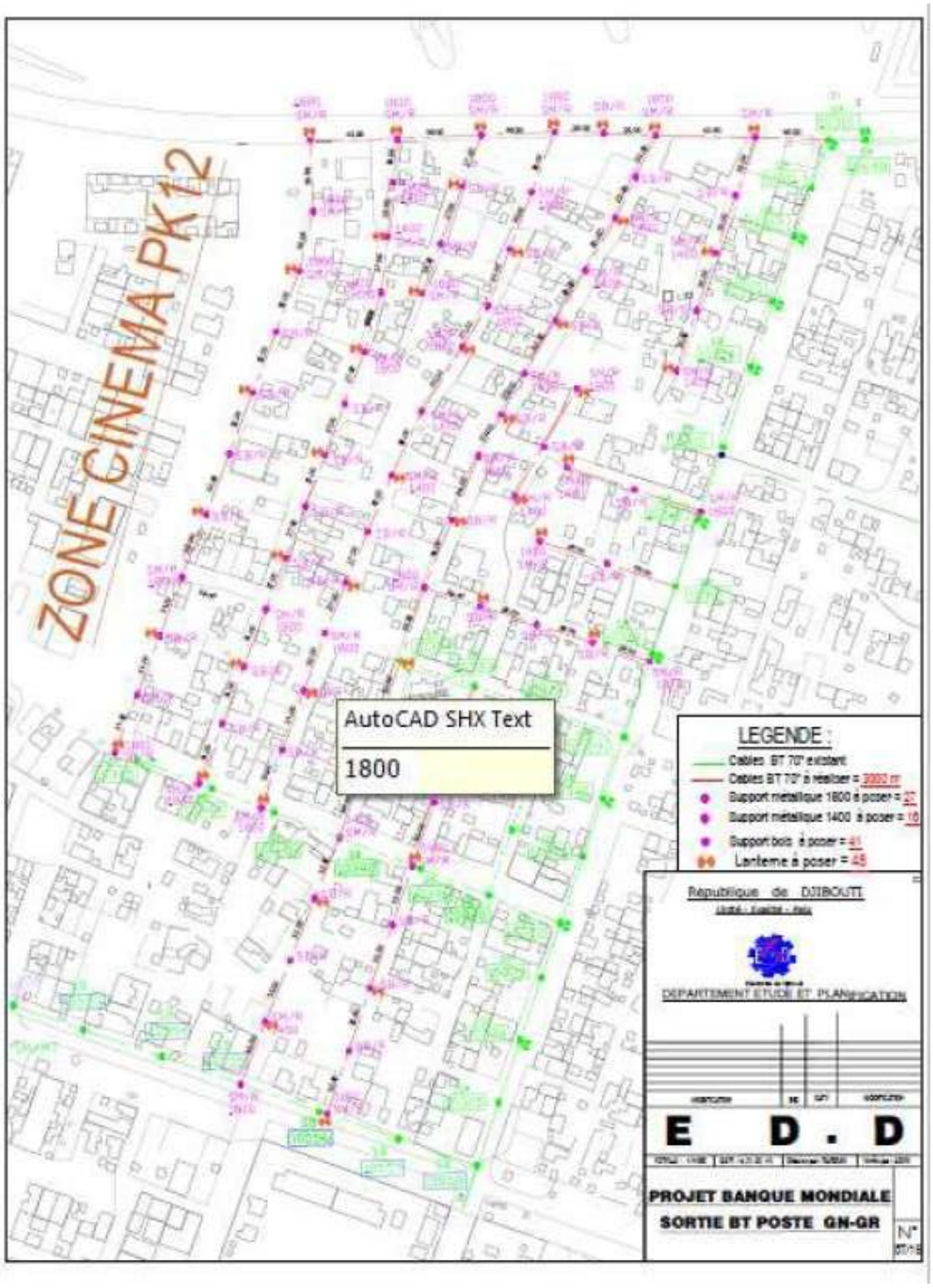


Figure 2.9. Localization of LV Lines in Cinéma PK 12 Neighborhood in Balbala North



24. Table 2.6 summarizes the quantities and prices for the Components 1 and 2 in Phase 1. The quantity and prices for Phase 2, based on the same standards as for Phase 1, will be defined at a later stage.

Table 2.6. Estimated Costs for Phase 1

	Items	Quantity	Unit cost (MFdj)	Total Cost $	Total cost Fdj	Units
Balbala North	MV 148 mm2 OHL	3,5	14	275 713	49 000 000	km
	MV 34,4 mm2 OHL	1,5	4	33 761	6 000 000	km
	LV OHL	25	11	1 547 369	275 000 000	km
	MV/LV 630 kVA	5	19	536 723	95 000 000	value
	MV/LV 400 kVA	3	17	286 967	51 000 000	value
	Street lighting	440	0,07	173 305	30 800 000	value
	Connections	4000				value
Balbala South	MV 148 mm2 OHL	10,5	14	827 139	147 000 000	km
	MV UG	1	18	101 282	18 000 000	km
	MV 34,4 mm2 OHL	0	4	0	0	km
	LV OHL	28,5	11	1 764 001	313 500 000	km
	MV/LV 630 kVA	4	19	427 637	76 000 000	value
	MV/LV 400 kVA	2	17	191 311	34 000 000	value
	Street lighting	350	0,07	137 857	24 500 000	value
	Connections	5000				value
TOTAL IDA-1				**6 303 065**	**1 119 800 000**	

	capacity planning		100 000	usd
	audits		100 000	usd
	National distribution master plan		500 000	usd
TOTAL IDA-2			**700 000**	**usd**

Component 2: Technical Assistance, Capacity Building, and Program Management (US$0.7 million from IDA and US$ 0.28 million from EDD).

25. This component will finance the cost of project implementation and oversight, as well as assistance and capacity development with the elaboration of the national electrification strategy (100 percent electrification rate and 100 percent renewable energy in 2035) and studies to support the transitioning of the energy sector. This technical assistance will finance the drafting of a National SEP, including the national distribution master plan and an action plan to support the GoDj in its efforts to (a) expand significantly the rate of national electrification, (b) contribute to supporting socio-economic development policy within the regions, and (c) reduce urban migration.

26. EDD's contribution to the project consists in funding the costs related with the connection of the client to the distribution grid[62]. Table 2.7 lists all the equipment which will be used to connect households to the grid in Balbala.

[62] Except for the Project-financed last-mile connection materials for poor households, which shall be registered as such at the State Secretariat for National Solidarity and for which these materials will be financed by the IDA credit.

