

AFRICAN DEVELOPMENT BANK GROUP



NIGER

RURAL, SEMI-URBAN AND URBAN ELECTRIFICATION PROJECT (PEPERN)

ONEC DEPARTMENT

November 2016

Translated Document

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CURRENCY EQUIVALENTS

[August 2016]

UA 1	822.459	XOF
UA 1	1.39338	USD
UA 1	1.25383	EUR

FISCAL YEAR

1 January – 31 December

WEIGHTS AND MEASURES

m	Metre	kVA	Kilovolt ampere (1,000 va)
cm	centimetre = 0.01 metre	kW	kiloWatt = 1,000 Watts
mm	millimetre = 0.001 metre	GW	Gigawatt (1,000,000 kW or 1,000 MW)
km	kilometre = 1,000 metres	MW	Megawatt (1,000,000 W or 1,000 kW)
km ²	square kilometre = 1,000,000 m ²	kWh	Kilowatt-hour (1,000 Wh)
ha	hectare = 10,000 square metres	MWh	Megawatt-hour (1,000 KWh)
t (t)	Tonne (1,000 kg)	GWh	Gigawatt-hour (1,000,000 KWh)
kV	Kilovolt = 1,000 Volts		

ACRONYMS AND ABBREVIATIONS

ADF	African Development Fund	GoN	Government of Niger
AfDB	African Development Bank	IsDB	Islamic Development Bank
ANPER	Rural Electrification Agency of Niger	MEP	Ministry of Energy and Petroleum
ARP	Abbreviated Resettlement Plan	NTF	Nigeria Trust Fund
CNES	National Solar Energy Centre	OHADA	Organization for Harmonization of Business Law in Africa
DGE	Directorate General for Energy	SC	Steering Committee
EIRR	Economic Rate of Return	PEPERN	Rural, Semi-Urban and Urban Electrification Project
ENPV	Economic Net Present Value	PMU	Project Management Unit
ERP	Enterprise Resource Planning	CSP	Country Strategy Paper
ESDP	Economic and Social Development Plan	TFP	Technical and Financial Partner
ESIA	Environmental and Social Impact Assessment	UA	Unit of Account
ESMP	Environmental and Social Management Plan	UA Million	Million Units of Account
EU	European Union	UNDP	United Nations Development Program
FIRR	Financial Return Rate	WADB	West African Development Bank
FNPV	Financial Net Present Value	WB	World Bank

PROJECT INFORMATION SHEET	
Borrower/Donee:	Republic of NIGER
Executing Agency	Electricity Corporation of Niger (NIGELEC)

FINANCING PLAN		
Financing Source	Amount in UA million	Instrument
Nigeria Trust Fund (NTF)/Loan	7.40	Loan
African Development Fund/Loan	15.07	Loan
African Development Fund/Grant	29.25	Grant
Government of Niger	7.2	Counterpart Contribution
Total Project Cost	58.92	

KEY FINANCIAL INFORMATION ON NTF LOAN	
Loan Currency	UA
Interest Type	Not applicable
Interest Rate Margin	Not applicable
Commitment Fee	0.5% per year
Service Commission	0.75% per year
Maturity	40 years
Grace period	10 years

KEY FINANCIAL INFORMATION ON ADF LOAN	
Loan Currency	UA
Interest Type	N/A
Interest Rate Margin	N/A
Commitment Fee	0.50%
Service Commission	0.75%
Maturity	40 years
Grace Period	10 years

DURATION AND MILESTONES	
Concept Note Approval	June 2016
Project Approval	9 December 2016
Effectiveness	January 2017
Completion	June 2020
Last Disbursement	December 2020

PROJECT SUMMARY

1. **Project Overview:** The overall goal of the Rural, Semi-urban and Urban Electrification Project (PEPERN) is to increase the electricity access rate for the communities in the eight regions of Niger. The project also seeks to improve sector governance by building the capacity of energy sector stakeholders. It essentially entails: (i) the construction of electricity infrastructure including extension of the distribution network, connection of 46,000 households, and increase in the local electric power generation capacity by 20 MW; and (ii) institutional support through the conduct of feasibility studies for projects in rural areas and capacity building for energy sector stakeholders. The project, estimated at a total cost of UA 58.92 million (net of taxes), will be implemented over a four-year period from 2017 to 2020. Its beneficiaries will be 46,000 households in the rural, semi-urban and urban areas of Niger, with approximately 50.3% being women, as well as the energy sector stakeholders. By strengthening and expanding the electricity network, the project will reduce losses resulting from the installation of prepayment metres. Furthermore, by building capacity and providing planning tools, the project will improve the governance and operational efficiency of the sector. Lastly, by increasing production capacity, the project will also guarantee power supply to domestic and industrial users.

2. **Needs Assessment:** Electricity in Niger covers only 1.2% of the country's energy consumption, which is dominated by wood fuels that harm the environment. The electricity sub-sector is mainly characterized by: (i) a low access rate at national level (11% by end-2015) and disparity in access rates between urban areas (access for approximately 50% of the population) and rural areas (which hold 80% of the population yet less than 1% have access); (ii) saturation and aging of distribution networks, resulting in degradation of service quality, a large volume of undistributed energy, and growing technical losses; (iii) capacity building needs for sector stakeholders, some of whom come from entities newly created through reforms initiated over the 2013-2015 period. These constraints have emerged within a context of rapid population growth (3.9% in 2012) and growing demand for good quality electricity supply for various communities and SMEs/SMIs.

3. **Value-added for the Bank:** The Bank's participation in the project will further strengthen its support to the Government of Niger as it addresses these key energy sector challenges. Indeed, in opting to increase production capacity through reinforcement and expansion of the distribution network and provision of institutional support to the energy sector, the Bank, through PEPERN, will help to improve Niger's community access to electricity under the New Deal on Energy and strengthen sector governance, which is a prerequisite for the public and private investments sorely needed by the country. By conducting various scheduled studies, including feasibility studies in about 100 rural communities, the Bank will help to create favourable conditions for future investments in the sector so as to achieve universal access as defined by the New Deal on Energy for Africa.

4. **Knowledge Management:** The Project Management Unit (PMU) will produce periodic reports with information on the performance indicators in the logical framework. Furthermore, the Bank's supervision reports, the reports of the consultant engineer responsible for works control and supervision, and the audit reports are sources from which the Bank will learn lessons on the achievement of project objectives, with a view to improving the design and implementation of similar future operations in the country and in other regional member countries.

VII. RURAL, SEMI-URBAN AND URBAN ELECTRIFICATION PROJECT (PEPERN)
Goal: Increase electricity access rate for communities in Niger, while improving service quality

RESULTS CHAIN		PERFORMANCE INDICATORS			MEANS OF VERIFICATION	RISKS / MITIGATION MEASURES
		Indicators	Baseline Situation (2016)	Target (2020)		
IMPACT	Contribution to the improvement of quality of life for project area population	1.1. National electricity access rate	11%	18%	Reports: - Ministry in charge of Energy - NIGELEC, ANPER - National Institute of Statistics	<u>RISKS</u> 1. Lack of electricity for the 46,000 new customers 2. Low capacity of the executing agency to monitor several projects <u>MITIGATION MEASURES</u> 1. This is mitigated through the procurement and <i>installation of the 5th generator set in Gourou Banda that will increase capacity by 20 MW and thus raise total additional production capacity to 100 MW.</i> 2. The recruitment of the consultant engineer, to support NIGELEC in its mission of works quality control, will mitigate this risk. Furthermore, the project implementation unit will rely on the skills
	1.1 Increase in the number of connected households (including % for women)	1.1 Number of households connected	298,000	363000 (186000)		
OUTCOMES	1.2 Number of jobs created (including % for women).	1.2 Number of direct and indirect temporary jobs created (including for women)	--	+50 /20		
		1.2 (a) Number of permanent jobs created (including for women)		256 (90)		

