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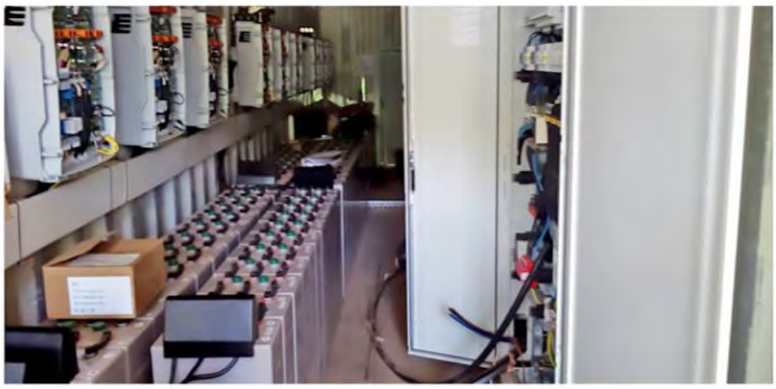

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RENEWABLE ENERGY AND ENERGY EFFICIENCY PROJECT IN NIGERIA

FINAL PERFORMANCE EVALUATION

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RENEWABLE ENERGY AND ENERGY EFFICIENCY PROJECT IN NIGERIA (REEEP)
FINAL PERFORMANCE EVALUATION

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ACRONYMS

AFD	*Agence Française de Développement* (French Development Agency.)
AMELP	Activity Monitoring, Evaluation and Learning Plan
BOI	Bank of Industry of Nigeria
CA	Cooperative Agreement
CBN	Central Bank of Nigeria
CDCS	Country Development Cooperative Strategy
COP	Chief of Party
DCA	Development Credit Authority
DISCO	Distribution Company
DO	Development Objective
DQA	Data Quality Assessments
EE	Energy Efficiency
EGE	USAID/Nigeria Office of Economic Growth and Environment
EQ	Evaluation Question
ERR	Economic Rate of Return
EU	European Union
EUCORD	European Cooperative for Rural Development
FRR	Financial Rate of Return
FX	Foreign Exchange
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIZ	*Gesellschaft für Internationale Zusammenarbeit* (German Development Corp.)
GON	Government of Nigeria
GW	Gigawatt
HH	Household
IFC	International Finance Corporation
INDC	Intended Nationally Determined Contributions
KII	Key Informant Interview
kWh	Kilowatt Hours
LED	Light Emitting Diode
M&E	Monitoring and Evaluation
MEL	Monitoring, Evaluation and Learning
MFI	Microfinance Institution
MPWH	Ministry of Power, Works and Housing
MSME	Micro-Small and Medium Enterprises
MT	Metric Ton
MW	Megawatt
NCIC	Nigeria Climate Innovation Centre
NEMSA	Nigeria Electric Management Services Agency
NERC	Nigeria Electric Regulatory Commission
NESP	Nigerian Energy Support Program
NG	Nigeria
NPL	Non-performing Loan
PPP	Power Purchasing Parity
PROG	USAID/Nigeria Program Office
PV	Photovoltaic (solar cell)
RE	Renewable Energy
REA	RE Association
REAN	RE Association of Nigeria
REEEP	Renewable Energy and Energy Efficiency Program
SME	Small and Medium Enterprise
SO	Strategic Objective
UNDP	United Nations Development Program
USAID	United States Agency for International Development
USD	United States Dollar
USG	United States Government
WI	Winrock International

KEY ACTIVITY DATA	
Activity Title	Renewable Energy and Energy Efficiency Program (REEEP)
Region/Country	Africa/Nigeria
Program	Cooperative Agreement under Strategic Objective 1 (SO 1) under Economic Resiliency and Livelihoods
Development Objective (DO) and Intermediate Result (IR)	Broadened and Inclusive Growth (DO 1) and Energy Access Increased (IR 1.3)
Government of Nigeria (GON)	Ministry of Power, Works and Housing (MPWH)
GON Authorized Regulatory Authority	Nigerian Electricity Management Service Agency (NEMSA)
Funder	USAID
Managing Contractor	Winrock International (WI)
Associate Cooperative Agreement	USAID Cooperative Agreement (CA) Award No AID-620-C-14-00001 (AID-OAA-L-11-00002)
Project Funding	USD $4.0 million
Key Activity Dates	Award Announced February 25, 2014 Signed on March 3, 2014. Effective through March 2, 2018.
REEEP Evaluation Dates	REEEP Final Evaluation November 2017–January 2018 and June 2018 REEEP Mid-term Evaluation, June–August 2016
Evaluation Provider	DevTech Systems, Inc. The Monitoring, Evaluation and Learning (MEL) Activity; Abuja, Nigeria
Final Performance Evaluation Mission Site Visits	Abuja and Lagos State Sites in Nigeria

EXECUTIVE SUMMARY

BACKGROUND

The United States Agency for International Development (USAID) designed the Renewable Energy and Energy Efficiency Program (REEEP) in response to Nigeria's energy and electricity availability problem, which presents a major constraint to economic growth. On March 3, 2014, USAID provided 4 million U.S. dollars (USD) via a four-year cooperative agreement to Winrock International (WI) for the implementation of REEEP to address Nigeria's energy constraints.

Classified as a lower-middle-income country[1] and Africa's leading petroleum exporter, Nigeria has the largest natural gas reserves in Africa. These fuel most of its conventional, diesel electrical generators. However, due to declining electricity generation from dilapidated and unreliable domestic power plants, the Government of Nigeria (GON) has had considerable difficulty in bringing electricity to its people. This has been the result of poor maintenance and gross inefficiency of the public utility provider; shortage of gas supply for thermal plants; high levels of unpaid electricity bills; and Nigeria's outdated and poorly maintained, government-owned, and privately-managed transmission network. Following the passage of the Electric Power Sector Reform Act (2005), the sector was unbundled into six generation companies (GENCOs) and eleven distribution companies (DISCOs)—but the new power operators, the DISCOs, have struggled to broadly increase access to electricity, lacking needed capital to invest in aging facilities that require substantial upgrades and expansion. As a result, only approximately 40 percent of the Nigerian population has access to conventionally-supplied electricity; the remaining nearly 60 percent lack consistent access to electricity.

As of 2014, Nigeria had 13.3 gigawatts (GW) of installed generation capacity, but only 3,500–4,500 megawatts (MW) were typically available. The annual consumption of electricity *per capita* in Nigeria, estimated at less than 150 kilowatt hours (kWh), is among the lowest in Africa and is in line with estimates for the lowest-income countries in this energy development category—it ranks at 166 out of 191 countries surveyed.[2] This lack of reliable and affordable electricity supply severely impacts every facet of life. Businesses routinely cite the cost of electricity as the principal drain on profitability and competitiveness, and schools and clinics often operate without electricity or rely upon costly diesel generators.

The majority of experts interviewed for this evaluation attributed Nigeria's conventional electrical supply problems to the following:

1. The lack of government capacity to make the financial investments needed to even sustain current levels of infrastructure provisions, much less to expand access to electricity services; and

[1] Economies are currently divided into four income groupings by the World Bank: low, lower-middle, upper-middle, and high. Income is measured using gross national income (GNI) *per capita,* in USD, converted from local currency using the *World Bank Atlas* method. Lower- and middle-income economies are those with a GNI *per capita* between $996 and $3,895.

[2] 2017 USG *CIA World Factbook,* based upon data from the International Energy Agency and the World Bank

2. Private investors' unwillingness to invest in infrastructure projects due to high losses, low collections, and lack of cost-recovery tariffs, resulting in unprofitability.

PROJECT DESIGN

As stated in REEEP's Activity Monitoring, Evaluation and Learning Plan (AMELP), REEEP's primary goal is to increase energy access as identified under Intermediate Result (IR) 1.3 in USAID/Nigeria's Country Development Cooperation Strategy (CDCS) (Figure 1, page 13). REEEP addresses this goal by "intervening in the supply-side economics of low-income electrification," and the activity addresses the barriers to credit and financing that severely limit the provision of inexpensive, renewable electrification technologies to low-income and off-grid households and communities.

When REEEP was launched in 2014, the Nigerian economy was relatively stable due to previous economic prospects for continued growth and macroeconomic stability, reflecting increased revenues to the federation, stable foreign reserves, and an augmented fiscal reserve fund. The World Bank reported that Nigeria was on track to achieve the economic goals established in its 2009 national planning document, *Nigeria Vision: 2020*.[3] The gross domestic product (GDP) and purchasing power parity (PPP) increased from US Dollars (USD) 170 billion in 2000 to USD 451 billion in 2012, with other estimates of the informal sector nearing USD 630 billion.[4] USAID anticipated that its Development Credit Authority (DCA) partial risk guarantee facility would support and facilitate financing for electrical power projects. In 2015, however, macroeconomic factors compelled the GON to restrict access to credit. Simultaneously, the decline in the value of the nation's chief export—petroleum—restricted access to USD/foreign exchange (FX). Since most renewable energy (RE) and energy efficiency (EE) equipment is imported, this economic situation compelled REEEP to revise its targets, work plan, and AMELP.

USAID's DCA, originally seen as an essential part of REEEP's design, serves as a credit guarantee instrument intended to lower financial risk and improve credit to Nigeria. REEEP intended to use DCA to facilitate financial transactions by working with investors, financial institutions, and development organizations to design and deliver investment alternatives. This would have enabled financing for activity priorities through private sector risk-sharing and advanced Nigeria's energy industry via new RE and EE technology. In turn, these activities mitigate climate change, reduce carbon emissions, increase economic opportunities, improve employment and sustain development. However, the DCA credit guarantee system resulted in only a few successful transactions initiated in 2015 with Ecobank.

CHALLENGES

REEEP was designed to: (1) facilitate the development and financing of RE and EE technology; and (2) strengthen the policy and regulatory environment, with an outreach activity to promote public- and private-sector investment. After the first year of implementation, USAID removed the outreach and enabling environmental components of REEEP, due to its limited budget and other resource constraints. These constraints became clearer after a year of operation, due to a reality check of the cost of some originally envisioned program elements, stakeholder input (particularly from the commercial banking sector) and needed personnel changes by WI. Nevertheless, REEEP was able to form an effective

[3] nationalplanning.gov.ng/.../NationalPlans/nigeria-vision-20-20-20

[4] https://proudnigerian.weebly.com/economy.html

partnership with *Gesellschaft für Internationale Zusammenarbeit* (GIZ) that supported the Nigeria Energy Support Program (NESP) with a 24.5 million Euro (USD 29 million) budget, largely funded by European Union (EU) programs.

Since 2015, the GON has held an exchange rate and FX currency restrictions that have created difficulties for the power industry to import electrical equipment. Utilizing FX for the settlement of obligations became difficult, as there is a high one-time capital cost associated with deploying solar technology. In Nigeria, the duty on solar *panels* is zero, but approximately 25 percent for solar *batteries*. Moreover, the duty on deep cycle batteries, used for vehicles, is not distinguished from solar batteries, creating a high cost to import and install RE products. At the same time, the Central Bank of Nigeria (CBN) adopted a restrictive credit policy that limited the availability of bank loans needed by the incipient solar energy small and medium enterprises (SME) to finance their RE projects. These macroeconomic policies contributed to the challenges that the activity confronted in achieving its ambitious goals.

EVALUATION PURPOSE AND EVALUATION QUESTIONS

This evaluation is intended to provide USAID/Nigeria with an objective analysis of REEEP's performance over the life of the activity and provide information and lessons learned to enable USAID/Nigeria to make strategic decisions on future programming for the implementation of similar RE and EE activities. The primary audience for this evaluation is the USAID Mission in Abuja, Nigeria and USAID/Washington.

Accordingly, the scope of work for the REEEP evaluation contained two questions about the effectiveness of REEEP's financing and access to energy activities, and three questions regarding findings-based recommendations. The evaluation questions (EQ) are as follows:

1. To what extent has REEEP established an improved financing environment for proposed investments in renewable energy and energy efficiency?
2. To what extent has REEEP been able to increase access to energy in Nigeria? To what extent has REEEP built national capacity in training and certification for RE and EE projects?
3. To what extent did the performance indicators reported by REEEP inform decision-making?
4. How can USAID improve its design and management of future RE and EE activities in Nigeria?
5. What steps can USAID take to sustain REEEP achievements?

METHODOLOGY

The Evaluation Team (the "Team") used a mixed-methods approach that combined qualitative and quantitative methods and analysis and was designed to increase the validity of the evaluation's findings, conclusions, and recommendations. Data sources included information drawn from the Team's comprehensive document review and analysis of REEEP documents; meetings with implementing partners; key informant interviews (KIIs); and a site visit to the REEEP-facilitated 85 kW solar mini-grid site in Gbamu-Gbamu, Ogun state. Data collected by the activity over its lifetime (used as secondary data in this evaluation), along with primary data collected during the evaluation (qualitative), provided an overall picture of the achievements of the activity. Hence, a combination of quantitative (collected by the activity between 2014 and 2018) and qualitative (conducted by the Team) methods were employed for this final performance evaluation. The Team prepared KII protocols as part of its mixed-methods approach to ensure they could fully respond to each EQ.

The interviews were conducted in two rounds. In the first round of interviews in December of 2017, the Team conducted KIIs with a total of 34 individuals from 26 organizations. A second round of interviews with 16 individuals was conducted six months later to fill gaps and enhance the findings. Twelve of these people had been interviewed in the first round. There were two additional organizations that had not previously been interviewed, so the total for both rounds of KIIs was 38 individuals from 28 organizations.

KEY FINDINGS AND RECOMMENDATIONS

The evaluation findings are organized by EQ and are summarized below.

EQ 1: TO WHAT EXTENT HAS REEEP ESTABLISHED AN IMPROVED FINANCING ENVIRONMENT FOR PROPOSED INVESTMENTS IN RENEWABLE ENERGY AND ENERGY EFFICIENCY?

REEEP achieved a significant number of its data targets despite a challenging national economic climate. It also encountered some challenges in improving the financing environment for investments in RE and EE. REEEP's loan activity training and due diligence work helped bankers begin issuing loans to SMEs in the RE/EE sector. However, macroeconomic constraints—which included multiple and high exchange rates, scarcity of dollars, unstable government policies, high costs associated with doing business, and difficulty in accessing credit—remained a key challenge in accessing credit. The majority of bankers would only do three- to six-month loans for the petroleum industry and other short duration businesses. Bankers were unwilling to consider five- to ten-year loans for RE investments, due to the challenges associated with assessing and managing longer-term risk. These challenges persisted even with a GIZ 50 percent credit (i.e., subsidy). Ultimately, some RE SMEs did not even apply for loans, as they were confident they would be rejected; they could not meet the collateral requirements and other loan approval process conditions.

Over 50 percent of respondents expressed disappointment with the DCA facility, due to the challenges associated with using it. Banks reported concern about their ability to accurately assess businesses and manage the risks associated with a credit guarantee.

However, over 80 percent of respondents stated that REEEP's loan activity training and due diligence work helped bankers begin to make loans to RE SMEs. By leveraging its capacity building resources in RE/EE with GIZ, REEEP was able to spark interest in the RE sector. The activity leveraged a sum of almost USD 2.2 million in RE/EE transactions over three years in an industry that is still nascent.[5] In addition, the ripple effects of training, mentoring, and due diligence reports done by REEEP continued after the completion of REEEP in March 2018. In essence, REEEP provided financial due diligence and conducted technical assessments of the solar developers; these activities helped banks to better understand RE/EE for financing. During the second round of KIIs with solar developers in June 2018, some of the nineteen developers supported by REEEP reported that pipeline projects prepared with REEEP had just been approved and that new project proposals were being prepared based on their work with REEEP.At least three of the SMEs said that their revenue has increased substantially in recent years directly due to the financial and business training and mentoring they had received from REEEP.

[5] The USAID/Power Africa Renewable Energy and Energy Efficiency Project 2014–2018 Resources Book

EQ 1: Recommendations

Whether or not USAID continues the work started with REEEP, the following activities would assist in improving investment in the RE/EE sector, based on the KIIs.

- Distribute due diligence guidelines to the private sector working in RE/EE, available in an annex of the REEEP Final Report.
- Support the Renewable Energy Association of Nigeria (REAN), the recently formed association of RE entrepreneurs.
- Conduct further piloting of various financing models that have emerged for mini-grids.
- Work with government agencies to eliminate tariffs and duties on all imported equipment.
- Continue to support financial training specific to RE/EE for financial institutions and the private sector.
- For DCA, make all of terms and relationships clear and be more liberal about guarantees. Address up-front payments, which some financial institutions are not comfortable making.

EQ 2: TO WHAT EXTENT HAS REEEP BEEN ABLE TO INCREASE ACCESS TO ENERGY IN NIGERIA? TO WHAT EXTENT HAS REEEP BUILT NATIONAL CAPACITY IN TRAINING AND CERTIFICATION FOR RE AND EE PROJECTS?

REEEP has met the majority of their RE and EE performance targets through its activities. Electricity consumers purchasing from a company assisted by REEEP, Cloud Energy, are now gradually shifting from using high-energy electric bulbs to low-energy light emitting diode (LED) bulbs in residential and commercial areas. There are now almost 20 operational mini-grid solar electrical systems functioning in Nigeria. More mini-grid solar electrical systems are in development, with equipment already in-country or in transit. The evaluation findings show that REEEP had a measurable role in facilitating the necessary loans and providing the necessary technical assistance to establish these mini-grids.

Through REEEP, USAID has reportedly earned acceptability and respect. The high quality of the content and delivery of the training programs and how it helped improve the quality of work in the RE and EE was noted. REEEP exceeded its target of 15,000 direct connections with 16,635 connections. REEEP's contributions have been instrumental in adding an estimated 2.15 MW, mostly in off-grid areas. A single company supported by REEEP, SME Funds, sold over 600,000 solar lanterns in three years with 30 percent of those sales attributable to REEEP support, However, challenges remain. Although the off-grid solar energy market is expanding, in the current context unsubsidized RE projects remain financially unattractive, due to commercial banks charging double-digit interest rates and short timelines. REEEP was unable to affect these big-picture considerations.

REEEP has been successful in developing seven course modules and conducting various training programs. All of the stakeholders have expressed appreciation of the usefulness and impact made by the trainings in the renewable energy sector. According to KIIs, these trainings were the result of a productive collaboration with GIZ's NESP program.

EQ 2: Recommendations

- Support efforts that invest in marketing to customers. There is a willingness to pay once consumer awareness is improved.

- Follow through on studies done of favorable sites for mini-grids, mostly in rural areas, with specific site assessments.
- Support powering micro-, mini- and other small-scale enterprises, as these have been found to be the quickest way to get more solar power implemented.
- While rural electrification is encouraged, constraining solar power entrepreneurs to only certain locations and market conditions should be avoided, as it decreases commercial activity and dissipates the entrepreneurial spirit.
- Permanent certification by an independent third party should be explored. REEEP has produced a report analyzing possible candidates for this activity.
- A training needs assessment should be conducted.
- High-quality training should be sustained to keep up with evolving international standards.

EQ 3: TO WHAT EXTENT DID THE PERFORMANCE INDICATORS REPORTED BY REEEP INFORM DECISION-MAKING?

The eight performance indicators generated results that senior REEEP staff found to be useful for decision-making. However, any future RE activity undertaking governance and outreach functions would require additional indicators to assess governance, communication, and outreach performance. Five of the eight REEEP indicators are Power Africa indicators and, therefore, enable direct performance comparisons with other USAID and international donor projects. These indicators were extremely useful for identifying the best candidates for future funding and other resource allocation-related decisions.

The fifth indicator captured the number of beneficiaries with improved energy services, including bio-gel fuel. The activity facilitated the development and financing of RE and EE markets by collaborating with private partners (largely SMEs) to address credit and financing barriers hindering the provision of affordable, renewable electrification technologies to low-income and off-grid households and communities. This custom indicator feeds directly into the REEEP result that seeks to increase RE access. The indicator data represent households (HH) with new RE connections and/or improved cook stoves as a result of REEEP's efforts, multiplied by the average Nigerian HH size, to provide an estimate of direct energy connections. These energy connections include solar lanterns, mini-grids, or village installations. The activity recorded over 220,000 beneficiaries that indirectly benefited from the provision of solar lanterns and bio-gel. These data suggest that REEEP indirectly provided sustainable energy to a large, poorer segment of the population in off-grid areas.

However useful the indicators, care was taken when collecting data from beneficiaries and attributing results to the program. During the second series of KIIs in June 2018, after REEEP had ended, at least one SME representative reported feeling "policed" or pressured to provide numbers to the USAID/REEEP team and went on to say that sales of lanterns and bio-gel fuels were only indirectly attributable to the REEEP project.

EQ 3: Recommendations

- Rate-of-return analyses would have provided a more precise measurement of much of the project achievements. A Financial Rate of Return (FRR) analysis of the access to finance activity could have shown whether leveraged investment targets had been met, and an

Economic Rate of Return (ERR) for access to energy activities would have shown the economic and poverty effects of the increase in the amount and affordability of energy.

- Implementers of project monitoring activities would be wise to take steps to avoid overburdening beneficiaries who are suppliers of indicator data.

EQ 4: HOW CAN USAID IMPROVE ITS DESIGN AND MANAGEMENT OF FUTURE RE AND EE ACTIVITIES?