Table 2.7. Equipment Used to Connect Households to the Grid

Equipment	Quantity
Meter	1 unit
Fuse AD45A	3 units
Circuit breaker	1 unit
Drop lines	2-90 meters
Anchors	2 units
Switchboard	1 unit

27. EDD will implement the project following the technical standards outlined in table 2.8.

Table 2.8. Technical Standards

IEC 60815	Guide for the selection and dimensioning of high-voltage insulators for polluted conditions
ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles — specifications and test methods
IEC EN 60305	Insulators for overhead lines with a nominal voltage above 1 kV - Ceramic or glass insulator units for air-conditioning systems - characteristics of insulator units of the cap and pin type
DGPT2	Relais de protection de transformateur immergé
EN 50182	Conductors for overhead lines - round wire concentric lay stranded conductors
EN 50183	Conductors for overhead lines - aluminum-magnesium-silicon alloy wires
EN 14229	Structural timber - wood poles for overhead lines
VDE0210	Planning and design of overhead power lines with rated voltages above 1 KV
IEC U40B	Glass suspension insulators
IEC U70BS	High-voltage glass suspension insulator
NFC 64140	*Interrupteur aérien à commande manuelle*
IEC 60099	Surge arresters
NFA 91-108	Demi-produits en cuivre et alliages de cuivre - produits laminés en bronze
IEC 60076	Power transformers
IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 62271	High-voltage switchgear and control gear
NFC 33 210	Insulated or protected cables for power systems. Cross-linked polyethylene insulated cables covered with a polyvinyl chloride sheath - type h1 xdv-a.
NFC 33-090	*Conducteurs et câbles isolés pour installations - câbles isolés par diélectriques massifs extrudés de tension nominale ne dépassant pas 600/1000 V*
NFC 34-120	Bare conductors for overhead lines aluminum conductors steel reinforced (acsr) for overhead lines; requirements
NFC 33-209	Insulated or protected cables for power systems - bundle assembled cores for overhead systems of rated voltage 0,6/1 kV
DIN 46391	Delivery drums; technical terms of delivery for steel drums
NFC 33-040	*Câbles isolés et leurs accessoires pour réseaux d'énergie - matériels de soutien pour réseaux aériens en conducteurs isolés torsadés, de tension assignée 0,6/1 kV*
NFC 33-041	*Câbles isolés et leurs accessoires pour réseaux d'énergie - matériels d'ancrage pour réseaux aériens en conducteurs isolés torsadés, de tension assignée 0,6/1 kV*
NFC 33-020	*Câbles isolés et leurs accessoires pour réseaux d'énergie - connecteurs de dérivation à perforation d'isolant pour réseaux et branchements aériens de tension assignée 0,6/1 kV en conducteurs isolés torsadés*
NFC 33-021	*Câbles isolés et leurs accessoires pour réseaux d'énergie - matériels de raccordement pré-isolés pour réseaux et branchements aériens de tension assignée 0,6 kV en conducteurs isolés torsadés*
DIN 1164	Special cement compositions, requirements and conformity evaluation

DIN 1045	Structural use of concrete design and construction
CEI 60502	Extruded solid dielectric insulated power cables for rated voltages from 1 kV up to 30 kV
CEI EN 50182	Conductors for overhead lines round wire concentric lay stranded conductors
CEI EN 50183	Conductors for overhead lines - aluminum-magnesium-silicon alloy wires
NFC 13-200	*Installations électriques à haute tension - règles complémentaires pour les sites de production et les installations industrielles, tertiaires et agricoles*

Box 1. The Precursor: The Energy Access and Diversification Project - PADSE

PADSE, which closed in 2015, was the first World Bank experience in the electrification of the country focusing on expanding the distribution network in Balbala. With a total of US$ 3.4 million dedicated to electricity access investments (out of a total budget of US$ 18.2 million), the PADSE succeeded in bringing electricity to 3,500 households in the slum area of Balbala. Moreover, EDD financed 1,500 additional connections building upon the infrastructure financed by PADSE and showing the multiplier effect of this type of electrification project.

The benefits PADSE are visible among the population (see pictures below: left picture - before PADSE and right picture - after PADSE). During a visit to Balbala in January 2016, the World Bank energy team met residents who explained what had changed since their connection to the grid. One of them created a small commercial activity of ice-cream making. His family has now the opportunity to watch television and children can play football safely in the evening thanks to the street lighting. Increased mobility for women permitted by increased safe areas and extended learning time for children are other benefits gained with street lighting. Access to electricity is one of the most basic services enabling social and economic development.

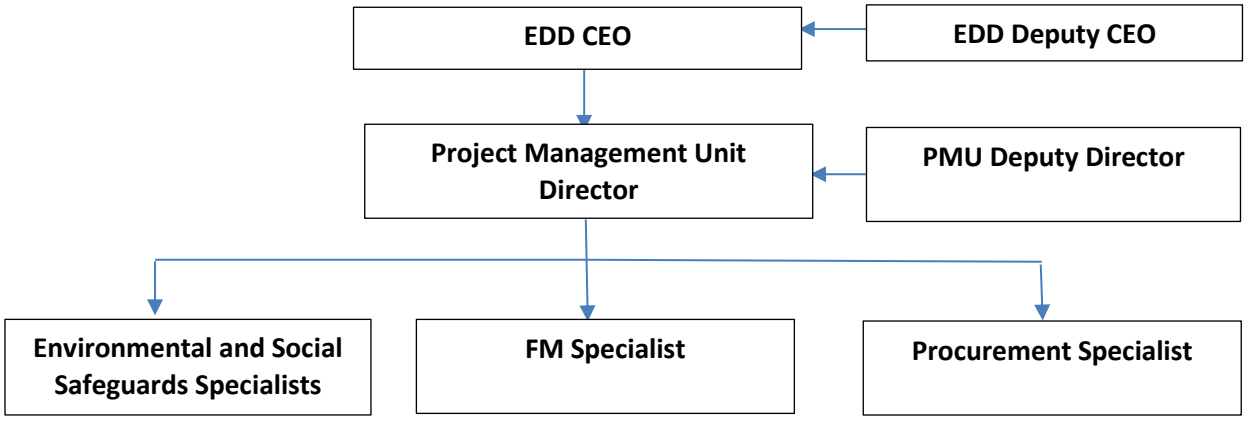
Annex 3: Implementation Arrangements

Djibouti: Sustainable Electrification Program

Project Institutional and Implementation Arrangements

1. The MoF is the borrower and EDD is the executing agency. Separate agreements will be made between the MoF and EDD to identify the exact responsibilities in the implementation of the project. Attention was given during the evaluation of the project to its technical and implementation capabilities. It has qualified personnel to (a) prepare and implement the infrastructure to be financed under the proposed project, and (b) prepare, supervise, and ensure the quality control of all activities in the project. Fiduciary positions in the PIU will require regular training and close supervision by the World Bank team. The organization chart of EDD's Project Management Unit is presented in figure 3.1.

Figure 3.1. EDD's Project Management Unit



FM, Disbursements and Procurement

2. The Republic of Djibouti has a body of complete and sufficient texts for sound management of its public finances. The legal framework of Djibouti includes notably (a) the Constitution of September 4, 1992, and (b) the Law No107/AN/00 relating to the finance laws which fixes the rules relating to the determination of the resources and expenses, the preparation and the vote on annual budget, the execution, and the control of the budget.

3. The institutional framework contains the structures necessary for public financial management. The institutional framework meets the needs with regard to preparation as well as execution and control of the budget. However, some practices affect the efficiency of the texts. This is the case particularly for (a) the use of the exemption procedures of public expenditure, and (b) a certain lack of budgetary discipline.