OUTPUTS	<table border="1"> <tr> <td data-bbox="185 225 392 475">1. Construction of energy infrastructure</td> <td data-bbox="392 225 667 475"> <ul style="list-style-type: none"> Construction of MV and LV networks Establishment of new connections Street lighting </td> </tr> <tr> <td data-bbox="185 475 392 788">2. Institutional support for the sector</td> <td data-bbox="392 475 667 788"> <ul style="list-style-type: none"> Preparation of rural electrification study reports Training of sector workers and experts Preparation of a renewable energies atlas Enhanced energy information system </td> </tr> </table>		1. Construction of energy infrastructure	<ul style="list-style-type: none"> Construction of MV and LV networks Establishment of new connections Street lighting 	2. Institutional support for the sector	<ul style="list-style-type: none"> Preparation of rural electrification study reports Training of sector workers and experts Preparation of a renewable energies atlas Enhanced energy information system 	<ul style="list-style-type: none"> 1.1. MV/LV lines constructed (km) 1.2. MV/LV transformers constructed (number) 1.3. Connections made (number) 1.4. Additional generator set installed at Gourou Banda 	<ul style="list-style-type: none"> n/a n /a n/a n /a 	<ul style="list-style-type: none"> 749 km/688 km +209 46000 1 	<p>Reports:</p> <ul style="list-style-type: none"> Ministry in charge of Energy DGE, NIGELEC and ANPER, ARSE, CNES National Institute of Statistics <p>Progress reports Bank supervision reports Completion report</p>	<p>of the staff executing ongoing projects, whose capacity would be developed.</p>							
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ACTIVITIES BY COMPONENT	<p>1. Construction of electricity infrastructure: (i) 20MW increase in production capacity; (ii) establishment of a distribution station in East Niamey and MV/LV networks over 749 km; (iii) establishment of 46,000 connections for approximately 324,000 people, including 162,972 women.</p> <p>2. Institutional Support for the Sector: Support for the Niger Electricity Corporation (NIGELEC), the General Directorate for Energy (DGE), the Niger Rural Electrification Agency (ANPER), the Energy Sector Regulatory Authority (ARSE) and the National Solar Energy Centre (CNES)</p> <p>3. Project Management: Works control and supervision; operating costs of the project management unit</p>					<p>Resources: UA 58.92 million</p> <table border="1"> <tr> <td>NTF loan</td> <td>: UA 7.40 million</td> </tr> <tr> <td>ADF (loan and grant)</td> <td>: UA 44.32 million</td> </tr> <tr> <td>Government of Niger</td> <td>: UA 7.20 million</td> </tr> </table> <p>Jobs: UA 58.92 million</p> <table border="1"> <tr> <td>Component 1</td> <td>: UA 48.15 million</td> </tr> <tr> <td>Component 2</td> <td>: UA 5.73 million</td> </tr> <tr> <td>Component 3</td> <td>: UA 5.02 million</td> </tr> </table>	NTF loan	: UA 7.40 million	ADF (loan and grant)	: UA 44.32 million	Government of Niger	: UA 7.20 million	Component 1	: UA 48.15 million	Component 2	: UA 5.73 million	Component 3	: UA 5.02 million
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REPORT AND RECOMMENDATION OF MANAGEMENT TO THE BOARD OF DIRECTORS ON FINANCING OF THE RURAL, SEMI-URBAN AND URBAN PROJECT (PEPERN)

Management submits the following report and recommendations on: (i) an NTF loan proposal of UA 7.4 million; (ii) an ADF loan proposal of UA 15.07 million; and (iii) an ADF grant proposal of UA 29.25 million, to finance the PEPERN.

1 STRATEGIC ORIENTATION AND RATIONALE

1.1 Project Linkages to Country Strategy and Objectives

1.1.1 The project is consistent with the priorities of Niger's second Economic and Social Development Plan (ESDP 2012-2015) extended to end-December 2016, which focuses on laying the foundation (including infrastructure development) for “a competitive and diversified economy that creates ideal conditions for rapid and inclusive growth.” By increasing energy sector production capacity and providing access to households and SMEs/SMIs, the project seeks to build infrastructure conducive to economic development and improved living conditions for communities in disadvantaged areas.

1.1.2 The project is consistent with the Government's policy to increase the access rate to 60% before 2027 by: (i) increasing domestic production capacity so as to reduce Niger's energy dependence on imports; and (ii) increasing electricity access in rural and urban areas as outlined in the business plan of the Niger Electricity Corporation (NIGELEC) for 2016-2027.

1.1.3 The project is consistent with Niger's CSP for 2013-2017, which focuses on two pillars, namely: (i) building resilience to food insecurity; and (ii) strengthening governance, including natural resource management. Pillar I (building resilience to food insecurity) lays emphasis on developing transformative infrastructure capable of contributing to its goal, especially in energy. Energy availability will boost food production through irrigation using the multiple facilities existing in Niger, and particularly along the entire length of the Niger River. Hence, it will provide agro-industrial SMEs/SMIs with a reliable source of energy.

1.2 *Rationale for Bank Involvement*

1.2.1. The Bank's involvement is mainly founded on its willingness to support the Government of Niger (GoN) in addressing major energy sector constraints and challenges, specifically by: (i) increasing the electricity access rate, which is currently 11%, and less than 1% in rural areas; and (ii) improving sector governance characterized by lack of studies and decision-making tools, and a need to build the capacities of the various stakeholders. Niger imports over 70% of its energy. The Bank's intervention will reduce this dependence, which exposes the country to the least supply risk in Nigeria that provides most of Niger's energy imports. Above all, the project will also address production deficits in the short-term, while providing immediate answers to the pressing access needs of the rural, semi-urban and urban communities concerned.

1.2.2. The project is consistent with the Bank's energy policy, whose objectives include “[supporting] RMCs in their efforts to provide all their populations and production sectors with access to modern, affordable and reliable energy infrastructure and services” as well as the Bank's Ten-Year Strategy (2013-2022), whose Pillar 2 seeks to achieve affordable access to reliable electricity infrastructure. It is consistent with the Bank's High-5 Priorities to light up and power Africa. It is also perfectly consistent with the New Deal on Energy for Africa (2016-2025) by covering 5 of its 7 focus themes, namely: (i) establishing an environment conducive to reforms by supporting the regulator ARSE; (ii) capacity building for electricity companies to guarantee success, by supporting NIGELEC; (iii) a substantial increase in the number of bankable energy projects, by conducting feasibility studies for 100 rural localities; (iv) increasing the funding pool

for new projects, by supplementing other projects for 65,000 and 60,000 connections being implemented by other partners (respectively AFD and the World Bank); and (v) access to energy sources at the bottom of the pyramid, by establishing 46,000 connections mainly in rural and semi-urban communities that have the poorest people.

1.3 Aid Coordination

1.3.1. Although Niger still does not have a formal consultative framework for energy sector technical and financial partners, regular information-sharing does take place. Hence, under this project, which is also one of the actions initiated by TFPs (World Bank, French Development Agency (AFD), West African Development Bank (BOAD) and the Islamic Development Bank (IDB)), consultations were held during the various project appraisal stages to create synergies, including relying on the management unit set up by these partners and whose capacities will be strengthened under this project. The project therefore complements other TFPs in addressing the production capacity, access and capacity building needs of energy sector stakeholders.

2 PROJECT DESCRIPTION

2.1 Description of Project Components

2.1.1 The programme comprises the following components: (i) construction of electricity infrastructure to increase production capacity by 20 MW (diesel-powered thermal plant at Gourou Banda) as well as rural, semi-urban and urban electrification to connect 46,000 households; (ii) institutional support to the sector to strengthen the capacities of the main stakeholders, namely: the Ministry of Energy and Petroleum, the Energy Sector Regulatory Authority (ARSE), the National Solar Energy Centre (CNES), the Niger Rural Electrification Agency (ANPER) and the Niger Electricity Corporation (NIGELEC); and (iii) project management.

2.1.2 The costs of the main components summarized in Table 2.1 below are detailed in Annex 2 and Annex B.2 of the Technical Annexes to the project.