REEEP was originally designed with outreach, governance, and enabling environment tasks, but REEEP's smaller budget (USD 4 million) and limited resources prevented the successful execution of these tasks. New RE and EE projects should have sufficient labor and financial capital to support the accompanying outreach and communication tasks. Stakeholders all reported that interactions with REEEP management was generally without conflict and interactions with REEEP staff were helpful. Some of the entrepreneurs expressed appreciation for advice they had received. However, some observed that the activities took a long time, because REEEP was understaffed for what they had taken on. Also, one stakeholder said that one set of consultants did not appear motivated. This is in addition to the issue of being pressured for data (discussed above).

EQ 4: Recommendations

- Solar energy MSMEs, bankers, and microfinance institutions (MFIs) should be part of a pre-solicitation workshop with other stakeholders prior to finishing a design for a new project.
- If ambitions are high for a relatively small project, adequate staffing should be planned.

EQ 5: WHAT STEPS CAN USAID TAKE TO SUSTAIN REEEP ACHIEVEMENTS?

Building the capacity of the newly privatized Nigerian Electric Management Services Authority (NEMSA) would be a positive step towards improving sustainability. Both REEEP and NEMSA have been underfunded in their work to support the RE and EE sector. USAID can use its strong standing with the GON to advocate for action plans and policies that improve the funding of NEMSA. Further, activities should strengthen certification training for RE and EE technicians and institutionalize the curricula, financial analysis and due-diligence trainings, and mentoring techniques.

REEEP has been successful in building and leveraging partnerships with international donors. The World Bank has a new USD 350 million RE and EE lending window, and the *Agence Française de Développement* (AFD) (French Development Agency) is providing a USD 90 million credit window. It has an interest rate buy-down system for Nigeria that can be leveraged for long-term RE and EE infrastructure.

A follow-on to REEEP should continue to build upon the partnership with GIZ to both strengthen the durability of many of the activity's efforts and prepare for more international public- and private-sector funding.

EQ 5: Recommendations

- Advocate for a credible, rigorous certification agency; REEEP has produced a report analyzing possible candidates for this activity.
- Incorporate outreach/communication and business-enabling environment components in future projects.
- Projects to enhance local economies, such as solar water lifting for irrigation, build on the experience gained by USAID and other agriculture projects and should be continued.

- Encourage donor alliances in new activities. In KIIs, it was consistently reported that stakeholders strongly believed in the importance of USAID and working with other international donors. An advantage of REEEP being a smaller-scale project was that parties worked closely and directly with SMEs and other stakeholders, building trust. Any new RE/EE project design should prioritize this type of cooperation.

SECTION 1. INTRODUCTION

1.1 BACKGROUND ON THE NIGERIAN ENERGY SECTOR

Often classified as a lower-middle-income country,[6] Nigeria is well-endowed with natural resources. The Government of Nigeria (GON), however, has had considerable difficulty in ensuring the consistent supply of electricity to its citizens. Less than 40 percent of Nigerians have access to conventionally supplied electricity.[7] Power outages are common throughout Nigeria, even where access to conventional electricity is available. Both power generation and transmission are from relatively old facilities and frequently fail, causing blackouts.

Current electricity generation in Nigeria is primarily from gas-fired or hydro-power plants. With an installed capacity of 13,308 MW, only 6,158 MW were operational in 2014.[8] Other estimates suggest that Nigeria's available grid capacity is approximately 4,500 megawatts (MW), which only meets one-third of the estimated demand for grid power.[9] Moreover, as electricity is a key input for many industries that produce goods and services necessary for a healthy economy, Nigeria's electrical supply issues cause economic efficiency problems that hinder the country's economic growth.

An historically low level of investment in Nigeria's power sector has hindered private investment, since its production-based economy requires power to produce goods and services. Renewable energy (RE) products and energy efficiency (EE) retrofits directly benefit end users and businesses by increasing access to affordable energy. Despite this, private-sector participation and investment has been minimal, due to an unfavorable policy environment, lack of market incentives, and lack of access to financing. Many Nigerian financial institutions view the financing of clean-energy projects as high-risk investments and lack the necessary incentives to provide required financing.

The potential for renewable energy, especially solar, to meet some of this power demand is clear. According to a 2015 report by Charles Opara-Ndu, considering its geographic location around the equatorial sun-belt Nigeria has the potential to exploit abundant solar energy resources. Nigeria receives abundant year-round sunshine, ranging from 6.70kwh/sqm/day in Borno state to roughly 4.06kwh/sqm/day to 5.86kWh/sqm/day in locations such as Calabar in Cross Rivers state. The Federal Capital Territory has a daily horizontal solar radiation ranging from a high of 6.07kWh/sqm/day to a low of 4.42kWh/sqm/day in August. This level of solar radiation across the country could support the significant deployment of solar power infrastructures designed to primarily feed into the regional power distribution. Despite the economic constraints of solar power development, it can support peak-time energy consumption and increase capacity directly to the national grid or embedded network of distribution—if current challenges are met successfully.

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[6] Economies are currently divided into four income groupings by the World Bank: low, lower-middle, upper-middle, and high. Income is measured using gross national income (GNI) per capita, in USD, converted from local currency using the *World Bank Atlas* method. Lower- and middle-income economies are those with a GNI per capita between $996 and $3,895.

[7] *Energy Access Outlook 2017,* International Energy Agency, 2017. Page 83.

[8] NESP (Nigerian Energy Support Programme), The Nigerian Energy Sector: An Overview with a Special Emphasis on Renewable Energy, Energy Efficiency and Rural Electrification, 2nd Edition. June 2015

[9] https://www.giz.de/en/downloads/giz2015-en-nigerian-energy-sector.pdf

1.2 REEEP DESIGN

The United States Agency for International Development's (USAID) mission in Nigeria (USAID/Nigeria) designed the Renewable Energy and Energy Efficiency Program (REEEP) in response to Nigeria's energy distribution and electricity availability problem. USAID signed a cooperative agreement with Winrock International (WI) on March 3, 2014 for the implementation of REEEP, a four million U.S. dollar (USD), four-year RE and EE activity.

REEEP's goal is "Energy access increased (USAID/Nigeria Intermediate Result [IR] 1.3)." REEEP addressed this goal by intervening in the supply-side economics of low-income electrification through the provision of affordable, renewable electrification technologies to low-income and off-grid households and communities. Combining RE and EE interventions, REEEP was designed to achieve the following objectives:

1. Develop the capacity of banks and other financial institutions holding Development Credit Authority (DCA) partial risk guarantees;
2. Strengthen the capacity of companies to deploy and maintain clean energy projects, and to provide a pipeline of potential projects for DCA and Private Advisory Financing Network Global Development Alliances;
3. Strengthen the capacity of agribusinesses, health delivery sites, and businesses to access loans for EE technologies;
4. Strengthen the capacity of the GON institutions to encourage the enactment of appropriate RE and EE legislation; and
5. Strengthen the capacity of vocational training institutes.

The REEEP design described a scenario where the development of Nigeria's energy industry via new RE and EE technology would mitigate climate change, reduce carbon emissions, increase economic opportunities and employment, and sustain development. Accordingly, REEEP provided technical assistance to facilitate private-sector RE financing to complement and coordinate the interventions, while cutting across other regional USAID programs like the Maximizing Agricultural Revenue and Key Enterprises in Targeted Sites II (MARKETS II) activity and HIV/AIDS activities.

To achieve the referenced objectives, REEEP initially included the following four tasks.

1. Increase access to clean energy financing for project developers.
2. Provide technical assistance to financial institutions.
3. Provide vocational training and create awareness of RE and EE benefits.
4. Enhance governance to enact enabling policies for RE and EE project development.[10]

REEEP was formally modified in its second year, following first-year implementation challenges. In December 2015, USAID/Nigeria and WI reached an agreement "to better focus the project on increasing access to finance; [task four] was removed, [task three] was modified, and other changes

[10] See Page 9 of the REEEP Year 2 Work Plan. This component was later deleted from REEEP plan.

were made."[11] Thus, for the last two years of the activity, the following tasks were established in line with USAID's objectives:[12]

1. Access to clean energy financing
2. Technical assistance to financial institutions
3. Training standards promotion

Under each of the three project implementation areas, WI identified, with USAID approval, leads and supporting subcontractors and/or other partners. Many of these activity areas relied heavily on international experts on short-term technical assistance assignments to support REEEP's implementation. With the elimination of the outreach and enabling environmental components to the activity, REEEP was better able to focus on its three revised tasks.

1.3 REEEP AND THE GIZ PARTNERSHIP

When REEEP was designed, it was noted that the GIZ Nigerian Energy Support Program (NESP) had similar goals. Thus, USAID/Nigeria established a Memorandum of Understanding with NESP to ensure complementarity of programming. GIZ did technical training, with assistance from REEEP, for designing and installing equipment for renewable energy systems. USAID addressed the issues around building access to finance for renewable energy and energy efficiency, working with financial institutions and private enterprise. GIZ handled training and the technical development of mini-grids and REEEP was tasked with pairing RE and EE companies with financers.

After the 2016 recession, GIZ's projects were not able to close with local banks. Since the financial preparation had been through REEEP, however, they were able to obtain crowd-sourced funding from Bettervest in Germany and constructed four mini-grids with that financing. GIZ covered the market entrance costs and REEEP provided due diligence (which is the research and analysis of a company or organization done in preparation for a business transaction) support and training for the companies. REEEP also established a solar home system with Bettervest. GIZ representatives reported that the REEEP-prepared due diligence guidance manual for mini-grids was very helpful and reported, overall, that the collaboration with REEEP went very well.

GIZ conducted joint trainings with experts from both GIZ and USAID. REEEP supplied the training equipment. The training covered photovoltaic (PV)/solar cell installation and design, small hydro, energy audits and mini-grid design. These trainings were held at 12 institutes throughout Nigeria[13] and are continuing, with financing assistance from the International Finance Corporation (IFC), which is paying 75 percent of participants' fees. According to an NESP representative, "structures have been established that will last beyond our projects (that is, REEEP and NESP)."

[11] Year 3 REEEP Work Plan footnote, Page 9.

[12] In December 2015, and upon mutual agreement between USAID and WI to better focus the project on increasing access to finance, Component 4 was removed, Component 3 was modified, and other changes were made.

[13] List of training institutes available in Figure 3, Section 4 of this report.

SECTION 2. BACKGROUND

2.1 EVALUATION RATIONALE

2.1.1 PURPOSE OF EVALUATION

This evaluation is intended to provide USAID/Nigeria with an objective analysis of REEEP's performance over the life of the activity and provide information and lessons learned to enable USAID/Nigeria to make strategic decisions on future programming and implementation of similar RE and EE activities. The primary audience for this evaluation is the USAID Mission in Abuja, Nigeria and USAID/Washington.

Accordingly, the scope of work for the REEEP evaluation contained two questions about the effectiveness of REEEP's financing and access to energy activities, and three questions regarding findings-based recommendations. The evaluation questions (EQ) are as follows:

1. To what extent has REEEP established an improved financing environment for proposed investments in renewable energy and energy efficiency?
2. To what extent has REEEP been able to increase access to energy in Nigeria? To what extent has REEEP built national capacity in training and certification for RE and EE projects?
3. To what extent did the performance indicators reported by REEEP inform decision-making?
4. How can USAID improve its design and management of future RE and EE activities in Nigeria?
5. What steps can USAID take to sustain REEEP achievements?

Limitations: One possible source of bias of the respondent selection process was that most selected stakeholders willing to meet with the evaluation team (the "Team") were likely to have a strong opinion (either positive or negative) of REEEP. However, to limit the effects of this potential source of bias and ensure inclusion of all viewpoints, the Team did a purposive sample of key informants from all stakeholder groups, including international development partners, private investors in RE and EE, financing institutions, and government entities.

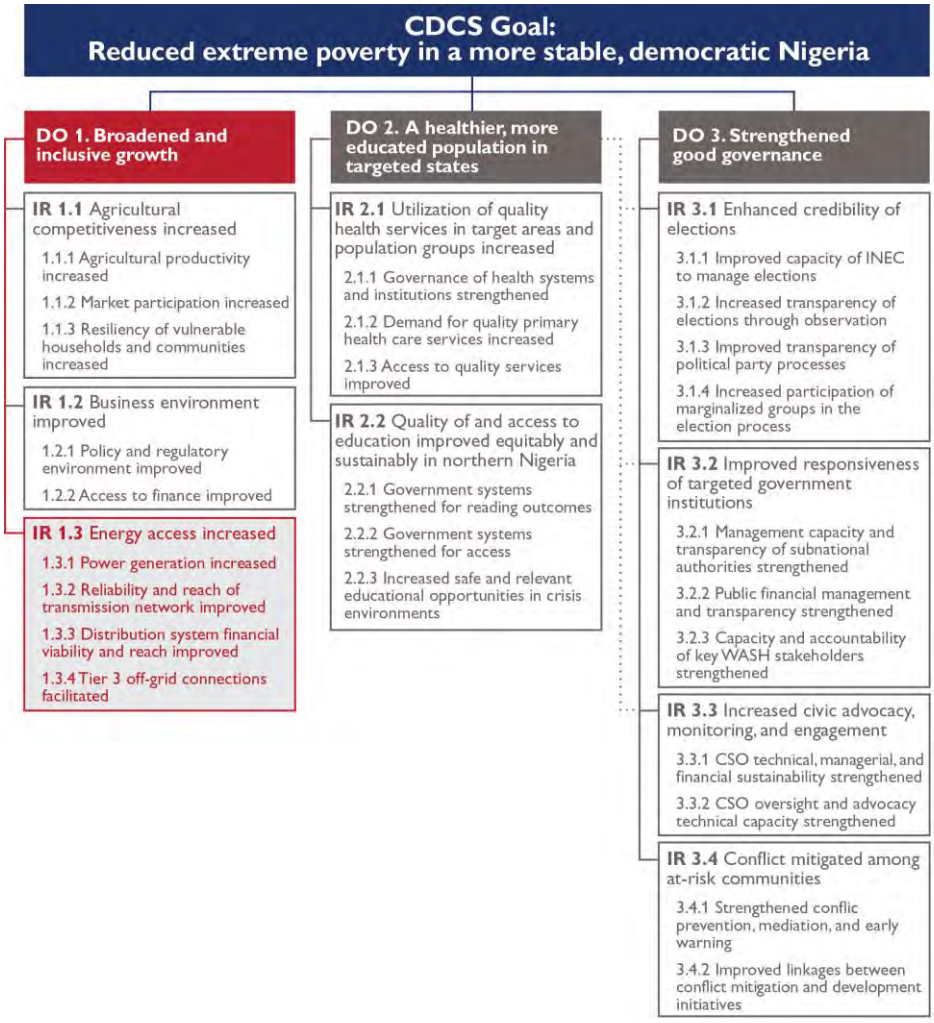
2.2 STRATEGIC DESIGN AND RESULTS FRAMEWORK

2.2.1 MONITORING AND EVALUATION (M&E) FRAMEWORK AND INTENDED RESULTS

Within the USAID Country Development Cooperation Strategy (CDCS), REEEP is located under Development Objective (DO) 1, Broadened and Inclusive Growth, IR 1.3: Energy Access Increased. The activity's development hypothesis is stated as:

"(1) If the technical capacity of financial institutions in Nigeria is increased to process loans and evaluate RE/EE projects, and (2) if the capacity of RE/EE businesses to develop bankable projects and loan documentation is increased, and (3) if the technical capacity in Nigeria to install and maintain RE/EE systems is increased, then the risks associated with lending to the RE/EE sector will be reduced and access to RE/EE for businesses and households will increase, allowing for better access to clean energy, more reliable energy services, and reduced carbon emissions."

Figure 1. USAID/Nigeria CDCS Results Framework (updated 1/31/2017)



REEEP's goal is "Energy access increased (USAID Nigeria IR 1.3)." REEEP addresses this goal by intervening in the supply-side economics of low-income RE and EE technologies. Specifically, REEEP addresses the credit and financing barriers that limit the provision of affordable, renewable energy and energy efficiency technologies to low-income and off-grid households and communities.

Accordingly, REEEP has the following IRs:

1. Access to RE/EE financing by social and economic businesses improved
2. Capacity of private sector entities developed

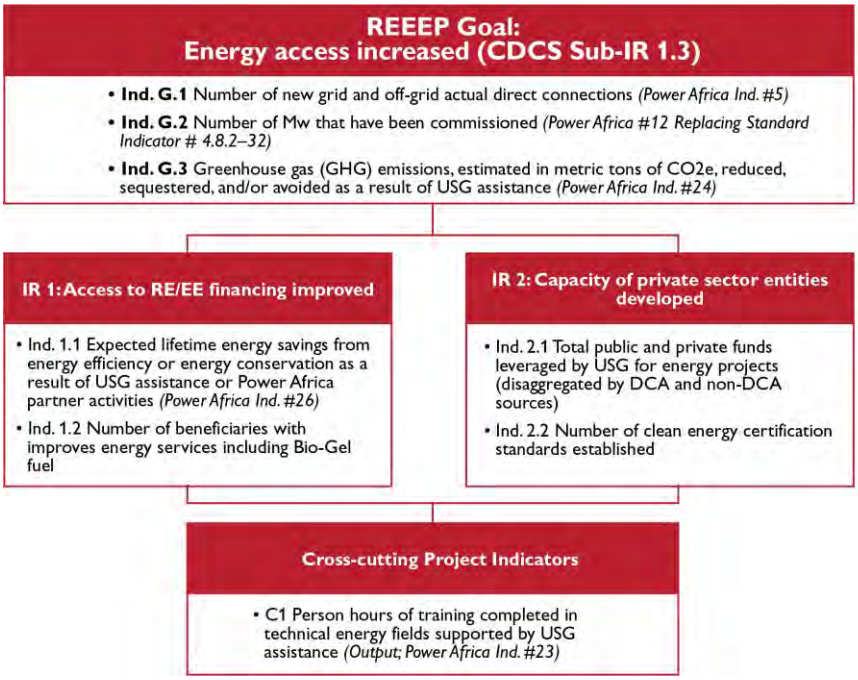
REEEP's results framework is illustrated in Figure 2 below. This design, adopting a basic structure that mirrors the Power Africa result framework, ensures that REEEP's activities will be developed and implemented within USAID/Nigeria's CDCS interests and will contribute to Mission results, which in turn will contribute to Power Africa.

REEEP works collaboratively with USAID/Nigeria, the GON and others to achieve its objectives by building the capacity of:

1. Ecobank (which implemented USAID DCA), other financial institutions such as microfinance institutions, and other commercial banks that were willing to lend to RE/EE;
2. Companies that deploy and maintain clean energy projects to help build a pipeline for DCA and other financial institutions, as well as agribusinesses, health delivery sites, and businesses willing to retrofit with energy-efficient technologies; and
3. Vocational training institutes, through its partnership with NESP, to continue to provide education and technical local technical expertise after project completion on a commercially sustainable basis.

Activity beneficiaries included GON institutions, financial institutions, vocational/tertiary institutions, RE and EE suppliers, project developers, agro-processors, health care facilities, individuals, homes, and offices that installed RE technologies.

Figure 2. REEEP Results Framework (updated 5/3/2016)



REEEP's documentation notes that banks in Nigeria, including DCA-supported banks, lack the capacity to fully understand and evaluate RE designs and businesses and establish their credit worthiness. Additionally, RE businesses, especially start-ups, lack the capacity to identify financing sources and successfully complete the required steps to secure favorable loans in support of their businesses.

Figure 2 above is drawn directly from the REEEP work plan. REEEP performance indicators are shown to depict how they fit into USAID/Nigeria's CDCS, and the REEEP Results Framework. The indicators and the data collection approach selected by the activity, and approved by USAID, are appropriate to the activity design and objectives. The indicators consider the interests of USAID, Power Africa, and other beneficiaries. The measures conform to Power Africa, which highlights the promotion of RE and EE.

SECTION 3. METHODOLOGY

The Team employed a mixed-methods approach to collect, analyze, and interpret primary and secondary data to answer the five EQs. Data collected by the activity over its lifetime (used as secondary data in this evaluation), along with primary data collected during the evaluation (qualitative), provided an overall picture of the achievements of the activity. Hence, a combination of quantitative (collected by the activity between 2014 and 2018) and qualitative (conducted by the Team) methods were employed for this final performance evaluation.

This approach was designed to increase the validity of the findings, conclusions, and recommendations presented in this report. Data were drawn from sources comprised of a comprehensive document review of activity monitoring data collected by REEEP and other documentation pertaining to REEEP's plans and targets; a site visit; and key informant interviews (KIIs) with beneficiaries (bankers, micro, small, and medium enterprises [MSMEs], partners and REEEP staff); government officials; and other relevant stakeholders. The Team prepared key KII protocols as part of its mixed-methods approach to ensure they could fully respond to each EQ.

