

FEDERAL REPUBLIC OF NIGERIA



RURAL ELECTRIFICATION STRATEGY AND IMPLEMENTATION PLAN (RESIP)

PREPARED BY

FEDERAL MINISTRY OF POWER, WORKS AND HOUSING

FOR IMPLEMENTATION BY

RURAL ELECTRIFICATION AGENCY (REA)

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Figure 4.1: General Overview of the REA23

Table 5.1: RURAL ELECTRIFICATION DEMAND PROFILE UP TO Y202036

Acronyms/Abbreviations

EPSR	Electric Power Sector Reform
FEC	Federal Executive Council
FGN	Federal Government of Nigeria
FMPS	Federal Ministry of Power and Steel kW Kilowatt
MW	Megawatt
NEPA	National Electric Power Authority
NERC	Nigerian Electricity Regulatory Commission
NESI	Nigerian Electricity Supply Industry
NGO	Non- Government Organization
PHCN	Power Holding Company of Nigeria PV Photovoltaic
RE	Rural Electrification
REA	Rural Electrification Agency
REF	Rural Electrification Fund
REP	Rural Electrification Programme (initiated in 1981)
RFP	Request for Proposal

Executive Summary

General

The primary objective of the Nigerian Rural Electrification Policy and by extension this Rural Electrification Strategy and Implementation Plan is to expand access to electricity as rapidly as possible in a cost-effective manner. This implies full use of both grid and off-grid approaches, with subsidies being primarily focused on expanding access rather than consumption. It is assumed that private sector providers will be heavily involved in enhancing access through - both the Power Holding Company of Nigeria (PHCN) successor distribution companies recently privatized and a range of other public and private companies.

The Ministry of Power will continue to be responsible for laying down policies on increasing access and rural electrification, including (a) setting-out policy guidelines and (b) monitoring and evaluating the performance of the programme and its agencies.

The Rural Electrification Goal

The Goal of Federal Government of Nigeria is to increase access to electricity to 75% and 90% by 2020 and 2030 respectively and at least 10% of renewable energy mix by 2025 as contained in the National Electric Power Policy (NEPP) of 2001 and the Rural Electrification Policy of 2005 respectively.

The Rural Electrification Strategy

This rural electrification strategy while striving to achieve Federal Govt. goals shall:

- i. Promote a full menu of rural electrification options—grid and off-grid (mini-grid & stand-alone) from thermal & renewable, etc.;
- ii. Ensure close co-ordination of rural electrification expansion with economic development objectives;
- iii. Encourage States, local communities and businesses to develop and contribute financially to rural electrification, and;
- iv. Facilitate the entry of new market participants and continued development of local rural electrification (RE) ventures whose activities may include the production, installation, operation, maintenance, and distribution/sales of equipment, systems, and services related to power supply in rural areas.

The Rural Electrification Implementation Plan

The proposed Rural Electrification Implementation Plan would be implemented using an independent Rural Electrification Fund operated by a Rural Electrification Agency. The RE Fund:

- i. Will be used to develop both grid-connected and off-grid rural electrification;
- ii. Will be comprised of contributions from government, donors etc. in accordance with provisions of EPSR Act of 2005;
- iii. Will be open to bids from a wide range of organizations (developers);
- iv. Will be used for funding of connections to supply (grid and off-grid) but not for consumption through open competitive bids;
- v. Will only provide a portion of the total funding so that other parties (distribution companies, local communities, business groups, etc.) would have to provide the rest.

Rural Electrification Fund

Rural electrification expansion in Nigeria will be achieved through the support of a Rural Electrification Fund. The criteria the Fund will use are to be developed by the Rural Electrification Agency (REA) and approved by Minister of power in Charge of rural electrification. These criteria will have to give due weight to development benefits and cost effectiveness as well as to equity and regional balance. The implementation of rural electrification programmes should as far as possible encourage the combination of centralized and decentralized configuration approach and diversity and make use of all resources (financial, technical and human) available at Federal, State and local levels.

Key Features

To make the Rural Electrification Fund work well, the key features shall be:

- (i) Clear policy guidelines within which the Fund must operate, particularly the criteria for selecting between applications;
- (ii) Transparent procedures for the operation of the fund and its bidding process; and
- (iii) Proper accountability of the Fund e.g., independent audit, proper monitoring and reporting procedures, etc.

1. Introduction

The National Electric Power Policy (NEPP) 2001 states “the primary objective of the Nigeria Rural Electrification Programme is to expand access to electricity as rapidly can be afforded in a cost-effective manner”. In March 2005, the Federal Government of Nigeria (FGN) passed the Electric Power Sector Reform Act 2005 (EPSR Act 2005), which established the legal foundation for reform of the Nigerian Electricity Supply Industry (NESI), including the establishment of an independent regulatory body, the Nigerian Electricity Regulatory Commission (NERC), unbundling and corporatization of the national electric utility, National Electric Power Authority (NEPA) and the creation of Successor Companies that are now privatized. It also provides the legal foundation for the establishment of the Rural Electrification Agency (REA), a governmental body charged with designing and implementing strategies to achieve rural access to electricity. The EPSR Act 2005 provides the framework for the Government’s approach to rural electrification; however, few details on its implementation are contained in the legislation.

The FGN’s Rural Electrification Policy outlines the Government’s objectives, goals, and policies regarding rural electrification. The Policy, in addition to other key documents on regulation, funding and institutional development, details the institutional framework and procedures to be pursued in order to achieve the objectives of the Government’s rural electrification program.

This document, the FGN’s Rural Electrification Strategy and Implementation Plan, sets forth the Government’s strategy to accomplish the goals established in the EPSR Act 2005 and Rural Electrification Policy.

2. Background Information,

2.1 Background

Since its inception in 1981, the key objective of the Nigerian Rural Electrification Programme (NREP) has been to increase electricity access in rural areas of the country. The NREP was initiated by the then Federal Ministry of Mines, Power and Steel (FMPS) and it was being executed by the then national utility (NEPA) on behalf of government. Its strategy has been to extend the national grid to provide electricity to Local Government Headquarters. While this has resulted in greater access to electricity by Local Governments and fortunate consumers in the immediate vicinity, rural households have not seen much improvement in the availability of services. In fact, today, it is estimated that only about 26% of rural households have access to electricity, no significant difference compared to when the NREP commenced in 1981. The growth in demand for electricity has outpaced supply and population growth has driven the rate of new household formation higher than the rate of new connections. As a result, rural households still rely on fuel-wood and other expensive, unhealthy and unsustainable sources of energy.

Meanwhile, Nigeria has been blessed with a wealth of natural resources that can be utilized to generate electricity. These include fossil fuels (e.g., gas, coal, oil), renewable energy sources (e.g., solar, wind, biomass, small hydro, geo-thermal, tidal), and large hydro sources. With proper market and regulatory mechanisms in place, these resources could be utilized to provide a reliable supply of electricity to all residential, commercial, industrial, and public sector consumers in Nigeria, at cost-reflective and affordable tariffs.

In recognition of that, the Federal Government of Nigeria has planned a renewed effort to increase rural electrification (RE), which has been identified as a priority for the growth and development of the nation. Reliable and affordable electricity supply will enable rural households to devote less of their time and income to procuring energy supply, in favour of more productive uses. Improvements in access to electricity in rural areas can have a significant impact on the quality of health services, education, and access to information and communication technology. Over time, rural areas can develop their productive

capacity in agriculture, agro-processing, manufacturing, light to heavy industry, and services. For all of these reasons, rural electrification is critical to the socio-economic development of rural areas of Nigeria and the nation as a whole.

The FGN has outlined its commitment and approach to rural electrification in a number of official documents, including the National Electric Power Policy (NEPP) 2001, National Energy Policy 2003, EPSR Act 2005, and the Rural Electrification Policy 2009.

