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Mid-Term Evaluation of Nigeria Energy Support Programme 2 (NESP-2) and Formulation of Nigeria Energy Support Programme 3 (NESP-3)

Final Mid-Term Evaluation Report

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List of Abbreviations

AfDB	African Development Bank
BMZ	German Federal Ministry for Economic Cooperation and Development
CEO	Chief Executive Officer
COREN	Council for the Regulation of Engineering in Nigeria
COVID	Corona Virus Disease
DAC	Development Assistance Committee
DisCo	Distribution Company
EE	Energy Efficiency
ETC	Energy Training Centre
EU	European Union
EUD	European Union Delegation
FMP	Federal Ministry of Power
FMWH	Federal Ministry of Works & Housing
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IEA	International Energy Agency
IMAS	Interconnected Mini-Grid Acceleration Scheme
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
KPI	Key Performance Indicator
LPG	Low Pressure Gas
M&E	Monitoring and Evaluation
MW	Megawatt
NAPTIN	National Power Training Institute of Nigeria
NBET	Nigeria Bulk Electricity Trader
NDICI	Neighbourhood, Development, and International Cooperation Instrument
NERC	Nigeria Electricity Regulatory Commission
NESP	Nigeria Energy Support Programme
NGEP	National Gas Expansion Programme
NLPGEP	National LPG Expansion Plan
O&M	Operations and Maintenance
OECD	Organization for Economic Cooperation and Development
PCM	Project Cycle Management
PPA	Power Purchase Agreement
PV	Photovoltaic
RE	Renewable Energy
REA	Rural Electrification Agency
ROM	Result Oriented Monitoring
SME	Small and Medium Enterprise
SMR	Steam-Methane Reforming
SWOT	Strengths, Weaknesses, Opportunities and Threats
TA	Technical Assistance
TCN	Transmission Company of Nigeria
TOR	Terms of Reference
WB	World Bank

1 Background & introduction

1.1 RELEVANT COUNTRY AND SECTOR BACKGROUND

To date, Nigeria's electricity supply is influenced by inadequate production, transmission and distribution capacity. Expensive and ecologically harmful diesel generators are widely used. The pace of reform is slow. Until recently, the private sector has developed only very few projects in the sector. Nigeria therefore continues to suffer from a shortage of electricity and low electrification rates. Around 55 per cent of the population, and as many as 75 per cent in rural areas, have no access to on-grid electricity[1]. The lack of access to electricity is hindering industrial production and economic growth. Renewable Energy and Energy Efficiency are also still underdeveloped.

picture 1: A new Solar Mining-Grid system in Bisanti, Nigeria, (Source: internet)

In order to foster private sector investment and to improve electrification rates, the Nigerian power sector was privatised in 2013, leaving only the transmission network in the Federal Government's hands.

Nevertheless, Renewable Energy (RE) and Energy Efficiency (EE) are still underused. In 2015, the Federal Government of Nigeria FGN approved the National Renewable Energy and Energy Efficiency Policy (NREEEP). The NREEEP promotes the development of an enabling framework to allow for faster electrification in partnership with the private sector, through both on-grid and off-grid RE solutions. In 2016, the FGN approved the "Electricity Vision: 30-30-30" with the aim of attaining a generation capacity of 30,000 MW by 2030 with at least 30 % of RE share in the electricity mix. As part of this Vision, the National Renewable Energy Action Plan (NREAP) was developed.

The Power Sector Recovery Programme (PSRP), adopted by the Federal Executive Council in March 2017, consists of series of policy actions, regulatory, operational, governance and financial interventions to be implemented by the FGN over 5 years. It aims to restore the financial viability of Nigeria's power sector, improve transparency and service delivery, resolve consumer complaints, reduce losses and energy theft, and reset the Nigerian Electricity Supply Industry (NESI) for future growth. In November 2019 the country had an electricity generation capacity of around 13,700 MW and is still far from meeting the demand.

With regards to policy developments and governmental engagement, the FGN strengthened its activities in the sector. Part of the plans from the FGN is to bridge the gap between grid-connected

[1] GIZ Fact sheet, Nigerian Energy Support Programme II, https://www.giz.de/en/downloads/NESP%20II_Factsheet.pdf

generation (large- scale feeding into the transmission grid) and to take into consideration the demand for renewable energies, namely hydro and solar. The Government has developed a pipeline of grid-connected solar projects, which in 2019 stood at 35 and a total planned capacity of 5.3 GW; all of which have been procured on an unsolicited basis. Besides, the Government is looking at the possibility to increase the capacities of existing and planned large hydropower plants, such as Kainji, Jebba, Shiroro and Mambilla, by allowing their hybridisation with solar.