3.1 DATA COLLECTION METHODS

The Team conducted a desk review of the activity's documentation related to performance targets, achievements, and deliverables. After an exhaustive review of the documents provided and online public resources, the Team requested additional documents from USAID and REEEP staff to ensure that they could compare M&E indicators and corresponding progress against the life of activity targets. This assisted in the validation of primary and secondary data collected, as well as in the validation of monitoring data, achievements, and progress presented in the activity's progress reports.[14] In the first round of interviews, the Team conducted KIIs with a total of 34 individuals from 26 organizations in Lagos and Abuja, Nigeria, of which eight KIIs were conducted via telephone. A second round of interviews with 16 individuals was conducted six months later to fill gaps and enhance the findings. Twelve of these people had been interviewed in the first round. There were two additional organizations that had not previously been interviewed. The total for both rounds of KIIs was 38 individuals from 28 organizations. Though the same tools were used, those in the second round were asked more focused questions, probing areas which warranted further detail given the first-round findings and were asked for updates in what had occurred in the interceding six months. This had the added advantage of observing further development and impacts of the activity after its closing, which proved to be quite helpful in understanding the true achievements of the activity.

Secondary data collection involved a review of activity documents shared with the Team by USAID and REEEP staff, including monitoring data for the activity's indicators, activity work plans, and the mid-term evaluation report. These documents provided key background information for the evaluation and served as the basis for the primary data collection exercise and evaluation protocols. Information collected

[14] Regarding Focus Groups: There were discussions between the Team and the REEEP staff about the high number of beneficiaries (over 2,000) as a result of SME technical assistance to the clean fuel cook stove activities. Since this was reported as a secondary impact of the REEEP activities work with SMEs, it was determined to eliminate focus groups with them. This data goes into the USAID Nigeria reporting database a a sub-category of beneficiaries. Obviously, USAID Office of Economic Growth and Environment (EGE) officials and M&E specialists had been over this subject in depth with REEEP for several years before the Final Evaluation Team inquired about it.

during this phase served as the secondary data for this evaluation. Primary data collection activities included the KIIs conducted with 38 individuals from 28 organizations in Lagos and Abuja. KIIs were organized around the EQs, with specific questions targeted to the respondent type. (Table 1)

Table 1. Respondents by type and number (both rounds of interviews)

RESPONDENTS	RESPONDENT DESCRIPTION & NUMBER
Bankers, microfinance and other finance experts	Five (5) banks and financial institutions
Micro, small, and medium enterprises	Ten (10) MSMEs
Government officials	Five (5) GON organizations
Other donors	Six (6) organizations
Project staff and other stakeholders	Two (2) training partner institutions and REEEP staff

3.2 DATA ANALYSIS

The Team used a deductive approach for its primary data analysis by summarizing and analyzing the KII notes by EQ. It then performed a content analysis of the primary data collected through the KIIs, identifying similarities and differences in the data. Primary data were triangulated *vis-a-vis* the REEEP performance indicators against its stated targets. Through the Team's primary data collection and analysis, the team was able to validate the monitoring data and achievements and progress presented in the REEEP activity progress reports. The analysis conducted in the later evaluation occurred after the close of the project, and the Team checked some of the final indicator data and asked about additional achievements since the close of the project.

3.3 QUALITY CONTROL

DevTech Systems, Inc. Monitoring, Evaluation and Learning (MEL) Activity provided staff to supervise the entire evaluation process. MEL oversaw the initial evaluation in the second quarter of Fiscal Year (FY) 2018, through the follow-up interviews in June 2018 and the development of the work plan and data collection instruments, to conducting field work with the Team in both Abuja and Lagos across both data collection periods. Finally, it conducted the review of the evaluation report, with consistent oversight from members of the USAID/Nigeria Office of Economic Growth and Environment (EGE) and the USAID/Nigeria Program Office.

3.4 EVALUATION LIMITATIONS

The Team faced the following limitations in the process of carrying out this evaluation:

- The quantitative data cited in this evaluation report are largely drawn from the REEEP desk review documentation and REEEP performance-related reporting (secondary data).

- The respondent sample included only beneficiaries that partnered with the REEEP. Indirect beneficiaries with improved energy services, including bio-gel fuel consumers, were not interviewed, as REEEP did not have a relationship this type of beneficiary.
- REEEP only had implementation agreements with the financial institutions. No agreements were signed with RE and/or EE developers and, as such, these groups were neither obliged nor willing to provide full data about their financials or results of the REEEP intervention.

SECTION 4. FINDINGS AND CONCLUSIONS

The findings are organized according to EQ. The first two questions focus on the findings for financial activities (EQ 1) and energy activities (EQ 2). The next three EQ are recommendations for future programs, including M&E indicators for project management usage (EQ 3), the sustainability of REEEP activities and outcomes (EQ 4), and USAID's activity design and management of future RE and EE activities in Nigeria (EQ 5).

4.1 EQ.1 FINANCIAL ENVIRONMENT FOR RE AND EE INVESTMENTS

4.1.1 FINDINGS

REEEP is a private-sector support activity with interventions designed to help build Nigeria's national capacity in training and certification. Before REEEP, banks in Nigeria, including DCA-supported banks, were unable to fully understand and evaluate RE and EE models and businesses and, accordingly, lacked the technical capacity to establish their credit worthiness. Additionally, RE and EE businesses, especially start-ups, lacked the capacity to identify financing sources and successfully complete the steps required to secure favorable loans. REEEP's conceptual approach was that 1) if banks and creditors develop the technical ability to evaluate RE and EE business models and technologies and 2) if RE and EE start-ups and businesses improve their ability to evaluate and apply for credit and financing, then 3) the financing barrier will be reduced and RE and/or EE business will be empowered to profitably market their products to low-income and off-grid communities, increasing energy access in these areas. Consequently, the REEEP approach will then contribute indirectly to RE and EE market penetration, still in its nascent stages in Nigeria.

The REEEP was challenged with the financing conditions in Nigeria, as banks there have to raise their own liquidity. Five Nigerian banks control 80 percent of the money. The remaining banks then compete for the remaining 20 percent. Accordingly, banks tend to put their money where it will maintain the most liquidity. The long-term nature of RE systems' payback periods make them a challenge for financers to gain the short-term profit they need. MSMEs are thus faced with double-digit interest rates, which are neither competitive nor affordable, due to this enhanced risk.

Despite this challenge, REEEP was able to enhance the financial environment for RE investments. Over 80 percent of respondents stated that REEEP's loan activity training and due diligence work helped bankers begin to make loans to RE MSMEs. ACCION Microfinance recalled that the "Credit Risk Assessment Workshop on [RE]" was useful for them to understand RE financing risks. However, a key challenge was that while they were willing to do short-term loans for the petroleum industry and other short-duration businesses in form of overdrafts—typically under two years with high interest rates of about 28 percent and high collateral requirements of over 100 percent—bankers were unwilling to consider five-to-ten-year loans for repaying RE investments, even with a GIZ 50 percent credit.[15]

[15] These roughly 50 percent credits provided by GIZ were often analyzed to be generally equivalent to the GON paying 100 percent of the cost of the (very expensive) long-distance conventional energy grid/transmission infrastructure.

By leveraging its capacity building resources in RE/EE with GIZ, REEEP has been able to spark interest in the RE sector. The activity leveraged the sum of almost USD 2.2 million in RE/EE transactions during three years in an industry that is still in its infancy.

Over 50 percent of respondents expressed disappointment with the DCA facility, due to the challenges associated with using it. Banks expressed concern about their ability to accurately assess businesses and manage the risks associated with a credit guarantee. Ecobank, however, still reports that it favors the DCA, as it has been the REEEP-designated bank for RE and EE business. Although Ecobank has had some recent problems[16] regarding a 2017 REEEP-proposed DCA-supported transition, it states that is still interested in pursuing additional DCA-supported RE investments. Other public- and private-sector banks expressed reservations about the DCA and stated that they considered the DCA credit guarantee to be an insufficient incentive to facilitate RE and EE financing, as it is not designed to change the short tenures and high interest rates of local commercial banks. At least one other bank thought the DCA guarantee program was inappropriate for RE financing because the bank would need to provide long-term loans, which the bank viewed as "impossible to do." They also disapproved of the up-front fees for the guarantees.

ACCION Bank is a notable outlier, as a non-DCA supported bank which showed a commitment to solar energy in particular. Its managing director had a solar home system installed and also instituted a program to convert their branch offices to solar. It has 60 branch offices throughout Nigeria, 10 of which are now powered by RE. Furthermore, ACCION has partnered with Cloud Energy, where ACCION provides credit and Cloud Energy supplies and installs the solar systems. Respondents attributed the relationship between ACCION and Cloud Energy to the REEEP-facilitated access to finance and RE and EE trainings. Finally, although relatively unknown to respondent bankers, SMEs, GIZ, the World Bank Group, the IFC, and other donors reported that REEEP helped to get the necessary funding flowing into the RE and EE sectors through its loan activity training and due diligence work that helped bankers to have a better understanding of the process, leading to the issuing of loans to SMEs in the RE/EE sector.

By leveraging its capacity building resources in RE/EE with GIZ, REEEP has been able to spark interest in the RE sector. The activity leveraged the sum of almost USD 2.2 million worth of RE/EE transactions in three years in an industry that is still nascent. In addition, in the KIIs conducted in June 2018, after the closed of REEEP, the MSME representatives said they have prepared additional project proposals beyond what was in the pipeline, based on work and advice they had received from the program.

At least three of the SMEs—Havenhill Synergy, Nayo Tropical Technology, and Rana World Technology—said that their revenue has increased substantially in recent years, directly due to the financial and business training and mentoring they received from REEEP. One said that its revenue doubled in the last two years, another claimed 150 percent growth over the same period, and a third said that their revenue grew 500 percent in the last three years. This would be hard to track further as the project is closed, but the after-effects of REEEP-facilitated trainings could continue for a few years.

[16] This problem was confirmed with USAID Nigeria, where the Bank of Nigeria had language that appears to the USAID USA office to be double-counting the DCA credit guarantee.

Many donors and the solar energy SME's trade association (the Renewable Energy Association of Nigeria [REAN]) confirmed interest in using the due diligence and other financial courses and syllabi for follow-up training after REEEP closed in March 2018.

Table 2. Question 1 on Improved Financial Environment for RE/EE investments

TO WHAT EXTENT HAS REEEP ESTABLISHED AN IMPROVED FINANCING ENVIRONMENT FOR PROPOSED INVESTMENTS IN RE/EE?	
A. Regarding training for access to financing, to what extent has REEEP training and/or mentoring increased your organization's/others' ability to obtain financing for RE/EE? How was the training/mentoring useful/not useful? Was it targeted to the needs of your business/sector's needs? Was it relevant? Why or why not?	Over 80 percent of KIIs said that REEEP was very useful. They claimed that the training and capacity building improved their risk management, lending, and management of non-performing loans. One KII noted that the training for access to finance was "very relevant." By working directly with the banks, REEEP provided technical assistance and group training sessions, depending upon the needs of the bank. These services enabled the banks to assess the credit risks of the developers. For the microfinance institutions, REEEP technical assistance helped the microfinancing institution (MFI) to offer consumers financing products to existing customers to access RE products. For the developers, REEEP provided advisory services on how to access financing so as to understand what banks are looking for in a customer.
B. How has the training improved the bank's/MFI's own capacity to lend to RE/EE projects?	Greatly. Initially banks had no idea of how to lend to the RE/EE sector; now, there is practical experience. Apart from Ecobank (implemented the DCA), the Bank of Industry (BOI), First City Monument Bank, Union Bank, and ACCION Microfinance Bank also reported improved capacity.
C. What kind of training have you received from the REEEP project regarding your lending activities to RE/EE projects? Was the training helpful?	Risk management, due diligence, financial document analysis, and mentoring. All were very helpful.

4.1.2 CONCLUSIONS

REEEP successfully convened financial institutions and small businesses to improve facilitation and increase the provision of RE (solar power) loans and successfully established partnerships that helped to create a market for future energy expansion in Nigeria. The ACCION/Cloud Energy collaboration supported 20 solar projects, for which ACCION provided credit and Cloud Energy supplied and installed solar systems. REEEP-conducted training sessions have encouraged and stimulated the market force to expand.

Nigeria's off-grid solar market is expanding and still has potential for future expansion. There are 35 companies associated under the newly created REAN. If their combined capacity is utilized, a large number of populations can be reached.

Mini-grids are promising infrastructure projects but, due to high up-front investment costs, are financially unattractive without subsidy or grant support and business consumers. The investment cost for the 85 kW mini-grid system being constructed in Gbamu-Gbamu is USD 595,000, and these costs are unrecoverable, given the applicable tariff rates and limited number of households served. At present,

it is impossible to say with any certainty whether the mini-grid will be commercially viable. The main constraint to its deployment is limited funding and high up-front cost, resulting in a long recovery of investment. The unclear renewable electricity tariff structure and high cost of imports[17] further hinders investment, as well as a lack of investor knowledge of the new technologies and thus their unwillingness to try them out.

Interviews with mini-grid developers provided recommendations for conditions which would enable mini-grids to succeed, despite conditions just described.

- Creating better financing models (see Recommendations)
- Investing in marketing to customers; willingness to pay is indicated, once there is consumer awareness
- Eliminating tariffs and duties on all imported equipment (panels, batteries, etc.)
- Completing a comprehensive energy assessment of where to locate mini-grids
- Working with the communities to take ownership; people will try to bypass metering, but if there is community ownership, they will police it
- Targeting "productive users"—small businesses and others who are willing to pay for consistent electricity because they can generate more income if they have more power
- Shortening time for importation of equipment by streamlining the Customs process; the quicker the equipment arrives, the faster the turnaround time for completing projects[18]
- Fine tuning current regulation passed at the end of 2016, *Nigerian Electricity Regulatory Commission MiniGrid Regulation*.[19]
- Continuing high-quality training from international experts.

Table 3. Question 1, Sub-Parts A–G, Regarding Finance and Access to Energy

QUESTION 1: SUB-QUESTIONS A - G FOR FINANCIAL ENVIRONMENT	
A. DCA Project Activities: To what extent has USAID's DCA program and REEEP's activities on DCA improved the ability of the RE/EE stakeholders/you to be able to invest in RE/EE new technology? Was the DCA used as a financial asset-risk reduction? Why or why not?	Ecobank reports that before the financial crisis and foreign exchange problem, they were able to finance DCA transactions. However, in attempting a new DCA transaction in 2017 they ran into a problem with some recent CBN language that, in turn, caused problems for the USAID DCA office. The DCA-backed transaction did not go through; other financing was found. Most bankers

[17] Solar panels attract between 5 percent to 10 percent import duty, though under the CET tariff code 8541.4010.00, a classification for import duty tariff on solar panels should be 0 percent; however, the Nigerian Customs Service is using a classification 85013300, meant for direct current (DC) generators with movable parts rather than the normal 85414000 classification hitherto used for solar panels.

[18] The 60-Day National Action Plan on Ease of Doing Business by the Presidential Enabling Business Environment Council (PEBEC), launched by His Excellency the Vice President of Nigeria Prof Yemi Osinbajo (SAN) on February 21, 2017, has greatly improved and shortened the time of clearing goods at the Customs office.

[19] http://nerc.gov.ng/index.php/library/documents/Regulations/NERC-Mini-Grid-Regulation/

	are optimistic that DCA will again be a tool for future RE investment financing business. Since the crisis, they were only able to start lending again for RE in the spring of 2018.
B. Financial Leverage: What is the amount of total public and private funds leveraged by DCA and non-DCA sources? How was the DCA Program useful/not useful? Why?	The frequency of REEEP pipeline financing deals slowed to a stop during the 2016 recession, but started rising once again because of Bettervest German Bank, which took up the loans that had been prepared using DCA but were unable to be disbursed during the recession. DCA may be useful in future if the CBN guarantee language issue is resolved. Interviews in June 2018 with developers indicate that most had signed new contracts based on the pipeline of projects prepared for DCA. In addition, they have new proposals in the works, using the financial and business planning training and mentoring they received from REEEP, so the amount leveraged will be beyond what was reported in the final life of project indicator list.
C. DCA Usefulness: Is there a way to make DCA more useful to the needs of your business/sector's needs?	Respondent recommendations include: Making all of the terms and relationships clear and being liberal about guarantees; addressing the up-front payment, with which some financial institutions are not comfortable; the amount needed for up-front payment is considered high.
D. DCA and Availability of Foreign Exchange Issues: If the USD-based (or other foreign exchange) financing were made freely available, do you think that this would assist with financing RE investments? Why or why not?	Some bankers, MFIs and others have said that FX is useful when local currency funding is very tight, as during the recession. Chinese and German (via Bettervest) suppliers can open a supplier credit accounts to SME energy firms. However, others said that having to pay back loans in FX is a problem and that they much prefer to borrow in the local currency.
E. DCA Relevance: Is the DCA program useful, and/or does it address loan repayment risk? Why or why not?	Partially relevant. In spite of recent problems, Ecobank and others view DCA as a useful tool to support future loans/credit to RE SME firms. The USAID DCA Legal Office had a language issue with the CBN, which may be resolved. Others do not find a guarantee useful if they cannot make a profitable loan. Other forms of support such as subsidies or grants might be more successful.
F. Financing Environment, Governance and/or Outreach: To what extent has REEEP's activities improved the ability of the RE/EE stakeholders to be able to invest in RE/EE technology?	REEEP's activities supporting RE entrepreneurs to prepare better business plans, learn about the latest technologies and equipment to use, and the due diligence prepared by REEEP for individual companies helped them to apply for larger contracts and more ambitious projects.
G. Business-enabling environment: What are the major policies/legislations enacted through the inputs provided by the project? Are there any positive effects on project implementation after the enactment of the policies/legislature? What is the status of implementation of these policies/legislations?	REEEP has not focused on policy and legislation. No indicators have been designed to measure progress regarding policy or legislation, and it is not one of the three main activity components. Nevertheless, it may be considered useful in a larger future program, if it is not already covered by another program and/or other donors (e.g., GIZ) consider it to be worthwhile.

4.2 EQ.2 IMPACT IN ENERGY ACCESS, TRAINING AND CERTIFICATION

4.2.1 FINDINGS: INCREASING ENERGY ACCESS IN NIGERIA

REEEP has increased energy access in Nigeria and is well-positioned to continue doing so in the fast-growing RE market.

REEEP faced another set of challenging conditions in trying to increase energy access: due to poorly installed equipment, solar energy had a reputation for not being reliable—so the general public, as well as potential investors and government agencies, were skeptical about installing it. The previous installations that had been done broke down frequently or did not last long. Awareness and understanding were low. In collaborating with NESP, REEEP was able to provide high-quality training and installations.

REEEP's target for increasing electricity access was 15,000 connections. Despite the adverse macro-economic conditions that restricted credit and imports, REEEP exceeded its target with 16,635 connections. REEEP's contributions in supporting local developers both technically and with business and financing expertise prepares them for anticipated projects and contracts with the newly approved USD 350 million World Bank project and increased commercial demand. The World Bank intervention aims to address some of the key REEEP results areas, including but not limited to support for isolated mini- and micro-grids, non-infrastructure projects, and hybrid systems.

According to respondents, there is a high demand in Nigeria for RE compared to the Power Africa programs in other countries, but estimations of peak demand vary widely. Five different sources are cited in the NESP study,[20] each of which project peak demand in 2020. The estimates range from 11,433 MW to 88,282 MW, based on different sets of assumptions regarding the population, GDP and structural changes in the Nigerian economy. The Renewable Energy Master Plan[21] provides the most detailed demand projections and estimates a peak power demand in 2020 of approximately 45,490 MW. According to the Word Bank, Nigeria's electricity consumption per capita is 149 kWh, which is likely a low estimate given that approximately 81 percent of Nigerians generate electricity through alternative sources such as diesel generators and wood to compensate for the irregular power supply. Moreover, the National Bureau of Statistics shows that more than 55 percent of the households in Nigeria still rely on fuel-based lighting options including kerosene, dry cell batteries, gasoline gensets and, to a lesser extent, candles and other fuels. For those without connection to the grid, the primary alternatives for lighting are kerosene (34 percent of those without electricity), followed by battery/dry cell (33 percent), and lastly by household-level gasoline generators (15 percent).

REEEP's contributions have been instrumental in adding a total of 2.15 MW, which is mostly in off-grid areas. The efforts to train and certify installers in collaboration with NESP program will continue to impact the market and increase energy access, as more and more technicians build high-quality systems and the developers increase production. A single company supported by REEEP, SME Funds, sold over

[20] GIZ, The Nigerian Energy Sector: An Overview with a Special Emphasis on Renewable Energy, Energy Efficiency and Rural Electrification; 2nd Edition. June 2015

[21] *2013 Renewable Energy Master Plan,* Nigeria Federal Ministry of Environment

600,000 solar lanterns in three years, with 30 percent of those sales attributable to REEEP support, according to interviews with their management.