In the latter, the FGN adopts as its guiding principles for rural electrification the following:

- 1. The FGN shall facilitate the provision of steady and reliable electric power supply at all times, at economic rates, for residential, commercial, industrial, and social activities in the country.*
- 2. The FGN shall facilitate the extension of electricity services to all Nigerians, irrespective of where they live and work.*
- 3. The FGN shall facilitate the promotion of private sector participation in Rural Electrification (on- and off-grid) in the development of the nation's abundant renewable energy resources by creating an enabling environment, while ensuring that governmental agencies, cooperatives and communities, where feasible, have adequate room to participate in enhancing electricity service delivery.*

The FGN's RE Strategy and Implementation Plan, contained herein, reflects each of these priorities and is designed to promote the objectives outlined below.

2.2 Objectives

The objectives of the FGN's RE program, as set out in the RE Policy, are to:

- 1. Promote agriculture, industrial, commercial, and other economic and social activities in rural areas;*
- 2. Raise the living standards of rural populations through improved water supply, lighting and security;*
- 3. Promote the use of domestic electrical appliances to reduce the drudgery of household tasks typically allocated to women;*

4. *Promote cheaper, more convenient and more environmentally-friendly alternatives to the prevalent kerosene, candle, and vegetable oil lamps and fossil fuel-powered generating sets;*
5. *Assist in reducing migration from rural to urban areas; and*
6. *Protect the nation's health and environment by reducing indoor pollution and other energy-related environmental problems.*

To achieve these objectives, the FGN is committed to pursuing the following supportive measures:

1. *Improving service standards, including increased availability, reliability, and quality of power supply;*
2. *Improving affordability of power through competition, subsidies on capital investments, and reduced barriers to entry, among others; and*
3. *Improving financial sustainability of power supply, through appropriate tariff policies that reflect costs of operation & maintenance, system expansion and upgrade, and a reasonable return on investment, while encouraging the use of modern and smart technologies to support RE efficiency.*

The FGN has also established its targets for the RE program. In the National Electric Power Policy and the more recent Rural Electrification Policy, the FGN has set an ambitious target: to make reliable electricity available to 75% of the population (rural and urban) by 2020¹ and at least 10% of renewable energy mix by 2025. The government shall also strive to achieve 90% electricity access by 2030. Pursuing this target is part of the FGN's overall objective of providing access to electricity for all Nigerians in order to stimulate economic development and improve the quality of rural life. This will be accomplished by encouraging a range of service providers to deliver cheaper, cleaner electricity. In order to support these objectives, the FGN is committed to improving the standards of service, the affordability, and the financial sustainability of rural service operators.

2.3 Previous Work

The "Act" (EPSRA 2005, 88(4)) requires the Minister of Power to submit to the President an RE Strategy and Plan for Nigeria. In preparing the submission the Minister is to consider submissions from both the Nigerian Electricity Regulatory Commission (NERC) and the Rural Electrification Agency) REA (EPSRA 88(5)).

¹ Rural Electrification Policy of the Federal Republic of Nigeria, 2005, p.10. (approved 2009)

This RE Strategy and Implementation Plan document is prepared using inputs from past work carried out by various rural electrification stakeholders in Nigeria.

In particular, this strategy document was prepared based on submission received from Nigerian Electricity Regulatory commission (NERC) and Rural Electrification Agency (REA). Back in 2009 a Committee was set-up by the Federal Ministry of Power to review the draft RE strategy and plan document prepared by REA. The Committee requested NERC to make submission via a letter Ref. no. FMP/Committee/7475/22 dated February 12, 2009 towards finalizing the draft RE strategy and implementation plan. Subsequently the Ministry received submission from NERC in 2009. However, the REA was suspended in late 2009, which stalled the process of preparing the strategy. In May 2011 another Committee was set-up by the Ministry to prepare a concept paper for “Addressing the Electrification of Rural Areas in Nigeria” the report of that Committee was considered in preparing this document. Most recently in 2013 REA had submitted new draft strategy documents to the Ministry, which were prepared with the support NIAF; this was also considered in preparing this strategy document. In addition to the above, comments were requested from Development partners (JICA, GIZ, NIAF, etc.) on the various draft strategy documents used to prepare the current document. Subsequently, several workshops were organized to review the draft strategy, which led to the formal presentation of the draft strategy to stakeholders at the first National Council on Power (NACOP) which comprised of Commissioners of Energy/Power from the 36 states of the Federation and FCT held in 2014.

Further to the above, references were made to earlier power sector policies, plans, documents, and workshop outcomes such as;

- RE Strategy and Implementation prepared by Econ One for BPE
- Reports of the national workshop on “Energizing Rural Transformation in Nigeria: Scaling-Up Electricity Access and Renewable Energy Market Development”, March 19–20, 2001 in Abuja.
- JICA Report on a Master Plan Study for Utilization of Solar Energy in the Federal Republic of Nigeria
- A Report On Nigeria’s Electricity Sector by The Sub-Committee of The Presidential Advisory Committee On 25 Years Electric Power Supply Projection
- Draft Renewable Energy Master plan by ECN

- Proceedings of the International Conference On Making Renewable Energy A Reality facilitated by One Sky November 21-27, 2006 in Calabar
- National Energy Policy, 2003
- Draft Energy master plan, 2005 (draft)
- National Electric Power Policy, 2001
- Rural Electrification Policy, 2009
- Etc.

2.4 Electrification Targets

The FGN has implied targets for the RE programme. In the National Electric Power Policy (2001) and the more recent Rural Electrification Policy, the FGN has set an ambitious but realizable target to make reliable electricity available to 75% of the population (rural and urban in aggregate) by 2020. Pursuing this target is part of the FGN's overall objective of providing access to power for all Nigerians in order to stimulate economic development and improve the quality of rural life. This will be accomplished by encouraging a range of service providers to deliver cheaper, cleaner electricity through the promotion of best practice including the use of renewable energy sources. In order to support these objectives, the FGN is committed to improving the standards of service, the affordability of power, and the financial sustainability of rural power service operators.

The goal of the FGN to increase electricity access to 75% and 90% by 2020 and 2030 respectively. This can be achieved only through a commitment to a rural electrification programme of unprecedented scale. This is because more than half of the populations are rural dwellers with low levels of electrification. Perhaps more than 70,000,000 rural Nigerians lack access to reliable electricity supply. For FGN electrification targets to be achieved by 2020 and 2030, it will require that both urban and rural electrification rate must increase at an unprecedented scale.

Only if by 2020 urban electrification reaches 95% and rural electrification reaches 60% can the national target of 75% be achieved. This will only happen by connecting more than 10,000,000 additional rural households (assuming 7 persons per household). The new generating capacity required to serve the additional domestic and non-domestic rural demand is around 6,000MW. This is more than the current capacity of the entire Nigerian power system. Achieving this would take the rural electrification rate to 60%.

Total capital costs to achieve this rural ambition by 2020 are estimated in the range of N1,440 billion (US\$ 9billion). It will take time to establish the national capability required to expand electrification in rural at the enormous rate required. Recognizing this, an interim target proposed for 2016 is to add 1million connections and 800MW of generation capacity in rural areas. This will require total capital of N192billion (US\$1.2 billion).

3. New Paradigm for Rural Electrification

3.1 Shift to Combination of Centralized and Decentralized Approach

In its new RE Policy and Strategy, the FGN is moving away from a purely centralized decision making approach to rural electrification. Instead, in recognition of the advantages of a bottom-up approach, the FGN will promote a centrally coordinated, but demand-driven approach, that is, market-oriented approach to rural electrification.

This will be achieved in the following way;

A single national, sector wide, roadmap that identifies the least-cost electrification solution for every community. The natural owner of this plan would be the Ministry of Power. The plan would bring together all national interests, across ministries, to ensure that all factors are considered. Then all participants – while acting separately – are working to the one plan.

DisCos will add connections based on their contractual obligations and commercial needs: The privatization contracts form BPE impose already an obligation on DisCos to add 4 million new connections by 2017. Their commercial objectives will tend to lead them to focus on urban areas.

The REA will not define individual projects, conduct feasibility studies, or raise RFPs for defined projects. The REF will invite bids for projects that are defined by developers. It will allocate funds to those that best meet the obligations of the REF as defined by the Act. This will enable the most cost-effective connections to happen first – delivering the greatest number of new connections for the least cost.