4. The SEP will be implemented in Djibouti according to the World Bank guidelines and through EDD. A PIU will be created within EDD to handle project execution. The project funds will be disbursed from a grant account established by IDA using advance to a DA, direct payments, and withdrawal for eligible expenditures accompanied by supporting documents or SOEs for sums less than predefined thresholds for each expenditure category, following the applicable procedures and the World Bank's Disbursement Handbook. Interim unaudited financial reports (IFRs) and annual PFSs will be used as a financial reporting mechanism and not for disbursement purposes.

Financial Management Assessment

5. The World Bank team reviewed the FM arrangement at EDD. EDD is currently implementing the Geothermal Power Generation project and previously implemented PADSE which had three financings and was executed satisfactorily by EDD.

6. Based on the result of the assessment, the FM risk, as a component of the fiduciary risk, is rated Substantial. With the proposed mitigating measures, EDD will have the FM requirements according to OP/BP 10.00 and will have an acceptable FM system and the residual FM risk rating would be Moderate.

7. In view of the risks identified and the weaknesses observed, the overall FM risk is deemed to be Substantial. The following are the risks identified (a) EDD has no accounting software to record the daily transactions (b) currently EDD has limited human resources capacities, (c) EDD has no internal control procedures; and (d) EDD is an autonomous public institutions and falls under the audit conducted by the Supreme Audit Institution (SAI). The SAI has a limited role in auditing public institutions and has no experience in auditing World Bank-financed projects. The SAI may not specifically audit the project as part of EDD operations which would give limited assurance on the project's use of funds.

8. Based on the below risks, the following mitigating measures have been agreed upon in order to reduce the FM risk level and have an adequate FM system in place:

(a) EDD will recruit a Financial Officer (FO) who will handle the FM aspects of the project. The World Bank will provide the necessary training to the FO on World Bank FM procedures.

(b) EDD will acquire an accounting software specific for the purpose of the project and will use the software to record the daily transactions and produce the unaudited IFRs. The format of the IFRs will be agreed upon with the World Bank. The IFRs will be submitted to the World Bank no later than 45 days after the end of each quarter.

(c) For the purpose of the project, EDD will develop an Project Operational Manual (POM) which will contain an FM chapter which with will in turn describe in detail the FM procedures, including internal controls.

(d) EDD will contract an independent external auditor with Terms of Reference (ToRs) acceptable to the World Bank to audit the PFS.

9. The auditor will prepare an audit report and management letter. The project will submit the annual audit report and management letter to the World Bank no later than six months after the end of each fiscal year.

Financial Management and Disbursement Arrangements

10. **Staffing.** A PIU will be established at EDD which will comprise a project manager, an FO, and a procurement specialist. The FO will handle the FM aspects of the project and will report to the project manager. The World Bank will provide the necessary training to the FO on World Bank FM procedures.

11. **Internal control.** For this project, EDD will prepare a POM which will define the roles, functions, and responsibilities of the implementing agency. The POM will contain a distinct chapter on FM detailing the FM and accounting procedures and will include internal controls procedures.

12. **Budgeting.** EDD prepares its budget on an annual basis which forms a part of the overall budget of the MENR. EDD's consolidated budget is prepared after inputs from the various departments. EDD will prepare a separate annual budget and a disbursement plan for project. The budget will be prepared on an annual basis and submitted to the World Bank in November/December of each year covering the subsequent year. The disbursement plan will cover each fiscal year and will be divided by quarter and submitted with the quarterly unaudited (IFRs). EDD will monitor the variances in the disbursement plan and will provide justification on any major divergence.

13. **Project accounting system.** EDD will acquire an accounting software for the project. EDD will use the accounting system to record daily transactions and produce the unaudited IFRs. The FO will be responsible for preparing the IFRs before their transmission to the Project Coordinator for approval. Periodical reconciliation between accounting statements and IFRs will also be done by the FO.

14. The general accounting principles for the project are as follows:

(a) Project accounting will cover all sources and uses of project funds, including payments made and expenses incurred. All transactions related to the project will be entered into the accrual accounting system. Disbursements made from the project's DA will also be entered into the project accounting system.

(b) Project transactions and activities will be separated from other activities undertaken by EDD. IFRs summarizing the commitments, receipts, and expenditures made under the project will be produced quarterly using the templates established for this purpose.

(c) The project's chart of accounts will be in compliance with the classification of expenditures and sources of funds indicated in the project cost tables and the general budget breakdown in addition to the POM. The chart of accounts should allow for data entry to facilitate the financial monitoring of project expenditures by component, sub-component and category.

15. **Project reporting.** The project financial reporting includes quarterly IFRs and yearly PFSs. IFRs should include data on the financial situation of the project, including

(a) Statement of cash receipts and payments by category and component;

(b) Accounting policies and explanatory notes, including a footnote disclosure on schedules:

(i) The list of all signed contracts per category showing contract amounts committed, paid, and unpaid under each contract;

(ii) Reconciliation Statement for the balance of the project's DA;

(iii) Statement of cash payments made using SOE basis;

(iv) A budget analysis statement indicating forecasts and discrepancies relative to the actual budget, and

(v) A comprehensive list of all fixed assets.

16. The IFRs should be certified by the external auditor on a yearly basis. The IFRs should be produced by EDD every quarter and sent to the World Bank within 45 days from the end of each quarter. The PFS should be produced annually. The PFSs should include (a) a cash flow statement, (b) a

closing statement of financial position, (c) a statement of ongoing commitments, (d) an analysis of payments and withdrawals from the project's account, (e) a statement of cash receipts and payments by category and component; (f) reconciliation statement for the balance of the project's DA, (g) statement of cash payments made using SOE basis, and (h) the yearly inventory of fixed assets acquired under the project.

17. **Flow of funds.** Payment will be instructed by three signatures - the Director of EDD, the Director of the External Financing Department at the MoF, and the Director of the Debt Department at the Ministry of Budget.

18. Funds will be transferred from the World Bank based on withdrawal applications submitted by the project. The funds will be channeled from the World Bank through the single segregated DA in U.S. dollars opened at a commercial bank in Djibouti acceptable to the World Bank. Advances from the IDA account will be disbursed to the DA to be used for the project expenditures.

19. **Audit of the project financial statements.** An annual external audit of the PFSs will cover the financial transactions, internal control, and FM systems and will include a comprehensive review of SOEs.

20. An external auditor will be appointed according to ToRs acceptable to the World Bank and should conduct the audit in accordance with international auditing standards. The auditor should produce, (a) an annual audit report including his opinion on the project's annual financial statements, (b) a management letter on the project's internal controls, and (c) a limited review opinion on the IFRs on a yearly basis. The annual reports will be submitted to the World Bank within six months from the closure of each fiscal year and the limited review opinion will be submitted to the World Bank along with the yearly audit report.

21. EDD will ensure that the recruitment of the external auditor will be done six months after project effectiveness for the auditor to start his fieldwork early so as to deliver the audit report and management letter within the deadlines and avoid any delays in this regard.