In order to catalyze investment and accomplish USAID's objectives for the RE/EE sector in Nigeria, REEEP supported several important initiatives, including the following:

- **Nayo Tropical Tech.** REEEP partnered with NESP to finance this company's first mini-grid activity in Tunga Jika, Niger State, through Bettervest and has received USD 270,000 in investment funding. Once operational, this mini-grid should provide power to over 300 households and over 3,000 people.
- **Sosai Renewable Energies Company.** In FY 2017, REEEP assisted Sosai to access USD 130,000 in Bettervest financing to provide 250 Solar Home Systems (SHS) on a pay-as-you-go basis for unelectrified rural communities, mostly in Kaduna state.
- **SME Funds–Go Solar.** REEEP provided technical training, capacity building, and support for accessing finance for Go Solar's pilot mini-grid in Lagos. Bettervest is expected to finance the mini-grid, which should provide power to 250 households and over 2,000 people. The mini-grid is expected to raise USD 300,000. REEEP previously facilitated over USD 600,000 in financing to Go Solar's parent company, SME Funds.
- **Green Village Electricity (GVE).** REEEP provided technical training, capacity building, and supported GVE to access finance for its pilot mini-grid activity in Plateau state. With expected funding of USD 250,000 through Bettervest, GVE should provide power to 300 households representing over 2,500 people. REEEP undertook the financial due diligence, which GVE had never had done, for Bettervest. Due diligence gives a comprehensive report on, and sometimes reduces, the risk the investor is taking.
- **ACCION MFI Nigeria.** REEEP provided technical assistance, advisory services, and training on Pico solar products aimed for ACCION MFI small business customers. REEEP cooperated with ACCION in doing a technical assessment of products and client portfolio. ACCION began its RE/EE activity with the support of REEEP and began selling RE/EE products to their clientele.
- **Demsa Integrated Rice Production Activity.** REEEP provided technical advisory services and access to financing assistance for a 5,000-hectare rice farm in Adamawa State. In the past, REEEP conducted a feasibility study and a solar design options analysis for the Demsa Integrated Rice Production Farm. In FY 2017, REEEP supported Demsa by preparing the Design Build Guidance Criteria, Request for Proposals, and supporting the bid analysis for final selection. The activity will begin construction in FY 2018 and, once completed, will be the largest solar-irrigated farm in Africa.

4.2.2 MINI-GRID POTENTIAL

There are now close to 20 operational, solar-based, off-grid (also called mini-grid) systems in Nigeria, and additional systems are under construction. Under the GIZ/NESP collaboration, the REEEP-facilitated 85 KW solar mini-grid site in Gbamu-Gbamu, Ogun state is providing electricity to approximately 600 households, with a projected cost of USD 595,000. It costs approximately USD 1,000 per household and USD 7,000 per kWh. At 70 percent utilization, the mini-grid will generate 1428 KWh per day. In the

present Nigerian electricity market, off-grid generation based on medium-sized diesel generators is more expensive for consumers' on-grid supply. The World Bank estimates gasoline and diesel generators produce power at levelized cost of energy between USD 0.23 and USD 0.42/kWh. The cost of electricity from solar panels and hybrid solar panel-wind/diesel systems range from USD 0.22/kWh to USD 0.30/kWh. As the costs of renewables continues to decrease and fossil fuel prices in Nigeria revert to global market prices ("export parity"), the economic advantages of renewables will be greater. For the 85 KW mini-grid in Gbamu-Gbamu to break even, it will take approximately 6,421.05 days (17.59 years) of 70 percent efficiency, based on USD 115.83 per day. A profitability analysis of mini-grids for different sizes and different costs per kWh would be a valuable exercise, but data available to this Team to do so are limited and beyond the scope of this evaluation. This analysis would be a practical and useful one to do, to show the cost effectiveness of mini-grids.

As part of a market study, REEEP calculated the inflection point where the monthly payback for a RE/EE system that replaces a traditional generator is lower than the monthly cost of running that generator. This is achieved with consumer financing at nine percent over five years. This is the tipping point (assuming 100 percent financing) where replacing a current diesel or petrol generator with an equivalent solar system results in immediate monthly savings on a customer's energy bill.

A PRIMER ON MINI-GRIDS AND STAND-ALONE SYSTEMS

An **isolated mini-grid** is an electric energy system independent from the central grid, with a capacity of up to 1 MW. With its own power generation capacity, it supplies electricity to more than one customer through a distribution line. Isolated mini-grids target rural electrical energy growth (densely populated large villages with a medium load resulting from small productive activities) located far away from the central grid and/or where grid extension is costly.

An **isolated micro-/nano-grid** targets remote and densely-populated communities with a demand for lighting or other small power appliances and low loads due to the absence of productive activities. Different isolated micro-/nano-grids include one central generation set or interconnected SHS to power additional customers. Isolated micro-/nano-grids may use low-cost direct current (DC) grids and different voltage levels (12, 24 and 230 volts), which are generally incompatible with the central grid.

A **non-infrastructure support system** is an individual electrical system that can power one building which is not fitted with a distribution system, such as SHS or solar lanterns. It can either be permanently installed on the roof of the building needing power, or it can be movable.

Stand-alone systems aimed to play a very important role in the electrification of the most remote, sparsely populated and poorest rural areas and hybrid systems, combining different renewable generation technologies and conventional technologies (e.g., open and closed cycle gas turbines, reciprocating oil and diesel engines, or coal technologies).

A mini-grid is not cost-effective if its purpose is limited to providing electricity to households. As such, the feasibility of mini-grid systems is largely determined by additional uses such as powering micro, mini, and small-scale enterprises. Though the off-grid solar energy market is expanding through primarily mini-grid projects, these projects are not financially attractive in the present context without subsidies. REEEP was unable to offset these big-picture considerations. The dramatic price decline in solar systems has brought conventional and RE systems to be roughly the same cost (depending upon location), since expanding on-grid (national grid) and off-grid (mini-grids) requires roughly the same level of national government or international donor subsidies. SME Funds–Go Solar, a recipient of REEEP capacity building and mentoring, reported sales of more than 600,000 solar lantern and bio-gel sales to 520,000 households from 2014 to 2017. In FY 2017 alone, through their bio-gel and solar lantern initiative and multi-layer distribution business model, SME Funds–Go Solar sold over 186,495 liters of bio-gel and 1,260 solar lantern products to over 17,215 beneficiaries, saving an approximate 121,222 metric tons of

CO_2 emissions. They said that REEEP helped them keep track of their sales, enabling them to target and market to buyers.

REEEP's convening power was often mentioned in interviews with solar developers. For instance, REEEP has indirectly organized the companies working in RE to form the REAN, which currently has 35 associated companies. REAN is an independent, non-profit industry association, founded by RE stakeholders and supported by REEEP. REAN members included RE professionals, project developers, and practitioners who promote private-sector interests in Nigeria's RE sector. The Association's constitution was ratified on August 18, 2016 and it was formally launched on November 24, 2016. REAN is dedicated to promoting the growth and development of RE in Nigeria by engaging with the public and private sectors to guide advocacy, policy formulation, and investment in the RE sector. The Association's mission is to be the umbrella association for all RE promoters, enabling and encouraging the sustainable development of the Nigerian economy through RE. In KIIs, company representatives said that they met through REEEP financial and technical trainings. These 35 companies can serve the larger RE market in Nigeria, promoting strategies that will lead to the real possibility of RE supplying forty percent of national energy needs. According to BOI, only three or four of these companies are well-established, older companies—the majority are young, entrepreneurial businesses. Furthermore, those in the banking sector who understand the potential of solar energy in Nigeria are eager to expand their RE loan portfolio, with both Ecobank and ACCION Microfinance Bank expressing their willingness to expand their respective RE business products.

Table 4. Question 2 on Energy Access, Training, and Certification

TO WHAT EXTENT HAS REEEP BEEN ABLE TO INCREASE ACCESS TO ENERGY IN NIGERIA? TO WHAT EXTENT HAS REEEP BUILT NATIONAL CAPACITY IN TRAINING AND CERTIFICATION FOR RE/EE PROJECTS?	
A. Access to Energy: To what extent has REEEP been able to increase access to energy in Nigeria?	Marginal. REEEP contributions only added an estimated 2.15 MW by facilitating mini-grids, but considering the scale of the REEEP investment at USD four million, this is a commensurate achievement.
B. Recent Accomplishments: What is the situation of energy access now and five years back in Nigeria?	REEEP's accomplishments were directly impacted by the 2015 foreign exchange crisis, as noted in other areas of this report, yet REEEP managed to meet and/or exceed many of its targets. This crisis resulted in a ban on imports, lack of long-term funding and unfavorable rates.
C. Greenhouse Gases (GHG) CO2e: What is amount of GHG emissions estimated in metric tons (MT) of CO2e, reduced, sequestered, and/or avoided as a result of the project?	REEEP recorded a GHG emission reduction of 4,544,269 MT of CO2e over the life of the project for beneficiary households. This represents 114 percent of the life of project target.
D. Energy Supplies: Did these activities work to increase the supply of energy?	By early 2018, four mini-grids, which received some assistance from REEEP, were commissioned and operational. **Rubitec:** 85-kW solar mini-grid in Gbamu-Gbamu, Ogun state. This mini-grid will provide electricity to an estimated 600 households. **Nayo Tropical Tech:** Mini-grid in Tunga Jika, Niger State.

	SME Funds-Go Solar: Pilot mini-grid activity for 250 households in Sokoto state. **GVE:** Pilot mini-grid activity for 300 households in Plateau state. In addition to mini-grids: **Sosai Renewable Energies Company:** 500 SHS on a pay-as-you-go basis for rural unelectrified communities in Kaduna state. **ACCION–MFI Nigeria:** Provision of stand-alone Pico solar products. **Demsa Integrated Rice Production Farm:** REEEP support was technical advisory services and access to finance assistance for a 5,000-hectare rice farm in Adamawa state. In the past, REEEP presented Demsa with a feasibility study and a solar design options analysis report. During FY2017, REEEP supported the tender process by preparing the Design/ Building Guidance Criteria and Request for Proposals. REEEP also supported the bid analysis for final selection. The activity has begun construction and once completed, it will be the largest solar irrigated farm in Africa.
E. Access to Energy: Did these activities boost access to energy (i.e., to those without energy before)?	REEEP supported SME Funds-Go Solar to provide 600,000 solar lantern and bio-gel sales to 520,000 households translating to an average of 200,000 lanterns per year to households that were mainly off-grid. Go Solar representatives reported that about 30 percent of these sales can be attributed to the REEEP. REEEP also funded five mini-grid projects, all of which are off grid, which installed 1.2 additional MW to approximately 50,000 Nigerians.
F. Other Donor Power Projects: What are the other projects/programs supporting energy access in Nigeria? How are REEEP and other similar energy access programs coordinated and by whom?	REEEP reached two major milestones in partnership with GIZ/NESP. The first of these milestones was Nigeria RE/EE certification in collaboration with GIZ-NESP. REEEP provided technical assistance and capacity building for RE/EE businesses. The second milestone was the Bettervest crowd-funding initiative. The crowd funding supported three projects within two years and completed over USD 600,000 in financing. (See full details under section on NESP collaboration.)
G. Saving Energy: What is the energy-saving potential and how much energy is really saved/expected during the lifetime of the project? Were these activities useful/not useful? Why or why not?	As a result of REEEP's activity, Theophilus Nweke of Cloud Energy Photoelectric Limited claimed many electricity consumers are now gradually shifting from high energy-consuming electric bulbs to low energy-saving bulbs in most residential and commercial areas. Many KIIs also said they have incorporated EE audits into their work, although it is hard to determine how much of that can be attributed to REEEP. Of note is the REEEP-conducted energy audit for CUSO International's microfinance banks.
H. Relevance: Were all of these activities relevant? Why or why not?	REEEP's target to provide capacity building, due diligence in access to finance in RE/EE financing and support to mini-grids are all relevant to help energy access for the long term.
I. Other Donor Projects: What are the other projects/programs supporting energy access in Nigeria?	1. The European Commission is currently supporting the improvement of renewable energy policy in Nigeria with financial support of €27 million. 2. The World Bank Group is partnering with Nigeria's Federal Ministry of Environment to raise a USD 100 million clean technology fund for the development of alternative energy sources in Nigeria. The low interest

	concessional loan is to diversify Nigeria's hydro- and gas-based energy sources to ensure energy security. 3. The United Nations Development Program (UNDP) and Nigeria's BOI are currently collaborating to support investments in the use of RE resources to improve the access to modern energy services for MSMEs in Nigeria that show creativity to facilitate investment in off-grid energy options.
J. Relevance: Were these technical power training activities useful/not useful or relevant? Why or why not?	The power training activities have helped improve the quality of services provided in the sub-sector. For example, the installers of ACCION/Cloud Energy partnership confirmed correcting already faulty installations based on the knowledge received from REEEP's training. Winrock also notes that they directly trained 33 developers who noted the positive impact the training had on their technical and professional capacities.

4.2.2 CONCLUSIONS: INCREASING ENERGY ACCESS IN NIGERIA

REEEP has been able to increase 2.15 MW in the off-grid market in a three-year period and surpassed its 2 MW target regarding increasing energy access, despite challenging macroeconomic constraints. However, REEEP's contribution is insignificant considering the huge power demand in Nigeria.

The off-grid solar market is expanding. REEEP has been able to stimulate the market, which is now ready for future expansion. It has already been proven that there exists good potential for off-grid energy solutions (such as solar home systems and solar lanterns) for future expansion.

Mini-grids are promising infrastructure projects, but they are not financially attractive in the present context without the provision of subsidies or grant support and business consumers that can consistently pay premium tariff. As stated earlier, it is impossible to say with any certainty whether the mini-grid will be commercially viable. Limited funding and high up-front cost, resulting in a long recovery-of-investment period, is a contributing factor. Also, the ill-defined renewable electricity tariff structure and high cost of importation further hinders investment. A general lack of understanding of the new technologies and lack of faith in their success is also a barrier.

There is a positive case of market penetration of bio-gel fuel to replace non-clean cooking fuel. All of the raw material inputs for the bio-gel production, such as sawdust, water hyacinth, grasses, and food and agricultural wastes are available in large quantities in Nigeria and are currently waste products that could be sourced at marginal delivery cost for production. SME Funds has demonstrated that bio-fuel for clean cook stoves is viable, sustainable, and scalable. This has been demonstrated by the fact that there are over 15,000 green entrepreneurs (distribution agents) and over 1.6 million liters of bio-fuel sold in the last two years. Since Nigeria is a large market, as part of their sustainability plan the firm sells clean cook stoves to be able to continue to stimulate demand for bio-gel as source of fuel. In Nigeria, there is huge waste. Nigeria has not fully exploited the potential for recycling waste materials, especially sawdust. Sawdust heaps are considered waste and therefore are indiscriminately incinerated, making a significant contribution to the greenhouse gas emissions. With improved technology promoted by REEEP and SME Funds, these waste pollutants can be converted to clean energy in a sustainable and scalable manner. When bio-gel from abundant waste in the country is used to cook, it is safe and clean. The gels burn evenly and safely with little air pollution, minimizing risks in homes.

4.2.3 FINDINGS: NATIONAL CAPACITY IN TRAINING AND CERTIFICATION

All the stakeholders applauded REEEP for their training courses. Through REEEP, USAID has reportedly earned acceptability and respect. The high quality of the content and delivery of the training programs and how it helped to improve the quality of work in the RE and EE was noted. REEEP has been successful in developing course modules and conducting various training programs. All stakeholders have appreciated the general usefulness and impact of the trainings in the renewable energy sector in Nigeria—in particular, in encouraging the banking sector and solar companies to expand RE business. One of the training beneficiaries, however, suggested that the training sessions could be improved by allowing more time on practical sessions instead of the current distribution of 25 percent practical and 75 percent theoretical sessions. There are seven course modules developed, but not all seem to be in high demand. A total of 12 training partners and research institutes across 11 locations in Nigeria deliver these trainings. Only training targeting solar PV and mini-grid are in high demand by the training beneficiaries.

NESP Training Collaboration

REEEP collaborated with GIZ through the NESP to increase the technical qualifications of installers in Nigeria, promote internationally acceptable standards, and ensure businesses have access to trained RE professionals. REEEP worked with NESP, government counterparts, and the Nigerian Electricity Management Service Agency (NEMSA) to promote standards and verification that will provide additional business certainty and improve RE investment potential.

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Figure 3. List of REEEP's training partners and research institutes

- Technical training for training partners: WI, in conjunction with NESP, developed trainings in seven key practice areas to improve Nigerians' technical capacity.
- REEEP worked with NESP and partner training institutions to implement the Certification System for RE/EE practitioners.
- REEEP assisted NEMSA to build its capacity to perform its obligations of verifying and inspecting all electrical solar installations. REEEP provided equipment and specialized training.

To address potential bottlenecks for developers in the pipeline and to improve opportunities for financial closure, REEEP collaborated with GIZ-NESP to train mini-grid developers in business development, strong management practices, and commercial loan application procedures. Specifically, through REEEP, developers received training in assessing economic and cash-flow projections for proposed projects, ensuring

overall project integrity and quality, and building relationships with potential financiers—all to ensure that viable projects secure the necessary financing. This mini-grid initiative anticipates the successful facilitation of financing of USD 1.2 million and an increase of installed capacity by over 1.2 MW, which will provide electricity to over 50,000 Nigerians. With NESP, REEEP developed technical curricula to prepare and certify installers for a viable, RE professional occupation and to assure banks and customers of the quality of their services. In coordination with GIZ, REEEP worked with 12 Nigerian institutions (see Figure 3, page 29) to provide broad-based assistance for RE education and certification. For the technical trainings, REEEP provided scholarships covering the training at 100 percent and procured training equipment.

Under its partnership with GIZ-NESP, REEEP successfully operationalized the Nigeria RE/EE Certification System and has been able to provide technical assistance and capacity building for nascent RE/EE businesses that are producing impressive results in terms of installed capacity and connections. REEEP also successfully operationalized the Bettervest crowd-funding initiative, having resolved all the technical, operational and regulatory issues associated with crowd-funding. REEEP closed three projects and over USD 600,000 in financing within its first three months of operation and the final transaction (with Sosai) was fully funded in under 24 hours.

Other donors, REAN, and 80 percent of respondents stated that the trainings were useful and appropriate for their kind of work and that they would recommend it for others.

Some trainees mentioned that they thought that a training needs assessment is a prerequisite to achieve the desired results.

Certification

Different stakeholders understand certification differently. In the absence of a total quality assurance system, it is not clear to what extent the certification program alone has contributed in the overall quality enhancement in Nigeria's RE sector. Many respondents said that if this training becomes the norm, quality will rapidly improve; the training, however, requires an accepted standard national certification program. The certification provided by the technical trainings developed by REEEP/NESP is considered provisional until a qualified, trusted agency can issue permanent certification. The quality of the products in the market is mixed, but generally it is rated better than in the past. Some companies still sell products or install systems which may not last for more than six months as a result of lack of certification and dearth of quality controls within the system.

NEMSA has a mandate to enforce technical standards and regulations by carrying out technical inspections, testing, and certification of electrical equipment/installations and power systems. It has 16 field offices and three meter-testing stations. WI (REEEP) and GIZ (NESP) have collaborated with NEMSA to develop a certification framework for RE and EE, and WI has also provided NEMSA with equipment. According to NEMSA, there was an active collaboration with WI in 2016, but there was no such relationship in 2017. NEMSA wants to have continued collaboration with REEEP in the area of inspection, testing, and certification.

Apart from USAID, other donors including the UNDP, GIZ, EU, and IFC/World Bank are active in the RE sector. Most stakeholders expressed that REEEP's collaboration with GIZ was useful and effective in delivering targeted programs that address the RE/EE needs of beneficiaries. GIZ expressed that the collaboration with REEEP was useful where REEEP contributed international resource persons and GIZ

provided financial resources in conducting various training programs. GIZ further expressed that REEEP's technical and financial strength matched well in executing various training programs.

GIZ is now planning for its next phase of the program—three years co-financing with the European Commission. The Euro 33 million program will focus on electrification planning and implementation.

4.2.4 CONCLUSIONS: NATIONAL CAPACITY IN TRAINING AND CERTIFICATION

REEEP is largely recognized for its training programs. Trainings have been effective and can be made even better by targeting participants' specific needs.

Certification alone is insufficient to enhance the overall quality of the system. A certification program should be an integral part of total quality assurance system. NEMSA could be one of the strong collaborative partners for executing inspection, testing, and certification activities.

There is a strong need and demand for collaboration among the development partners on the areas of training and certification. REEEP has placed itself in a prominent position by its past contributions on developing course modules and conducting various training programs. GIZ is one immediate partner with whom to collaborate.

4.3 ENERGY EFFICIENCY AND GREENHOUSE GASES (GHG) EMISSION REDUCTIONS

4.3.1 FINDINGS: ENERGY EFFICIENCY AND GHG EMISSION REDUCTIONS

The goal of EE is to reduce the amount of energy required to provide products and services. For example, installing fluorescent or LED lights, or natural skylights, reduces the amount of energy required to attain the same level of illumination compared with using traditional incandescent light bulbs. Improvements in EE are generally achieved by adopting a more efficient technology or production process or by application of commonly accepted methods to reduce energy losses. There are many motivations to improve EE. Reducing energy use reduces energy costs and may result in a cost savings to consumers—if the savings offset the expense of implementing the more efficient technology.

Reducing energy use is also seen as a solution to the problem of reducing GHG emissions. According to the International Energy Agency, improved energy efficiency in buildings, industrial processes, and transportation could reduce the world's energy needs in 2050 by one third and help control global emissions of GHG. A report published in 2006 by the McKinsey Global Institute, asserted that "there are sufficient economically viable opportunities for energy-productivity improvements that could keep global energy-demand growth at less than 1 percent per annum"—less than half of the 2.2 percent average growth anticipated through 2020 in a "business as usual" scenario. Energy productivity, which measures the output and quality of goods and services per unit of energy input, can come from either reducing the amount of energy required to produce—or from increasing the quantity or quality of goods and services produced from the same amount of energy.