Public-private partnerships will be encouraged, whereby the private sector and community-based organizations will be increasingly responsible for much of the service delivery with the minimum necessary financial support from the public sector.

To support the decentralized demand-driven approach under a central coordination by REA, the REA will maintain offices in each Zone of the country.

REF shall be used to support RE projects development using capital subsidies, supplementing private funding of the projects.

3.2 Type of RE Projects

In response to the range of conditions that prevail in rural communities across Nigeria, several different types of RE projects will be supported by the FGN. These falls into two main categories: grid extensions and off-grid (mini-grids, and stand-alone systems). The main features of each of the three types of RE projects are described below.

3.2.1 Grid extension- Extending the national grid to serve additional communities and enterprises will be one of the options for rural electrification. Discos have existing contractual obligations to add 4 million new connections by 2017 under their contracts with BPE]. Thus, DisCos will play a leading role in grid extension, independent of any actions by the REA.

In addition, DisCos are required to provide non-discriminatory access to the existing network to other entities seeking to extend the grid to serve rural customers. NERC will establish the rules and regulations for extending the grid to rural customers.

3.2.2 Off-grids - For remote settlements, Mini-grid solutions are often found to be more cost- effective than grid extension. In some particular cases where the level of demand and population density is relatively high, mini-grids (with either fossil fuel or renewable resource-powered generation technology) may be the most technically and economically viable approach to providing rural electricity. In addition to addressing the immediate need for power, mini-grids can be an important step towards eventual inter-connection to the grid by building upload and willingness to pay for electricity service, thus improving the viability of grid extension to a given locality. Pursuant to section 62 (1 and 2) of the EPSR Act of 2005 the development of mini-grids by communities and private enterprises will be encouraged.

PART IV – LICENCES TARIFFS

62. – (1) No person, except in accordance with a license issued pursuant to this Act or deemed to have been issued under section 98 (2), shall construct, own or operate an undertaking other than an undertaking specified in subsection (2) of this section, or in any way engage in the business of:

- a) Electricity generation, excluding captive generation;
- b) Electricity transmission;
- c) Electricity distribution; or
- d) Trading in electricity.

(2) Notwithstanding subsection (1) of this section, a person may construct, own or operate an undertaking for generating electricity not exceeding 1 megawatt (MW) in aggregate at a site or an undertaking for distribution for electricity with a capacity not exceeding 100 kilowatts (KW) in aggregate at a site, or such other capacity as the Commission may determine from time to time without a license.

It is not considered necessary to alter these provisions. This means that light handed regulation is provided for many of the small rural electricity services that typically struggle to be viable.

3.2.3 Stand-alone systems – In certain other instances, particularly in localities with low levels of demand and disperse populations, even mini-grids may not be feasible. In these cases, stand-alone systems may be suitable. Individual photovoltaic (PV) systems can provide sufficient electricity to satisfy the needs of households and small commercial enterprises (e.g., for lighting, radio, TV, fan). If they are offered at affordable terms (i.e., with significant subsidies and long payback periods for the remaining cost), stand-alone systems can provide critical services to the hardest-to-reach customers.

A series of factors-including distance, terrain, type of technology, population density, and economic profile, all of which influence costs and cost recovery - will be taken into account in determining the most cost-effective type of RE project to develop in each locality.

3.3 Barriers to Decentralized Rural Electrification

A decentralized, demand-driven approach to rural electrification poses a number of challenges that must be addressed by the policy and strategy employed. The barriers to be overcome encompass a range of issues, as outlined below.

3.3.1 Central planning and coordination – While projects themselves would be established in response to demand, rather than top-down Government planning. However, coordination of the activities within the sector will still need to take place at the Federal, State and Local Government levels. To most

efficiently achieve the RE targets, efforts by all parties should be coordinated to ensure that both gaps and overlaps are minimized. In particular, plans for off-grid RE projects must be checked with plans to extend the grid to avoid redundancy. The REA Operational Manual should clearly define the responsibilities of the Central and Zonal REA offices. Already the RE Policy has delineated the roles of various key stakeholder organizations. These documents will form the basis for coordination among organizations.

3.3.2 Demand – While it is clear that rural populations are eager to get access to electricity, it is not clear that their demand and willingness to pay for the services, as envisioned, will be forthcoming. Often rural communities believe it is the responsibility of government to provide highly subsidized infrastructure services, such as electricity. Efforts must be made to raise awareness about the alternative service provision arrangements that have been approved. In particular, outreach should focus on building rural populations' acceptance of community and privately-run RE schemes and the need to pay for the full cost (after an initial capital subsidy) of the services provided. The decentralized RE system envisioned will result in different tariffs between communities, depending on generation technology, system size, and other factors. The REA will strive to minimize such differences through various subsidy schemes.

3.3.3 Supply – The supply of RE schemes under a decentralized, demand-driven system will depend on the interest of project promoters. Their participation will be forthcoming only if it is financially attractive for them to participate. The Ministry of Power will develop a national, sector-wide plan identifying the least cost method of electrifying each location, and highlighting where the greatest number of connections can be added for the least cost. This would provide a foundation for all actors in the sector to better plan. Project developers would then be well placed to identify potentially attractive areas, to then conduct specific project feasibility studies. Such transparency and widespread analysis is essential to ensuring developers can be attracted and that rural electrification can be efficient. In addition, the REA would need to ensure that the REF offers funding support that is easy to access and allocated in a transparent way. Developers could then apply to the REF for co-funding support to implement their project.

3.3.4 Economics – The economics of rural service provision is one of the most challenging hurdles to a decentralized, or any other, RE program. Typically, RE schemes have high costs relative to the consumers' willingness and ability to pay for service. The FGN has pledged to do its part to improve this situation, both by providing subsidies towards initial capital costs and by undertaking steps to lower the cost of materials and supplies for RE projects. Many RE programs have proven unsustainable overtime, as operation and

maintenance costs were not fully accounted for project cost estimates. To combat this problem, any project under consideration by the REF for capital grants will be required to demonstrate their plans for a maintenance system and include such costs in their project proposal. While the costs of RE programs are often high, under the FGN's program, expansion of electricity service will be rationalized by considering the relative cost- effectiveness of on- and off-grid solutions. This will serve to improve the perception of the underlying economics of RE schemes as well.

3.3.5 Financing – In addition to high initial costs, RE schemes are also characterized by long pay-back periods. More commonly, they do not offer a payback at all. Financial institutions and investors will offer funds only where it is commercially viable to do so. Projects that do not offer realistic profits will not attract financing. The shortfall in capital needed to make projects commercially viable would need to come from government or donors. Once a project has sufficient grant funding to enable it to be financially viable, then the challenge remains for the private sector to raise the remaining necessary private finance. Access to capital can be expensive, particularly given the level of risk involved in such ventures. Concessional financing facilities might be available to assist. These might include debt at subsidized interest rates, or subsidized risk-sharing instruments such as first-loss or credit-risk guarantees, provided by development banks to commercial lenders. The REA could potentially play a role in mobilizing the availability of such concessional credit instruments. If commercially attractive projects and support mechanisms emerge, then private sector investors could be encouraged to enter. Private Equity Funds offer one potential route for such support to developers.

3.3.6 Technical capacity –While there are many engineers and other technical professionals in Nigeria, there is a scarcity of qualified personnel for renewable and off-grid RE applications. In particular, there is a lack of commercial and financing skill experienced in putting together investment worthy projects. The level of human resources in these areas must be increased over the long term to ensure the quality and affordability of their services.

3.4 Justification for Subsidies for Rural Electrification

Based on the low rate of electrification in Nigeria, it is clear that the RE targets will not be met if the matter is left to the market alone. While there is obvious interest in rural electricity service and, presumably, some willingness to pay, albeit at an undetermined level, a number of barriers have stood in the way of those who would provide such services, such as those described above. Subsidies towards the initial capital costs associated with establishing RE schemes will be granted in order to lower the economic barriers to entry.

These will be offered by the REF as capital grants based on an allocation method that is transparent and competitive. Developers will select their projects and then apply to the REF. The REF would support those that offer the best value and score most strongly against the other REF selection criteria, as required by the EPSRA 2005. All legal persons, corporate or otherwise with mandate to execute rural electrification activities will be allowed to compete for REF without discrimination.