Table 2.1 Project Components	Cost in UA Million	Percentage
CONSTRUCTION OF ELECTRICITY INFRASTRUCTURE		
1. Increase in production capacity of Gourou Banda power plant		
2. Construction of MV/LV lines (749 km/688 km) and 209 associated distribution stations	43.78	74.3%
3. Extension, strengthening and densification of the electricity network in 24 urban centres, including 16 departmental capitals, and electrification of villages along the power lines, thus connecting 46,000 new households.		
INSTITUTIONAL SUPPORT TO THE SECTOR		
1. Capacity building for MEP, CNES, ANPER, ARSE and NIGELEC		
2. Conduct of feasibility studies for the electrification of 100 rural localities	5.22	8.9%
3. Preparation of a renewable energy atlas		
4. Modernization of the educational facilities of NIGELEC's Electricity Vocational School (EPELEC)		
PROJECT MANAGEMENT	4.56	7.9%
1. Works control and supervision		
2. Project audit (financial, environmental and social, procurement)		
3. Implementation of the ESMP and ARP		
4. Operating costs of the Project Management Unit (PMU)		
Base Cost	53.56	91%
Contingencies	5.35	9%
TOTAL	58.92	100%

2.2 *Technical Solutions Adopted and Alternative Solutions Considered*

On the whole, it was agreed to electrify all targeted localities by connecting them to the interconnected electricity network. Indeed, the 100 initially identified rural communities lack feasibility studies and are located in areas that are not connected to the interconnected network. Feasibility studies have been planned under the institutional support component of this project. The construction of liaison lines will provide power to isolated localities, thereby leading to the shutdown of existing outdated and costly diesel-powered mini power plants. Such localities would then benefit from regular and environmentally-friendly electricity supply.

The alternative solutions considered and the reasons for their rejection are indicated in the table below.

Alternative solution	Brief Description	Reasons for rejection
Electrification of rural areas from decentralized systems composed of photovoltaic (PV) solar power plants	Install a PV power plant in each rural locality (with a backup diesel-powered generator, where appropriate) and build a mini distribution network	<ul style="list-style-type: none"> • Very costly investment • Difficulties in satisfying demand for income-generating driving force • No optimization due to the multiplicity of localities
Electrification of localities from decentralized systems using generator sets	Install mini networks connected to diesel-powered generator sets	<ul style="list-style-type: none"> • Very costly investment • Costly maintenance • Harmful environmental impact due to emissions of CO₂ and fine particulate matter
Construction of a 20 MW solar power plant in Niamey	Procure additional land in Gourou Banda (Niamey) to build a 20 MW solar plant to be connected to the power evacuation network of the thermal power plant under construction.	<ul style="list-style-type: none"> • Much longer implementation period • Very expensive investments with a high per kWh cost in the short-term • Need to incorporate storage or backup to maintain the same level of service; thus involving an additional cost, which substantially raises the cost per kwh of energy generated.

2.3 *Project Type*

This is an autonomous investment project that receives funding from the Nigeria Trust Fund (NTF) and the ADF (loan and grant), as well as co-financing from the Government of Niger (counterpart contribution). It falls within a comprehensive capacity building programme on electricity production and access partly financed by other TFPs, particularly BOAD, IsDB, World Bank and AFD.

2.4 *Project Cost and Financing Arrangements*

2.4.1 The total project cost, net of taxes and customs duties, is UA 58.92 million, comprising UA 41.24 million in foreign exchange and UA 17.68 million in local currency. This cost includes a 4.5% provision for technical contingencies and a 4.5% provision for price escalation in both foreign exchange and local currency. The project cost by component and by expenditure category are presented in Tables 2.3 and 2.4 below.

2.4.2 The Bank will fund the project through an NTF loan of UA 7.4 million, an ADF loan of UA 15.07 million and an ADF grant of UA 29.25 million. The detailed costs of the

components by source of financing and procurement method are presented in Technical Annexes B2 and B5.

COMPONENTS	Amounts in UA Thousand		
	Foreign Exchange	Local Currency	Total
Construction of electricity infrastructure	30,646	13,134	43,780
Institutional support to the sector (ANPER, DGE, ARSE, CNES & NIGELEC)	3,652	1,565	5,217
Project management	3,197	1,370	4,566
Total Base Cost	37,495	16,069	53,564
Physical contingencies	1,875	803	2,678
Price escalation	1,875	803	2,678
Total Cost in UA Thousand	41,244	17,676	58,921

Source of Financing	Foreign Exchange	Local Currency	Total	%
NTF loan	5,180	2,220	7,400	13%
ADF loan	10,549	4,521	15,070	26%
ADF grant	20,475	8,775	29,250	50%
Sub-Total: AfDB	36,204	15,516	51,720	88%
GoN	5,040	2,160	7,201	12%
Total	412,444	17,676	58,921	100%

2.4.3 The detailed costs of components by source of financing and procurement method are presented in Technical Annexes B2 and B5. Bank funding will finance the construction of electricity infrastructure, capacity building and project management. The Government's counterpart contribution will essentially defray the cost of connection works, preparatory (technical, economic and financial, environmental and social) studies, environmental and social measures (ESMP, compensation of affected persons and procurement of land) and a certain percentage of the salaries of civil servants assigned to the project.

Expenditure categories	In UA Thousand			Sources of Financing			
	F.E.	L.C	Total	NTF Loan	ADF Loan	ADF Grant	GoN
Goods	5,924.80	2,539.20	8,464	1,617	2,377	2,093	2,377
Works	29,304.93	12,559.25	41,864	5,783	12,693	20,283	3,105
Services	5,904.70	2,530.59	8,435	-	-	6,717	1,719
Operating Costs	110.05	47.17	157	-	-	157	-
Total Cost in UA Thousand	41,244	17,676	58,921	7,400	15,070	29,250	7,201

Components	2017	2018	2019	2020	TOTAL
Construction of electricity infrastructure	12,040	14,448	14,448	7,224	48,158
Institutional support to the sector	1,435	1,722	1,722	861	5,739
Project management	1,256	1,507	1,507	753	5,023
TOTAL COST	14,730	17,676	17,676	8,838	58,921

2.5 Project Area and Beneficiaries

2.5.1 Project Area: The project covers all the eight (8) regions of the country on which feasibility studies have been conducted and are available. It is consistent with the business plan of the Niger Electricity Corporation for 2016-2027 and is implemented partly to ensure the harmonious socio-economic development of these regions, namely: Agadez (Arlit), different (Nguigmi), Dosso (Gaya, Doutchi), Maradi (Madarounfa, Tessoua, Mayahi, Guidan Roundji, Aguié and Dakoro), Tahoua (Abalack, Illéla, Bouza, Madaoua, Konni, Malbaza, Keita), Tillabéry (Filingué, Téra, Torodi), Zinder (Mirriah, Magaria, Matameye, Tanout) and Niamey. Details on the localities concerned are found in Annex 3.

2.5.2 Project Beneficiaries: The project will benefit 46,000 households, representing a little over 330,000 inhabitants, including nearly 166,000 women, who will have access to electricity. At least 190 temporary employees, including at least 90 women, will benefit from its outcomes. Small and medium-sized businesses, shops, workshops and other processing units (grain mills) will largely benefit from this power grid extension. The quality of basic social services in the outlying areas, as well as the administrative and municipal services in urban, semi-urban and rural localities (education, health, hygiene and sanitation, and drinking water), will be improved through modern and more reliable energy supply available for their operation.

2.6 Participatory Approach to Project Identification, Design and Implementation

2.6.1. In accordance with Bank policy, an inclusive and participatory approach was adopted at all stages of the project appraisal. Hence, the project's design was informed by the feasibility study conducted by Niger and discussions held among the Bank, the Ministry of Planning, the Ministry of Petroleum and Energy, the General Directorate of Energy (DGE), the Niger Electricity Corporation (NIGELEC), ANPER, CNES and ARSE. During preparation of the Environmental and Social Impact Assessment (ESIA), the Environmental and Social Management Plan (ESMP) and the Abbreviated Resettlement Plan (ARP), practical measures were taken to inform and involve stakeholders, including: meetings with municipal authorities and technical services, public meetings and a survey of affected persons.