Carbon dioxide (CO_2) is one of six major GHGs recognized by the International Panel on Climate Change. Many of these gases are produced by both natural and human activities; particular attention, however, has been given to CO_2 emissions as they account for the vast majority of man-made GHG emissions (83 percent in the U.S.). Because CO_2 is the most prevalent of all man-made GHGs, the other

five GHGs—methane; nitrous oxide; hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulfur hexafluoride (SF6)—are typically reported in terms of a CO_2 equivalent, based on their global warming potential to provide a common unit of measure.[22] The World Resources Institute estimates that Nigeria's GHG emissions in 2012 (its latest record for the country) exceeded 296 metric tons of CO_2 equivalent ($MtCO_2e$), excluding land use. The figure exceeds 474 $MtCO_2e$ when land use is included (CAIT Climate Data Explorer, 2015). The data available for the period 2000 through 2012 show an upward trend in emissions, with decreases in levels reported from 2007 through 2009 compared to 2006 values; 280 $MtCO_2e$ without land use and 463 $MtCO_2e$ with land use.

EE seems to have drawn less attention than RE. There are course modules developed for EE building design, energy management, and energy audits. REEEP efforts were confined to conducting RE training sessions. There were no targeted activity interventions that contributed directly to enhancing EE.

GHG emission reduction is based on estimates that bio-gel would replace kerosene, charcoal, and firewood in cooking and solar would replace petroleum fuels used in electrification. No stakeholders reported major concerns regarding GHG emission reductions.

4.3.2 CONCLUSIONS: ENERGY EFFICIENCY AND GHG EMISSION REDUCTIONS

Advocacy and communications effort are needed to address both EE and GHG reduction. Key barriers to Nigeria's reducing its GHG emissions are dependence on fossil fuels for energy and foreign exchange, as well as significant levels of gas flaring during petroleum exploration and production. Many Nigerians, because of limited electricity supply from the national grid, provide their own electricity for business and personal use by means of privately-owned fossil fuel-powered generators (Punch, 2016; Oyedepo, 2012). Nigeria, in its Paris Agreement Intended Nationally Determined Contributions (INDCs) noted that to meet its conditional and unconditional targets the country would have to end gas flaring by 2030. Further, it would need to reduce dependence on fossil fuel-powered generators while enabling access to energy for all Nigerians and establish significant (13 GW) off-grid solar electricity, as well as be given technical support, to improve EE. The estimated national cost is more than USD100 billion (ICF International, 2016). To achieve these goals, both present and successive governments at all levels will have to implement (and where necessary improve upon) the national and other policies that formed the basis of the INDCs.

Abubakar Alkali, a practicing environmental management professional in Nigeria, in his comments on the issue, pointed out that Nigeria did not participate in the signing of the Paris Agreement—let alone meeting a pledge (Alkali, 2016). He believes this was because Nigeria did not recognize the Agreement to be important; some Nigerians perceive the Agreement to be retrogressive and would undermine the country's development efforts. Nigeria's inability to sign the agreement, Mr. Alkali remarks, means that the country's GHG emissions would increase as no efforts will be made to make reductions. He suggests an urgent creation of a national think-tank in this area and strengthening of relevant national institutions to introduce and implement policies, plans, and programs aimed at reducing GHG emissions. Other practicing environmental management professionals in Nigeria identified the following barriers to Nigeria's minimizing its greenhouse gas emissions: traditional bush burning in preparing land for farming; absence of environmental education on climate change in the rural areas with particular reference to use

[22] Emissions of Greenhouse Gases in the United States 2005. Energy Information Administration, November 2006: xi

of wood as major source of energy for domestic purposes; inadequate provision in environmental laws on the control of industrial air pollution; inadequate institutional structure and poor capacity on climate change in Federal and State Ministries of Environment; and discordant national policy on climate change. (Andah, 2016). These issues translate to the absence of reliable data on quantities and major sources of GHG. Also, the situation prevents regulatory agencies from meaningfully tackling the problems—for example, selecting the best technological and natural methods to reduce emissions.

Energy efficiency can apply to all sources of energy, not just renewables. This may have a bigger impact if EE is disconnected from RE and applied to all sources.

4.4 SUSTAINABILITY OF REEEP ACHIEVEMENTS

4.4.1 FINDINGS: SUSTAINABILITY OF REEEP ACHIEVEMENTS

The RE market is new in Nigeria. EE lags even further behind. REEEP has made an essential contribution by designing training curricula and developing partnerships with some institutions (mainly GIZ). USAID should build on the already well-established GIZ partnership to improve on the present collaboration gains.

The number of companies in the RE sector is increasing. While quality issues have been addressed to some degree through REEEP-supported training and certification, a full-fledged quality assurance system has yet to be instituted at the local or national level. Some level of awareness has increased among the participating banks and companies, but knowledge of the full potential of the RE/EE sectors is not widespread among financers. Additionally, while training and certifications have been well received, stakeholder respondents emphasized the need for follow-on trainings.

The environmental sustainability of the activity is positive due to the promotion of RE and EE with strong consideration to the reduction GHGs in the improved installation and deployment of quality solar equipment. Both RE and EE contribute to CO_2 reduction and climate protection.

The effectiveness of the REEEP results shows that rural electrification has started as a result of the support provided through collaboration with GIZ/NESP with deployment of five mini-grids and the large solar irrigation facility at a rice farm.

Looking forward, as part of the activity's "honest broker" services to continue beyond the life of the activity, REEEP has created a pool of stakeholders in the RE/EE sector that can provide technical support in the sector:

- Continue building the private sector; private-sector programs are more effective and more sustainable.
- Start incubators for MSMEs and support entrepreneurs; there is a multiplier effect.
- World Bank, Nigeria Climate Innovation Center (NCIC): REEEP has discussed having the new NCIC located in Lagos, to provide due diligence services for Bettervest beneficiaries.
- Training partners on clean energy certification: The 13 certified training partners/institutions will take on the challenge of developing qualified technicians in the RE/EE sector.

- REAN: REAN's capacity is developed to take over the technical assessment and quality standard interventions that REEEP is currently performing for financial institutions.
- Financial institutions: By continuously providing relevant training and advisory services to various banks and organizations in Nigeria, these institutions are better positioned to understand RE/EE risks and opportunities in future.
- Financial and business support should continue, as there is still a skills gap. There is some evidence that the new NCIC is taking this on.
- Continue the momentum that has been created and recognize the impact this has for small companies. They are very frustrated, having worked intensely, and then the program shut down.

4.4.2 CONCLUSIONS: SUSTAINABILITY OF REEEP ACHIEVEMENTS

While all REEEP stakeholders are of the opinion that REEEP should be continued, the concept and approach are appropriate for many partners and target beneficiaries in the RE and EE sector of Nigeria. The concept conforms with the *Nigeria Vision 2020* planning document. *Nigeria Vision 2020* was released in 2010 and outlines a path for the global and national vision to position the country among the leading 20 economies of the world in 2020. At its core, the objective is a holistic transformation of the economy. The Vision program identifies the barriers to the country's development (e.g., unreliable power supply, poor and decaying infrastructure, high dependence on the oil sector) and names the directions for achieving the target, using a strategy of three main pillars building one on to each other. The goal of these central pillars is to solidify the foundations of productivity and well-being, optimizing key factors of economic growth, and promoting sustainable economic development. Energy provision is regarded as a key component of all three pillars. Its development is intended to be led by the private sector in a liberalized market. The role of government and state agencies shall then be limited to providing the legal and regulatory environment. Overall, an increase of the installed capacity to 35,000 MW by 2020 is planned for.

4.5 DESIGN AND MANAGEMENT OF FUTURE RE AND EE ACTIVITIES

4.5.1 FINDINGS: DESIGN AND MANAGEMENT OF FUTURE RE AND EE ACTIVITIES

Nigeria has abundant access to RE, mostly in solar, wind, biomass, and small hydropower sources. The access to energy in Nigeria is still very poor. With poor access to energy, it was expected that RE/EE will form part of the solutions in Nigeria. The demand for RE/EE is still very low, however, as result of lack of awareness of the RE/EE and perception of a high cost of acquiring it. Also, for those that are even aware of RE, its dismal reputation for reliability due to spotty quality of installation has proven a barrier. To address this situation, it is recommended that GON create an awareness campaign that promotes RE/EE as a reliable and cost-effective solution to the energy crisis in Nigeria.

KIIs indicated a number of suggestions for further development. Respondents indicated that the quality of the equipment supplied needs to be improved to ensure that it remains operations for the expected life of the equipment. There is a need for further work on the areas of equipment testing, training certification by a trusted organization, and targeted training that respond to stakeholder needs. Involvement of the right institutions is important, especially in testing and certification; respondents

suggested that independent organizations such as universities may be an option. NEMSA could be one of the authorized partner institutions on inspection, testing and certifications. A needs assessment for trainings should be conducted, after which curriculum based on the training needs would be developed. Training programs could then be conducted on a cost shared basis.

Additional support is reportedly needed across the board to help ensure that RE project developers achieve financial closure. Introducing a loan product or connecting a developer with a bank are not sufficient. Communication and strong advocacy are needed to create bankable project designs and ensure that financing is provided to viable RE/EE projects. REEEP's partnership with Bettervest is a notable one and shows the type of alternatives that are available. That model could be scaled up. REEEP is providing due diligence services for investors with no local presence and filling in gaps in the current markets.

4.5.2 CONCLUSIONS: DESIGN AND MANAGEMENT OF FUTURE RE AND EE ACTIVITIES

Even though Nigeria's national RE/EE *policy* is in place under the Federal Ministry of Power, full *implementation* is not, and support for implementation and private-sector participation is not complete. USAID can help the GON to develop actionable steps for the implementation of actionable policy relative to other sources of electrical power, including using municipal waste to generate methane, other combustible biomass to generate power, and small-scale hydropower. This will further support the World Bank Low Carbon Initiative.

Expanding working relationships with other banks (such as the BOI and the Development Bank of Nigeria) and companies is necessary to expand energy access. REAN seems to be an emerging institution which may make a great impact on advocacy in the future.

There is a need for further work in the areas of equipment testing, certification by an entrusted organization, and trainings targeted to the needs of the stakeholders. NEMSA may have a part to play in testing, inspection, and certification going forward.

REEEP collected good financial information and RE/EE data, which need to be used in the future for designing another project. It is worthy of note that gender is neither integrated into the planning nor disaggregated in the data collected.

Results indicate that REEEP may really work positively with the private sector. Other Power Africa countries say they are—but then constrain private-sector efforts by dictating that they must work in rural areas or serve a particular population. To its credit, REEEP served whoever was willing to do the work, according to KIIs. Although there is an obvious need in unserved rural areas, there is often a large demand by businesses in urban areas who want consistent, cleaner forms of energy to run their operations—and they are willing to pay for it.

4.6 EQ.3 USEFULNESS OF M&E PERFORMANCE INDICATORS

4.6.1 EVALUATION OF EIGHT INDICATORS

The indicators reflected the activities and expected results of the REEEP well and fit into the CDCS and Power Africa results frameworks. The indicators collate RE sources as source-reliable and clean energy to the population, particularly for the resource-poor. They also incorporated EE by promoting and tracking efficient use of energy that reduces GHG. The Team, however, recommends that energy governance, outreach, gender, and communication policy should be incorporated into future indicators.

Eight is a manageable number of performance indicators for the size of REEEP. There were not so many indicators as to be burdensome, and not too few to adequately measure results. Most of the indicators were Power Africa indicators and thus, besides being logical choices, were useful and comparable to other USAID and international donors' projects.

REEEP has had three data quality assessments (DQAs) over the activity's four years, and repeatedly scored well in reviews of data collection and recording processes. Three indicators were assessed in total. Two indicators were standard indicators and one was a custom WI indicator.

The DQA team discussed the data collection process for all the indicators with the REEEP staff and private-sector partners, as well as the DCA bank, Ecobank. Private-sector partners are business oriented and involved in selling and installing RE technologies and use distinct approaches in recording their client data. Some record their customers and issue receipts, while others provide their customers with unique identifying numbers. Beyond these distinct processes of collecting primary data, however, REEEP provided partners with a uniform data collection method. This data form collected a range of information, including the month of reporting, name of project developers, location name and address, customer name, customer sex, amount of monthly diesel/fuel consumption, number of kWh/kVa deployed, number of beneficiaries, and distribution site/location. Once the private-sector partner has completed the form, it is submitted to REEEP. The REEEP M&E Specialist then conducted field visits to the SMEs to review submitted documents for completeness and confirm reported data. The M&E Specialist also made periodic phone calls to locations s/he had not physically visited to double-check on the entered data. During the DQA exercises the assessment team visited the REEEP's private-sector partners in Lagos. All partners confirmed that they had received training on how to complete data on the REEEP tools that they had received. During the assessment, the DQA team physically verified completed data collection tools at all levels. The WI M&E Specialist clearly explained the data storage system used across the board (WI stores data both by soft copy [electronically] and by hard copy [files]). This was observed when the assessment team visited WI and the partner organizations in the field.

However, an over-emphasis on results monitoring may have shown a negative side. KIIs held in June 2018, after the REEEP had closed, found that at least one private-sector partner said that his company felt "policed" by the REEEP staff and pressured to provide numbers for their monitoring. Thus, numbers given may be skewed higher than the reality on the ground warranted. This does not invalidate the results shown in the indicators, but does provide a cautionary note to take steps to validate data while not overburdening the suppliers of that data.

Table 5. Question 3 on Usefulness of the REEEP Performance Indicators for Results Measurement

TO WHAT EXTENT DID THE PERFORMANCE INDICATORS REPORTED BY REEEP TO INFORM DECISION-MAKING?		
#	**INDICATOR**	**QUESTION/ANSWER**
1	Ind. G.1: Number of new grid and off-grid actual direct connections (Power Africa Ind. #5). This indicator measures actual direct connections reflect the actual number of new households and businesses that access electricity through on-grid connections, micro-grid, and off-grid solutions.	1st Ind. G.1: *Was this indicator useful in decision making? Yes. Relevant? Yes. Why or why not?* Tied into REEEP and Power Africa and helped track REEEP impact.
2	Ind. G.2: Number of beneficiaries with actual access to connections (Power Africa Ind. #6A).	2nd Ind. G.2: *Was this indicator useful in decision making? Relevant? Why or why not?* This indicator was useful in decision-making and relevant for tracking work plan and activities. Tied into REEEP and Power Africa and helped track REEEP impact.
3	Ind. G.3: GHG emissions, estimated in metric tons of CO2e, reduced, sequestered, and/or avoided as a result of USG assistance (Power Africa Ind. #24). This indicator reports the quantity of GHG emissions on an annual basis, estimated in metric tons of CO_2-equivalent, reduced, sequestered, and/or avoided, as a result of USG activities, as compared to a baseline level of GHG emissions. The baseline is the "business as usual" reference for GHG emissions that would have occurred during the reporting period if there had been no USG intervention. This indicator is a calculated estimate, and typically not a result of direct emissions measurements.	3rd Ind. G.3: *Was this indicator useful in decision-making? Relevant? Why or why not?* This indicator was partially useful in decision-making. Much of the results of REEEPs activities were in new connections, which were not replacing polluting energy sources. However, the support to companies supplying bio-gel and solar lanterns are relevant. The indicator was also relevant for tracking work plan and activities. Tied into REEEP and Power Africa and helped track REEEP impact.
4	Ind. 1.1: Expected lifetime energy savings from energy efficiency or energy conservation as a result of USG assistance or Power Africa partners (Power Africa Ind. #26). This indicator reports on both thermal and electricity savings generated from energy efficiency and energy conservation as a result of USG assistance. Lifetime savings must be calculated using the USAID default lifetime values for each technology unless more accurate data is available and reported in the indicator narrative.	4th Ind. 1.1: *Was this indicator useful in decision making? Partially, and not directly as an Activity. Is it Relevant? Why or why not?* The indicator is relevant in that energy saving helps to improve the use of energy—as energy prices increase, the more energy savings becomes attractive. Demand for electricity in Nigeria is far higher than supply, so energy saving makes for efficient use of the limited supply. While most companies which received benefit from REEEP said they did indeed do a lot of EE work, and they did receive training on EE, it was not measured.
5	Ind. 1.2: Number of beneficiaries with improved energy services, including bio-gel fuel.	5th Ind. 1.2: *Was this indicator useful in decision making? Relevant? Why or why not?* This indicator was useful in decision-making, as it directly relates to ongoing and proposed activities. It is also relevant as it relates to assistance given to SME in bio-gel work.
6	Ind. 2.1: Total public and private funds leveraged by USG four energy projects (disaggregated by DCA and non-DCA Sources).	6th Ind. 2.1: *Was this indicator useful in decision making? Relevant? Why or why not?* Yes, the indicator was useful in decision-making and relevant, as it directly relates to tracking work plan activities.
7	Ind. 2.2: Number of clean energy certification standards established.	7th Ind. 2.2: *Was this indicator useful in decision making? Relevant? Why or why not?* Yes, this indicator was useful in decision-making and relevant because REEEP established seven installation standards, where little or none existed.

8	Ind. C1: Person hours of training completed in technical energy fields supported by USG assistance (Power Africa Ind. #23).	8th Ind. 1.2: *Was this indicator useful in decision making? Relevant? Why or why not?* The indicator was useful in decision-making and relevant as it tied directly into the REEEP and Power Africa and helped to track REEEP impact.

4.7 EQ.4 STEPS TO SUSTAIN REEEP ACHIEVEMENTS

4.7.1 FINDINGS: SUSTAINING REEEP ACHIEVEMENTS

Technical Training: The economic sustainability of the activity is positive, particularly now that the cost of solar panels has reduced significantly compared to the cost five to ten years ago. The training in improving the quality control and standards in the market has given credibility to the viability of solar energy systems making a large contribution to the supply of energy in Nigeria. The reportedly smooth cooperation between RE developers and financial institutions makes the sector increasingly attractive. One of the noted achievements brought about by the now inexpensive solar panels is the day-time irrigation of farms (i.e., without the need for costly batteries for night-time electricity; these investments in solar energy quickly pay off the investment).

Certification Systems for Technicians: Trade associations and other international donors stated they are interested in taking over some of the REEEP training after the activity closes in March 2018. The growing community of developers is pushing the demand and emphasis on certified RE/EE technicians. Thus, training with an aim towards a technician certification drives a skill set that is much in demand, since it is a new field—and there are many self-proclaimed self-taught "experts" who make costly mistakes.

Clean Energy Certification Standards: REEEP adapted international standards where they exist for new technologies. In KIIs, many respondents stated that adapting these foreign standards to the reality in Nigeria has been very useful. Certification systems for the new RE industry have been widely embraced as a public good for both the industry and its customers.

Mini-Grids: According to REAN, Nigeria spent about USD 14 billion yearly on inefficient generation of electricity due to the use of old and inefficient equipment and production processes. These include the inefficient traditional wood stoves used by 70–80 percent of households, the use of vehicles with low fuel efficiency, the predominant use of incandescent light bulbs, the indiscriminate use of electricity among urban dwellers (such as leaving appliances on when not in use), and the purchase of second-hand appliances which have often been rejected by former users in favor of more efficient appliances. This suggests that acceleration of mini-grid electricity development could reduce the amount spent by Nigerians. REAN also pointed out that off-grid alternatives such as creating a mini-grid and SHS can cost USD 9.2 billion dollars a year and can save Nigeria's citizens USD 4.2 billion dollars annually. REAN is expecting support from World Bank estimated at USD 350 million dollars to be dedicated to development of mini-grid electricity in Nigeria. REAN envisaged that the fund would help provide electricity for 200,000 Nigerian households and could assist 50,000 entrepreneurs in the sector. Currently, RE solar mini-grids are not profitable without GON or donor subsidies.

Clean Cooking Bio-Fuel: This is a highly competitive alternative to kerosene/petrol-based fuels. With a free source of water hyacinths in the coastal area around Lagos, it makes sense, while other raw material inputs for the bio-gel production, such as sawdust and food and agricultural wastes, are also available in large quantities in Nigeria and could be sourced at marginal delivery cost for bio-gel production. There are plans to use Jatropha in bio-gel/bio-fuel production process, but thus far the cost of water hyacinths is more attractive as local governments supply it for free as part of their water-way maintenance programs. Also, it does not burn off all the carbon as cleanly.

Financial Training, Curriculum, Due Diligence, and Loan Standards: The financial trainings for bankers about RE/EE industry financial and credit standards in other countries were highly praised. REEEP's due diligence work with loan facilitation was greatly valued by other donors. Small business owners said that for the first time, they learned about financing and how to put together a proper business proposal, and they said the trainings were very much targeted to their needs. Attendees said the trainings connected them to potential financers. According to one developer the Team interviewed, "Five years ago, everything in this field was in a dark room. With REEEP, suddenly there is a flashlight in that dark room, and financers, developers, entrepreneurs can find each other."

The trainings provided the needed technical information, particularly with lending, that the stakeholders in the industry needed to expand the acceptability of RE/EE. As with the technical training, the curricula prepared for this training should be followed up in future programs.