While these large-scale projects have not materialise, the Government has opened a new window to promote Hydro and Solar Embedded Generation (medium scale generation feeding into the distribution grid). The Government is doing it via innovative models involving public investment. For instance, the Government has tasked the Nigerian Sovereign Investment Authority (NSIA) with the competitive procurement of a 10 MW solar power plant near Kano City. The FMP is supporting new tenders to concession new five small scale (less than 10 MW) and two medium scale hydropower plants such as Kashimbilla or Gurara.

Progress has also been made on the commercial level in the power sector, as evidenced by the approval of the new distribution tariffs. Meanwhile, this tariff review is not expected to solve the commercial issues that Distribution Companies (DisCos) are facing in some areas of their grid, including rural and peri-urban settlements.

Directly connected to the distribution tariff review, the FGN has gone on and banned estimated billing by DisCos and approved an import levy on meters. These efforts, jointly with the approval by NERC of the Meter Asset Regulations back in 2018, form part of the FGN strategy to bring more transparency to the commercial functioning of the power sector.

To solve these issues, the FGN, namely NERC and FMP, are exploring the Franchising Model. The launch of the Guidelines on Distribution Franchising in the NESI by NERC in 2020 has marked a milestone in this process. This model would allow the DisCos to transfer the responsibilities for operation of designated feeders to qualified third parties selected as part of competitive tenders. Whereas, NERC is working on a regulation on Franchising, FMP is piloting the business model in a feeder in Sokoto (Yabo-Shagari) in collaboration with the Kaduna DisCo. Other DisCos have joined this initiative and are currently assessing the potential for franchising projects in their concession areas. Development Finance Institutions are also currently prospecting this new segment.

Meanwhile, the mini-grid and stand-alone (incl. Solar Home Systems, SHS) segments continue to flourish. The Rural Electrification Agency (REA) lies at the centre of these developments with different programmes e.g. Nigerian Electrification Projects (NEP) funded by World Bank (WB) and African Development Bank (AfDB), Rural Electrification Fund funded by the FGN itself or the Mini-Grid Acceleration Scheme and Interconnected Mini-Grid Acceleration Scheme funded by the EU and the German Government.

In parallel, the FGN signed in 2019 a Memorandum of Understanding (MoU) with Siemens under the Presidential Power Initiative (PPI). The collaboration aims to attract international development finance, to refurbish the whole grid in Nigeria and to increase generation capacities. If successful, this initiative together with other initiatives led by the Transmission Company of Nigeria (TCN), could represent a breakthrough in the Government's efforts to increase the reliability of power supply in the main grid by reducing technical losses, automating operations and increasing the amount of energy available.

In 2020, the Minister of Power inaugurated the Ministerial Task Force (MTF) on Power with the aim to accelerate the pace of reforms and improve and increase the power output and availability in the short,

medium and long term in the power sector. NESP provides advice to this Taskforce. A Kick-off Meeting of the MTF Power was held beginning of December 2020 in Abuja with a view to facilitate an exchange between the parties on their achievements so far and identify synergies in order to agree on a joint work plan for 2021.

In any case, in general, the power supply sector in Nigeria still struggles to overcome its challenges. on 17th of March, 2022, while this evaluation was ongling, the Nigerian President Muhammadu Buhari has issued an apology to the nation following problems in petroleum products supply and an increase in power blackouts.

1.2 THE ACTION TO BE EVALUATED

1.2.1 The Nigerian Energy Support Programme

The Nigerian Energy Support Programme (NESP) is a technical assistance programme co-funded by the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in collaboration with the Federal Ministry of Power (FMP) in Nigeria.

The European Development Fund (EDF) Committee approved the Energising Access to Sustainable Energy in Nigeria (EASE) Programme in June 2013, to support improved access to energy through renewable energy and energy efficiency measures, as well as measures for forestry development in northern Nigeria. The programme comprises contributions from the 10th EDF (EUR 27 000 000) and from the German Federal Ministry for Economic Cooperation and Development (BMZ) (EUR 1 500 000).

EASE consists of four components: (1) Improving the Federal policy framework for energy access with a focus on RE/EE, (2) capacity building of selected State Governments to plan and implement access to energy measures, focused on the use of renewable energy and energy efficiency, (3) building the institutional and professional capacity of NAPTIN and other training institutes with a focus on RE/EE, (4) demonstration of the commercial viability of small-scale gas processing in the Niger Delta region.

