RURAL ELECTRIFICATION AGENCY

ENERGY = EMPOWERMENT = EFFICIENCY

NIGERIAN ELECTRIFICATION PROJECT

OVERVIEW

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THE WORLD BANK
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NIGERIAN ELECTRIFICATION PROJECT (NEP)

OVERVIEW

The objective of the Nigerian Electrification Project (NEP) is to increase electricity access to households and Mirco, Small and Medium Enterprises (MSMEs), students and patients at federal universities and university teaching hospitals throughout Nigeria. The Rural Electrification Agency (REA) (Implementing Agency for the project) has been working with the World Bank team to develop a robost project that when implemented will be the largest off grid electrification project in West Africa.

The project is a $350 million facility from the world bank to the Nigerian government for off grid development. The implementing Agency is the Nigeria Rural Electrification Agency (REA):

This project has four components:

1. Component 1 - Solar Hybrid Mini Grids for Rural Economic Development – US$150m
2. Component 2 - Standalone Solar Systems for Homes, Farms and Enterprises – US$ 75m
3. Component 3 - Power systems for public universities and teaching hospitals – US$105m
4. Component 4 - Technical assistance – US$20m

NIGERIAN ELECTRIFICATION PROJECT (NEP)

The project is part of the Nigerian Economy Recovery and Growth Plan (EGRP)

OBJECTIVES

- To support FGN's goal of increasing electricity access;
- To develop a **data driven off grid model** for Nigeria that will become an exemplar for **Sub Saharan Africa**;
- To utilize the funding from the **Nigerian Electrification Project (NEP)** as a catalyst to scale up rapid implementation of off- grid solutions across Nigeria;
- To align with the **Country Partnership Strategy (CPS)** for Nigeria;
- To contribute to **Sustainable Development Goal 7 (SDG7),** Sustainable Energy for All (SEfor4ALL), the World Bank's Energy Sector Directions Paper (ESDP), and is aligned with **the Multi-Tier Framework for Energy Access (MTF);**
- To increase **gender Inclusion** in the Nigerian power sector;
- To increase **economic growth** in critical sectors e.g. **Agriculture**;
- To provide **reliable power supply for 250,000 SMEs and 1 million Households;**
- To provide **uninterrupted power supply** in Federal Universities and University Teaching Hospitals;
- To supports the FGN's climate change obligations under the **Paris Agreement**, with respect to **promoting renewable** and **reducing carbon emissions**.

Nigerian Economic Recovery and Growth Plan (ERGP)

Stabilize the macro-economic environment

1. Align monetary, trade and fiscal policies
2. Accelerate non-oil revenue generation
3. Drastically cut costs
4. Privatize selected public enterprises/ assets