4.7.2 CONCLUSIONS: SUSTAINING REEEP ACHIEVEMENTS

REEEP was Successful: Most KIIs agreed that the REEEP was successful, with the exception of the first year of management problems.[23] The resources used in training partners and beneficiaries have resulted in building important capacities in the RE/EE SMEs and financial institutions. All of REEEPs stakeholders are of the opinion that REEEP should be continued; REEEP is viewed as an "honest broker" that provided quality capacity building in RE/EE training and certification.

Advocacy Needed: The multitude of governance and finance problems show that there is a need for strong advocacy to support the industry as it grows. Communications plans with outreach and strategic marketing of the RE industries' main talking points are needed. This could take the form of an outreach effort via television, radio, and internet/social media messages tailored to the audience to achieve long-term sustainability.

Training Program: Syllabi and training courses tailored to the needs of the industry, especially in EE, and targeted at selected beneficiaries, will increase competitiveness in the sector and at the same time create new crops of service providers in the RE/EE sector.

Capacity Building: Capacity building approaches are more complex than just training. There should be an institutional approach after a needs assessment/gap analysis about how to build up the governance organizations in the rapidly growing RE industry.

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[23] As cited in the USAID Scope of Work for the REEEP Final Evaluation, serious management changes had to be made (and were made), and the program turned around quickly. However, what was a four-year program turned into a three-year program, often very short for an electric infrastructure type of project.

Budget Realities: The REEEP budget of USD four million over four years was not sufficient for a RE/EE project for what was designed, with the outreach and governance components. Fortunately, there was a good opportunity for the REEEP to work with GIZ and it was fortunate that the REEEP Chief of Party (and the USAID Agreement Officer's Representative) were supportive of this effort. Without partners like GIZ, a USAID RE project may need two to three times the funding obligation (e.g., USD 10–15 million for four years). This is suggestive that USAID should support the follow-on activity leveraging donor collaboration to develop a common work plan and intervention strategy. However, even with external assistance from GIZ and/or other partners, a viable energy infrastructure activity requires much more funding and personnel resources than what was provided to REEEP.

REEEP Due Diligence: GIZ and other stakeholders spoke very highly of REEEP senior staff and how they carried out due diligence. In addition, REEEP was successful in developing training modules and syllabi for working with business loans. This opened the door with Bettervest; one of GIZ's partner organizations.

Future Program Opportunities with World Bank Group and the African Development Bank: Future possibilities include the new USD 350 million World Bank credit window for RE and EE financing. The World Bank credit window will provide support to isolated mini-grids, isolated micro-/nano-grids, non-infrastructure projects, and hybrid systems. About USD 150 million is slated for solar hybrid mini-grids for rural areas. The hybrid systems are a combination of renewable generation technologies and conventional technologies (e.g., open and closed cycle gas turbines, reciprocating oil and diesel engines, or coal technologies). There is USD 75 million allocated to SHSs and for SMEs. The rest of the credit window is for installing solar systems for hospitals and universities, and for technical assistance (see Table 6 below). In addition, the French Development Agency, AFD, has a program that has proved very effective in a number of African countries to buy down the interest rate. This should soon be available in Nigeria, and the World Bank program was approved at the end of June 2018. However, the World Bank has a reputation for being slow to operationalize and disburse its program funds for Nigeria.

Table 6. The World Bank's Nigeria Electrification Project

COMPONENT	EST. AMOUNT (USD MILLION)	COMMENTS	TENTATIVE TARGETS
Rural mini-grids	150.00	Serve HH, increase economic activity, support agriculture	200,000 HH 50,000 Enterprises
Rural stand-alone solar systems	80.00	Serve remote rural HHs	250,000 HH 10,000 Enterprises
Underserved universities and hospitals	100.00	Improve their productivity	37 Universities Seven (7) Hospitals 50,000 HH 10,000 Enterprises
Technical assistance	20.00	Implementation support and building facilitative framework	Technical Assistance
TOTAL	**350.00**		

Table 7. Question 4 on the Steps USAID can Take to Sustain Achievements

WHAT STEPS CAN USAID TAKE TO SUSTAIN REEEP ACHIEVEMENTS?	
A. (i) What steps can USAID take to sustain REEEP achievements? (ii.) Which results appear to be unsustainable, or less sustainable, and why? (iii.) Was the scale of USAID support appropriate to ensure sustainability?	(i.) Advocacy, training, capacity building, and outreach (TV/radio/internet), permanent certification program would help to sustain REEEP's achievements. (ii.) The use of DCA as an instrument of access to finance for RE appears unsustainable given the current stated lending terms. USAID/Washington DCA Legal Office interpretation issue with Central Bank (CBN) may still come up as an issue. (iii.) Scale of support of USAID's USD four million investment over four years depends on external assistance from GIZ and/or other partners. Without partners project may have needed two to three times spending (e.g., USD 10–15 million for four years).
B. How did REEEP collaborate with Government and other donors to ensure a sustainable program after USAID ceases to be involved?	Collaboration Facilitated: (i.) Due diligence may be taken over by the Nigeria Climate Innovation Center. (ii.) IFC has taken over funding of training developed by REEEP. (iii.) Business loans via GIZ and German Bank Bettervest. (iv.) REAN. (v.) GIZ NESP.
C. Does REEEP have the ability to raise its own program funds from its own activities, or is it wholly dependent on donor funds for its own sustainability?	REEEP has been able to leverage private-sector financial funding (e.g., Ecobank) and other international donors (e.g., GIZ-related Bettervest Bank/Finance). GIZ Ina Homers opined that a follow-on REEEP-like project may

	be able to incorporate French AFD CAP interest rate reduction lending to SME.

Table 8. Continued from Question 4 on the Steps USAID can Take to Sustain REEEP Achievements

WHAT STEPS CAN USAID TAKE TO SUSTAIN REEEP ACHIEVEMENTS?	
A. Lessons Learned on Sustainable Activities: Do you have any lessons that were learned from the REEEP activity with regard to the following: (i.) Project activity implementation team? (ii.) USAID and implementing partners? (iii.) Future activities?	Lessons Learned on Sustainable Activities: (i.) Staff should take steps to be realistic when collecting data from stakeholders who might feel pressured and misrepresent the realities on the ground. Also, carefully vet any consultants to be sure they are committed to the project. (ii.) Need to leverage resources with other donors (GIZ). (iii.) Make sure due diligence is continued for SMEs either by USAID or other partners; Work with training syllabi and certification with GIZ; work with World Bank project staff funding window of USD 350 million.
B. Project Management: (i.) Did the activity achieve all its planned activities in time? Probe further: (ii.) If yes what conditions helped in this achievement? (iii.) If not, what could they have done, or what happened? (iv) Did the project achieve its objectives and activity timelines?	Project Management: (i.) Yes, generally do all planned activities. (ii.) What helped was that it was able to work with GIZ and its German Bank partner, Bettervest, (iii.) Many bankers had a problem with loan/credit pipeline when financial restriction in 2015. However, they later recovered. (iv.) Yes, once the indicators and targets were adjusted to the macro-economic situation.
C. Successful and Unsuccessful Activities: (i.) In your opinion as REEEP, which activity of the REEEP was most successful and why? (ii.) In your opinion as REEEP, which activity of the activity was least successful and why?	Successful and Unsuccessful Activities: (i.) Over 80 percent of the stakeholders cited training and capacity building as most successful. (ii.) Over half the stakeholders cited as least successful was DCA credit guarantees. Most of the banks did not fully understand the DCA and could not use it as opportunity to lower their credit risks, except Ecobank which had worked with DCA before on other financing projects. Most of the other banks learned about DCA through REEEP's training or word of mouth.
D. Sustainability: In your view, are the results of the activity sustainable in terms of creating opportunities and filling RE gaps with households and MSMEs?	Yes, because GIZ is continuing to support training and the REAN plan to use the curricula and certification system in their training programs. The IFC is currently subsidizing these trainings. There is more understanding of the finance sector, and those skills and knowledge are being leveraged to finance more RE installations.
E. What are the main challenges for the project implementation?	The foreign exchange crisis directly impacted REEEP implementation, creating a difficult financial environment within which to promote lending and competitive loan terms. The DCA was not able to address all of the constraints that banks faced in providing loans within this financial environment.

F. What are the areas to improve in future project design?	The project design was based on a budget of USD four million, with limited personnel. Needed more people for partnering for this kind of work.
G. Where should USAID focus in future project design in RE and EE?	(i.) Future design should start off looking into training programs, and how to scale up with growing demand for solar energy, mini-grids, etc. (ii.) DCA may be included in future activities and it will possibly work well provided the shortage of foreign exchange. (iii.) New projects may wish to focus on World Bank, Other multilateral donors (e.g., IFC), Bilateral Donors (GIZ, Japan International Cooperation Agency [JICA] and DFID, according to GIZ).

4.7.3 FINDINGS: DESIGN AND MANAGEMENT OF NEW RE AND EE ACTIVITIES

Access to Markets: The access to energy in Nigeria is still very poor and it is expected that RE/EE will form part of the solution in Nigeria. However, the demand for RE/EE is still low as result of lack of awareness of the RE/EE and perception of high cost of acquiring it, along with dismal performance on quality by those that aware of RE. In order to address this situation, it is recommended that GON create an awareness campaign that promotes RE/EE as a reliable and cost-effective solution to the energy crisis in Nigeria.

Access to Finance: Access to finance is one of the biggest obstacles in the penetration of RE/EE in Nigeria, coupled with FX crisis and economic recession that made financing in the sector impossible. REEEP and NESP have created the necessary qualifying standards and products for lending in the sector.

Subsidized Infrastructure Network Approach: REEEP has facilitated the expansion of electrical supplies into areas far from the national electric grid. With the high demand for energy in rural areas, solar energy is the most cost-effective manner to deliver energy to rural areas. This is so because, at present, it is impossible to say with any certainty whether the mini-grid will be commercially viable. The main constraint to its deployment is limited funding (mostly FX-dependent) and high up-front costs, resulting in a long period to recover investment. Also, the unclear renewable electricity tariff structure and high cost of importation further hinders investment, as well as lack of knowledge of the new technologies and unwillingness to try them out. For mini-grids to be viable, some form of subsidy will be needed.

Nigeria's Renewable Energy Resources

Abundant Resources: Nigeria has abundant sources of renewable energy, of which solar, wind, biomass, and small hydropower are the most plentiful RE sources.

Table 9. Renewable Energy Potential in Nigeria

RESOURCE	POTENTIAL	CURRENT UTILIZATION / REMARKS
Large hydropower	11,250 MW	1,900 MW exploited

Small hydropower	3,500 MW	64.2 MW exploited
Solar	4.0 kWh/m2/day – 6.5kWh/m2/day	15 MW dispersed solar PV installations. (estimated)
Wind	2—4m/s @ 10m height mainland	Electronic wind information system (WIS) available;
Biomass (non-fossil organic matter)	Municipal waste	18.5 million tons produced in 2005 and now estimated at 0.5kg/capital/day
	Fuel wood	43.4 million tons/yr. fuel wood consumption
	Animal waste	245 million assorted animals in 2001
	Agricultural residues	91.4 million tons/yr. produced
	Energy crops	28.2 million hectares of arable land; 8.5% cultivated

Source: Energy Commission of Nigeria: Renewable Energy Master Plan (2013)

Quality Control on RE/EE Equipment: Quality of the equipment supplied needs to be monitored and overseen to ensure that it operates according to its specifications and requirements. The newly privatized NEMSA is tasked with this function, but is understaffed and underfunded for its work. The role of an independent organization and affiliation with a Nigerian university may be an option. Clearly, for a future USAID activity to take this work on, there would need to be an overall needs and/or gap assessment, a training needs assessment, and then a plan, undertaken step by step with a well-designed approach for capacity building of NEMSA.

4.7.4 CONCLUSIONS: DESIGN AND MANAGEMENT OF NEW RE AND EE ACTIVITIES

Nigeria's national RE and EE policy has not been implemented as expected, as the government has not provided an enabling environment for the implementation of RE/EE to make it profitable. USAID and other donors may help the GON to develop an actionable plan for the implementation of the policy.

Expanding working relationships with other banks and companies (such as the BOI and the Development Bank of Nigeria) is necessary to expand energy access. The REAN seems to be an emerging institution which can be supported to make an impact on advocacy, particularly because it has members who are enthusiastic and have a stake in the future of RE.

There is a need for further work in the areas of equipment testing; certification by an entrusted organization; and trainings targeted to the needs of the stakeholder(s). NEMSA could be one of the authorized partner institutions on inspection, testing and certifications. The final report on the REEEP project (May 2018) has an assessment of possible agencies/entities that could do this work. REEEP has collected sufficient RE financial data which should be analyzed and used in future project design.

Table 10: Question 5 on Findings on Design and Management of RE/EE Projects

HOW CAN USAID IMPROVE ITS DESIGN AND MANAGEMENT OF FUTURE RENEWABLE ENERGY AND ENERGY EFFICIENCY ACTIVITIES IN NIGERIA?	
A. Designs, planned activities, and achievements: Looking back in hindsight, what could have been better laid out, and designed within this project RFA/RFP?	DCA seemed to be over-emphasized initially in the design. At least one financier commented that this model was not appropriate for the economic situation in Nigeria and USAID had enough experience in the country to have known that technical assistance to both banks and borrowers would be needed. If a new project has sufficient resources, internet, TV and radio may be considered for outreach and communication. Some grant money may be considered for technical innovations and demonstrating new technology.
B. Design shortcomings: What were the main gaps shortcomings of the design of the REEEP activity? For example, were there any design gaps and shortcomings realized during the activity implementation?	Too much emphasis on DCA initially. Not enough staff for what was planned in the activity.
C. Design relevance: What do you think should be done to ensure relevance of future programs to your needs at the design stage?	Stakeholders stated that they were not consulted before the program was announced and did not know of its limitations. SME, Solar Energy Association, Bankers and MiFi should be consulted prior to finishing a design for a new project.
D. What are the other donors working in the areas of RE and EE in Nigeria?	GIZ is working in the same area, but concentrates more on the technical side and less on financial side of business. Good match for REEEP. World Bank and IFC are working in sector.
E. Is there any mechanism for donor coordination? If yes, who is responsible for the donor coordination?	The World Bank coordinates donor working groups in Nigeria. GON Office of Presidency has donor coordination role.
F. What steps should USAID take to sustain the achievements so far made by the project?	USAID may wish to advocate for REEEP follow-on achievements with other donors and GON. Working with RE Association (mainly SMEs).

SECTION 5. SECTORAL ISSUES AND CHALLENGES

5.1 MACRO-ECONOMIC ISSUES – OIL EXPORTS VALUE DROPS SHARPLY

Nigeria is Africa's largest oil producer and, in 2012, was the world's fourth largest exporter of liquefied natural gas. The Nigerian economy suffers from inadequate diversification as a result first of commercial oil production in the late 1950s and the collapse of the developing manufacturing sector in the mid-1980s. For example, sporadic availability of electricity still forces manufacturers to deploy very expensive diesel generators for reliable electricity supply. The top five drivers of the economy are agriculture, trade, oil and gas, information and communications, and manufacturing. These top five sectors represent more than 70 percent of the total GDP (NBS; 2014). While oil only contributes to 16 percent of the GDP, it accounts for approximately 75 percent of government revenues and 90 percent of export earnings. However, Nigeria's oil production is at present impeded by the challenges of oil theft and supply disruptions caused by pipelines being sabotaged or failing. The gas sector is restricted by the ongoing shortfall in infrastructure to monetize gas that is presently flared. And even though Nigeria is among the leading exporters of crude oil in the world, it still imports about 85 percent of its refined petroleum products, due to low capacity utilization of its domestic oil refineries (around 30 percent). While the price of petrol is still subsidized in order to compensate for the high prices of internationally traded refined oil, the diesel price was deregulated in 2009. This significantly increased the cost of private electricity generation. Due to the high dependence of the Nigerian economy on its oil industry, changes in oil prices in the international market naturally have a big impact on Nigeria's overall revenue. Accordingly, the sharp fall in oil prices between mid-2014 and beginning of 2015 resulted in a 28 percent drop in Nigeria's revenue.

During REEEP's four-year tenure, macroeconomic events as stated above made it difficult to achieve its earlier targets for facilitating loans and growth in the renewable energy sector. Consequent to the above scenarios, the GON has had to restrict access to finance and foreign exchange. Since most, if not all, of the RE and EE equipment is imported, this macroeconomic situation has led to a revision in the REEEP targets, with downward adjustments in its work plan and indicator results in its AMELP.

5.2 CHALLENGES

Sustainable Development: During an economic downturn, it is difficult for any international development project to discuss sustainable development—most stakeholders have a very short-term horizon. In 2015 and 2016, many organizations were facing the prospect of real or perceived budget cuts, with people losing their jobs in the wake of the macroeconomic recession. Since 2017, the Nigerian economy is on a somewhat better footing, as REEEP activity is coming to an end. Nevertheless, REEEP's senior staff formed a good partnership with GIZ, which should ensure that its most prominent achievements become sustainable as GIZ and other donors seek to continue REEEP activities. More importantly, REEEP helped form REAN, which should carry the RE development agenda forward as part of their mission. In any case, the various stakeholders involved in solar and RE depend on the industry and have a vested interest in making the work of REEEP sustainable. Also, the training institutes are enthusiastic about including high-quality training in their curriculum and are valuable advocates.

REEEP Activity Design and Resources Available: Originally, USAID Nigeria designed REEEP to facilitate the development and financing of RE and EE markets, as well as to strengthen the current

policy and regulatory environment with an outreach activity promoting public- and private-sector investment. Soon after the first year of implementation, however, the outreach and enabling environmental work was taken away from the REEEP mandate, largely because the program had a limited budget and other resource restrictions. Nevertheless, REEEP was able to overcome these obstacles and form an effective partnership with GIZ and NESP with a Euro 24.5 million budget, largely funded from EU programs. More than one KII said that REEEP "did a lot with a little."

Macro-Economic GON Policies: Since 2015, the GON introduced a framework for a Managed Float Exchange Rate System that involves countervailing policy actions anchored on the prioritization of the most critical needs for foreign exchange, as well as maintaining stability in the exchange rate. While the policy has largely eliminated speculators from the FX market, it also made it difficult for the budding RE and EE industry, which is largely import-based, to import equipment. These macroeconomic policies played a big part in the problems that the REEEP had in achieving its ambitious goals. Consequently, REEEP managers had to revise its AMELP and work plans for facilitating new investments in the electric power sector.

5.3 ISSUES: ACCESS TO FINANCE IN RENEWABLE ENERGY SECTOR

Access to information is important both from the SME perspective and from the perspective of the providers of financial services. The SME sector requires information with which to identify potential suppliers of the financial services. It needs to evaluate the cost of the financial services that are being offered. The financial service providers require information with which to evaluate the risk of the SME which is applying for financing, and to assess the prospects of the SME within the market segment and geographical area within which it operates. There are identified deficiencies in both these arenas. Addressing these deficiencies requires public action, as it involves trade-offs between the individual's right to privacy, balanced against the commercial value of information. Moreover, the market economy requires appropriate information in order to optimize the allocation of resources.

International experts consistently conclude that the greater the number of entities that find lending to SMEs profitable and the higher the level of competition in conventional banking services, the greater the likelihood of increasing the supply of financing to SMEs. The regulatory environment should thus facilitate entry and stimulate competition. This may not be easy in the Nigeria market. Limitations on access to capital are a substantive obstacle to the growth of non-bank financial institutions (including micro-lenders), which in turn limits such institutions' ability to provide financing to SMEs. The profile of capital to which non-bank financial institutions have legal access prevents these institutions from structuring optimum asset/liability structures. As a result, the originating of assets of the size and term structure required for SME financing becomes very difficult for Non-Bank Financial Institutions (NBFIs).

Depending upon their stage of growth, the most appropriate form of financing for SME development is frequently venture capital, rather than debt. There are several ways through which the provision of venture capital can be stimulated. Legislation should be changed to allow institutional investors to increase their investment in venture capital, unlisted shares, and small capitalization companies (i.e., SMEs), and consideration should be given to the creation of tax incentives for business "angel" investments. This may well be justified as a measure to correct the market failure in the provision of equity for SMEs, i.e., by offsetting the high transaction costs and risks associated with small cap venture capital transactions. All the above may not be easy to do in Nigeria.

Last but not least, many parties in Nigeria express concern on the lack of formalization of SMEs, and in particular of SMEs in previously disadvantaged communities. This obviously impacts negatively on such enterprises' growth prospects and upon their ability to raise financing. There are many factors that could contribute to this phenomenon, including tax status (and thresholds), company registration requirements, and a range of other factors. This is a complex issue which deserves further attention, as it clearly has great significance in the evolution (including the sociopolitical profile) and growth of the SME sector.

Financing ideas for RE:

- Promote A-Sonia model, where consumer subscribes and can purchase an amount of power from a RE company. The company controls the usage, which they can turn off when you've used up what you've paid for.
- Use "split asset model." Instead of trying to convince banks and other financial institutions to invest in a mini-grid project as a whole, separate the distribution and generation components and provide grants to cover the distribution costs (roughly half of the total project expenses).
- Donors could provide "in-kind" grants, purchasing all the equipment.
- Try pilots would reduce interest rates, which would be subsidized.