Subsidies for rural electrification, in this case, will also be used as tools for social justice. The FGN has identified alleviating poverty and addressing the needs of rural populations as a matter of equity. Currently, rural Nigerians do not enjoy, to the same extent, the infrastructure services available to urban residents of Nigeria. Thus, improving access to electricity services in rural Nigeria, through initial capital subsidies to RE schemes, is also intended as a means to improve the quality of rural life and stem the tide of rural-to-urban migration.

3.5 New Policy Instruments

In the course of pursuing its RE initiative, the FGN has established several new policy instruments to promote rural electrification. They are profiled hereunder.

3.5.1 FGN Rural Electrification Policy

The FGN's Rural Electrification Policy, was prepared in 2005 and approved in 2009, it outlines the Government's objectives, goals, and policies regarding rural electrification. The RE Policy establishes the ideological framework through which all RE activities will be approached.

To establish the boundaries of its focus, the Policy outlines the parameters that define rural electrification for the purpose of Government activities related to said Policy. Those areas to be targeted under the Government's RE program are characterized, as are the qualifying electrification schemes.

The RE Policy also clearly outlines the FGN's goals, objectives and targets with respect to rural electrification. Allocation of funding and other key decisions will be made with the aim of achieving the established goals. Overtime the targets will be reviewed and revised as needed by the FGN.

The EPSR Act 2005 establishes the national power market design. It sets the legal framework for rural electrification and, in particular, private sector provision of rural electricity service, both on-and off-grid. The RE Policy further elucidates the power market rules with respect to rural service provision, emphasizing the rights (and opportunities) of a range of alternative service providers to participate in rural

electrification.

Achievement of rural electrification goals will require an inter-institutional effort on the part of the Nigerian Government. The RE Policy outlines the roles and responsibilities of key Government agencies, as well as the guidelines for their cooperation and collaboration.

The EPSR Act 2005 also establishes the legal and regulatory framework for the power sector, which will be enforced by the NERC. There are many gaps with respect to rural electrification schemes, which are largely exempt from NERC's economic regulation. The RE Policy outlines the general guidelines for regulating RE schemes that fall outside NERC jurisdiction. Details of the regulations will be established based on the principle of self-regulation via bilateral agreements to be enforced by NERC where necessary.

While the EPSR Act 2005 establishes the legal foundation for the provision of initial capital subsidies to setup RE schemes, the RE Policy outlines the procedures and mechanisms through which such subsidies would be provided.

The Electricity Power Sector Reform Act (2005), Section 91 describes how the REA shall establish (in consultation with the Minister) a range of mechanisms for allocating funds from the REF. The REA must 'establish objective and transparent criteria for the geographical allocation of resources from the REF' (EPSRA 91 (1a)), and 'develop an open, competitive and transparent procedure for making disbursements from the REF to individual projects, including establishment of Eligibility and Selection Criteria' (EPSRA 91 (1b)).

Importantly, the Act requires that the REA establishes these criteria. The establishment is in consultation with the Minister. This is separate from the present document (also required by the Act) which relates to rural electrification more broadly.

In establishing the eligibility and selection criteria, the Act defines a range of criteria that must be met by those criteria. These are defined in particular in EPSRA 91 (2), 91 (3), and 88 (13).

These obligations go beyond, and would follow-on after the current policy document.

3.5.2 Tariff Policy

In accordance with the RE Policy and international best practice, tariffs for rural electricity service will be cost-reflective. They shall account for the average annual cost of fuel, operation, maintenance, safety, generation, distribution, revenue collection, spares, equipment and operator fees, expected sales of electricity, generator capacity, number of connections, volume of consumption, and level of service.

In relation to projects that fall within the NERC licensing requirements, tariffs will be regulated. In order to ensure light-handed regulation for rural electrification the approach taken will be more gentle than for urban tariffs.

In the case of individual developers presenting projects, then during the normal licensing process with NERC, tariff levels will be determined. NERC will establish a tariff model that is specifically designed for rural, with its more challenging operating environment, higher risk, and typical lack of attractiveness for investors. The rural model, compared with the current model, will allow for higher margins, a higher safety factor in estimates, higher assumptions on non-collections, and substantially higher rates of return to investors. In the absence of these, the projects may not happen at all. Controls, reviews and oversight will also be less stringent and burdensome on operators.

NERC will also allow a second approach to setting tariffs for new projects. This would allow developers to set the tariff outside of the tariff model, provided that prospective consumers for at least 60% of the proposed output have signed acknowledgements that they are willing to pay this tariff. This method ensures that a community that wants a new electricity service (that would save them money compared with generators) can access the new service without the risk that the regulator blocks the entire project due to imposition of tariff constraints.

Tariffs will be reviewed annually and recorded in the Electricity Supply Contract between consumers and RE service providers after obtaining NERC approval. In case of capacity stipulated in the EPSR Act 2005, NERC will retain responsibility for monitoring and enforcing agreed-upon tariffs.

3.5.3 Regulatory Policy

NERC will have overall regulatory powers over rural electrification in Nigeria, without prejudice to the provisions of EPSR Act 2005 which exempt RE schemes whose generation capacity at a single site is 1 MW and below or whose distribution capacity is 100kW and below from license.

3.5.4 Participation of Non-Traditional Operators

In recognition of the enormity of the challenge posed by fulfilling rural electrification needs, the FGN has established a policy to encourage the participation of non-traditional operators, including community-based organizations, private sector entities, NGOs, and others. The power market rules will permit a range of industry and ownership structures to accommodate public, private, and co-operative entities. Capital grants towards initial costs will be available for qualified applicants through the REF.

3.5.6 Promotion of Low-Cost Technologies

In order to ensure the financial sustainability of RE schemes, and ultimately the achievement of RE targets, the FGN has established a policy to promote the use of low- cost (but high quality) options for rural electrification. These include the use of renewable energy technologies (e.g., solar, wind, hydro, biomass), where appropriate. Where such options are not cost-effective, there are low-cost options that can reduce the cost of grid-connected rural electrification. These include single phase lines, Single Wire Earth Return, shield wire technology, fixed-cost supplies, among others. Load limiters, pre-paid and smart meters can be used in either renewable or grid-supplied RE schemes to manage costs to end-users and prevent consumers from overloading the system.

The REA will demand the use of low-cost options in RE projects that apply for subsidy grants towards start-up costs from REF. Furthermore, the REA will advocate, based on established feasibility studies, for the broader availability and use of such low-cost equipment and materials so that all RE projects (and consumers) may benefit from the potential cost reductions.

3.5.7 Promoting Efforts to Reduce Equipment Costs

Further reducing the cost of materials and equipment for rural electrification in Nigeria will require a concerted effort to stimulate demand and supply. To increase demand for such products, the REA will raise awareness of their benefits and availability. A list of regulator-approved items will be made available to all RE promoters.

To increase the supply (and decrease the cost) of more affordable, high quality products, the FGN will support the participation of new market entrants and the continued development of local ventures whose activities may include the production, installation, operation, maintenance, and the distribution/sale of equipment, systems, and services related to rural power supply. The REA will advocate for tax incentives, investment capital allowances, and low-interest loans for local producers of RE equipment and materials.

In the meantime, the import taxes levied on renewable electricity generation equipment and low-cost supplies must be reduced. While Nigerian industry prepares to compete in this area, RE schemes must have access to imported materials, components and equipment for rural electrification systems without paying exorbitant import taxes.

3.5.8 Capital Subsidies

Through the REF, the FGN will provide grants towards the initial capital costs of qualified RE schemes. Such subsidies will be offered to RE projects that promote the objectives of the FGN's approach to rural electrification. Funding will be provided to selected projects upon completion of certain

requirements in accordance with international best practice. The process for selecting and awarding projects to receive funding will be designed to maximize transparency, efficiency, competition, and sustainability in the funding process and within the projects themselves.