2.6.2. These public consultations were an opportunity to: (i) inform stakeholders about the project, its impact on the project area, and proposed mitigation and rehabilitation measures to mitigate negative impacts; and (ii) gather their views, concerns and expectations of the project.

During the project implementation, an IEC campaign will be organized on works progress, environmental protection, energy promotion and STI/HIV-AIDS. Similarly, an information, awareness and marketing campaign will be organized to generate customer interest in prepayment metres.

2.7 Bank Group Experience and Lessons Reflected in Project Design

2.7.1 Bank Group Experience: The Bank's portfolio in Niger as at 30 June 2016 comprised 12 operations (grants and loans) worth approximately UA 230 million. The key focus areas are: agriculture (43.74%); transport (22.92%); governance (11.66%); the social sector, including education (9.91%); and the financial sector (4.01%). The other sectors (governance and finance) represent 7.2%. The Bank's active portfolio has no energy sector project. Portfolio monitoring is essentially undermined by the absence of a Government coordination mechanism and AfDB presence in Niger.

2.7.2 Lessons Learned: The main lessons learned from various project completion reports and the last combined portfolio review of June 2016 focus on the need to: (i) enhance project quality at entry by improving the quality of technical studies; (ii) recruit executing agency staff prior to project start-up; (iii) produce project audit reports on time; and (iv) establish an efficient project monitoring mechanism within the Ministry responsible for coordinating the Bank's actions in Niger.

2.7.3 The lessons learned from project implementation problems in Niger were factored into the design of the current operation. Indeed, there are plans to: (i) retain the project management unit already operational within NIGELEC for projects funded by other TFPs and whose capacity will be strengthened to manage the project; (ii) recruit an engineering firm that will assist the abovementioned unit with works control and supervision; and (iii) establish a coordination mechanism that includes all the beneficiary entities of the project.

2.8 Key Performance Indicators

Project performance will be measured through performance indicators detailed in the results-based logical framework, which include: (i) the number of new customers connected; (ii) the number of direct and indirect jobs created; and (iii) the number of experts trained. The output indicators at end-2020 are: (i) the magnitude of distribution networks (MV/LV) expansion and the number of transformer sub-stations (MV/LV) constructed; (ii) the number of new connections made; (iii) the establishment of an energy and geographical information system within the DGE; (iv) renovation of NIGELEC's vocational training school; and (v) the number of studies conducted on electrification and the renewable energy atlas. Project performance indicators will be included in the periodic progress reports of various project stakeholders (PMU, NIGELEC, DGE, ANPER, CNES and ARSE) and Niger's National Institute of Statistics. The reports will be analysed in terms of project target values that will be monitored using the progress reports prepared with the assistance of the consulting engineer to be recruited for that purpose.

3 PROJECT FEASIBILITY

3.1 Economic and Financial Performance

3.1.1 Financial Performance: The project's financial rate of return (13.01%) was assessed based on the financial internal rate of return (FIRR) and the financial net present value (FNPV), calculated in terms of project implementation costs and revenue in the eight (8) regions. The project revenue will be generated from the sale of additional energy consumed by new customers, priced at the current applicable average rate and for the duration of the project estimated at 25 years. The project costs are: (i) the total investment amount, net of taxes and including physical contingencies (4.5%), spread over the construction period; (ii) the annual operating and maintenance costs estimated on average at 3% of the investment cost; and (iii) the production cost of the energy sold.

3.1.2 **Economic Performance:** Economic performance (18.94%) was assessed in terms of the economic externalities of project implementation. The economic benefits used in calculating the economic internal rate of return (EIRR) and the economic net present value (ENPV) relate to the gross economic benefit arising from the development of additional energy sold in all the regions, including improvements pertaining to the expected decline in technical losses and shutdown of dilapidated power plants. The economic costs considered are investment costs plus a revolving capital for the construction period, the production cost of the sold energy, and the maintenance and manpower costs estimated at 3% of the initial investment cost.

3.1.3 **Sensitivity Analysis:** The sensitivity of the project's financial and economic performance was analysed essentially in relation to: (i) an increase in investment costs; and (ii) a decline in the electricity selling price. The analysis showed that the project's (economic and financial) rate of return and net present value, though sensitive to changes in the various factors, remained within acceptable levels, thus confirming the project's financial and economic viability. Indeed, the economic and financial internal rates of return remain higher than the weighted average cost of capital (12%) used in most cases.

<i>Table 3.1 Key Financial and Economic Performance Indicators of the Project</i>		
Baseline Scenario	FIRR 13.01%	FNPV: CFA.F 15 billion
	EIRR: 18.94%	ENPV: CFA.F 56.76 billion

3.2 *Environmental and Social Impact*

Environment

3.2.1. From the environmental and social standpoint, the project was classified in category 2, given its identified negative environmental and social impacts which range from low to average. The ESIA, ESMP and ARP were finalized and validated in September 2016. The summary ESMP and ARP were published on the Bank's website on 8 November 2016 (30 days prior to submission of the project to the Board of Directors).

3.2.2 As regards the positive impacts, the various project routes do not require the creation of access roads for the execution of works. Hence, the project has a limited footprint, since it merely entails erecting electric poles and connecting cables to existing facilities and substations. Noise pollution, though inevitable, will have a minor impact. The potential impact on air quality will be short-lived, localized, low and consequently of minor significance. The risk of overexploitation of water resources in the area is very low, given the small size of the project.

3.2.3 The main negative environmental and social impacts are: (i) disturbances and traffic disruption (access to buildings, commercial facilities, etc.) during the works; (ii) various nuisances (emissions, waste/rubble, noise, etc.) generated by the civil engineering works (trenches for underground lines, preparation of electric pole sites, etc.); (iii) health and safety risks for workers and local communities during the works, operational and maintenance phases of the electrical facilities to be constructed under the project.

3.2.4 Mitigation measures have been proposed in the ESMP to avoid or limit such impacts, where appropriate. These are: (i) the implementation of construction site signalling measures, community sensitization on project sites, restoration of access for the local population, etc.; (ii) the implementation of construction site waste management measures, compliance with working hours, etc.; (iii) the implementation of measures to ensure safety and health protection of

workers and local communities during the works and operational phases; and (iv) compensatory tree-planting. The cost of the ESMP measures (net of expropriation) is estimated at CFA.F 255 million or 0.02% of the total project cost.

3.2.5 The PMU, working through an environmentalist and a socio-economist, will monitor ESMP implementation in close collaboration with the consulting engineer. Niger's Environmental and Impact Assessment Office (BEEEI) will also participate in monitoring ESMP implementation. The project provides for capacity building for stakeholders involved in ESMP implementation.

Climate Change

3.2.6 As regards climate change, the project was classified in Category 2 in accordance with the Bank's climate screening system. The main climate challenge for the project is the frequency of extreme phenomena, including torrential rains/floods and increasing variations in temperature. More specifically, these are: (i) the risk of wind erosion (due to strong winds and the bare land) and water erosion (resulting from the hilly relief and bare land) mainly in Tahoua and Tillabéri areas; (ii) the risk of flooding mainly in Niamey area for zones below an altitude of 182 m; and (iii) the decline in generator performance due to wide temperature variations.

3.2.7 With respect to adaptation, best sizing practices will be applied to ensure: (i) drainage of the site for the Gourou Banda generator and the pad-mounted transformers (including all sub-stations); (ii) appropriate sizing of the foundations for poles/towers, taking into account the geotechnical parameters (nature of the soil and landforms) and reference speeds of dominant winds; (iii) the choice of electrical equipment, including items for sub-stations, taking into account the thermal class and cooling systems suitable for conditions in the zones considered. The costs of these measures are included in the priced bill of quantities for works, with the relevant specifications.