SECTION 6. CROSS-CUTTING RECOMMENDATIONS

6.1 SUMMARY OF GENERAL RECOMMENDATIONS

6.1.1 OUTREACH /COMMUNICATIONS AND BUSINESS-ENABLING ENVIRONMENT

Incorporate Outreach/Communication and Business-Enabling Environment Components in Future Projects. All KIIs reported that any new RE/EE projects designed should have sufficient funding, staffing, and/or other appropriate resources to cover the much-needed outreach and communication tasks and/or components. All knowledgeable stakeholders strongly agreed with this as useful and needed in Nigeria. All knowledgeable stakeholders expressed their opinions very clearly that it was very fortunate that GIZ and other programs were able to cover this for REEEP, but being a specialized and technical subject, this fortunate partnership should not be assumed as a given in future project designs.

It is recommended that all stakeholders—donors, GON, financial institutions, international investors—continue to provide support and help to maintain the momentum of REEEP activity. All knowledgeable stakeholders stated that they strongly believed it was particularly important in Nigeria to have this enabling environment aspect in design of new RE/EE project/activities.

Some KII respondents suggested that if USAID is to fund small programs, they should focus either in one geographic area or on one aspect of renewable energy.

6.1.2 ENERGY ACCESS AND ENERGY EFFICIENCY

In order to increase the effectiveness of renewable energy delivery, the technological capability of the private and financial sector is necessary to cope with future challenges. Also, Nigeria needs a coordinated and implementable policy on climate change; the policy must be such that responsible MDAs can produce implementable and enforceable GHG emission control regulations.

The Team recommends the following energy solutions/models for considering future activity design/development.

Lighting Solutions

- Company- and/or microfinance-led model for individual off-grid solutions. such as SHS, solar lanterns
- Bank-assisted model for mini-grid and projects to power institutions such as schools, hospitals, and business enterprises
- Projects targeted to growing local economies, such as solar water lifting for irrigation, building on experiences gained by USAID and other agriculture projects

Cooking Energy Solutions

- Expanding bio-gel, securing available sustainable resources
- Improving cook stove applications to stimulate demand for bio-gel

Energy Efficiency

- Expanding efficient technologies, such as LED lamps

- Encouraging behavior change for efficient energy use, in collaboration with global initiatives such as *Power for All*

6.1.3 RE/EE TRAINING AND CERTIFICATIONS FOR TECHNICIANS

Focus on RE/EE Training and Certification. Advocate for a credible, rigorous certification agency. Also, financial analysis/due-diligence training and mentoring techniques should be done in collaboration with GON and other donors in the sector. Support and build programs in the field that will help "handymen" become entrepreneurs for these technologies. There are 100,000 of them who already know local needs and markets and know how to work with equipment.

6.1.4 DONOR ALLIANCES IN NEW ACTIVITIES

Encourage Donor Alliances in New Activities. In KIIs, it was clear that stakeholders strongly believed in the importance of USAID and working with other international donors. The advantage of being a smaller-scale project was working closely and directly with SMEs and other stakeholders, building trust. Any new RE/EE project design should prioritize cooperation with other donors including, but not limited to: (a) GIZ (as REEEP has); (b) with the AFD and its interest rate-reduction program; and (c) the World Bank/African Development Bank and its USD 350 million loan window available for financing RE/EE investments in Nigeria. In particular, a review of the documents for the World Bank program shows an assumption that the sector is ready for upscaling. USAID's experience in REEEP can show where there are still gaps in private-sector capacity, where there is still some nurturing needed, and who is best placed to handle different aspects of the World Bank project activities.

SECTION 7. ANNEXES

7.1 SCOPE OF WORK

USAID/NIGERIA

FINAL PERFORMANCE EVALUATION SCOPE OF WORK

USAID/Nigeria Renewable Energy and Energy Efficiency Project

BACKGROUND INFORMATION

Activity Identification Data

Development Objective	**Activity Title**
Broadened and Inclusive Growth	Nigeria Renewable Energy and Energy Efficiency Project (REEEP)
Award Number	**Project Dates**
AID-620-C-14-00001	March 3, 2014 to March 2, 2018
Type of Contract	**Project Funding**
Associate Cooperative Agreement	$3,999,556
Agreement Officer's Representative (AOR)	**Implementing Partner (IP)**
James G. Lykos	Winrock International.

DEVELOPMENT CONTEXT

Background

On February 25, 2014, USAID awarded a $3.9 million, four-year contract to Winrock International for the implementation of the Nigeria Renewable Energy and Energy Efficiency Project (REEEP). USAID named Imeh Okon, an Energy Program Specialist, as the Agreement Officer's Representative (AOR) and James G. Lykos, a Private Sector & Trade Officer, as the Assistant AOR. The REEEP agreement was signed for a complete performance period of forty-eight months, and the end date was set for March 2, 2018. USAID/Nigeria designed REEEP to facilitate the development and financing of renewable energy (RE) and energy efficiency (EE) markets, and to strengthen the current policy and regulatory environment for public and private sector investment. Through the implementation of the REEEP agreement, the renewable energy and energy efficiency interventions of the Mission were designed to achieve the following development objectives:

1. Developing the capacity of banks and other financial institutions holding Development Credit Authority (DCA) partial risk guarantees;
2. Strengthen the capacity of companies to deploy and maintain clean energy projects, to provide a pipeline of potential projects for DCA and Private Advisory Financing Network (PFAN) Global Development Alliances (GDA);
3. Strengthen capacity to access loans for agribusinesses, health delivery sites, and businesses willing to retrofit with EE technologies;
4. Strengthen the capacity of GON institutions to encourage the enactment of appropriate RE and EE legislation; and
5. Strengthen the capacity of vocational training institutes.

Intended Results

Within the USAID Country Development Cooperation Strategy (CDCS), REEEP is located under Development Objective 1 (DO1), Broadened and inclusive growth, Intermediate Result 1.3: Energy Access Increased. The project's development hypothesis is:

If the technical capacity of financial institutions in Nigeria is increased to process loans and evaluate Renewable Energy (RE)/Energy Efficiency (EE) projects, and if the capacity of RE/EE businesses to develop bankable projects and loan documentation is increased, and if the technical capacity in Nigeria to install and maintain RE/EE systems is increased, then the risks associated with lending to the RE/EE sector will be reduced and access to RE/EE for businesses and households will increase, allowing for better access to clean energy, more reliable energy services, and reduced carbon emissions.

Figure 1: Draft USAID Nigeria Results Framework (Source: USAID Nigeria CDCS)

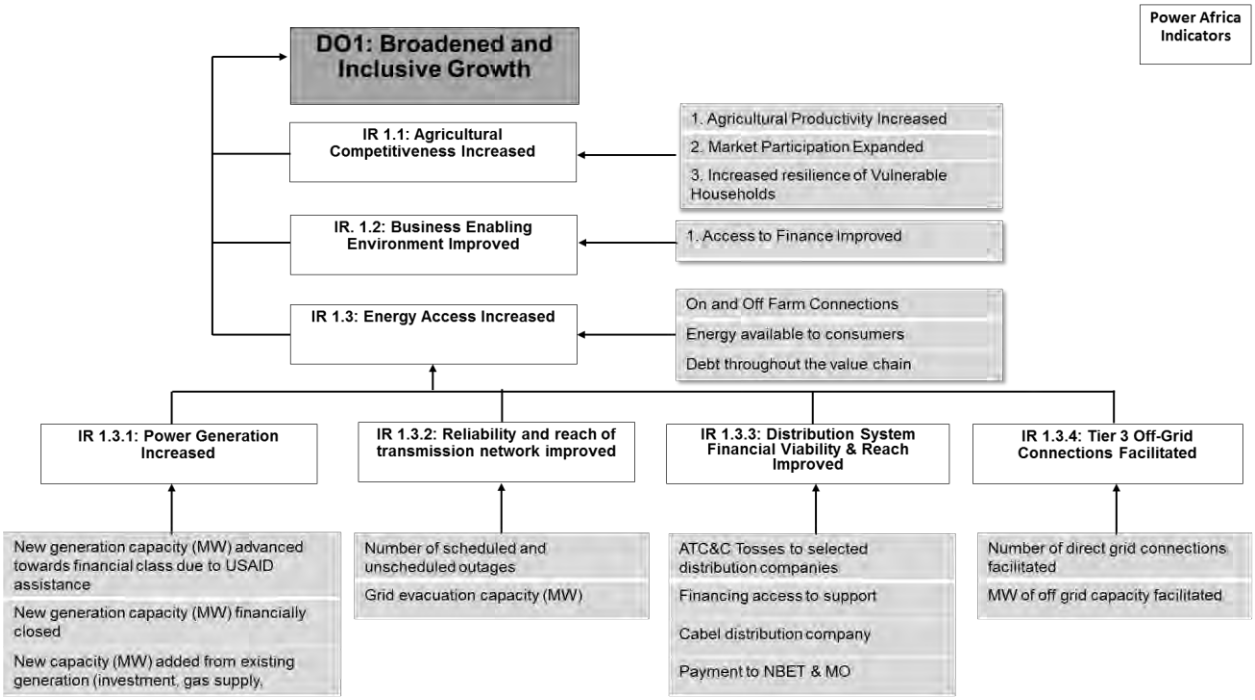
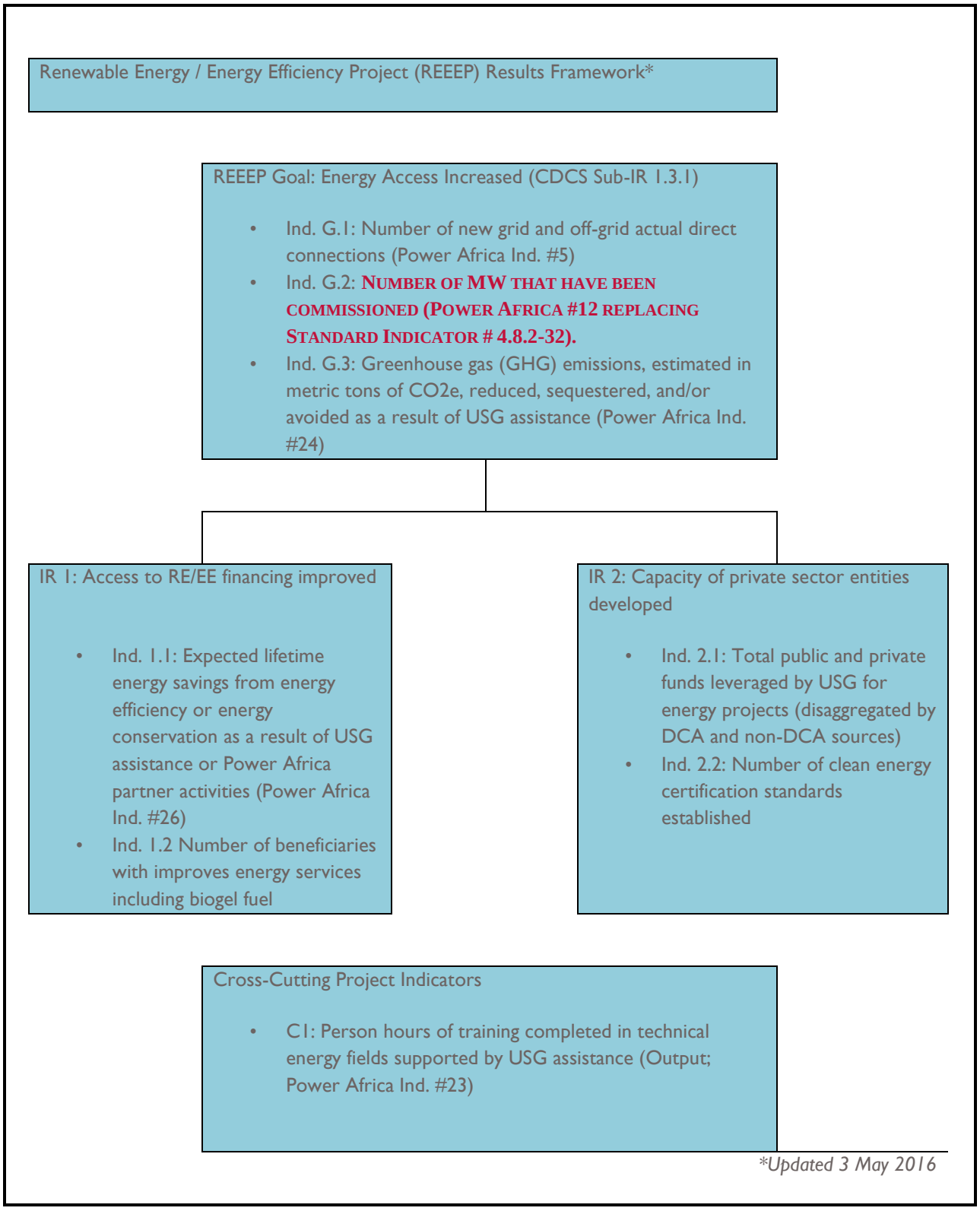


Figure 2: REEEP Results Framework with Performance Indicators



Approach and Implementation

As originally designed, REEEP was intended to implement – at a minimum – key activities leading to the achievement of three primary intermediate results:

1. Increased lending for renewable energy projects.
2. Amount of greenhouse gas (GHG) emissions reduced as a result of reductions in the amount of fossil fuel generators used to generate electricity.
3. Access to clean and efficient energy services.

Winrock replaced the REEEP Chief of Party (COP) on November 14, 2014. The termination was made "at will" for violation of Winrock policies and procedures. Winrock did not notify USAID the reason for the COP's dismissal until January 29, 2015, in violation of the agreement that stated that USAID needed to be notified if a key personnel member was removed for financial malfeasance. The activity's Renewable Energy Technical Specialist left on January 16 to pursue other opportunities. Winrock, with USAID's assent, installed a new COP that arrived in country March 30, 2015 to assume responsibility for the project, and hired a new Renewable Energy Technical Specialist soon thereafter. The Winrock Program Manager in Washington D.C., managed REEEP in the interim period between COPs with assistance from a mixture of in-country and remote support. Winrock achieved virtually zero project results during its first year of implementation, partially due to the human resources issues, but also because of generally slow project implementation during the first COP's time in office.

Slow project implementation, the lack of progress achieved toward key objectives, and the circumstances surrounding the release of the first COP prompted USAID to put Winrock on a Contractor Improvement Plan (CIP) and the activity on a Corrective Action Work Plan (CAWP) for the period from March 30, 2015 to July 31, 2015. The CAWP included a detailed plan and milestones for:

- New activities and resources resulting in an increased commitment of private-sector debt financing in the RE/EE sector.
    - Activity should achieve completed, private-debt transactions worth approximately $300,000;
    - Letters of intent or late stage indications from commercial banks for intent for debt financing of a further $500,000; and
    - A client pipeline with debt demand of approximately $1 million.
- Accelerated interventions and resources to advance policies to ensure timely delivery of recommendations in the policy and regulatory environment.
- Specific interventions to improve public awareness of the benefits of RE/EE, including the launch of a "RE/EE Knowledge Context" and joint promotions with the International

Finance Corporation's (IFC) Lighting Africa initiative and the Ecobank SME Club initiative.

During the time of the CAWP, Winrock quickened the pace of project implementation and met the conditions set for exiting the CAWP on July 31, 2015. The improvement was short-lived; however, as project implementation slowed significantly throughout the fall of 2015. While the project built a significant deal pipeline, it had trouble converting pipeline into financial close. Other activity interventions, including the website that it was to rely upon for outreach activities, became very difficult to implement in a reasonable amount of time. At this point, USAID, with Winrock's assent, modified the agreement to focus on fewer activity components within REEEP's manageable interest, and to focus its interventions on a set number of deliverables.

In the agreement modification, USAID and Winrock eliminated the outreach and policy components, as the outreach component was outside of the activity's manageable interest on such a small staff and the policy work had already largely been accomplished by another development partner. The access to finance and technical assistance to financial institutions components remained in the modification. Technical assistance for RE/EE installer certification, promotion of vocational education, and standards promotion also remained in place.

The modification took into account a Memorandum of Understanding that Winrock and GIZ signed in 2015 to collaborate around a mini-grid concept where GIZ would handle technical implementation of the mini-grids and Winrock would contribute financing expertise to the effort. The logical framework was also modified to reflect the changes to the agreement, with two indicators dropped, a restructuring of the framework, and other indicators replaced to reflect the new scope of work. The agreement modification went into force on December 3, 2015. USAID changed the Agreement Officer's Representative (AOR) from Imeh Okon to James G. Lykos, and named Nduka Okaro, a Senior Agriculture and M&E Specialist, as the Assistant AOR on that same date.

USAID conducted Data Quality Assessments (DQA) in December 2015 and March 2016 that revealed major deficiencies in data integrity and attribution to the point where it was unclear what results the activity accomplished. The AOR requested that the activity receive additional support from Winrock headquarters to work through the data quality issues and to sustainably address them in the Monitoring & Evaluation (M&E) Plan. An M&E specialist from Winrock traveled to Nigeria in April 2016 to provide assistance to the REEEP M&E Specialist and to help determine the attribution of the results that Winrock claimed.

After several months of discussions and collective work by USAID and Winrock, the two parties amended the Results Framework to reflect a tightened focus for the activity, and modified the indicators to better reflect the activity's objectives. REEEP and USAID also worked to focus the activity's client pipeline to a handful of fewer than 10 projects that had a relatively high possibility

of reaching financial close instead of the over 40 projects that the activity originally supported. The new direction yielded results in July and August 2017 when two mini-grid projects reached financial close and others had a pathway to success. USAID conducted a DQA in August 2017 on the remaining three activity indicators.

A factor that has complicated activity implementation of the access to finance component is the downturn of the Nigerian economy and restrictions on banks' abilities to lend foreign exchange to client projects. Throughout 2015, the Central Bank of Nigeria (CBN) tightened access to foreign exchange to safeguard against depleting the country's foreign exchange reserves. One condition that has significantly affected lending across the board, including for RE and EE projects is that banks are not authorized to lend U.S. dollars to firms that receive Nigerian Naira as their revenue. As most RE and EE equipment is imported and denominated in U.S. dollars, firms in this industry cannot receive foreign exchange at the official rate and must resort to using the black market to acquire foreign exchange at a price higher than the official rate. Even though USAID and REEEP worked with the CBN to receive a waiver for RE and EE projects, access to finance at official rates has still been very difficult.

A related challenge to the banks' abilities to administer foreign exchange has been the downturn in the broader banking sector that has been driven by high amounts of non-performing loans (NPLs), particularly among small and medium enterprises. As a result of the high NPL rates that average around 10% per bank, some banks, including Ecobank (with which USAID has a DCA facility for renewable energy and energy efficiency lending) and UBA, stopped lending to SMEs altogether. Against this backdrop, REEEP has had a very difficult time achieving results in its targets for access to finance, which USAID sees as a sustainable project impact. To its credit REEEP has been very active in trying to partner with alternative sources of finance and has received positive results, albeit on a limited scale, by crowdfunding mini-grid projects through Bettervest, a German finance provider.

Existing Data

The evaluation team will have access to the vital documents relevant to conducting this evaluation. These documents will include the technical proposal, original contract, monitoring and evaluation plan, annual work plans, quarterly and annual reports, data quality reports, contract amendments, memorandums of understanding, and any other relevant materials documenting the management, implementation process and results for the REEEP activity permitted by the Office of Acquisition and Assistance.

EVALUATION RATIONALE

Evaluation Purpose

The primary purpose of the evaluation is to determine whether the assistance provided by USAID/Nigeria through REEEP met the stated development objectives, and to understand the lessons learned from this particular intervention in Nigeria. The evaluation should provide a detailed picture of the major accomplishments and weaknesses of the activity since its inception, and determine how its successes can be sustained. The evaluation should also elucidate the lessons that USAID should learn from this activity in terms of activity design and management.

The evaluation should include specific recommendations to USAID about how activity interventions can be sustained and scaled by other Power Africa activities, partners, private sector firms, or by the Government of Nigeria (GON).

The evaluation will identify priority areas that should be the focus of possible future programming in the Nigerian energy sector, including the renewable energy and energy efficiency market.

The timing of this evaluation is important, as it will allow the lessons learned from REEEP's implementation to be carried over to new USAID Power Africa programming in a task order specific to Nigeria under a new power IDIQ. It would also allow USAID to better determine how it could work with various development partners, as some of them (like GIZ) are introducing new activities in the next few months.

Finally, USAID/Nigeria is in the process of launching a new Feed the Future program and a new flagship water, sanitation, and hygiene (WASH) activity that can incorporate small-scale renewable energy and energy efficiency techniques.

Audience and Intended Users

The primary users of the evaluation findings are the USAID EGE Office, other Mission colleagues, and other U. S. Government (USG) officials. Other audiences include non-USG donor organizations, the Government of Nigeria (GON), and private sector firms, all of whom can use the findings to improve Access to clean and efficient energy services. The evaluation report will also serve as a reference material for the future program design.

Evaluation Questions

1. To what extent has REEEP established an improved financing environment for proposed investments in renewable energy and energy efficiency?

2. To what extent has REEEP been able to increase access to energy in Nigeria? To what extent has REEEP built national capacity in training and certification for RE and EE projects?