The subsidy grants will be applied to the initial start-up costs of RE schemes, which have been a known barrier to entry. By subsidizing the cost of establishing an RE scheme, the FGN will encourage participation by a broader range of potential service providers, including community-based organizations, private sector entities, NGOs, and others, who may have been excluded in the past due to high start-up costs. By providing such support, the FGN is also hoping to mobilize matching financial contributions to RE scheme from the above entities.

3.5.9 Promotion of RE as a Catalyst for Rural Development

Promoting rural electrification can be a powerful and efficient tool for achieving rural development. Electrification is both an important pre-requisite to and stimulant of economic growth and development, particularly for rural areas. Reliable and affordable electricity supply enables rural households to devote less of their time and income to procuring energy supplies, freeing them up for productive uses. Over time, informal productive uses of household labor become formal economic activities, which can eventually lead to productive capacity in agriculture, agro-processing, manufacturing, light to heavy industry, and services. Thus, rural electrification directly and indirectly promotes rural development, one of the broader policy objectives of the FGN.

3.5.10 Regional Equity

As a nation characterized by religious, ethnic, and cultural diversity, Nigeria's efforts to promote rural electrification will emphasize equity across regions and population groups. The RE Policy sets as one of its objectives the achievement of more equitable access to electricity across regions.

Regional equity will be a driving force in determining the allocation of funds for subsidy grants. RE funds will be made available in equal measure to each of the six geo-political Zones. Arising from the RFP issued by the REA projects within each Zone, projects will compete for funding. Those projects that would serve populations within the most infrastructure-poor areas will be prioritized, in order to achieve, on a larger scale, more equitable access to service delivery. All decisions on the allocation of REF funds between projects will however occur centrally: Zones will recommend but the decision will be made centrally, ensuring the full application of the eligibility and selection criteria and transparent selection processes. At certain stage in the future some regions will achieve universal electrification, thus, REF will be prioritized to

focus support to regions with electrification gaps.

3.5.11 Capacity and Awareness Building

The FGN understands that the success of a decentralized approach to rural electrification hinges on the participation of project developers. The broad range of individuals and organizations that are potential candidates for establishing and operating RE schemes must be made aware of such opportunities. As many will be in-experienced with RE schemes, they must also be offered capacity building exercises to improve their understanding of and qualifications for developing and running RE schemes, including electrical safety. The FGN, largely through the REA, will take action to raise awareness about the RE program and opportunities for public participation and to build strong counter parts within communities and the private sector.

3.5.12 Dealing with Legacy Rural Electrification Projects

The FGN is concerned over the several on-going rural electrification project spread across the country some of which have been abandoned by contractors for more than 5 years. These projects numbering about 1,600 as at 2012, could be found in all the States of the Federation, and it was estimated that close to N40 billion (\$205 million) is required to complete the projects in 2012.

A critical assessment of these projects indicates that most of them were abandoned due to poor funding and lack of proper planning before they were awarded. Almost all of them are grid extension rural electrification projects, and many of them even after completion may not be put to any meaningful use, as they would have no reliable source of power supply.

In dealing with the problems associated with completing legacy RE projects, FGN will through the REA engage all relevant stakeholders including the FGN MDAs involved in rural development and in particular those involved in rural electrification projects implementation: states and their rural electrification agencies, local governments, communities, industry, civil society groups, and financiers. Engagement will include workshops, public consultations, private meetings, and capacity building to create the necessary interest and encourage the various actors to take over and complete some of the viable rural electrification projects that are on-going but with no clear source of funding. The REF will be used to provide financial support to those prioritized projects that meet the selection criteria established by REA. The REA would develop a comprehensive plan for handing over of these projects for completion by stakeholders.

3.5.13 Constituency Projects

FGN may continue to implement a limited number of constituency projects for rural electrification. These would be high priority projects promoted by political leaders. Constituency projects would be implemented under the REF which may receive special budgetary allocations for that purpose. REA (as per EPSR Act 2005) shall develop, for approval by the Minister, the methodology for selection and funding of constituency projects to ensure they meet the overall objectives of this rural electrification Strategy and Implementation Plan with respect to economic sustainability of the projects. The National Assembly will be involved in the process of identifying candidate projects.

3.5.14 Capacity Building in Rural Electrification (RE)

Significant capacity building is required across the Nigerian energy sector. In particular in the areas of implementing rural electrification in a privatized sector, leveraging the opportunities presented by the now lower cost renewable and clean energy technologies, and to enable the local industry to play a larger role in the supply chain from materials, manufacture, construction and operation of the assets.

The Ministry through the REA will play a leading role in encouraging capacity building. This may include engagement with universities, industry, research institutes, and training organizations.

3.5.15 Local Content and Participation in RE

REA will encourage the use of local content and local participation in RE (including community ownership of stocks). This includes both materials and people through the planning, establishment, and operational phases of RE projects. Such encouragement will help the local industry develop skills and scale. This will be achieved primarily by giving additional points for the use of local content and participation when selecting projects to be funded by the REF.

REA will also work with local industry to help them improve their capability to manufacture suitable equipment, although such support shall not be sourced from REF funds.

To assist the local industry develop and adapt, the FGN will look for funding and technical support from multi-and bi-lateral donors, to be directed towards the industry and research institutions.

3.5.16 Energy Efficiency in RE

Energy efficiency is important: it defers investment and reduces costs. Efficiency concerns include both the distribution system and the end uses. These issues are wider than RE alone but impact RE. The Ministry will ensure that efficiency is improved across the national transmission and distribution system. The Ministry, through the REA, will encourage the use in RE of energy efficient appliances and devices.

3.5.17 Dealing with Network expansion and ownership

In the event that a rural electrification frontier meets the advancing urban electrification frontiers (DISCOs) asset, several alternative paths can be followed to ensure an orderly and efficient process. The selected process requires careful consideration, including respect of the legal rights of private asset ownership, technical compatibility, and mis-aligned incentives for DsCos to unfairly force free acquisition of assets.

Stand-alone or captive generation systems will be unaffected. Ownership remains unchanged. If the owner wishes to interconnect with the DisCo system, then that would be the subject of normal commercial negotiation with the DisCO.

Mini-grids serving captive customers on private land (such as a housing or industrial estate under a single property title) will be unaffected and treated the same as captive systems.

The choice of handover or exit path would be subject to the commercial terms agreed by the parties, in collaboration with NERC. The legacy operator would have the certainty of operating until the expiry of the last permit or license in place.

4. Institutional Framework

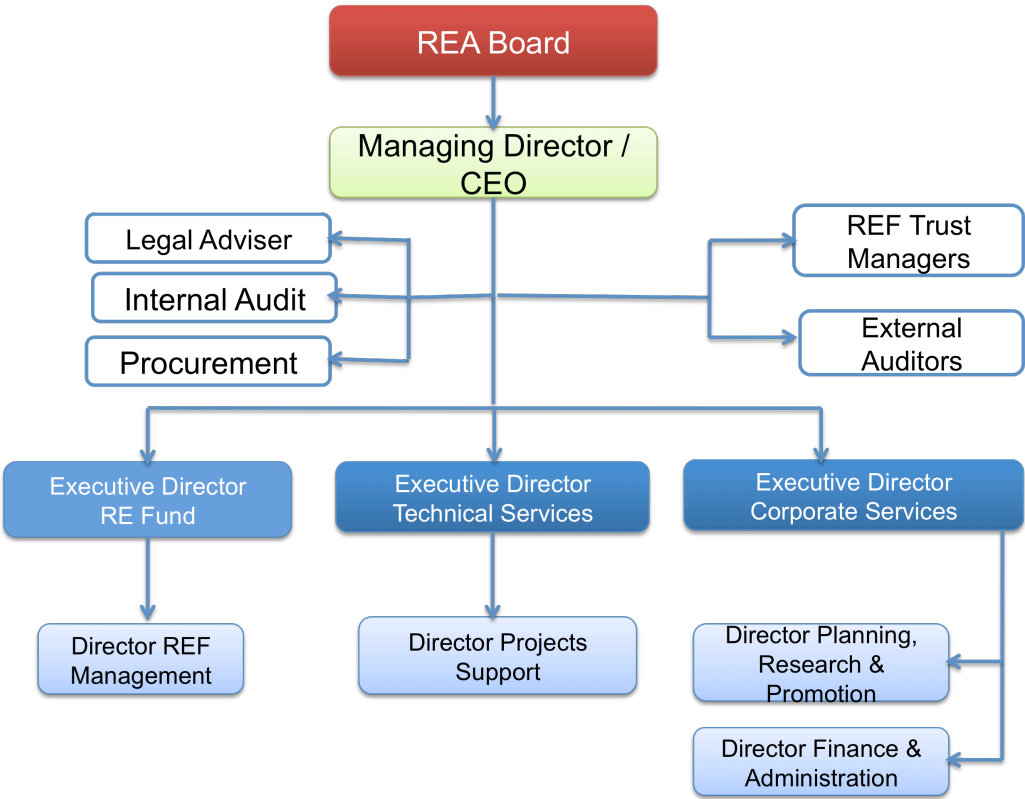
Many institutions and entities will be involved in rural electrification throughout Nigeria. This chapter addresses how their roles and responsibilities, with respect to each other, shall be defined.