3.2.8 With regard to mitigation, the project will result in the shutdown of 15 standalone production sites, thereby ending the generation of greenhouse gas (GHG) emissions. This positive impact largely offsets the emissions from Gourou Banda power plant. Moreover, compensatory planting of trees will mitigate the negative effects of emissions generated during the works and operational phases of the project.

Social Aspects and Job Creation

3.2.9 The project provides for the following operational social measures to facilitate and promote the connection of 46,000 new customers: (i) All households in the project area are eligible for customer subscription. Accordingly, the project will cover the area such that all potential customers have a nearby electric pole for their connection, thus obviating the need for them to pay for the erection of additional poles. (ii) The project will apply a special subscription rate of CFA.F 42,500, representing 50% of the normal rate (85 000 FCFA) in urban areas and a flat social rate of CFA.F 10,000 in rural areas. These conditions will be applicable throughout the project until the expected 46,000 customer subscriptions have been made. (iii) New customers who cannot pay the full subscription fee will be given a 12-month deadline after making a down payment of 10%. (iv) The project will systematically connect schools, health centres, community water-pumping stations, and multipurpose public buildings in close collaboration with the relevant Ministries and management committees of these bodies. (v) The project provides for an information, awareness and marketing campaign to attract customers to prepayment metres.

3.2.10 As regards employment and income-generating activities for the project area communities, the project will create at least 190 temporary jobs, with at least 90 for women. The electricity network expansion will benefit small and medium-sized businesses, shops, workshops and other processing units (grain mills). Furthermore, the introduction of electricity in rural communities will facilitate the emergence of new job-creating activities in food processing, new information and communication technologies, carpentry, maintenance and services.

Gender

3.2.11 The lack of electricity access in the project area affects both men and women. However, these energy access issues weigh disproportionately more on women. Indeed, the lack of electricity access increases the drudgery of household chores performed almost exclusively by women (and girls), thus depriving them of the time they could have devoted to income-generating activities, education or leisure. It also has adverse consequences on the management of deliveries and quality of maternity care, especially in this virtually rural area. Electricity access will encourage the use of household appliances, thus easing the tedium of household chores traditionally executed by women in Niger. Information and awareness campaigns, conducted under the ESMP, will enable the population to use electricity efficiently and avoid any domestic accidents. Electricity access will enable approximately 166,000 women, girls and youths from the project area to create microenterprises (mills, small shops) and engage in income-generating activities (ice-making, sale of beverages etc.).

3.2.12 To help improve the living conditions of children and women, the project intends to connect: (i) public schools in target districts and communities; (ii) health centres in target neighbourhoods; (iii) water-pumping stations; and (iv) conduct an IEC prevention campaign (various themes will be developed).

Involuntary Resettlement:

3.2.13 The project implementation will affect seven (7) households with a total of 41 persons. No female household head will be affected. The project affected persons (PAPs) comprise: 1 owner of a 4 m² oven built with durable material for grilling meat; 4 owners of straw huts (Séko) used for petty trading; 1 owner of a sheet-metal shed used for petty trading; and 1 owner of virgin land (without a title deed). The ARP provides for indemnification and compensation for these losses up to CFA.F 207,740,000, or 0.04% of the total project cost, prior to the commencement of works on the sections concerned.

4 PROJECT IMPLEMENTATION

4.1 Implementation Arrangements

4.1.1 **Project Implementation:** The project falls within a vast energy sector programme initiated by the Government of Niger, with some activities financed by other TFPs. Hence, its implementation will draw on experience garnered from ongoing projects implemented by the World Bank and AFD, as well as the ongoing installation of the first 4 generators at Gourou Banda (Niamey) power plant funded by BOAD, IsDB and the Government of Niger. At the institutional level, the works will be supervised by the Ministry of Energy. NIGELEC will be the executing agency of the project, acting through the Project Management Unit based within its structure and whose capacity will be strengthened. In accordance with DP 02/2015, the PMU has been established prior to presentation of the project to the AfDB Board of Directors. Hence, the institutional mechanism provides for a Steering Committee and a Project Management Unit.

4.1.2 **Steering Committee (SC):** Since the project involves several institutions, including DGE, ANPER, CNES, NIGELEC and ARSE, the role of the Steering Committee will be to ensure harmonization and resolve strategic issues pertaining to the overall coordination of the project. The Committee will comprise: a representative of the Ministry of Energy (as Chair); a representative of the Ministry of Planning (as Vice-Chair); a representative of the Ministry of the Environment; a representative of the Ministry of Finance and the Budget; and the General Managers of DGE, ANPER, ARSE, CNES and NIGELEC. The Coordinator of the Project Management Unit will serve as Secretary. The Steering Committee will meet once per quarter to review the project status, address implementation issues, and present its conclusions to the Government of Niger.

4.1.3 **Project Management Unit (PMU):** The PMU already exists within NIGELEC to implement ongoing projects for 125,000 connections funded by other TFPs and the Government of Niger. However, it will be strengthened under this project. Its role will be to ensure the day-to-day management of the project including: management of the various contracts, coordination of various stakeholders and all public structures and services concerned, and periodic assessment of project implementation. At the operational level, the PMU will report directly to the General Management of NIGELEC. The following main profiles have been identified for the PMU: a Coordinator, a Monitoring/Evaluation Officer, an Administrative and Financial Officer, an Environmental Management Officer, a Gender Socio-Economist, a Procurement Officer, a Network Engineer, a Sub-station Engineer, and an Accounting/Administrative Assistant. The DGE, ARSE, CNES and ANPER, which also benefit from institutional support under the project, will designate focal points in their respective institutions to interface with the PMU. The PMU will be supported in its monitoring mission by the Consulting Engineer currently being recruited through advance procurement action. The PMU will submit quarterly reports to be used by the Bank to appraise the project status. Annex B3 provides more information on project implementation arrangements.

4.1.4 **Procurement**

4.1.4.1. All goods, works and services for this project will be procured in accordance with the Bank's new procurement policy approved on 14 October 2015 by the Boards of Directors of the AfDB Group. The new policy allows for greater use of the national procurement system.

4.1.4.2. Furthermore, reviews conducted by the Bank since 2010 on the national public procurement system have shown that the system is generally consistent with international norms and standards and that the country has made significant progress. Accordingly, it has an appropriate regulatory and institutional framework for awarding some of the contracts envisaged under this project. In addition, the adopted Standard National Competitive Bidding Documents are based on the standard documents of multilateral development banks and international financial institutions, and tally with the fundamental principles of public procurement. However, some discrepancies and deficiencies have been identified relative to the Bank's procurement policy and international standards. These points of divergence will be addressed through an action plan to be agreed upon by Niger and the Bank so as to preserve the fundamental principles governing procurement.

4.1.4.3. Accordingly, procurements under this project will be based on national rules and procedures using the standard national competitive bidding documents. They will be governed by Law No. 2011/037 of 28 October 2011 on the general principles, control and regulation of public procurement and delegation of public services, as well as all its applicable implementing instruments, including Decree No. 2013-569/PRN/PM of 20 December 2013 on the Procurement Code and its various implementing instruments. International competitive bidding and the use of consultants will be based on Bank procedures and methods.

4.1.4.4. Procurement arrangements (including advance procurement action) and assessment of the capacity of the executing agency are detailed in the Technical Annexes to this project appraisal report. Detailed procurement arrangements are presented in the table in Annex B.5. Lastly, advance procurement action will be taken for activities crucial to project implementation. These include recruitment of the Consulting Engineer for the conduct of studies, and works control and supervision.

4.1.5 **Financial Management:** The administrative, financial and accounting management of the project will be the responsibility of the PMU established by Decision No. 001/2015 of 13 July 2015 within the Niger Electricity Corporation (NIGELEC). The PMU will institute private commitment accounting to be conducted using integrated software that is adapted to the management of development projects. The accounting plan will be developed based on the accounting law standards of the Uniform Act of the Organization for Harmonization of Business Law in Africa (OHADA), which apply in Niger. At the beginning of each year, the project will produce a work plan and annual budget (WPAB), as well as quarterly financial monitoring reports based on the execution of the work programme and an annual budget. The report will be included in the quarterly progress reports sent to the Bank, together with an analysis of budget estimates and actual performance for the quarter, analysing and explaining any deviations which occur. Project activities will be included in the annual work programme of the Audit and Management Control Officer of NIGELEC, who will ensure that internal control mechanisms remain operational throughout the project. To that end, he/she will be involved in preparing the WPAB and analysing and explaining any deviations, as well as conduct regular periodic reviews of the various transactions executed under the project.