Achieve agriculture and food security

5. Deliver on agricultural transformation

Improve transportation infrastructure

6. Deliver targeted high priority transportation projects
7. Enable private sector financing of infrastructure

Ensure energy sufficiency in power and petroleum products

8. Urgently increase oil production
9. Expand power sector infrastructure
10. Boost local refining for self-sufficiency

Drive industrialization focusing on SMEs

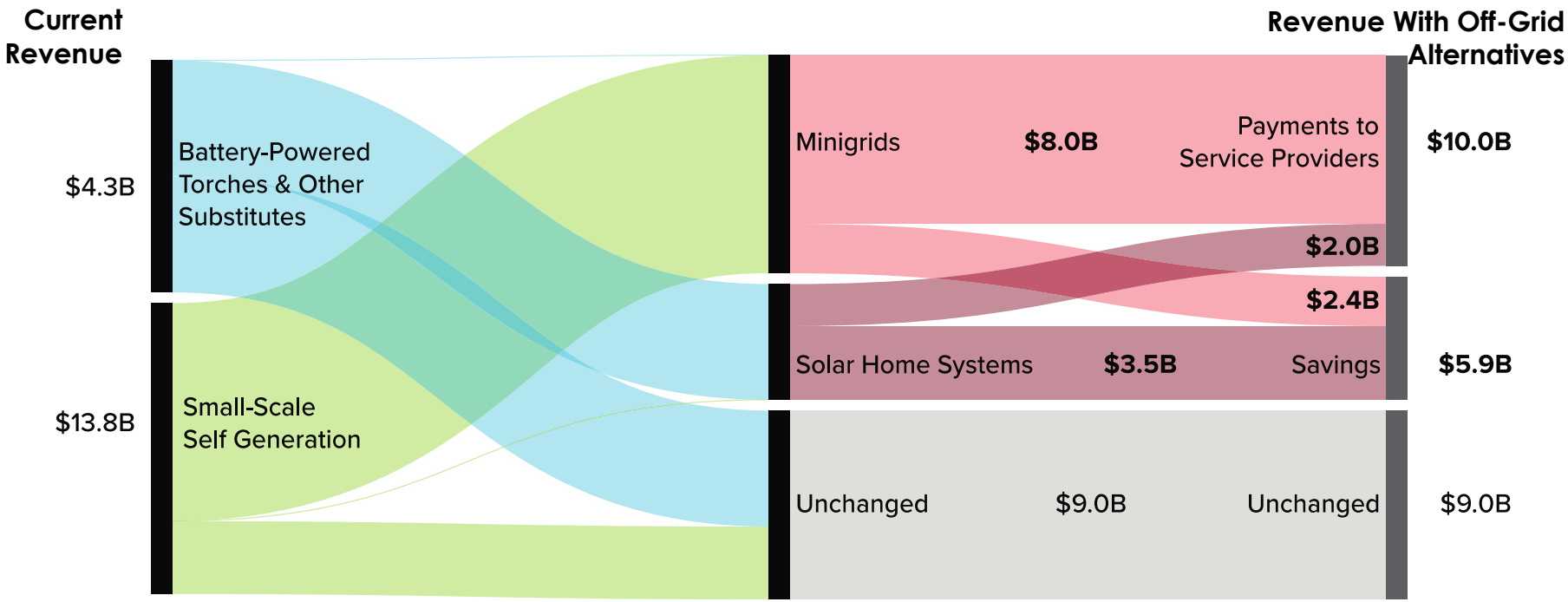
11. Improve Ease of doing business
12. Accelerate National industrial revolution plan implementation

NIGERIAN OFF GRID MARKET

THERE IS A $10B/YR MARKET OPPORTUNITY *TODAY* FOR MINIGRIDS AND SOLAR HOME SYSTEMS THAT WILL SAVE NIGERIANS $6B/YR

- **$10 billion annual market opportunity** to supply off-grid and underserved customers with minigrids and solar home systems*
- With 8% economic growth through 2030 there is an **additional $670 billion** value proposition
- This estimate is based on current expenditures, but customers **may pay more for superior service**
- This shift from expensive generating sets would **save Nigerians customers $6B/yr** over current energy costs

Today's off-grid and underserved annual market size in Nigeria, by off-grid technology*



Source: RMI analysis

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* Assumes 50% adoption of solar home systems by torches and other substitutes, and 75% adoption of minigrids by small-scale self generation; conservatively does not assume growth in electricity use

NIGERIA ELECTRIFICATION PROJECT (NEP)

Components and Breakdown of funds $350 Million

COMPONENT 1: $150 Million for solar mini grids.

- $70 Million: Competitive bidding for portfolios of mini grid sites
- $80 Million: Connecting new customers
- Mini grids built to grid code standard
- First-mover potential in the next 5 years: 300,000 households and 30,000 SMEs served by 1000 mini grids

COMPONENT 2 : $75 Million for SHS.

- $15 Million: "Accelerator" grants to high-potential importer-distributors
- $60 Million: Output-based grants
- Business model neutral
- First-mover potential in the next 5 years: 1.5 million households and micro-enterprises.

COMPONENT 3: $105 Million for University & Hospital Power Systems.