4.1 Rural Electrification Agency

The legal framework for the REA is outlined in the EPSR Act 2005. The REA was established as an independent and accountable agency, responsible for the coordination of rural electrification activities in Nigeria.

To ensure that REA is effectively managed and for efficient allocation of resources towards rapid development of the sector, the REA will have three major divisions to be headed by three Executive Directors under the Managing Director- the Executive Director, RE Fund will oversee the RE Funds Management Directorate to implement RE Funds; the Executive Director Engineering & Technical Services will oversee the RE Projects Directorate to provide project support to developers, and Executive Director, Corporate Services will manage two Directorates namely, Planning Research & Promotion Directorate to promote rural electrification and create awareness more generally; Finance & Administration Directorates to manage the agency's internal finance & administration. The Directorates' will each have a unique function and will be headed by a Director, as illustrated in the figure below. The primary objectives of each of the Directorates in the REA are subsequently described.

Figure 4.1: General Overview of the REA



Given the decentralized nature of rural electrification, the REA will be headquartered in Abuja and maintain six Zonal offices responsible for implementing the policies set at the Federal level.

4.1.1 REF Management

The REF Management Directorate of the REA will be responsible for establishing and administering the Rural Electrification Fund to provide capital subsidies, in a clear and transparent competitive process, to qualified rural electrification schemes developed by public and private sector entities.

The REF Management unit will develop policy guidelines and procedures for administering the Fund, which include: (1) criteria for subsidy award; (2) transparent procedures forbidding; and (3) accountability instruments, such as independent audit, effective monitoring and reporting procedures.

Administering the REF will involve coordinating tasks executed at the local, Zonal, Federal and international levels.

4.1.2 REA Project and Zonal Coordination

The Project Support Directorate will provide technical support to RE schemes in accordance with policies designed to protect both consumers and service providers and on the basis of bilateral agreements signed between REA and project developers. It will monitor project development and supervise project implementation to ensure compliance with standards and specifications use for project supported by REF. REA's monitoring and supervision of rural electrification projects will ensure that projects supported by REF meets:

- Minimum safety and technical standards;
- Quality of materials requirements;
- Appropriate design and proper use of the network equipment;
- Reasonable cost effectiveness; and
- Technical, Economic, Financial, Environmental and Social feasibility and viability

These requirements are without prejudice to any regulatory requirement set up by NERC. REA support to project will take in to consideration developers' adherence to conditions given by REA for such support.

All aspects of REF funding allocation will apply uniformly across the REA – this is an implicit requirement under the Act. There is not provision for different eligibility or selection criteria by zone.

Each zone will assist developers and applicants to understand, prepare for, and apply to the REF. Such applications will be submitted directly by the applicant to the REF centrally. All decisions on REF allocations will be taken centrally.

4.1.3 RE Planning Research and Promotion

The RE Planning, Research and Promotion Directorate will be responsible for promoting rural electrification throughout Nigeria. The RE Planning, Research and Promotion Directorate will serve as an information clearing house and public outreach body. It will work closely with Ministry to collect and maintain information on rural electrification, including existing and planned projects, renewable resources, rural load, equipment and material suppliers, and technological innovations for cost-effective power supply. The RE Promotion unit will raise public awareness about rural electrification and advocate for Government

policies that stimulate appropriate development in the sector.

4.1.4 Finance and Administration

The Finance and Administration (F&A) Directorate is responsible for the internal financial and administrative management of the agency. The F&A Directorate will liaise with Zonal Offices Directorate in deciding Zonal Offices staff matters.

4.2 Rural Electrification Board

The RE Board will oversee the REA. In accordance with the EPSR Act 2005, there will be seven members of the part-time Board, including representatives from each of the six geo-political zones and the Managing Director/CEO of the REA, among the six board members three will be appointed as Executive Directors based on their qualification, competence and experience. The composition of the Board shall reflect the integrated nature of rural development and the diversity of Nigeria's rural population. The FMP will provide guidance on the range of qualifications that should be represented by members of the Board. Once the members are selected the Minister of the FMP will recommend them to the President for official appointment.

The functions and responsibilities of the RE Board shall include:

- To be the Board of the REA and to develop policies and guidelines for its operation; To be the Board of the REF;
- To decide on policies and procedures for the optimal allocation and use of REFsubsidies; and
- To approve allocations of REF subsidies for selected rural electrification projects.

The Board will report to the Minister in charge of RE. The operating guidelines of the Board will be designed to ensure autonomy, transparency, and accountability as it oversees the REA and its activities.

4.3 Project Sponsors

The FGN has acknowledged that achieving universal access to electricity in rural areas will require mobilizing many forces. Thus a wide range of ownership structures will be permitted to operate RE

schemes. Projects led by the private sector, communities, and Government will be encouraged to apply for capital subsidies to establish operations to provide rural electricity service. In addition, a range of private sector participation models (including concession, dealership and leasing arrangements) will be eligible.

These project sponsors will play a significant role in the development of rural electrification in Nigeria. The emphasis on demand-driven service coverage also highlights the critical role communities (i.e., end users) will play in the development of rural electrification under the Government's new approach. Community support and desire for a given RE scheme will be essential to ensuring the sustainability of a project.

Project sponsors will be required to comply with certain qualifications, detailed in the REA Operational Manual. Applications for and awarding of REF subsidy grants will be conducted on the basis of an established set of objective criteria.

4.3.1 State Governments, State RE Boards and local Government Areas

In view of the importance of States and Local Governments in the delivery of Rural Electricity in the country, the REA shall continually engage the States and Local Governments on quarterly basis. These engagements will include but not be limited to workshops, public consultation, private meetings, capacity building and outreaches to assist them in developing their project proposals and how to leverage the REF to support their projects

4.4 Institutions Involved in Setting RE Policy

The FGN Policy on rural electrification will evolve over time in response to changing circumstances. Several agencies will play a role in shaping the policy that drives rural electrification. The key agencies are profiled below:

4.4.1 Federal Government of Nigeria

The FGN, through the Federal Executive Council (FEC) and the Presidency, retains responsibility for setting the overall policy direction for the energy sector. The FGN is responsible for enacting the necessary laws, regulations and other measures required to support the energy sector and its reforms, and ensure general consistency of energy policies with all other national policies. The FGN also establishes the overall objectives and priorities in rural development and establishes strategies to harmonize and optimize the

rural development activities of various institutions to bring the maximum overall benefit to rural people.

With regards to rural electrification, the FGN is responsible for establishing the legislation and regulations required to support the RE Policy and Strategy. In addition, in accordance with the National Electric Power Policy, the FGN will be responsible for allocating money from the federal budget to the REF in order to finance RE projects.

The FGN will ensure the coordination of rural development activities, (e.g., education, health, security, water supply, and other economic activities) as part of its over-arching Rural Development Policy under which all Government agencies understand their responsibilities and interface appropriately.

4.4.2 Federal Ministry of Power

The FMP has overall responsibility for formulating electric power policy and facilitating its implementation. In terms of rural electrification issues, the FMP is responsible for policy development on increasing access to rural electrification. The FMP also monitors and evaluates the performance and impact of rural electrification programs from a policy perspective.