22. **Flow of information.** EDD will be responsible for preparing periodic reports on project implementation progress and on both physical and financial achievements. These reports will be based on project activity progress (by component and expenditure category), including technical and physical information reported on a quarterly basis.

23. EDD will maintain the project bookkeeping, and will produce annual PFSs and quarterly IFRs.

Table 3.1. Summary of Actions to be Implemented

Actions	Deadline
Prepare an FM chapter as part of the POM detailing the FM and accounting procedures	By effectiveness
Acquire an accounting software	6 months from effectiveness
Hire an external auditor with ToRs acceptable to the Bank	6 months from effectiveness

24. **Disbursements.** The IDA funds will be disbursed according to the World Bank guidelines and should be used to finance project activities. The proceeds of the project will be disbursed in accordance with the traditional disbursement procedures of the World Bank and will be used to finance activities through the disbursement procedures currently used: advances, direct payment, reimbursement accompanied by appropriate supporting documentation (records, list of payments against contracts

subject to World Bank prior-review, and/or SOEs) in accordance with the procedures described in the Disbursement Letter and the World Bank's 'Disbursement Guidelines'. The ceiling of the project's DA is set at US$1.25 million). The IFRs and the PFSs will be used as a financial reporting mechanism and not for disbursement purposes. The minimum application size for direct payment and reimbursement will be equal to 20 percent of the ceiling advance.

Table 3.2. Allocation of Credit Proceeds

Category	Amount Allocated (US$ million)	Percentage of Expenditures to be Financed (inclusive of taxes)
(1) Goods, works, non-consulting services, and consultants' services, training and workshops, incremental operating costs and audits for Subcomponents 1.1 and 2.1 of the Project	23.30	100.00
(2) Costs of subcomponents 1.2 and 2.2 of the Project	0.00	0.00
Total	**23.3**	

25. **DA.** On behalf of EDD, the Department of External Financing will open a segregated DA in a commercial bank in Djibouti acceptable to the World Bank in U.S. dollars to cover the project's share of eligible project expenditures. The ceiling of the DA will be US$1.25 million. EDD will be responsible for submitting monthly replenishment applications with appropriate supporting documentation.

26. **SOEs.** For requests for reimbursement and for reporting eligible expenditures paid from the DA:

(a) SOEs in the form attached (attachment 4 of the Disbursement Letter)

(b) List of payments for contracts subject World Bank's prior-review (attachment 5 of the Disbursement Letter).

27. **Requests for direct payments.** Records evidencing eligible expenditures, for example copies of receipts and copies of suppliers' invoices above the minimum application size.

28. **Governance and Anti-Corruption.** Fraud and corruption may affect the project resources, and thus negatively affect the project outcomes. The World Bank's FM specialist worked closely with project's task team leader as well as the project's consultants and developed an integrated understanding of possible vulnerabilities and agreed on actions to mitigate the risks. The above proposed fiduciary arrangements, including the POM with a detailed FM chapter, reporting and auditing, and review arrangements are expected to address the risk of fraud and corruption that are likely to have a material impact on the project outcomes.

29. **Supervision plan.** The FM of the project will be supervised by the World Bank in conjunction with its overall supervision of the project and conducted at least thrice a year.

30. **Supporting documentation and recordkeeping.** All supporting documentation was obtained to support the conclusions recorded in the FM assessment.

Procurement Arrangement and Capacity Assessment

31. **General**. The proposed project will be implemented in line with the World Bank policies that are standard for project implementation. All goods, works, non-consulting services, and consultants'

services required for the activities to be financed out of the proceeds of the project shall be procured in accordance with the requirements set forth or referred to in the 'Guidelines: Procurement of Goods, Works and Non consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 and updated in July 2014 (Procurement Guidelines) and in the 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 and updated in July 2014 (Consultant Guidelines). The Guidelines on Preventing and Combating Fraud and Corruption in Projects financed by IBRD Loans and IDA Credits and Grants, dated October 15, 2006 and revised in January 2011 will also apply to this project.

32. **Project implementation agency**. The project procurement activities will be administered by the implementing agency, EDD as the PIU, with the responsibility of procuring all goods, works, consultants and non-consultant services required for the implementation of the project activities.

33. **PIU procurement capacity assessment**. A procurement capacity assessment of the PIU was carried out in the context of the proposed project and the following principal procurement risks were identified: (a) limited procurement and technical capacity, (b) low participation by bidders and luck of local market capacity, (c) potential delays in procurement processes due to internal coordination with the National Commission for the Public Procurement and lack of harmonization of some procurement procedures, and (iv) potential delays in evaluation of bids/proposals as the evaluation committee members are not familiar with international procurement procedures.

34. The following mitigation measures will be implemented:

(a) Prepare a procurement manual.

(b) Hire an experienced consultant familiar with the World Bank procurement procedures on a part-time basis to support the PIU during the project implementation; the consultant would provide technical assistance to the project staff during bid/proposal evaluation, support the evaluation committee during bid/proposal evaluation reports and assist in contract management. The consultant would also mentor/coach the procurement staff through a hands-on training.

(c) Procurement staff will continue to receive the training/coaching from the international procurement expert and participate in training in a specialized center.

(d) Hire engineers to assist the PIU in preparing designs, technical specifications, bidding documents, and bid evaluation reports, and in contract supervision and management for highly specialized contracts, such as contracts for the construction of sub-transmission and distribution networks, supply of transformers, and so on.

(e) Develop a strategy that aims at attracting more national bidders.

(f) Take into account lessons learned from the previous contracts under PADSE in setting out qualification requirements and planning.

(g) Provision of advice and assistance on a regular basis by the World Bank's procurement specialist.

35. Some of the PIU staff are already in place and the procurement planning is being prepared by the PIU in collaboration with the Geothermal Power Generation Project procurement specialist who will also be responsible for the procurement activities of this project.

36. **Procurement Plan**. A Procurement Plan for the initial 18 months of project implementation for contracts to be signed under the project has been prepared by the PIU and approved by the World Bank. It will be made available in the project's database and on the World Bank's external website. The Procurement Plan will be updated annually or as required to reflect implementation needs and improvements in institutional capacity.

37. **Review of procurement decision by the World Bank**. The Procurement Plan shall set forth those contracts which shall be subject to the World Bank's prior-review. All other contracts shall be subject to post-review by the World Bank.

38. **Frequency of procurement supervision**: In addition to the periodic World Bank supervision missions, procurement post reviews will be carried out by the World Bank every 12 months.

Environmental and Social (including Safeguards)

39. The project is assigned a 'Category B' based on the nature of the activities that will be financed. The rating is based on the conclusions of the preliminary assessment at the concept stage and reconfirmed after the Environmental Impact Assessment was done.

40. The ESIA prepared for Phase 1 was conducted and considered all the areas and the infrastructures concerned by the project in Balbala. The project will allow the realization of MV and LV new lines, especially an MV line of 35 km, MV/LV new transformers and the connection of approximately 5,000 households to the grid. Both the environmental assessment and the preliminary screening have come to the conclusion that the project has moderate negative impacts, easy to manage, with limited spatial influence.