4.1.6 **Disbursements:** Loan resources will be disbursed in accordance with the Bank rules and procedures specified in the Disbursement Handbook, through the following three methods: (i) the special account method; (ii) the direct payment method; and (iii) the reimbursement method. Under the special account method, it is recommended that a special account be opened in a local bank acceptable to AfDB to receive the ADF Grant resources. The account will function under the double signature of two authorized officers. It will receive funds from the Bank as revolving capital that will be used to defray eligible expenses pertaining to operating costs, field missions and training activities or short-term workshops. The direct payment method will be adopted for expenditures on goods, works, studies, miscellaneous institutional support, and other consultancy services, including auditing of accounts and procurements, etc. The reimbursement method will be used only if there is need to reimburse to the project any eligible expenditures pre-financed with counterpart funds on the prior authorization of the Bank. Counterpart funds will be disbursed through a special counterpart account opened in a local bank and operating on the principle of double signature by two authorized officials. The account will receive funds allocated to the payment of expenditures eligible for financing with counterpart resources. The first disbursement under the project will be subject to the opening of a special account in a bank acceptable to the ADF to receive funds from the Bank.

4.1.7 **External Audit:** The accounts will be audited by an independent private external audit firm. The firm will be recruited based on terms of reference agreed upon beforehand with the Bank and according to Bank rules and procedures, no later than three months after the financing agreement becomes effective. The audit contract will have a non-renewable term of three years, and the auditor will be required to submit the report within six months following closure of the relevant fiscal year.

4.2 Project Monitoring/Evaluation

4.2.1 Overall responsibility for monitoring/evaluation of project implementation progress and impact rests with the PMU, which will regularly monitor the implementation of all project

activities, procurements, management of the various contracts and coordination of various consultants, businesses and all public structures and services concerned, as well as periodic evaluation of the project. A tripartite agreement between the Ministry of Energy, ANPER and NIGELEC will facilitate establishment of the connections scheduled for rural areas which legally fall under ANPER supervision. The PMU will be supported by the Consulting Engineer to ensure the diligent monitoring of project activities.

4.2.2 The Bank will monitor the project during the implementation phase by sending regular onsite supervision missions (at least twice a year) and reviewing the annual audit reports. It will conduct a mid-term review of the project, about 18 months after its approval by the Board of Directors. Within six months prior to project completion, the Bank will prepare a project completion report (PCR).

4.2.3 The scheduled monitoring activities are summed up in the table below:

Table 4.1		
Monitoring of Project Activities / Feedback Loop		
Period	Stages	Monitoring Activities/ Feedback Loop
November 2016 - February 2017	Loan approval and effectiveness	Government/FAD/PMU
End-March 2017	Finalization of the recruitment process for the Consulting Engineer through advance procurement action (APA)	PMU
Mid-October 2017	Finalization of final design studies and preparation of bidding documents	PMU/IC
Mid-November 2017	Finalization of the selection of consultants for various studies	PMU/IC
March 2017 - March 2019	Conduct of studies	PMU/IC/consultancy firms
July 2017	Finalization of the selection of works companies	PMU/IC
October 2017 - March 2019	Execution of works	PMU/IC/Companies
Mid- and end-2017; Mid- and end-2018; Mid- and end-2019; Mid-2020	Project supervision	ADF/PMU/IC
End-2018	Mid-term review	ADF/PMU/IC
June 2020	PMU completion report	PMU/IC
December 2020	Bank's completion report	ADF

4.3 Governance

4.3.1 Economic and financial governance performance has somehow improved in recent years. Accordingly, Niger is ranked 160th out of 189 countries in "Doing Business 2016", representing an improvement of 4 places between 2015 and 2016; and 33rd out of 54 countries in the 2015 Ibrahim Index of African Governance. With Bank support, the Government introduced reforms in budget support approved in 2015, mainly to support the implementation of public finance management reforms (PFMR), including an increase in the number of regions covered by the General Directorate for Financial Control, and preparation of the implementing instruments for the Public Procurement Code. These reforms could lead to progress in the medium term.

4.3.2 Niger's energy sector is underdeveloped. In general, the electricity sub-sector, whose development began decades ago, is plagued by low electricity access rate (11% at national level and less than 1% in rural areas which hold 80% of the population). The Government has made efforts over the past few years to strengthen the sector's institutional base through: (i) creation

of the Niger Rural Electrification Agency (ANPER) in 2013; (ii) creation of the Energy Sector Regulatory Authority (ARSE) in 2016; and (iii) ongoing revitalization of the National Solar Energy Centre (CNES) through staff recruitment. Stakeholder capacity building scheduled under the project will help to improve sector governance through training, as well as provision of operating equipment and decision-making support tools, including project feasibility studies.

4.4 Sustainability

4.4.1 Project sustainability depends mainly on the degree of ownership of the project and its objectives by the Government and NIGELEC. Indeed, this project falls within the Government's vision implemented through NIGELEC to increase the electrification rate from 11% in 2015 to 60% in 2027. Accordingly, ongoing projects financed by the World Bank (60,000 connections) and AFD (65,000 connections) are implemented by NIGELEC. The PEPERN Project (46,000 connections) is consistent with this overall Government policy, and thus enjoys the support of various stakeholders met during the project appraisal.

4.4.2 Furthermore, project sustainability is based essentially on NIGELEC's capacity to repair and maintain the equipment and facilities to be constructed under the project. In this regard, NIGELEC has sufficient technical staff and adequate material resources. This project, which will be implemented in the eight (8) regions of the country, will also receive support from the technical and administrative staff in the regional directorates.

4.4.3 This project involves the connection of new customers and the use of a new measuring device that will provide additional income for NIGELEC.

4.5 Risk Management

The project involves some degree of risk. The main risks and mitigation measures are presented below:

- *Risk pertaining to lack of electricity for the 46,000 new customers:* This risk is mitigated by the procurement and installation of a 5th generator at Gourou Banda that will increase capacity by 20 MW, thus raising total additional production capacity to 100 MW. Furthermore, the installation of new sub-stations (209) and reinforcement of the network will provide customers with better quality service.
- *Limited capacity of the executing agency in monitoring several projects:* This risk relates to the executing organ's inability to effectively monitor the project, which is implemented in eight (8) regions. The recruitment of the Consulting Engineer to support NIGELEC in its mission of works quality control, will mitigate this risk. Furthermore, an independent auditor will audit the project throughout its implementation, in addition to the periodic financial and environmental audit. In addition, the PMU will rely on the skills of staff implementing ongoing projects, whose capacity would be strengthened.

4.6 Knowledge Building

4.6.1 The knowledge to be garnered from the project implementation will concern best practices in the implementation and monitoring-evaluation of an energy project. Project implementation best practices will be shared with key sector stakeholders during periodic meetings and through briefing notes. The focus on assessing the project's impact will particularly be geared towards addressing the need for knowledge building. Establishing the baseline situation prior to the implementation of project activities would yield benchmarks for conducting a realistic assessment of the achievement of project development objectives. The

result of the project impact assessment conducted after project completion would provide comparative data.

4.6.2 The knowledge and key lessons learned will be centralized in NIGELEC in the project's half-yearly financial reports, interim financial reports, and annual external audit reports, which will provide information on the project and serve as basis for Bank supervision missions from which lessons will be learned. The publication of project completion and performance evaluation reports will facilitate the dissemination of knowledge to Bank staff, stakeholders (ME, ARSE, ANPER and CNES) and the public. The lessons learned will enhance the design of similar Bank operations in future.