- 37 federal universities and 7 affiliated hospitals
- EPC contracts for constructing power systems
- O&M contracts for 10 years
- Power systems designed to operate independently from the Grid

COMPONENT 4: $20 Million Technical Assistance

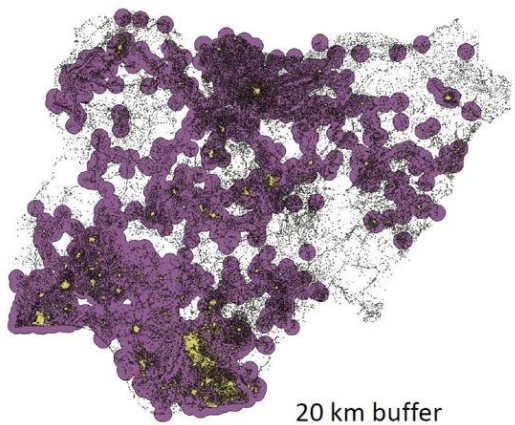
- Institutional support for REA
- Investment pipeline development
- Financing needs assessment
- Regulatory support
- Pre-investment support to mini grid developers
- Ecosystem development for SHS
- Environmental & Social Safeguards

COMPONENT 1:

SOLAR MINI GRIDS: $150M

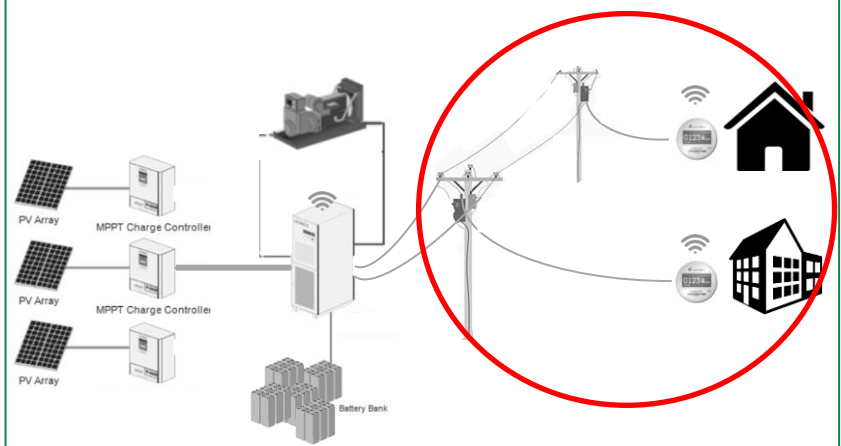
$70 Million: Competitive Bidding

- 100 pre-selected mini grid sites clustered into bid packages for auction
- Bidders compete on lowest subsidy to build, own, and operate a portfolio of mini grids
- Detailed economic and geospatial data will be made available to developers
- Standardized design: solar PV & diesel hybrid with smart meters using a prepaid system
- An additional 70+ mini grids will be auctioned off in high-risk environments (e.g., conflict areas) – these will be fully financed by the project



$80 Million: Connection Cost Subsidies

- $300+ for each new connection to a mini grid, 100% payment made after connection
- Payments made upon completion
- Applications assessed on a rolling basis



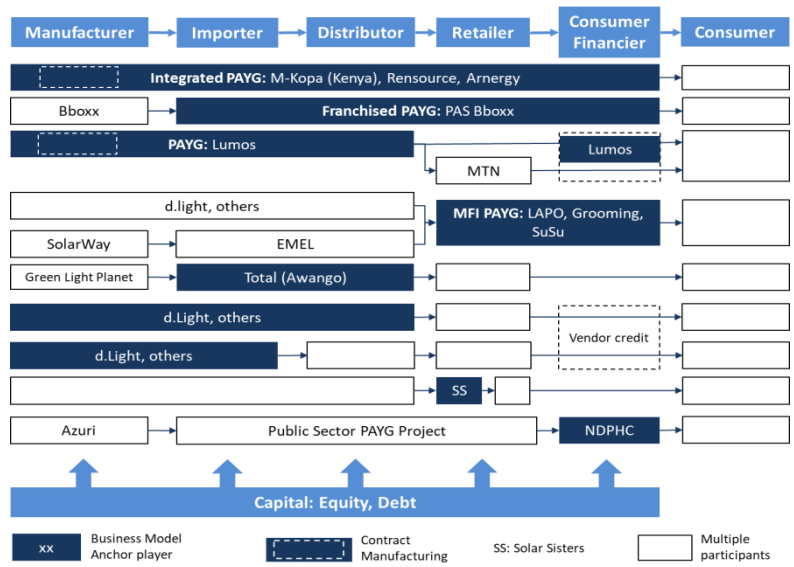
COMPONENT 2:
SOLAR HOME SYSTEMS (SHS): $75M