The FMP will set and maintain overall policies at a national level for electricity supply to rural areas. It will continue to facilitate rural electrification initiatives and remain responsible for coordinating the national supply power strategy with power utilities, and the other relevant ministries, departments, authorities and organizations at the Federal and State level.

The FMP will set and revise targets for rural electrification across the country. It will monitor the performance of individual States and the REA, ensuring equity of access to resources, bearing in mind the particular needs of different states.

FMP is to closely monitor and ensure harmony between the activities of the privatized PHCN successor companies and those of the REA.

4.4.3 Rural Electrification Agency and its Board

While many organizations will have roles related to the RE sector, the REA is the only institution whose sole mission is to promote rural electrification. As such, it will be the driving force behind rural electrification policy. The REA will establish its own internal guidelines and policies, as well as those for

providing financial and technical support of RE schemes. In addition, the REA will advocate for needed developments in the RE sector, including lowering import duties on RE equipment and materials, favorable tax policy for RE schemes, government support for research and development on RE technology, and sufficient allocation of funds to the REA and REF.

The REA will also facilitate the setting up and driving of the Government's policy on building capacity and raising public awareness regarding rural electrification.

To ensure effective coordination, harmonization and planning of national rural electrification policy and initiatives, the REA will provide a forum for rural electrification stakeholders to meet at least once a year. It shall be mandatory for all MDA's both Federal, States and Local Government and private parties involved with RE projects implementation to participate in the RE forum in respective of their source of funding. REA shall seek the support of the Ministry and the regulator (NERC) to ensure stakeholders participation. The forum shall serve to disseminate information regarding federal government policies, guidelines and standards for RE project implementation in Nigeria and shall have the powers of oversight and coordination of all RE project implementation across the country.

The RE Board will be responsible for overseeing the REA and guiding its actions. It will approve the REA's internal guidelines, including funding decisions and other RE support procedures.

4.4.4 Nigerian Electricity Regulatory Commission

The EPSR Act 2005 provides for the creation of the country's first independent electricity regulator, NERC, which will grant licenses and regulate all electricity supply functions (generation, transmission, distribution, and retail). However, the EPSR Act 2005 exempts from licensing requirements (i.e. commercial regulations), and thus from NERC's scope of powers, any generating station with less than 1MW aggregate capacity, distribution systems with less than 100kW aggregate capacity, and "such other capacity as the Commission may determine from time to time". This has the potential to exempt a considerable number of RE schemes from commercial regulation by NERC. In the absence of NERC's direct regulatory oversight, the REA will take advantage of the enormous resources at its disposal to ensure that project applying for financial and technical support from REF meet the requirement that ensure protection of consumers, providers, and power equipment. Regulatory policy, with regards to relevant RE schemes, will be developed by NERC in consultation with stakeholders.

5. Funding Rural Electrification

5.1 Funding Principles

In accordance with the EPSR Act 2005, the FGN will establish a Rural Electrification Fund whose objectives will be to:

- Achieve more equitable access to electricity across regions;
- Maximize the economic, social and environmental benefits of rural electrification subsidies;
- Promote expansion of the grid and development of off-grid electrification; and
- Stimulate innovative approaches to rural electrification.

The Fund will provide subsidies towards the initial capital costs of RE schemes. Funding will take the form of grants to be applied to project start-up costs. Grants will not be made for operational or maintenance costs.

Capital grant subsidies will be provided on the basis of competition against an objective and verifiable set of criteria, taking account of the least cost subsidy required for maximum social benefit. In accordance with international best practice, the policies and procedures for selecting projects for funding will be designed to promote and achieve transparency, efficiency, competition, and sustainability.

The FGN has designed this strategy for funding rural electrification as a way to maximize the efficient use of available resources. With each capital subsidy grant, the FGN will be improving access to electricity services in rural areas and stimulating growth and development simultaneously. By placing an emphasis on productive uses of electricity (i.e., income-generating activities) and prioritizing high-demand locations, the REA will ensure the most benefit is generated from each grant provided.

5.2 Source of Funds

In accordance with the EPSR Act 2005, the Fund will consist of the following capital and assets:

- Any surplus appropriated pursuant to the EPSR Act 2005 (section 53);
- Any fines obtained by NERC pursuant to the EPSR Act 2005;
- Any donations, gifts, or loans made by international agencies, State Governments, the Federal Government, local communities, businesses or any other entity;
- Any contribution that may be made pursuant to the EPSR Act 2005, and interest and other benefits accrued to the Fund; and
- Monies appropriated by the National Assembly/Special Intervention fund..

In accordance with the EPSR Act 2005, to the extent required by the Rural Electrification Policy and to cover any short fall in the capital and assets of the RE Fund, NERC may determine contribution rates to be sent to the RE Fund by market participants. These may include:

- Eligible customers; and
- Consumers (other than the under privileged consumers whose access to power is meant to be supported by the REF), on the Commission being satisfied that retail power tariffs for such consumers have reached a level where they reflect the cost of electricity.

In addition to producers and consumers in the sector, the FGN and REA will strive to attract contributions from domestic and international parties such as commercial banks, NGOs, bilateral and multilateral donors and development banks, project sponsors and end-users, as well as other relevant groups.

5.3 Selection Criteria

Through the REF, RE project developers will be able to apply for funds with which to establish their RE schemes. The idea is to offer funding to developers of RE schemes that require the least-cost subsidy for the maximum community benefit. As such, applicants will be required to demonstrate their total project costs and funding requirements, as well as the project design and population served. In order to ensure the maximum benefit from Government and donor funds, applicants will also have to demonstrate the financial viability and sustainability of their schemes, covering all operation and maintenance costs. The FGN's

objectives for the REF will be reflected in the evaluation of RE schemes, which will be based on the following principles:

- Economic and financial viability, with the initial capital subsidy;
- Promotion of social and economic objectives, (e.g., service provision to a maximum of new consumers, fair allocation of infrastructure investment across regions and between populations of different income levels, and use of environmentally- sustainable energy sources);
- Choice of technology to be used, (e.g., preferential scoring of renewable energy (RE) projects);
- Cost effectiveness (e.g., cost per connection, and long-term operation and maintenance costs);
- Nature and extent of community support (e.g., consumer buy-in, willingness and ability to pay for service); and
- Investor commitment (i.e., significant capital investment).

The REF Management Directorate will develop a detailed list of criteria and a relevant scoring system to rank eligible RE project applications, upon which funding decisions would be made in line with this strategy document. Under the EPSRA the REA shall establish this in consultation with the Minister. In developing the details the REA will of course engage openly and widely to take into account the views of key stakeholders. The REF Management Directorate will also establish a pre-determined set of eligibility criteria, which will include, but not be limited to, compliance with technical, regulatory, financial and institutional requirements, and submission of all necessary supporting documents.

5.4 Fund Management

The REF will be administered by the REF Management Directorate, comprised of selected REA staff at the Federal and Zonal level, working together to establish and implement policy, subject to the RE Board's approval. The REF Management Directorate will be responsible for establishing eligibility requirements, evaluation criteria and procedures, and guidelines for the size of grants to be issued.

Applications will be processed centrally by the REF directorate. Applicants may be supported by the Zonal REA offices.. The first round of evaluations, conducted at the Zonal level, will include scoring and ranking

applications against the established set of criteria. Applications and their scores will then be sent to the Central REF Management unit for a second round of evaluations, upon which it will make its awarding decisions. Such decisions must be approved by the RE Board. Upon final approval and awarding, the REF Management Directorate will notify winning bidders and set an appropriate payment schedule against project milestones for each project. Payments will be made through a Trust Agent against project milestones.

The respective Zonal offices to ensure that projects are developing and operating as reported. Zonal offices will conduct periodic monitoring and evaluation exercises. The funding process will be audited annually to ensure the proper and efficient flow of funds.