41. Overall, the project has a positive impact that will lead to the enhancement of livelihood of the poor by improving the distribution services and extending these services to underserved communities, towns, and villages.

42. The major environmental risks associated with installations are related to (a) electrical hazard lines LV/MV and transformer stations, (b) site contamination at work by solid and liquid waste, (c) accident during works on MV/LV networks and (d) accidents during customer connection work.

43. The electricity transport and distribution component will be implemented in compliance with international standards and best practices for electric transport and distribution projects followed by the GoDj and EDD, due to the absence of national standards. Due consideration will be given to the safety aspects associated with the construction and operation of the distribution network and focusing specially on the connection of households. No connections will be executed if the security conditions are not fully met. In urban areas, the routing of MV/LV lines will be designed in such a way to minimize exposure to electric and magnetic fields.

44. **The use of PCBs is completely prohibited**. All the components will be implemented in compliance with the World Bank environmental regulations, policies, and procedures. The ESIA will be reviewed and approved by the National Environmental Authority. This ESIA had recommended (a) an ESMP with measures to mitigate the environmental risks, (b) a capacity building plan for EDD, some authorities, and neighborhood committees involved in the project, (c) an institutional arrangement for the management and for follow up of the environmental issues. As part of the ESIA, the populations affected by the project have been consulted and their requests have been considered. The disclosure of

ESIA was done on the website of EDD and on the public website of the World Bank Group on December 8, 2016.

45. The population in the targeted districts is relatively large as compared to the population of the capital. Overall, communities tend to be poor with an estimated unemployment rate of 42 percent; low access to electricity (about 70 percent do not have access to electricity) and water (about 10 percent). Nearly 78 percent live in precarious homes and 80 percent live in temporary structures. Sources of employment are mostly informal however communities are eager to be connected to electricity and have raised that concern strongly during consultation. Connection costs seem less of an issue as a limited number of people have used the payment facility with monthly installments proposed by EDD for first time connection clients (under PADSE). The project is expected to enable access to electricity, strengthen existing systems and create some jobs among local inhabitants in particular youth.

46. Citizen engagement will be an important aspect of the project given its social scope. Initial consultations have taken place during preparation.

47. The project will trigger OP 4. 12 on Involuntary Resettlement as the implementation of financed activities will require temporary and permanent (that is, freeing rights of way in Phase 1); physical and economic relocation of people, mostly occupying state land and rights of way. As the project sites are known and the impacts and persons affected by the project already identified, EDD has prepared an ARAP, which was disclosed in-country and on the World Bank Group public website on December 8, 2016. EDD has elaborated also a RPF as it plans to extend this project into a larger government program.

48. EDD considers the negative impacts to be low to moderate. In Phase 1, 64 people are expected to be affected mainly as a result of the dismantling of fixed and/or movable light assets (shelters, vending tables, and so on) made of sheet metal (*'tôles'*) and/or wood. The total estimated ARAP budget is about US$40,000 including about US$30,000 of compensation monies to project affected people.

Annex 4: Implementation Support Plan

Djibouti: Sustainable Electrification Program

Strategy and Approach for Implementation Support

1. The project will mainly have procurement of contracts through International Competitive Bidding (ICB) and National Competitive Bidding (NCB). EDD will use its in-house technical expertise and experience as much as possible to prepare the technical specifications for the materials to be purchased.

2. The project will start implementation on Phase 1 (Balbala) because detailed due diligence, technical assessments, and safeguard documents (ESIA, ARAP) have been prepared. The implementation of Phase 2 (south of Djibouti) will be implemented sequentially after the completion of the technical assessments which will identify the specific towns and villages to electrify. Phase 2 involves a framework approach to safeguards, which will require site-specific safeguards documents to be developed in the first year of project implementation. The detailed support from the World Bank team during project supervision is outlined here.

a) **Environmental and social safeguards.** The World Bank safeguards team will provide implementation support for (a) preparation of site specific safeguards documents for Phase 2, (b) implementation of safeguards requirements through regular supervision missions, including visits to the project sites, (c) reviewing of environmental and social monitoring reports and following up on any safeguards issues that may arise (d) training on safeguards for EDD staff, and (e) monitoring on GRM and gender issues.

b) **Procurement and technical.** The World Bank team will provide implementation support for (a) reviewing procurement documents including technical specifications and providing timely feedback and no objection, and (b) monitoring procurement progress against the Procurement Plan developed by EDD.

c) **FM.** The World Bank team will provide implementation support for reviewing the project's FM system, including but not limited to accounting, reporting, and internal controls.

Implementation Support Plan

3. The proposed implementation support requirements are as shown in tables 4.1 and 4.2.

Table 4.1. Implementation Support Plan

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First twelve months	Monitor and assist in the procurement of main contracts of Phase 1.	Procurement specialist	2	None. All Procurement will follow World Bank Group Guidelines
		Transmission and distribution engineer	1	
	Support preparation of site-specific safeguards documents of Phase 2 and supervise safeguards implementation of	Environmental and social safeguards specialists	2	None. World Bank Group Safeguard policies will apply.

Time	Focus	Skills Needed	Resource Estimate	Partner Role
	Phase 1			
12-48 months	Monitor project management and supervise project implementation progress	Project manager	1	None.
		Power engineer	1	
	Monitor FM implementation and disbursement	FM specialist	1	None.
48-72 months	*Monitor implementation of social safeguards for Phase 1 and 2*	Social development specialist	1	None.

Table 4.2. Skills Mix Required

Skills Needed	*Number of Staff Weeks*	*Number of Trips*	*Comments*
Team leader	12	3	Washington, DC
Transmission and distribution engineer	8	3	Washington, DC
Procurement specialist	6	0	Country Office-based
FM Specialist	6	2	Washington, DC
Environmental specialist	6	2	Washington, DC
Social specialist	8	3	Washington, DC
Operations analyst	6	2	Washington, DC
Total	**52**	**15**	

Annex 5: Economic and Financial Analysis

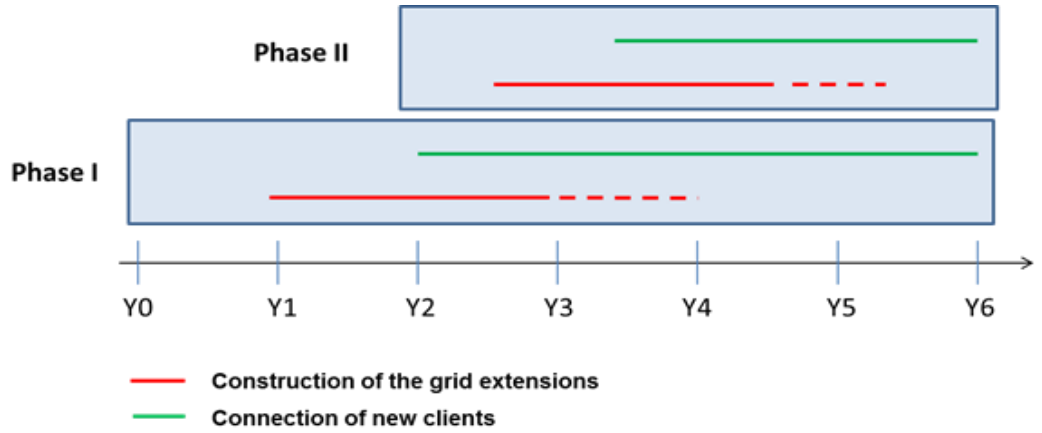
A. Project Overview:

1. The scope of the project consists in the extension of the distribution grid for the following areas:

- During Phase 1: (a) Balbala North (4,000 households) and (ii) Balbala South (5,000 households)
- During Phase 2: Interior regions of Djibouti (4,960 households in locations to be determined)

2. The total cost of the distribution grid extension is US$22.6 million for 13,960 households. The distribution grid extension for Phase 1 will be implemented in the first two years and for Phase 2 in the following two years. The connection of the new clients will be done over a four-year period for the first phase and three years for the second phase. Figure 5.1 below presents the sequencing of the implementation of the grid extensions and the connection of new clients.

Figure 5.1. Implementation of Project's Phase 1 and 2



3. The electricity consumption for these new customers is based on EDD's historical data. The economic profile of these customers is the one generally found in these areas: urban or semi-urban and low-income. Based on the high number of electricity connection requests in a previous World Bank-funded project in Balbala[63], the willingness to pay for electricity is assumed to be substantial.

B. Economic Analysis

4. Before presenting the results of the economic analysis, a few key issues need to be addressed:

(a) **Project's development impact:** The electrification of Balbala, the overcrowded suburb of Djibouti-City (Phase 1) will enable the area's economic and social development together with water distribution and waste management improvements. PADSE demonstrated that the access to electricity led to the creation of local commercial activities, increased the security after sunset, and provided better sanitary conditions. This is the base for the

[63] PADSE

future urbanization of this region. All these critical developments could not take place without these types of projects. Today, 50 percent of the Djiboutian population has no access to electricity. Large investments are planned for developing new power plants and high voltage lines because the private sector needs electricity to invest in new infrastructures (ports, industrial zones, railways, and so on). The extension of the distribution network is currently being funded by EDD, but the electrification rate is progressing slowly due to limited funding. Additional funding is therefore required to make a difference at the country level. Phase 2 of the project aims to accelerate electrification by extending the distribution grid to the small cities and villages in the south.

(b) **Women and youth will largely benefit from the project through the new electricity service.** Around 20 percent of households in Balbala are headed by a woman,[64] which are disadvantaged because of their socioeconomic characteristics.[65] Among other benefits, women will benefit from (i) the ability to organize household chores better and perform them more efficiently because of better household lighting; (ii) public lighting, which will make them feel safer when walking during the evening or night; and (iii) improved care and health benefits during childbirth facilitated by access to electricity in health centers. The Djiboutian population is characterized by its youth, with 39 percent of the population below 15 years and 74 percent below 35 years.[66] The youngsters in the targeted areas are expected to benefit, among others, from (i) improved education facilities due to electricity, which will allow both youth and adults attending school during the night and (ii) the ability to sell goods after sunset. Indeed, the past World Bank electrification project financed in Balbala[67] showed the critical importance of electricity in spurring economic development in the targeted areas, which paved the way for the following public and private investments after the project: a health center, a police station, a community center, a primary school, a hardware store, seven bakeries, six windmills, and five mosques.[68] In the south, the supply of water is one of the most burning issues. Without access to electricity, motor pumping is used but diesel is expensive. In all cases, water tanks are not close to the houses. Very often, women are tasked with the filling and transportation of individual tanks.

(c) **Project alternatives.** Individual electrification solutions based on solar photovoltaic modules would not be appropriate given the high density of the population, that is, there is almost no surface available for installing photovoltaic panels and the costs of doing so are high (US$2,000–US$3,000 per household). Given the available financing, the present project is the least-cost option for electrification. Two villages in the south implemented solar mini-grids. Phase 2 of the project should extend the access to electricity at a lower cost for a significant number of villages.

[64] DISED 2015.
[65] Almost 90 percent of female heads of households have no educational attainment, in contrast to 55 percent of their male counterparts. About 30 percent of female heads of households work mainly as day laborers or are self-employed.
Source: World Bank, Djibouti Poverty and Social Impact Analysis, 2015, page 14.
[66] DISED 2012, EDAM3-IS/2012.
[67] The World Bank-funded PADSE, which closed in 2015 provided access to 3,800 households or added 26,600 people to EDD's grid.
[68] Implementation and Completion Results Report (ICR), Power Access and Diversification Project, 2015, Report No 3363.

(d) **Public financing rationale.** In many countries, the development of the distribution grids is driven by public investment. This is mainly because the electrification process is linked to a national policy aimed at developing rural and urban regions.[69] The goal is to provide universal access to electricity at affordable tariffs. This does not prevent private operators from operating and maintaining this type of infrastructure. Having easy access to electricity is generally a prerequisite for the private sector willing to develop business in any country (Djibouti is ranked 176/189 for getting electricity by Doing business 2015). Because distribution is a natural monopoly and EDD remains a vertically integrated utility, the very modest size of the country does not leave space for private sector financing in this segment.

(e) **World Bank's role.** For more than 10 years, the World Bank has been deeply involved in programs aimed at reducing poverty in the country. Access to electricity for low-income populations is an enabler for social and economic development. The project can be considered as a follow-on of the previous PADSE. The main added value of the World Bank relies on the global vision (targeting 80 percent to 100 percent electrification rate for Djibouti) which has been proposed for the SEP and the implementation and technical support provided to EDD teams for many years. Other donors often rely on the World Bank for this type of program coordination.

(f) **Investment rationale to deliver greater quantities of power.** The other solutions generally applied by other countries, such as the reduction of losses or energy efficiency measures, are not as relevant in Djibouti due to the underdevelopment of the grid. Before implementing these solutions, the first step is to provide access to electricity for all citizens.

Basic Assumptions

5. The economic analysis is based on a cost-benefit analysis methodology taking into account the difference between the economic benefits derived from consumption of electricity generated by the new connections, and the social costs of creating those connections and supplying the electricity. The following assumptions are made for the economic analysis:

(a) Four years are required to connect all targeted new clients (one quarter per year)[70] for Phase 1 and three years for Phase 2

(b) Client segmentation is based on the following:

(i) Table 5.1 sizes each segment.

Table 5.1. Segment Sizes

	Social-1	Social-2	Residential
Phase 1 (%)	70	25	5
Phase 2 (%)	30	50	20

[69] Electrification can be used as a mean to fix population where other public services will be developed.
[70] Based on the previous Bank experience with the Power Access and Diversification Project (PADSE) closed in 2015.

(ii) For each tariff the usages are the following:

- Social-1 (1 kVA): Fridge, two ventilators, lighting, and TV set[71]
- Social-2 (3-6 kVA): All the above + air conditioning
- Residential (9 kVA): Includes small businesses (for example bakeries)

(c) Fixed **yearly charges.** US$36.88 (Social-1), US$64.47 (Social-2), and US$88.68 for residential.