$15 Million: Accelerator Grants

- Up-front grants to strongest and most capable SHS providers
- Pre-qualification based on evidence that applicant has ready-to-go capabilities for scaling rapidly
- Grants will crowd-in large-scale additional private sector investment and provide liquidity for working capital
- Grants disbursed in lump sums based on milestones outlined in grant proposal
- Prospective Market Players:

$60 Million: Output Based Grants

- Pre-qualification based on business capabilities and SHS technical standards
- Focus will be primarily on strong new entrants and Nigerian start-ups
- Grants set at 15-20% of the nominal retail price and paid in tranches on verified product installations
- Grant support is business model neutral



COMPONENT 3:
ENERGIZING EDUCATION: $105 million

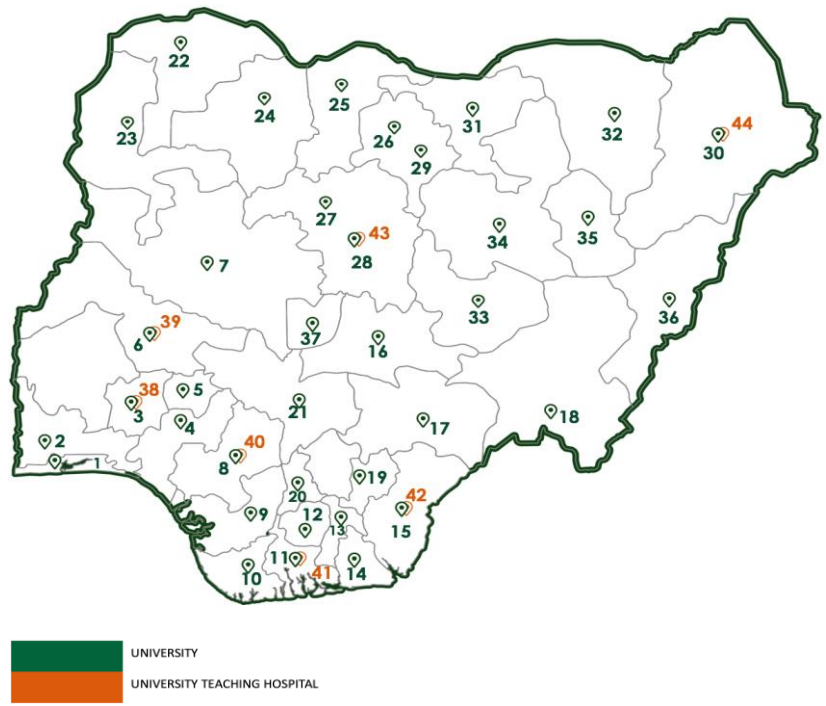
$105 Million: University & Hospital Power Systems

Objectives:
- Support to Nigerian Government's Energizing Education Program
- Provide new or improved power systems for 37 federal universities and 7 associated teaching hospitals

EPC contracts for:
- Solar hybrid or gas-fired power systems to operate independently of DISCO grid, with capability to be connected at a later stage
- Campus-wide distribution system upgrade as necessary
- Campus-wide street lighting
- Training center facilities dedicated to renewable energy and electrical engineering education

O&M contracts for:
- Operating and maintaining power system and street lighting for 10 years
- O&M contracts will be offered to EPC contractors upon satisfactory completion of works