6. Rural Electrification Targets and Funding Requirements

The FGN has set an ambitious electrification target of 75% of the population (rural or urban) electrified by 2020² in the NEP 2001, and intend to achieve 90% access by 2030. Universal coverage, i.e., 100% electrification, is anticipated by 2040. Greater access to electricity services will require improving and expanding network coverage in urban areas, and extending services to rural areas. This Strategy deals with the latter.

Achieving an electrification rate of 75% by 2020, in accordance with the stated Government policies, will require a massive effort. It will involve extending service to an additional 1.1 million rural households each year from 2015 to 2020³. To reach the target of 100% electrification by 2040, 513,000 new rural household connections must be made each year from 2020 to 2040⁴.

The cost of reaching these targets will be comprised of the cost of the RE schemes themselves, and the cost of operating the REA. The cost of establishing RE schemes to reach the 2020 target will range from

² See the National Energy Policy and the FGN's Rural Electrification Policy.

³ It is estimated that by 2020 urban electrification will be nearly complete, which would imply a 50% electrification rate, comprised solely of urban dwellers. Thus, to reach the 75% target the additional 25% would have to be rural connections, equating to 40 million people. An estimated 24 million rural inhabitants currently have access to electricity. Thus, an additional 39.6 million people would have to gain access to rural electricity services by 2020 to reach the FGN electrification target. Assuming an average household size of 6 persons, this equates to some 6.6 million rural households over the 6-year period, or some 1.1 million rural households, per year, from 2015 to 2020.

⁴ With the remaining population that will not have been electrified by 2020, and the additional population resulting from population growth, the target for 2020-2040 will be to electrify 61.6 million rural people (equal to approximately 10.3 million rural households). Over the 20-year period, that is 3.1 million people (or 513,000 rural households) each year.

NGN311billion to NGN519billion. To reach the 2040 target of universal access, an additional NGN 484billion to NGN 807 billion will have to be spent on rural electrification schemes in the subsequent 20-year period⁵.

The cost of administering the REA will be an estimated NGN6.8billion (total) for the period 2015 – 2020, and NGN 23.2 billion (total) for the period 2020 - 2040.

Achieving the 2020 target of 75% electrification will require between NGN317.8 billion and NGN 525.8billion for administration and project costs combined. To reach 100% electrification by 2040, an additional NGN 507.2 billion to NGN 830.2 billion will be required. The cumulative total of funding required to reach universal electrification by 2040 will be between NGN 825 billion and NGN 1.4 trillion.

The required funding and investment will come from a combination of sources including the FGN, other Nigerian Government entities (e.g., State and Local Governments, relevant Ministries), electricity companies and customers, international donors and development banks, commercial banks (both domestic and foreign), RE scheme operators and customers (i.e., end- users), and equity investors.

The design of the REF and regulations for RE schemes were made specifically to encourage participation and funding contributions by a broad range of stakeholders. In its administration of the REF, the REA will strive to maintain transparency and accountability in its management and allocation of funds.

The FGN and the REA in particular will endeavor to secure sufficient funds required to reach the Government's electrification targets. REA is to develop a comprehensive implementation plan giving details of projects to be implemented and the budgetary requirements.

⁵ These figures are based on the estimated number of new connections required (equal to the household connections detailed above plus an additional 10% for enterprise connections) and an estimated cost per connection ranging from \$330to \$550. These estimates assume constant prices and exchange rates. More details on the calculations are provided in Econ One's consultant report, RE Fund and Financing Rural Electrification.

7. Implementation Plan

The process for establishing the FGN's new program for rural electrification was formally initiated with the passage of the EPSR Act 2005 and has continued with recent developments. Much progress still remains. The key steps to implementing the Rural Electrification Strategy are outlined by the following milestones and indicative deadlines.

- Presidential approval of the FGN's Rural Electrification Strategy and Plan;
- Establishment of the Board of the REA (achieved);
- Strengthening of the REA management, including appointing a Managing Director and three Executive Directors together with Four Directors (partially in place, but require staff capacity building), procuring suitable premises and recruiting staff for the Central REA, and strengthening up of the six Zonal REA offices (partially achieved)
- Securing the REA's minimum annual operating budget of \$62.5million (N10 billion) for FY2015 from the Federal Budget;
- Approach donors to secure firm pledges to the REF, for the first year of disbursements, as well as ongoing activities, beginning in June 2015;
- Conclude with NERC the application of levies and fees on power sector participants and consumers to be applied to the REF, as provided for in the EPSR Act 2005;
- Establishing for the Rural Electrification Fund the criteria for eligibility and selection of projects, and criteria for the equitable and geographic allocation of funds from the REF. REA will develop the criteria as per EPSR Act 2005 for approval by the Minister;
- Contract a Trust Agent to manage the REF disbursements;
- Meet with NERC to discuss regulations for RE schemes above 1MW generation and 100kW distribution capacity; and
- Begin sensitization campaign to raise awareness of and interest in REF-funded RE schemes.

Implementation of the rural electrification program will proceed in parallel with broader power sector reforms within Nigeria. To the extent possible, implementation of the Rural Electrification Strategy and Implementation Plan must be coordinated with the wider sector reforms.

Table 5.1: RURAL ELECTRIFICATION DEMAND PROFILE UP TO Y2020

Item	Unit	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total population	[million]	148.3	151.9	155.4	159.2	162.7	166.2	170.5	174.4	177.5	181.3	183.9	187.4
Population Growth Rate*	[%]	2.7	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.4
Capita/Household	No.	5.9	5.8	5.8	5.7	5.7	5.6	5.6	5.6	5.5	5.5	5.4	5.4
Households	[million]	25.1	26.2	26.8	27.9	28.5	29.7	30.4	31.1	32.3	33.0	34.1	34.7
Rural Population	[%]	57.1	56.5	56	55.4	54.9	54.3	53.8	53.2	52.7	52.1	51.6	51
Rural Household	[million]	14.4	14.8	15.0	15.5	15.7	16.1	16.4	16.6	17.0	17.2	17.6	17.7
% of Electrified Rural	[%]	22.9	23.8	24.6	25.4	26.2	27.1	27.9	28.7	29.5	30.4	31.2	32.0
No. of Electrified	[million]	3.3	3.5	3.7	3.9	4.1	4.4	4.6	4.8	5.0	5.2	5.5	5.7
Additional Electrified Rural	[million]	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.2	0.3	0.2	0.3
Ave. Per Capita Electricity consumption by Rural	kW	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Households Electricity Consumptio	MW	3586.7	3921.7	3991.0	4230.2	4405.7	4667.3	4970.1	5055.0	5217.3	5520.9	5682.7	5963.6
Additional Household s Demand	MW	63.2	73.6	59	65	58.7	58.8	72.4	64.4	47.5	61.9	38	53.2
Commercial Service Sector [School, Clinics, Community Centers, Religious	MW	9.5	11	8.9	9.8	8.8	8.8	10.9	9.7	7.1	9.3	5.7	8
Total Other Demand	MW	15.8	18.4	14.8	16.3	14.7	14.7	18.1	16.1	11.9	15.5	9.5	13.3
Cumulative Capacity	MW	88.5	103	82.7	91.1	82.2	82.3	101.4	90.2	66.5	86.7	53.2	74.5
		3675.2	4024.7	4073.7	4321.3	4487.9	4749.6	5071.5	5145.2	5283.8	5607.6	5735.9	6038.1

8. Conclusion

The establishment and implementation of the Rural Electrification Strategy and Plan is a critical element in the achievement of the FGN's rural electrification goals, objectives, and targets.

The Rural Electrification Strategy, together with the Rural Electrification Policy, forms the framework through which the expansion of electricity services to rural areas will be achieved. The RE Strategy establishes the ideological foundation and strategic approach according to which the decentralized efforts of the Government, private sector, academia, donors, and rural communities will be unified by the REA.

The Rural Electrification Strategy and Implementation Plan also constitutes the Federal Government of Nigeria's commitment to achieving the rural electrification targets it has set, along with the attendant objectives for social development and poverty alleviation.

Having established the framework and committed funds for rural electrification, the FGN now calls upon State and Local Governments, the private sector, NGOs, community-based organizations, donors, and other relevant parties to participate in the rural electrification agenda with the goal of achieving universal service coverage by 2040.