(d) **One-time connection fee**. The average connection cost for Balbala is close to DJF 84,000 (US$473).[72] This cost is shared between the clients (one-time connection fee: DJF 50,000 or US$281) and EDD (remaining cost: DJF 34,000 or US$191). A tax exemption for all imported materials for the project will pass through to the customers, who will benefit from a reduction of 25 percent of usual connection fees. Thus, customers will pay DJF 38,000 (US$212) and EDD DJF 26,000 (US$144). For low-income households, this connection fee may be paid over six installments (one year). It has been assumed that all materials that EDD has to purchase will be tax free.[73] It has been assumed that the same cost of connection would be applied also for the clients in the south (Phase 2).

(e) After two years, 50 percent of the Social-1 tariff clients will move to Social-2 because of the higher capacity (3–6 kVA) which is provided.[74]

(f) The average annual consumptions per household have been estimated as 2,016 kWh for Social-1, 5,016 kWh for Social-2, and 12,816 kWh for residential.

(g) Street lighting yearly consumption is estimated as originating from 790 poles for Phase 1 and 435 for Phase 2, with 913 kWh for each. Tariff price is US$0.31 per kWh.

6. The last revised tariff for the residential sector is provided in table 5.2.

Table 5.2. Revised Tariff for the Residential Sector

EdD monthly tariff (US$) - March 2016				
Categories	**PS (kVA)**	**<200 kWh**	**>200 kWh**	**Fixed part tariff**
Social-1	1	0,15	0,31	3,07
Social-2	3 to 6	0,23	0,31	5,37
Residential	6 to 21	0,27	0,31	7,39
Street lighting		0,31	0,31	0

[71] Based on the type of population living in this area and according to EDD experience.
[72] Connection cost includes meter, fuse, circuit breaker, cables, and connection hardware.
[73] Value-added tax is 33 percent for this type of product.
[74] Based on EDD's experience with clients who benefited from access to electricity because of the previous PADSE . In the previous tariff, the cost of electricity above 200 kWh per month was less expensive than Social-2.

7. The marginal cost of supply is based on 70 percent imports (US$ cents 6–7) and 30 percent of local generation. According to EDD's 2015 provisional financial report, generation costs encompasses the following, as shown in table 5.3.

Table 5.3. Composition of Generation Costs

	DFJ	US$, millions
Fuel (HFO + diesel)	3,499	19,688
Imports from Ethiopia	5,940	33,423
Staff	2,237	12,587
Taxes	2,548	14.337
External	1,057	5.947

8. Based on a total generation of 402 GWh (20 percent losses are excluded), the marginal generation cost, including taxes is DJF 37.97 (US$ cents 21) and excluding taxes DJF 31 (US$ cents 18).

9. Economic benefits are derived from the consumption of electricity that is brought about by these new connections. The willingness to pay is expected to be high based on results of PADSE in the same area and results from recent studies.[75] In addition, for a large proportion of the new clients (5,000) in the Nassib area, the social housing plan being implemented should reduce the household's expenditures. Information on electricity substitutes is also limited and underestimates the added value that electricity brings in quality of service and fungibility of power.[76] Instead, willingness to pay for electricity is conservatively assumed to be equal to the electricity expenditures of the newly connected households.

10. According to the International Monetary Fund's guidance on discount rates (Unification of Discount Rates Used in External Debt Analysis for low-income Countries), a discount rate close to 5 percent is recommended for Djibouti. The World Bank Group's guidance on discount rates (Discounting Costs and Benefits in Economic Analysis of World Bank Projects - 2016) alternatively recommends a discount rate equal to twice the real per capita gross domestic product growth rate. Djibouti is experiencing a real per capita annual growth rate of 3.7 percent, implying a discount rate for this project of 7.4 percent.[77]

11. With all these assumptions, the economic NPV of the project (20 years) is US$8,664,607 and the EIRR is 16 percent. The financial internal rate of return (FIRR) is 11 percent.

12. Compared to the parent project (PADSE Additional Financing I), the cost per connection[78] is lower for Phase 1 of the new SEP. The reasons are the high density of the population in Balbala and the use of the MV infrastructures already built with PADSE. However, for Phase 2, the lower density of the

[75] A Public Private Infrastructure Advisory Facility- funded study on rural electrification in Djibouti (2014) estimated willingness to pay for electricity from mini-grids that varied between US$0.23 per kWh to US$0.72 per kWh depending on household income. These were typically poorer households with expected consumption volumes that are lower than those in Balbala.

[76] Expenditures on candles and dry batteries in villages have been estimated at around US$61 per month. If one were to assume that residential clients (5 percent of newly connected households) own their own diesel generators and consume an equivalent volume of power pre- and post-grid connection, combined expenditures on lighting and generators are around US$0.08–-0.11 per kWh.

[77] 3.7% × 2.

[78] This cost includes all the assets required to deliver the service. This cost does not consider technical assistance and project-related consulting services.

population in the south and the need for new MV lines over long distances lead to double the cost per connection. Table 5.4 summarizes this comparison.[79]

[79] For SEP, technical assistance is not included.

Table 5.4. Cost Comparison between SEP and PADSE

	PADSE AF I	SEP	
		Phase I	Phase I + II
Project cost (US$)	3 401 695	7 594 000	22 603 000
Number of connections	3 500	9 000	13 960
Cost per connection (US$)	972	844	1 619

13. A sensitivity analysis was conducted for scenarios, including higher projects costs (+15 percent), more time required to connect new clients (+2 years), a higher marginal cost of supply (+10 percent), a revision of the tariff (±10 percent), and different discount rates (5.4 percent, 9.4 percent). The impact of each of these elements on the EIRR (base case 16 percent) and the NPV (base case US$15,552,222) are as shown in table 5.5.

Table 5.5. Sensitivity Analysis

Factors	Project EIRR (%)	NPV (US$)
No change	*16*	*15,552,222*
Cost of the project: +15 percent	13	12,271,602
Connection of clients: +2 years	4	–7,753,587
Marginal cost of supply: +10 percent	11	6,652,142
Tariff: +10 percent	21	28,564,577
Tariff: −10 percent	9	2,539,866
Discount rate: 5.4 percent	16	23,112,834
Discount rate: 9.4 percent	16	9,918,681

14. Factors influencing the NPV are as listed, in the order of decreasing importance:

(a) **A less optimistic connection rate** (+2 years) leads to a reduction of the EIRR to 4 percent. The project's NPV is no longer positive assuming a social discount rate of 7.4 percent.

(b) **A decrease of the tariff.** In 2014, the tariffs decreased by 10 percent for Social-1 and Social-2 groups. The new tariff (March 2016) further decreases the social tariff. If another decrease (–10 percent) should be implemented in the future, without reducing the marginal cost of supply, the economic viability of the project would be endangered because it is here being used as a measure of willingness to pay. The EIRR would be reduced to 9 percent and the NPV to US$2.5 million.