Sites for the Energizing Education Program



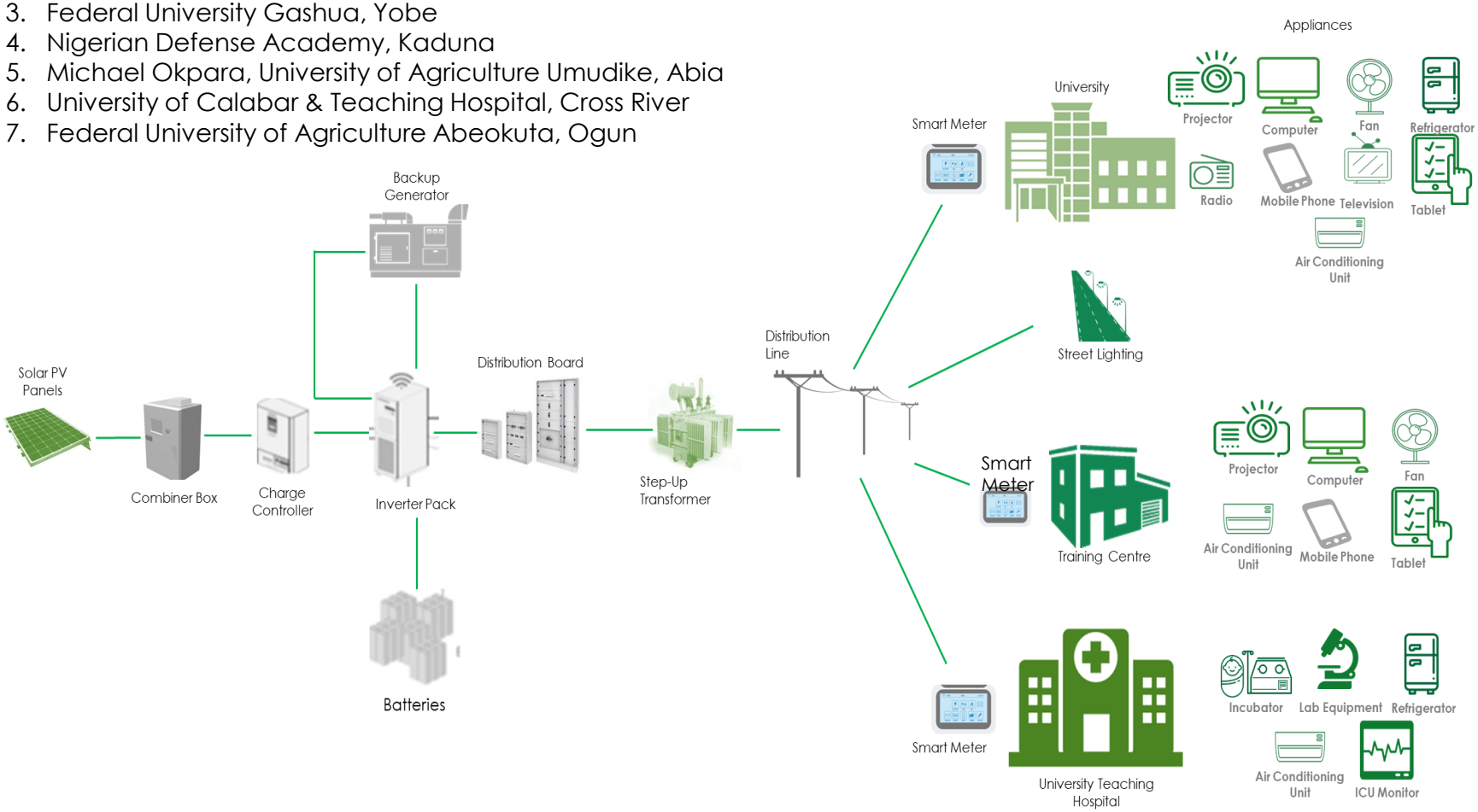
Power System Characteristics:
- Capacity: 0.5 - 8.0 MW
- Technology: Solar-Hybrid or Gas fired with Smart Metering
- Reliability: > 99% for high-priority loads

COMPONENT 3:

ENERGIZING EDUCATION: $105 million

UNVERSITIES - SOLAR POWERED PROJECTS

1. University of Abuja, FCT
2. University of Maiduguri & Teaching Hospital, Borno
3. Federal University Gashua, Yobe
4. Nigerian Defense Academy, Kaduna
5. Michael Okpara, University of Agriculture Umudike, Abia
6. University of Calabar & Teaching Hospital, Cross River
7. Federal University of Agriculture Abeokuta, Ogun



COMPONENT 4:
TECHNICAL ASSISTANCE: $20m

Market Intelligence for Mini Grid Development Tool Powered by Odyssey

Cross River State: Abo Ogbagante, Boki LGA

Abo Ogbagante is in Cross River State, which is located in the south-south region of Nigeria.

Nearest City:	Port Harcourt (446km)
Nearest Port:	Fort Onne, Port Harcourt Warf & Port Harcourt International Airport
Nearest major road:	Eket-Port Harcourt expressway
Nearest cell tower:	Not Available
Population (est.):	850
Total Estimated Load (kW):	126.74
Coordinates:	Long: 6.143582, Lat: 9.011223

Main Economic Activities	Main Crops	Average Monthly Household Income
Food Processing, Healthcare, Welding & Wholesale and Retail trade	**Maize, Banana, Citrus, Oil palm & Cassava**	**₦ 23,700**

Distance from Grid	Primary Electricity Source	Average Daily Working Hours	Average Daily Diesel/Petrol Spend
47km	**Diesel/Gasoline Generator**	**13-15 Hours**	**₦ 690**

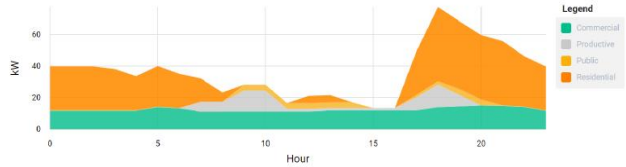
Population	850
Household Distribution	**Count**
Small Household	108
Medium Household	89
Large Household	36
Commercial/Productive	**Count**
Barbing /Beauty Salon	3
Black market fuel dealer	2
Welder	2
Furniture maker	1
Farmer	1
Grinder	0
Petty Trader	20
Tailor	2
Recharge Card Vendor	0
Phone Charger	1
Restaurant	8

Fig 1. Geotag of community businesses

Fig 2. Picture of productive use

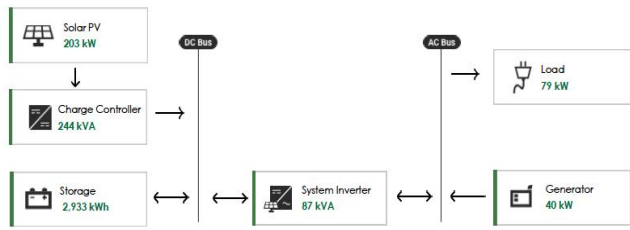
Cross River State: Abo Ogbagante, Boki LGA

281 Connections	79.42 Peak kW	18 Peak Hour



Daily load	877.2 kWh/day Total	467.1 kWh/day Residential	297.2 kWh/day Commercial	77.6 kWh/day Productive

Generation System



Distribution Network

Cabling & Poles	Length (Km)
Cabling & Poles: 89 kVA	5.57
Cabling & Poles: 107 kVA	0.33
Cabling & Poles: 123 kVA	0.24
Cabling & Poles: 188 kVA	0.08
Cabling & Poles: 240 kVA	0.1
Cabling & Poles: 291 kVA	0.14
Cabling & Poles: 441 kVA	0.03
TOTAL	6.49

KEY MILESTONES & NEXT STEPS

2018 Q2	**Approval** World Bank Approval of the NEP projects obtained
2018 Q4	**Procurement** Commence NEP procurement process for mini grids and stand alone systems
2019 Q1	**Mini Grids and Stand alone systems** Deployment of the first 250 mini grids commences and 500k stand alone systems
2019 Q2	**Review** Conduct a comprehensive review of the successes/ challenges of implementing the off grid electrification strategy

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