5 LEGAL FRAMEWORK

5.1 *Legal Instrument*

5.1.1 To finance this project, the Bank will provide a Nigeria Trust Fund (NTF) loan, an African Development Fund (ADF) loan, and an ADF grant to the Republic of Niger.

5.2 *Conditions for Bank Intervention*

5.2.1 **Conditions Precedent to NTF and ADF Loan Effectiveness:** Effectiveness of the loan agreements (ADF and NTF) shall be subject to the Borrower's fulfilment, to the Bank's satisfaction, of the conditions provided for in Section 12.01 of the General Conditions for Loan Agreements and Guarantee Agreements.

5.2.2 **Conditions Precedent to ADF Grant Effectiveness:** Effectiveness of the grant agreement shall be subject to its signature by the Donee and ADF.

5.2.3 **Conditions Precedent to First Disbursement:** In addition to effectiveness of the loans and grant, the first disbursement shall be subject to the Borrower's fulfilment of the following conditions to the satisfaction of the Bank:

- (i) Open a special CFAF account in a commercial bank acceptable to the Bank to receive funds to cover the operating costs of the Project.
- (ii) Submit the agreement to onlend the resources for project activities under conditions acceptable to the Bank. The agreement should provide for onlending of the NTF and ADF loans under the same conditions as those granted by ADF and onlending of the ADF grant as a grant.

5.2.4 **Other Conditions**

- (i) Provide the Bank, as the works progress and prior to commencement of works in each area, with evidence of compensation of persons affected by the project in the area concerned, in accordance with the Bank's applicable rules and procedures, the Environmental and Social Management Plan (ESMP), and the Abbreviated Resettlement Plan (ARP);
- (ii) Provide evidence of update of NIGELEC's procurement management handbook; and
- (iii) Obtain a commitment from NIGELEC to make the 46,000 scheduled connections at a special rate.

5.2.5 **Commitments:** The Borrower/Beneficiary undertakes to:

- (i) Implement the project, ESMP and CRP, and ensure their implementation by its contractors in accordance with: (a) the Bank's rules and procedures; (b) national laws; and (c) recommendations, prescriptions and procedures contained in the ESMP and CRP;
- (ii) Refrain from commencing works in any given area until the affected persons in that area have been fully compensated;
- (iii) Submit to the Bank quarterly reports on ESMP implementation, including, where applicable, any shortcomings and corrective actions initiated or to be initiated; and
- (iv) Submit to the Bank the results of the current tariff study, and update electricity rates so as to ensure sector equilibrium, given the commissioning of the power plant at Gourou Banda.

5.3 *Compliance with Bank Policies*

The Rural, Semi-urban and Urban Electrification Project is consistent with all applicable Bank policies.

6 **RECOMMENDATION**

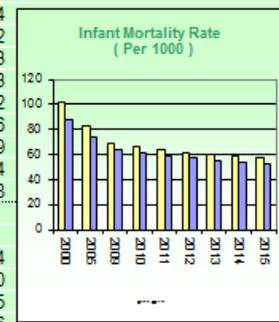
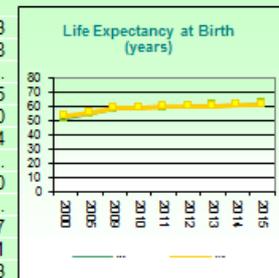
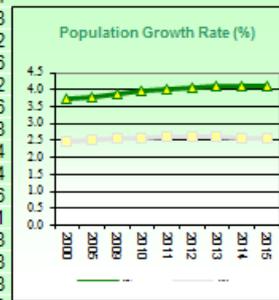
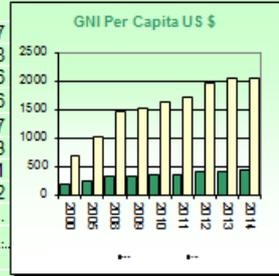
Management recommends that the Boards of Directors approve the proposal to grant to the Republic of Niger: (i) an NTF loan of UA 7.4 million; (ii) an ADF loan of UA 15.07 million; and (iii) an ADF grant of UA 29.25 million, to finance the Rural, Semi-urban and Urban Electrification Project (PEPERN), in accordance with the conditions set out in this report and its annexes.

REPUBLIC OF NIGER
RURAL, SEMI-URBAN AND URBAN ELECTRIFICATION PROJECT (PEPERN)

Annex 1
Comparative Socio-economic Indicators of Niger
Niger

COMPARATIVE SOCIO-ECONOMIC INDICATORS

	Year	Niger	Africa	Developing Countries	Developed Countries
Basic Indicators					
Area ('000 Km ²)	2016	1,267	30,067	94,638	36,907
Total Population (millions)	2016	20.7	1,214.4	3,010.9	1,407.8
Urban Population (% of Total)	2016	18.4	40.1	41.6	80.6
Population Density (per Km ²)	2016	16.4	41.3	67.7	25.6
GNI per Capita (US \$)	2014	420	2,045	4,226	38,317
Labor Force Participation % - Total (%)	2016	64.7	65.6	63.9	60.3
Labor Force Participation % - Female (%)	2016	40.3	55.6	49.9	52.1
Gender -Related Development Index Value	2007-2013	0.714	0.801	0.506	0.792
Human Develop. Index (Rank among 187 countries)	2014	188
Popul. Living Below \$ 1.90 a Day (% of Population)	2008-2013	50.3	42.7	14.9	...
Demographic Indicators					
Population Growth Rate - Total (%)	2016	4.1	2.5	1.9	0.4
Population Growth Rate - Urban (%)	2016	5.5	3.6	2.9	0.8
Population < 15 years (%)	2016	50.5	40.9	28.0	17.2
Population >= 65 years (%)	2016	2.6	3.5	6.6	16.6
Dependency Ratio (%)	2016	113.3	79.9	52.9	51.2
Sex Ratio (per 100 female)	2016	101.7	100.2	103.0	97.6
Female Population 15-49 years (% of total population)	2016	20.5	24.0	25.7	22.8
Life Expectancy at Birth - Total (years)	2016	62.3	61.5	66.2	79.4
Life Expectancy at Birth - Female (years)	2016	63.4	63.0	68.0	82.4
Crude Birth Rate (per 1,000)	2016	49.0	34.4	27.0	11.6
Crude Death Rate (per 1,000)	2016	8.6	9.1	7.9	9.1
Infant Mortality Rate (per 1,000)	2015	57.1	52.2	35.2	5.8
Child Mortality Rate (per 1,000)	2015	95.5	75.5	47.3	6.8
Total Fertility Rate (per woman)	2016	7.5	4.5	3.5	1.8
Maternal Mortality Rate (per 100,000)	2015	553.0	495.0	238.0	10.0
Women Using Contraception (%)	2016	16.0	31.0
Health & Nutrition Indicators					
Physicians (per 100,000 people)	2004-2013	1.9	47.9	123.8	292.3
Nurses and midwives (per 100,000 people)	2004-2013	13.7	135.4	220.0	859.8
Births attended by Trained Health Personnel (%)	2010-2015	29.3	53.2	68.5	...
Access to Safe Water (% of Population)	2015	58.2	71.6	89.3	99.5
Healthy life expectancy at birth (years)	2013	54.2	54.0	57	68.0
Access to Sanitation (% of Population)	2015	10.9	39.4	61.2	99.4
Percent. of Adults (aged 15-49) Living with HIV/AIDS	2014	0.5	3.8
Incidence of Tuberculosis (per 100,000)	2014	98.0	245.9	160.0	21.0
Child Immunization Against Tuberculosis (%)	2014	76.0	84.1	90.0	...
Child Immunization Against Measles (%)	2014	72.0	76.0	83.5	93.7
Underweight Children (% of children under 5 years)	2010-2014	37.9	18.1	16.2	1.1
Daily Calorie Supply per Capita	2011	2,546	2,621	2,335	3,503
Public Expenditure on Health (as % of GDP)	2013	3.2	2.6	3.0	7.7
Education Indicators					
Gross Enrolment Ratio (%)					
Primary School - Total	2010-2015	70.6	100.5	104.7	102.4
Primary School - Female	2010-2015	65.0	97.1	102.9	102.2
Secondary School - Total	2010-2015	18.8	50.9	57.8	105.3
Secondary School - Female	2010-2015	15.6	48.5	55.7	105.3
Primary School Female Teaching Staff (% of Total)	2010-2015	48.0	47.6	50.6	82.2
Adult Literacy Rate - Total (%)	2010-2015	19.1	66.8	70.5	98.6
Adult Literacy Rate - Male (%)	2010-2015	27.3	74.3	77.3	98.9
Adult Literacy Rate - Female (%)	2010-2015	11.0	59.4	64.0	98.4
Percentage of GDP Spent on Education	2010-2014	6.8	5.0	4.2	4.8
Environmental Indicators					
Land Use (Arable Land as % of Total Land Area)	2013	12.6	8.6	11.9	9.4
Agricultural Land (as % of land area)	2013	35.4	43.2	43.4	30.0
Forest (As % of Land Area)	2013	0.9	23.3	28.0	34.5
Per Capita CO2 Emissions (metric tons)	2012	0.1	1.1	3.0	11.6