(c) **An increase of the marginal cost of supply (+10 percent).** A decrease of this cost occurred in 2014 because of the interconnection with Ethiopia. EDD translated this into a decrease of the tariff. The same occurred in 2016. Because EDD is progressively reducing the supply based on thermal generation, this increase of the marginal cost of supply is unlikely.

(d) **Increase of the discount rate (7.4 ≥ 9.4 percent).** The impact is moderate: NPV would be 30 percent less.

(e) **Increase of the cost of the project.** EIRR is slightly reduced (16% ≥ 13%) and NPV is reduced by less than 20 percent.

15. In 2014, EDD client debt was slightly more than one year's revenue. Half of this debt comes from 'special customers', namely administrations. However, arrangements are often found so that bills are compensated at a certain point in time. This project will not contribute to significantly increase this debt, because targeted customers are disconnected when bills are not paid.

C. Financial Analysis

16. This section indicates how the financial situation of EDD may evolve as it electrifies 13,960 households starting in Year +0. It is assumed that EDD's financial situation in Year +0 is the same as that in 2014.[80] Assumptions made, including the tier (Social-1, Social-2, and residential) and rate over time at which households are connected, are the same as those in the economic analysis.

17. In 2014, EDD provided service to some 50,000 clients. Adding a further 13,900 represents an increase its customer base by 28 percent. These households are expected to consume less than the average connected client with a combined demand that would increase sales revenue by 19.1 percent relative to 2014. The average revenue per connected client in 2014 stood at DJF 55 per kWh. Around 8,550 of the newly connected households will (initially) be connected at social tariff rates which lie at or below this level. As a consequence, the average tariff revenue per subscriber is expected to drop, though only marginally to DJF 54.3 per kWh, or 1.7 percent, by Year 6.

Table 5.6. Connected Households and Additional Generation Requirements

	2013	2014	Year +0	Year +1	Year +2	Year +3	Year +4	Year +5	Year +6	Growth (%)
New subscribers										
Subscribers (1,000)	—	—	—	2.3	4.5	8.0	11.5	12.7	14.0	
Electricity sales (GWh)	—	—	—	7.80	16	30	45	61	68	
Sales revenues (DJF)	—	—	—	421	757	1,485	2,165	3,006	3,359	
Average tariff (DJF/kWh)	—	—	—	54.0	48.6	49.0	48.2	49.3	49.4	
All subscribers										
Subscribers (1,000)	47	50	50	52	55	58	62	63	64	27.9
Electricity sales (GWh)	341	356	356	364	372	386	401	417	424	19.1
Sales revenues (DJF)	19,987	19,662	19,662	20,083	20,420	21,147	21,827	22,668	23,021	17.1
Average tariff (DJF/kWh)	58.7	55.2	55.2	55.2	55.0	54.7	54.4	54.4	54.3	–1.7

18. EDD's average cost per kilowatt-hour sold in 2014 is DJF 54. This includes financial and other costs that are independent of the project. Excluding these elements one arrives at a marginal cost that is around DJF 43 for each kilowatt-hour delivered, lower than the marginal revenue per kilowatt-hour of sales.[81] With project investment costs incurred up front but marginal revenues of delivering power exceeding marginal costs, the picture that emerges is one in which the project lowers EDD's net income in the first years but increases it in the longer run. This is looked at in more detail in the following paragraphs.

19. EDD's financial situation deteriorated between 2013 and 2014 (table 5.7). Net income dropped from DJF 3,543 million in 2013 to DJF 1,001 million in 2014 and the net profit margin (net income over

[80] At the time of writing, the financial statements for 2013/2014 were the latest available

[81] This is slightly higher than the marginal cost used for the economic analysis due to provisions for increased costs of depreciation flowing from the investment.

revenue) declined from 17 percent to 5 percent. This was primarily a result of increased operating expenses in the form of fuel purchases to supply generators that were heavily used over 2014 despite the existing interconnection between Djibouti and Ethiopia.

20. On the balance sheet a comparison of 2013 to 2014 shows that trade accounts receivable increased by DJF 3,323 million between 2013 and 2014. The arrears are owned primarily by public sector enterprises, and arrears with *Office National de l'Eau et de l'Assainissement de Djibouti* alone stood at DJF 6,398 million at the close of 2014. The company increased its equity and simultaneously reduced its debts, the combined effect of which is lower profitability as measured by return on assets and return on equity. Despite the reduction in debts, the debt ratio (total debts/total assets) remains high at 53 percent.

Table 5.7. EDD's Financial Situation 2013–2014

	2013	2014
Income statement (DJF)		
Operating revenue	22,162	21,954
Operating expenses	18,400	20,954
EBIT	3,761	1,001
Net income	3,543	1,012
Balance sheet		
Fixed assets	18,992	17,610
Current assets	19,279	21,171
Unrealized exchange loss	195	53
Prepaid expenses	—	—
Assets	38,466	38,834
Net equity	11,935	17,302
Provisions for risks and expenses	217	53
Liabilities	26,120	20,633
Liabilities conversion difference	194	845
Net equity and liabilities	38,466	38,834
Financial metrics		
Profitability		
EBITDA margin (%)	22.00	7.00
Net profit margin (%)	17.00	5.00
Return on assets (%)	9.10	2.60
Return on equity (%)	20.50	5.80
Liquidity ratios		
Current ratio	2.79	2.52
Quick ratio	2.31	2.11
Cash ratio	0.50	0.37
Debt ratios		
Debt ratio	0.68	0.53
Debt-equity ratio	2.19	1.19

Note: EBIT = Earnings Before Interest and Taxes.

21. Table 5.8 illustrates how the operating income would change assuming operating income that is not project-related remains at 2014 levels. Since the operating margin is already low in 2014, the additional expenditures that EDD would incur for the project's investment and connection costs would lead to an operating loss for several years after project inception. However, six years after project

inception (when all new customers connected), it is expected that operating revenues will have increased 15.3 percent while operating expenses will have increased 13.1 percent relative to 2014. The net effect is an increase of EBIT of DJF 619 million in that year relative to 2014.

Table 5.8. Effect on Operating Income (DJF, millions)

	2014	Year +0	Year +1	Year +2	Year +3	Year +4	Year +5	Year +6	Growth (%)
Operating revenue	21,954	21,954	22,375	22,712	23,439	24,120	24,961	25,314	15.3
Operating expenses	20,954	21,514	21,963	23,159	23,824	22,961	23,427	23,694	13.1
EBIT	1,001	441	412	(447)	(385)	1,158	1,534	1,620	61.9

22. How EDD's net income and debt evolve depends very much on the terms of financing that it arranges for the US$22 million investment. With a loan, the investment costs are deferred (principal repayments) but higher in total due to interest payments, relative to financing with equity.

23. The FIRR of 11 percent in the economic and financial analysis results when one assumes EDD is paying the investment costs without a loan. If EDD were to finance all investment costs with a loan, the FIRR could go up or down depending on the terms of the loan. For example, with a 10 percent interest rate and 10-year pay-back period starting in Year 5 (after construction of the grid), the FIRR would increase to 14 percent. The cost of this loan would peak at DJF 890 million in the Year 6.