Desired Recommendations Based on Findings:

3. To what extent did the performance indicators reported by REEEP inform decision-making?
4. What steps can USAID take to sustain REEEP achievements?
5. How can USAID improve its design and management of future renewable energy and energy efficiency activities in Nigeria?

EVALUATION METHOD AND METHODLOGY

VII. Evaluation Design

The Evaluation Team should consider a range of possible methods and approaches for collecting and analyzing the information required to answer the evaluation objectives. The methodology should include, but not be limited to, the following techniques to conduct the evaluation. Prior to arriving in country and conducting field work, the team should submit to USAID/Nigeria three key deliverables: 1) Document Review Summary, 2) Methodology / Detailed Work Plan, 3) Site Visit Schedule and plan. USAID/Nigeria will review these three deliverables, turning them around within two work-weeks to the evaluation team.

- **Document Review/Data Analysis**. Prior to arriving in country and conducting field work, team members will review various documents and reports, including but not limited to the REEEP original contract and amendments; USAID/Nigeria strategy document; Power Africa strategy document/Road Map; activity quarterly and annual reports; the activity Mid-Term Review; activity technical studies; and other relevant documents such as the specification of the activity deliverables. USAID/Nigeria will provide the relevant documents.
- **Key Informant Interviews.** The team will conduct interviews and focus groups with a variety of stakeholders including USAID staff, renewable energy targeted private sector enterprises, partner banks, government staff in various departments, implementing partner staff, and other key donor partners. A full list of stakeholders and contacts will be provided by USAID/Nigeria, and additional individuals may be identified by the evaluation team at any point during the evaluation prior to the drafting of the final report.
- **Site Visits.** In addition to the many key informant interviews that will take place in Abuja and Lagos, the evaluation team will visit activity sites to interview local GoN staff and private project developers. Some interviews with Winrock program management should also occur in the United States.

USAID staff from the EGE Office and from other Mission offices will accompany the Evaluation Team as needed.

EVALUATION PRODUCTS

IX. Deliverables

The Evaluation Team will be responsible for producing the following deliverables:

- Document Review Summary and proposed outline of draft evaluation report (either prior to the field or at the end of first week of interviewing).
- Detailed Work Plan detailing evaluation methodological approach and draft schedule of field activities and draft and final questionnaire (s) to be used during interviews (prior to travel to the field).
- Summary of initial findings, including a PowerPoint Briefing (at the end of follow-up and synthesis effort and prior to Team's departure from Nigeria).
- Draft Evaluation Report.
- Final Evaluation Report (within two weeks of receiving Mission comments on draft report).

All reports are to be submitted in English in both electronic and hard copies. The Team will provide five printed copies of the Final Evaluation Reports. The consultants will be responsible for report production. The Final Evaluation Report should not exceed 30 pages in length in its body, not including title page; Table of Contents; List of Acronyms; usage of space for tables,

graphs, charts, or pictures; and/ or any material deemed important and included as Annexes. The Final Evaluation Report and PowerPoint addressing the Mission's comments should be submitted in both Word and PDF formats. Once the PDF format has been approved by the Mission, the Team will submit the Final Evaluation Report to the Development Experience Clearinghouse for archiving. Reports should be submitted consistent with the Automated Directives System (ADS) 579.

Reporting Guidelines

USAID's evaluation policy requires that all evaluation SOWs include USAID's *Criteria to Ensure the Quality of the Evaluation Report* (USAID Evaluation Policy, 2011). The policy also indicates that the report will outline in detail, any additional expectations USAID has regarding a report's structure, format, and length.

The format for the evaluation report is as follows (number of pages is illustrative):

- Executive Summary (2 pp.)
- Table of Contents (1 pp.)
- Introduction (1 pp.)
- Background (2-3 pp.)
- Methodology (1 pp.)

- Findings/Conclusions (17- 20 pp.)
- Issues and Challenges (1-2 pp.)
- Recommendations/Future Directions (5-10 pp.)
- References
- Annexes

The draft report will be submitted electronically. The final report will be submitted in five hard copies and one electronic copy. All reports will be in English.

The report must:

- Distinguish clearly between findings, conclusions (based strictly on findings) and recommendations (based clearly on the evaluation findings and conclusions);
- Comply with USAID's Evaluation Policy
- Ensure submission to the DEC after finalization.

Dissemination Plan

It is expected that USAID/Nigeria will plan a dissemination session with other technical units within the mission, implementing partners, donor community as well other stakeholders.

TEAM COMPOSITION

The Evaluation Team shall consist of at least two individuals: one team leader with over 10 years of experience in renewable energy and energy efficiency projects (including financing) in low-income countries with USAID and/or other donors, and a second individual with Nigeria-specific experience in renewable energy and energy efficiency. Demonstrated experience and skills in activity evaluation are required for at least one of the two team members proposed.

Team members will be required to travel to Lagos and Abuja to obtain an understanding of the activity's interventions. A six-day work week is authorized for this evaluation. The evaluation is proposed to be conducted in Nigeria and the U.S. for a total of four work weeks, beginning on or about January 2018. The Team will provide 7.5 working days to USAID/Nigeria for review and comments on the draft evaluation report and PowerPoint presentation, after which time the Team will be expected to spend another 8 days finalizing the report and presentation and then submitting the requested deliverables to USAID/Nigeria as outlined in this SOW.

The required areas of technical (subject matter) expertise that should be represented on the team correspond to the technical focus areas of the program being evaluated. The contractor may propose a different configuration of these skills between team members than outlined below, but all skill areas outlined must be represented:

- RE and EE technologies with an emphasis on household and small business applications;
- RE and EE financing with an emphasis on mini-grids, household systems, and small and medium enterprises; and
- RE and EE installer certification, standards promotion, and vocational training.

Team:

1. **Team Leader:** The Team Leader will serve as the primary point of contact between the USAID/Nigeria Mission and Evaluation Team. The incumbent must:
   - Be able to communicate effectively with senior U.S. and host country officials and other leaders;
   - Have a proven track record in terms of leadership, coordination, and program/process evaluation for development projects and programs; and
   - Have excellent writing/organizational skills and proven ability to deliver a quality written product (Evaluation Report and PowerPoint).

2. **Access to Finance Specialist:** This member should have substantial experience in efforts to increase access to finance for household and SME level rural and renewable energy systems.

- S/he should have experience in building capacity among financial institutions and RE/EE clients.
- Experience in expanding access to finance for RE/EE projects in Nigeria or West Africa region preferred.

3. **Renewable Energy Specialist:** This member should have substantial experience in renewable energy systems, technology dissemination, and relevant policy.
   - Have knowledge and professional experience in RE/EE technology dissemination in developing countries;
   - S/he should have experience in building capacity among financial institutions and RE/EE clients.
   - Experience in expanding access to finance for RE/EE projects in Nigeria or West Africa region preferred.

Conflicts of Interest

All evaluation team members will provide a signed statement attesting to a lack of conflicts of interest, or describing an existing conflict of interest relative to the activity being evaluated. USAID/Nigeria will provide the conflict of interest forms.

SCHEDULING AND LOGISTICS

Responsibilities

The funding source will be through the budget of the USAID/Nigeria Monitoring, Evaluation, and Learning (MEL) Activity. The USAID/Nigeria Office of Economic Growth and Environment contributes to the budget of the MEL Activity. The Learning Program (TLP) /DevTech will be responsible for all offshore and in-country administrative and logistical support, including identification and fielding appropriate consultants. DevTech will arrange and schedule meetings, international and local travel, hotel bookings, working/office spaces, computers, printing and photocopying. DevTech will make all logistical arrangements, including the vehicles for travel around Abuja and Lagos city, and should not expect any logistical support from the Mission. DevTech will also make their own arrangements about space for team meetings and equipment support for producing the report.

USAID/Nigeria will provide:

- Background documents to be provided to the evaluation team as early as possible prior to work on the evaluation, but at least two weeks before the start of the evaluation;

- A list of key informants, institutions, organizations, and other stakeholders;
- Ensure constant availability of Mission Point of Contact to provide technical leadership and direction for the evaluation team's work;
- Assistance with arrangements/letters of introduction for formal and official meetings, and where necessary for high-level meetings, will accompany teams on introductory interviews; and, but not limited to,
- If necessary and deemed appropriate, assist in identifying and helping set up meetings with local development partners relevant to the assignment.

Performance Period

The period of performance will run approximately four weeks, starting on or about November 2, 2017 depending on the availability of consultants and available funding.

USAID/Nigeria will designate a technical representative to work in coordination with the evaluation team; however, the Team Leader will have the primary responsibility for ensuring the final deliverables are completed in a timely manner and are responsive to the scope of work and Mission comments.

TIMELINE & LOE TABLE

Item	Period of Performance	Number of Days		
		Team Leader/ Int. Evaluation Expert	Access to Finance Specialist/ Int.	Renewable Energy Specialist
Review background documents & preparation of the draft workplan, data collection tools (protocols), & preparation of the Document Review Summary	Nov. 2–9	7	7	7
Submission of the Document Review Summary to USAID	Nov. 10	0	0	0
Submission of the draft workplan to USAID to review	Nov. 10	0	0	0
International travel to Abuja, Nigeria	Nov. 11	1	1	1
USAID reviews and provides comments on workplan	Nov. 13	0	0	0
In-brief/team planning meetings with USAID, & to receive more comments.	Nov. 14	1	1	1
Evaluation team integrates USAID comments to the workplan and submits to USAID	Nov. 15	1	1	1
Evaluators submit finalized data collection tools to USAID	Nov. 16	0	0	0
Evaluation team collects field data in Abuja	Nov. 17–18	2	2	2
Evaluation team travels to Lagos	Nov. 19	1	1	1
Evaluation team conducts interviews in Lagos	Nov. 20–24	5	5	5
Evaluation team travels back to Abuja	Nov. 25	1	1	1
Evaluation team continues to collect field data in Abuja	Nov. 27–30	4	4	4
Preparation of the draft evaluation report, and preliminary findings/PPT	Dec. 1 - 7	7	7	7
Submission of preliminary findings/PPT	Dec. 7	0	0	0
Presentation of preliminary findings, exit brief and submission of outline	Dec. 8	1	1	1
Incorporation of USAID comments to the draft report	Dec. 11–14	4	4	4
International travel out of Nigeria	Dec. 15	1	1	1
Submission of draft evaluation to USAID by TLP	Dec. 18	0	0	0
USAID reviews and comments on draft evaluation report	Dec. 19–29	0	0	0
Team addresses USAID comments, and finalizes the report due to USAID/Nigeria	Jan. 2–4	3	3	3
Submit the final report by TLP	Jan. 5	0	0	0
TOTAL LOE		**39**	**39**	**39**

ANNEX 7.2 KEY INFORMANT INTERVIEW RESPONDENT

S/N	COMPANY	ADDRESS	EMAIL	PHONE	CONTACT
SOLAR DEVELOPERS					
1	Nayo Tropical Technologies	1st Floor, Theodak Plaza by National Hospital Junction, Central Area, Abuja	nayotroptech@yahoo.com	08033135657	Engr. Anayo Okenwa (MD/CEO)
2	Blue Camel Energy Limited	Suite 4, 5, 6, & 23 Angels Plaza, Plot 1243 Samuel Ladoke Akintola Boulevard Garki II, Abuja	gm@bluecamel.us	08069790333, 08178700120	Mr. Bartholomew Anzaku, (General Manager)
3	SOSIA Renewable energies.	No 1A Yakubu Gowon Way, Kaduna state	sosai@sosairen.org	08033110130	Mrs. Habiba, (MD/CEO)
4	Go-Solar (SMEFUNDS)	No. 18b, Ogundana Street, Off Allen Avenue, ikeja, Lagos state	C.adeyeni@smefunds.com	08035523435	Mr. Caleb Adeyeni
5	Go-Solar (SMEFUNDS)	Femi Oye, CEO, No. 18b, Ogundana Street, Off Allen Avenue, ikeja, Lagos state	F.oye@smefunds.com	08035523435	Mr. Femi Oye, CEO
6	Go-Solar (SMEFUNDS)	No. 18b, Ogundana Street, Off Allen Avenue, ikeja, Lagos state	m.ologunoye@smefunds.com	08035523435	Michael Ologunoye, Vice President Engineering
7	Rubitec Power Limited	No. 5 TALABI ST., Off Adeniyi Jones Avenue, Ikeja, Lagos state	bolades@rubitecsolar.com	08034499670/ 08023193757	Mr. Bolade A. Soremekun, (MD/CEO)
8	Rana World Technologies	Suite B14, First Floor J'S Innovation Plaza, Stadium Roundabout, Kaduna	info@ranaworldtech.com	07065601294, 08096177110	Dr. Tajudeen Humble Sikiru
9	Havenhill Synergy Limited	Suite A-10, Kenuj 02 Mall, Behind Games Village, Gudu District, Abuja, Nigeria	info@havenhillsynergy.com	08127736184	Olusegun Odunaiya
10	Havenhill Synergy Limited	Suite A-10, Kenuj 02 Mall, Behind Games Village, Gudu District, Abuja, Nigeria	info@havenhillsynergy.com	08127736184	Femi _____
11	Arnegy Solar Limited	1 Adekunle Owobiyi Street, off Oladele Kadiri close, off NobNob-Oluwa street, Ogba, Ikeja	femi.adeyemo@arnegy.com; info@arnegy.com	07059193800; 08022888840	Femi Adeyemo
12	Creeds Energy Limited	Suite A14 TJ1406 Plaza, Wuse 2, Abuja	hkabir@creedsenergy.com	08035997030	Hannah Kabir
13	Ashdam Solar	University of Ibadan Bookshop Basement	ashdamsolar@gmail.com	08033978070	Mr. Adeyemi Asaleye

14	Cloud Energy Photoelectric Limited	85, Ikorodu Road, Fadeyi, Lagos	theo@cloudenergy.com.ng	08033077225	Mr. Theophilus Nweke, (MD/CEO)
BANKS/FINANCIAL INSTITUTIONS					
15	Ecobank PLC	1675 Oyin Jolayemi, Victoria Island, Lagos	tolawal@ecobank.com	07083361764	Mrs. Theresa Lawal
16	Ecobank PLC (formerly)	Block A2-1, Suite 165 Sura Shopping Complex, Simpson St., Lagos	sunkanmi@r828consulting.com	+234-808-718-0208	Olowo Sunkanmi
17	Union Bank of Nigeria (formerly)	Eze Nwakanma, (current) NIRSAL, Plot 1581,Tigris Crescent, Maitama, Abuja	e.nwakanma@nirsal.com	+234 (0)818-220-2525	Mr. Eze Nwakanma, former Team Lead, Corp. Agric-biz
18	Union Bank of Nigeria	Oladipo Bolaji, Credit Analyst Agribusiness, Stallion Plaza, 36, Marina Road. Lagos	obolaji@unionbank.com	08182202525	Mr. Oladipo Bolaji, Credit Analyst Agribusiness
19	ACCION Microfinance Bank	4th Floor, Elizade Plaza, 322A, Ikorodu road, Anthony, Lagos	aarowojolu@accionmfb.com	08055111146	Mr. Abiodun Arowojolu, (Treasure Manager)
20	Fortis Microfinance Bank Plc.	Medife House, Plot 2135 Herbert Macaulay Way, Wuse Zone 5, Abuja Nigeria	bomojeso@fortismfb.com Tjombai@fortismfb.com	07069703008	Busayo Omojeso Thomas Jombai
21	FCMB	17A, Tinubu Street Lagos Island, Lagos Island	George.ogbonnaya@fcmb.com	08074501084	George Ogbonnaya, (Group Head Business Banking)
22	Bettervest GmbH	Schweizer Str. 28, 60594 Frankfurt am Main, Germany	marilyn.heib@bettervest.de	+49 (0) 6934877347	Ms. Marilyn Hiebb
GON STAKEHOLDERS					
23	NAPTIN (National Power Training Institute of Nigeria)	Plot 21, Near FCDA Sewage Treatment Plant , Idu Industrial Area, P.M.B. 596, Abuja, FCT, Nigeria	oreslek@gmail.com	0706-777-7559	Oregbesan Olalekan
24	NEMSA (Nigerian Electric Mgmt Services Authority)	Peter O Ewesor, 4 Dar el Salaam Cresent, off Aminu, Cano Cresent, Wuse 2, Abuja	poewesor@gmail.com	08036198406	Peter O Ewesor
25	NEMSA (Nigerian Electric Mgmt Services Authority)	4 Dar el Salaam Cresent, off Aminu, Cano Cresent, Wuse 2, Abuja	adannew@gmail.com	08036198406	Adanne Wadibia
26	NIMSA Center of Excellence		adannew@gmail.com	08036198406	Adanne Wadibia
27	Team Laboratory	4 Dar el Salaam Crescent, off Aminu, Cano Crescent, Wuse 2, Abuja	adannew@gmail.com	08036198406	Adanne Wadibia
28	Nigeria Incentives Based, Risk Sharing	Farouk Kurawa, Assistant General Manager,	f.kurawa@nirsal.com	+234 (0) 805-500-0267	Farouk Kurawa

	System for Agricultural Lending (NIRSAL) Central Bank of Nigeria (CBN)	Agricultural Value Chain Development and Services, Plot 1581, Tigris Crescent, Maitama, Abuja, Nigeria			
29	Hon. Commissioner, Ministry of Agriculture & Natural Resources, Kano State	Nasiru Ysuf Gawuna, Commissioner, Ministry of Agriculture & Natural Resources, 1 Biddu Road, P.M.B 3078, Kano State			
30	Bank of Industry (BOI)	Austin Egwuche, BOI, Lagos	Project Manager		Austin Egwuche
31	Bank of Industry (BOI)	Idris K Ibrahim, BOI, Lagos	BOI/UNDP Solar Energy Program		Idris K. Ibrahim
INTERNATIONAL DONOR PARTNERS					
32	World Bank, CIC Climate Innovation Centre	Maite Lasa Garcia, Climate Innovation Centre, (CIC), World Bank, Washington, DC US	maitelasagarcia@worldbank.org		Maite Lasa Garcia
33	GIZ, Nigerian Energy Support Program, (NESP)/GIZ	Ina Hommers, No 2 Dr. Clement Isong Street, Asokoro, Abuja	ina.hommers@giz.de	0805 4601986	Hommers Ina
34	IFC (Lighting Africa)	7th fl, Alliance Place, 33A Alfred Rewane Way, Ikoyi, Lagos	oigbu@ifc.org	+234.1.280-5916	Robo Igbo
35	All On		stella.obot@all-on.com		Stella Obot
36	Power For All	Campaign Manager, Nigeria	ify@powerforall.org		Ify Malo
37	Power AFRICA (PATRA)	Nigeria Power Africa Head, Plus Part-time REEEP Consultant	monica.samec@winrock.org	09053461854	Monica Samec
INTERIM CERTIFICATION TRAINING PARTNERS					
38	The National Institute of Architects (NIA)	24, Magaji Muazu Crescent, Katampe Extension, Abuja	lamideeso@gmail.com lamesh82@yahoo.com	08034843041	Olamide
39	Ibrahim shehu shema centre for renewable energy research (iSSCeRER)	Umaru Musa Yardua university, Dutsin ma Road, Katsina	Abdullahi.mati@umyu.edu.ng	08065825699	Dr. MATTI Abdullahi (Director)
REEEEP IMPLEMENTING PARTNER STAFF					

40	Javier Betancourt	Chief of Party, REEEP, Winrock International/REEEP, Abuja
41	Samuel Ahanor	Renewable Energy Technical Specialist, REEEP, Winrock International/REEEP, Abuja
42	Shittu Suraj Bomidele	Monitoring and Evaluation Specialist, REEEP, Winrock International/REEEP, Abuja

ANNEX 7.3 SOURCES OF INFORMATION

Revised Technical Application, Dec 16, 2013
Revised Technical Application, Nov 12, 2015
First Year REEEP Work Plan, March 3, 2014 - Sept 30, 2014
Second Year REEEP Work Plan, Oct 1, 2014 – Sept 30, 2015
Third Year REEEP Work Plan, Oct 1, 2015 – Sept 30, 2016
Corrective Action Work Plan, March 30- July 31, 2015
Year 3 Progress Report, Oct 1, 2015 – Sept 30, 2016
Year 4 Progress Report, Oct 1, 2016 – Sept 30 2017
REEEP Quarter 1 Quarterly Progress Report, Oct 1-Dec 31, 2016
REEEP Quarter 2 Quarterly Progress Report, Jan 1 – March 31, 2017
REEEP Quarter 3 Quarterly Progress Report, April 1 – June 30, 2017
REEEP Quarter 4 Quarterly Progress Report, July 1 – Sept 30, 2017
REEEP Monitoring & Evaluation Plan (revised) May 1, 2016
REEEP Mid Term Evaluation, August 2016
DQA Forms
REEEP DQA Checklists
REEEP DQA Checklists #2
REEEP DQA TOR
REEEP DQA Trip Report
Key World Energy Statistics, International Energy Agency, Annual Report for 2017
CIA World Factbook, Nigeria Country Section, USG Central Information Agency, Fall 2017 Data
Databank, World Bank (WB) website for Nigeria, and other WB databases for economic data
The USAID/Power Africa Renewable Energy and Energy Efficiency Project: 2014-2018. Resources Book