Sources : AfDB Statistics Department Databases; World Bank: World Development Indicators;

last update : August 2016

UNAIDS; UNSD; WHO, UNICEF, UNDP; Country Reports.

Note : n.a. : Not Applicable ; ... : Data Not Available. * Labor force participation rate, total (% of total population ages 15+)

** Labor force participation rate, female (% of female population ages 15+)

Annex 2

Detailed Cost of the Components

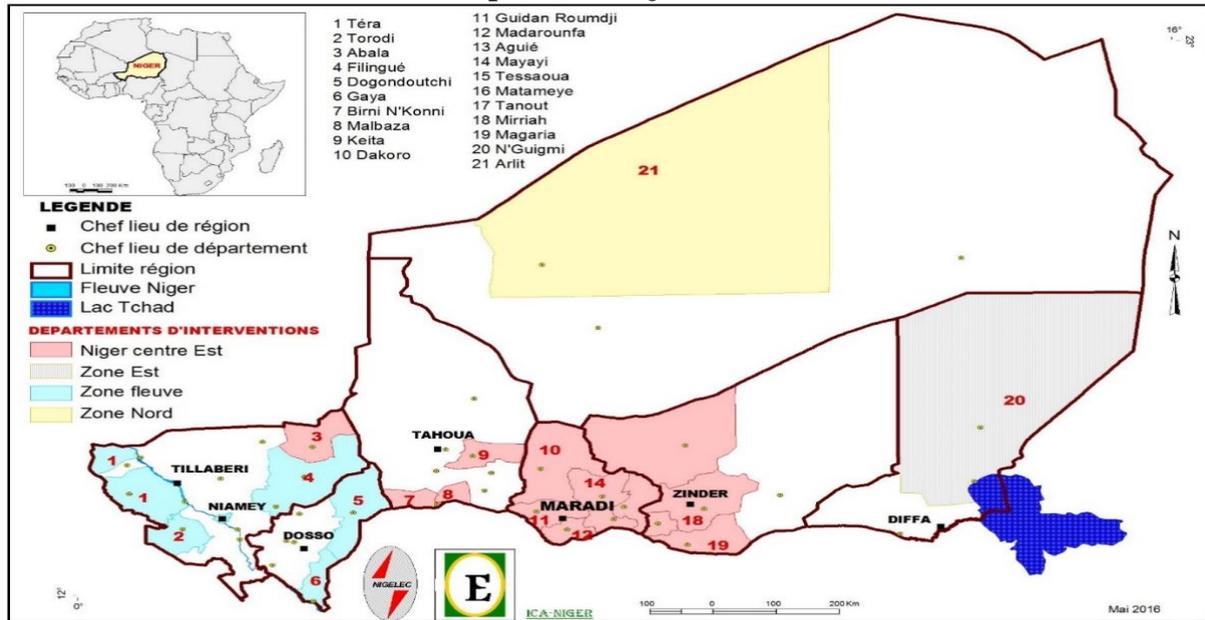
No.	Component Name	Cost Estimate (UA Thousand)	Description of Components
1	Construction of electricity infrastructure	43,780	<ol style="list-style-type: none"> 1. Increase of production capacity: This activity relates to the construction of the diesel-powered thermal power plant of Gourou Banda which entails the procurement and installation of a 20 MW unit. 2. Creation of a distribution sub-station in East Niamey 3. Construction of four 33 kV liaison lines over a total estimated length of 500 km. 4. Extension, strengthening and densification of distribution networks: The objective of this activity is to extend, strengthen and densify electricity distribution networks in some localities of Niger, namely: (i) the eastern suburb of Niamey to supply power to the zone connected to the new distribution sub-station; (ii) 30 (thirty) urban centres: Niger Centre East - NCE (15); River zone (10); East (3) and North (2) zones; (iii) 71 rural localities, including 21 new ones; (iv) connection of 46,000 households to improve electricity access in all localities targeted by the project.
2	Institutional support to the energy sector	5,217	<ol style="list-style-type: none"> 1. Technical support to the Ministry of Energy and Petroleum, the Energy Sector Regulatory Authority (ARSE), the Niger Rural Electrification Agency (ANPER), and the National Solar Energy Centre (CNES) 2. Strengthening the energy information system (EIS) for the benefit of MEP; (iii) establishment of a geographical information system (GIS) for ANPER; (iv) stakeholder capacity building; and (v) conduct of studies required for the electrification of 100 isolated rural communities. 3. Capacity building on project analysis under public-private partnership (PPP) arrangements 4. Establishment of a geographical information system for ANPER that will enable it to have quality information necessary for the promotion of rural electricity 5. Rural electrification studies and miscellaneous sector studies
3	Project management	4,567	<ol style="list-style-type: none"> 1. Recruitment of the Consulting Engineer for works monitoring and control 2. Monitoring of the implementation of environmental and social measures (ESMP & ARP) 3. Project audit: (financial, environmental and social, procurements) 4. Operation of the PMU
	BASE COST	53,564	Total base cost, net of physical and price contingencies
	Contingencies	5,357	Physical contingencies (5%) and price contingencies (5%)
	TOTAL COST OF PROJECT	58,921	

Annex 3

DESCRIPTION OF THE ZONES AND NUMBER OF CONNECTIONS

Region	Identified Localities	Number of households to be electrified	Percentage of the population to be electrified
Agadez Region	Arlit and Tchirozérine	2,575	5.6
Diffa Region	Diffa, Mainé Soroa, Nguigmi	650	1.4
Dosso Region	Gaya, Doutchi, Loga	5,725	12.4
Maradi Region	Madarounfa, Tesssaoua, Mayahi, Guidan Roundji, Aguié, Dakoro, Dan Issa, Tchadaoua, Gazaoua, Kanembakaché, Tibiri, Jirataoua, Saé Saboua, and Angoual Mata	6,175	13.4
Tahoua Region	Abalak, Illéla, Bouza, Madaoua, Konni, Malbaza, Keita, Guidan Iddar, Galmi, Tsernaoua, Badaguichiri, Tounfafi, Tamaské and Founkoye	8,525	18.5
Tillabéry Region:	Filingué, Téra, Torodi, Kollo, Say, Sakoiria, Lossa, Gothèye, Hamdallaye, Ndounga and Karma		
Zinder Region	Mirriah, Magaria, Matameye, Tanout, Kantché, Droum, Takieta, Maimoujia, Sassoumbroum, Dantchiao, Tirmini, Bandé and Gogo	5,675	12.3
Niamey	Outlying neighbourhoods of Niamey	9,920	21.6
	TOTAL	46,000	100

Annex 4 Map of the Project Area



The staff of the ADB Group have provided this map for the exclusive use of readers of this report to which it is appended. The appellations and the demarcations on this map do not imply any judgment on the part of the ADB Group and its members concerning either the legal status of a territory or the approval or acceptance of its boundaries.