1.2.1 NESP Phase 1

EASE components 1 - 3 are implemented by GIZ under the name “Nigerian Energy Support Programme” (NESP; now known as NESP Phase 1). NESP 1 was 91% financed by the European Union and 9% by the Federal Government of Germany. The original implementation period of the Action was from June 2014 – 9/2017, but was extended twice cost-neutrally until December 2017.

NESP supported five state governments in partnering with private developers using the PPP model to construct and operate 6 mini-grids. NESP work laid a solid platform which led to the rapid development of the Nigerian off-grid market which according to the rural electrification agency is worth 9.2billion dollars annually. NESP also supported the Nigerian government to improve the regulatory and legal framework conditions at the national level by working with the Federal Ministry of Power, Works and Housing (FMPWH) and relevant agencies under it like the Nigeria Electricity Regulatory Commission (NERC) and Rural Electrification Agency (REA)

In order to support improved access to energy through renewable energy and energy efficiency measures, a policy for RE and EE was adopted, feed-in-tariffs and grid codes revised, a Building Energy Efficiency Guideline drafted, organisational assessment and development conducted at National

Power Training Institute of Nigeria (NAPTIN) and a clean energy training partnership network created. Pilots have been launched on Energy Management Systems, solar water heating and rural electrification, through mini-grids. Lessons learned[2] from NESP Phase 1 included:

One implementation challenge has been the engagement with the Rural Electrification Agency (REA) including the operationalisation of the Rural Electrification Fund, which is administered by REA. Another relates to the budgetary constraints of federal and state governments, which means that partner contribution could not always be enforced within our projects. There is a need to strike a balance between local ownership and programme progress, which can be done by engaging beneficiaries early in programme development. Ownership has an important role to play in maintenance and adequate technical assistance needs to be provided to ensure ownership. Lack of effective operations and maintenance is the biggest reason for social solar project failure across the world and this verifies in Nigeria, with the aggravation that projects have also often not been well designed.

The first phases of Solar Nigeria, implemented in Lagos and Kaduna since 2014, showed that, regardless of counterpart funding commitment, technical assistance on operations and maintenance is needed up to one year post commissioning. Another lesson is that political cycles must be factored into project planning and that beneficiaries should be educated where possible with respect to the renewable energy technology being used. Further, site selection is a sensitive issue, as multiple plans may exist for potential sites and priorities of government may change after an approved list has been agreed. State government is often concerned with numbers of facilities receiving support, rather than total coverage for individual sites. However, there are different governance and funding challenges that need addressing in northern states than in Lagos, where the first phase of Solar Nigeria has been implemented.

1.2.2 Set up and co-funding arrangement

NESP Phase 2 which has been started in December 2017 provides a direct continuation of Phase 1.

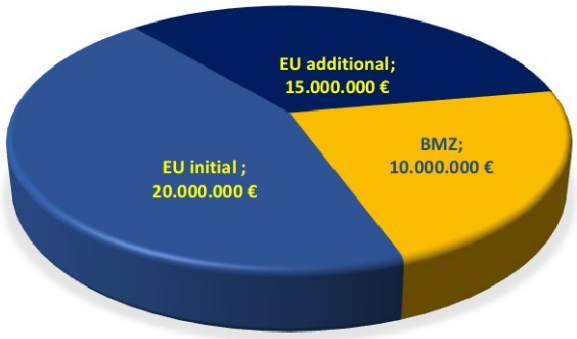

figure 1 : NESP 2 Budget Shares

The EU's original contribution was EUR 20 million while the BMZ contributed EUR 10 million. NESP2 has been extended by 24 months until November 2022 for the EU contribution and until May 2023 for the BMZ contribution. The extension includes additional funds of EUR 15 million from the EU to scale up the current activities with special focus given to solar battery recycling, clean cook stoves, promoting the diversification of the energy mix in the renewable energy space, new business model for on-grid energy access within DisCo's networks, etc. This adds up to the overall budget of **EUR 45 million.**

[2] NESP 2 Action Document

1.2.3 NESP2 Objectives

NESP2's Overall Objective[3] (OO) is: ***"to contribute to the use of affordable, reliable, sustainable and modern energy by all Nigerians including the most vulnerable".***

Specific Objectives (SO) are:

- **SO 1:** ***Enabling and fostering investments in a domestic market for Renewable Energy and Energy Efficiency***
- **SO 2:** ***Improving access to electricity for rural communities (including conflict affected areas) particularly women and people living in vulnerable situations***

The NESP-2 programme builds upon the initial project phase 1 from 2013 to 2018. Over these five years, it supported measures to promote renewable energy and energy efficiency, as well as investments in these areas. The NESP-2 provides advisory services with regard to energy policy and management, and imparts technical knowledge for various interest groups mainly in the following areas:

- **Data management and electrification planning**: The programme aims to develop an interactive database for the energy market in Nigeria. This is to contain information about on-grid power, off-grid power and energy efficiency, and also to provide public actors with a basis for planning and monitoring strategies and services, for example providing market data for the private sector.
- **Environmentally friendly power supply (on-grid and off-grid):** In the on-grid area, the programme aims to provide necessary framework conditions, thus providing incentives for private investments in on-grid energy generation from renewable energy sources. It also seeks to improve the efficiency of transmission and distribution grids. In the off-grid area, the programme is supporting the Rural Electrification Agency and the federal states in the public-private process to extend the provision of off-grid renewable energy solutions to 100,000 people.
- **Enabling environment for renewable energy and energy efficiency investments**: This area comprises measures to improve energy efficiency in industry and in buildings and foster investments in the domestic market for renewable energy. The programme supports the enforcement of energy efficiency directives that have already been developed, and also the development of new directives. It provides training courses on energy efficiency for selected employees of partner institutions to enhance their skills. It also promotes mechanisms to improve access to funding solutions.

1.3 INTRODUCTION TO THIS ASSIGNMENT

1.3.1 Objectives of the assignment

This assignment combines a Mid-Term Evaluation for the NESP-2 with the Formulation of the upcoming NESP-3. Both components of the assignment have been implemented in parallel by the entire team.

[3] The Logframe has been revised in 2020 when NESP2 has been extended by 24 months. The original Overall Objective was to: *"contribute to Nigeria's economic and social development through a better access to reliable and sustainable energy".*

Objectives of the Assignment:	
Evaluation	**Formulation**
The main objectives of this evaluation are to provide the relevant services of the European Union, the interested stakeholders with:	The main objective of the formulation study is to assist the EU Delegation to Nigeria in the formulation of a successor (Phase III) of the Nigeria Energy Support Programme under the Neighbourhood, Development and International Cooperation Instrument (NDICI) - 2021-2027, and specifically:
✦ **an overall independent assessment of the past performance of Nigeria Energy Support Programe2**, paying particular attention to its 'intermediate' results measured against its expected objectives; and the reasons underpinning such results; ✦ **key lessons learned, conclusions and related recommendations** in order to improve current and future Interventions.	✦ **to assess how the Nigeria Energy Support Programme phase3 should be designed** to continually offer technical assistance to the Nigerian power sector in accordance with the Neighbourhood, Development and International Cooperation Instrument (NDICI) - 2021-2027 and relevant EU templates and guidelines. ✦ Based on the bullet point 1 above, **to formulate and design the proposed action**, based on the analysis carried out during the evaluation, and in accordance with relevant EU templates and guidelines.

However, this **Evaluation Report covers only the NESP 2-Mid-Term Evaluation component**.

1.3.2 Commencement and Evaluation Phases

The **Inception Phase** commenced on 10th of January 2022 and included home-based preparation and desk work as well as (inter alia) a virtual kick-off meeting with the European Union Delegation in Abuja on the 10th of January and with the GIZ-Programme Management on the 26th of January, 2022.

The Draft Inception Report has been presented and discussed during an online meeting with the Evaluation Manager (DEU) and the Reference Group on 24th of February, 2022.

The Draft **Desk Report** has been presented and discussed with the Evaluation Manager and the Reference Group on 14th of March, 2022.

The **Field Mission** to Nigeria, which included a one-week mission to Lagos, took place from the 21st of March to the 9th of April. During this field mission, the team consulted more than 20 stakeholder institutions and met with more than 40 people. The list of stakeholders included

- Federal Ministries
- Government Agencies
- Non-governmental Organisations,
- Development Partners

- Training Partners
- Private Sector Industries
- Private Sector Developers

The field mission concluded with a **debriefing at the EUD in Abuja to present and discuss preliminary findings and the way forward. A Field Note and the Field Mission Presentation have been submitted**.

The **Synthesis Phase**, emphasizing on the final analysis and triangulation of findings and the formulation of the overall assessment, conclusions and recommendations commenced on the 11th of April and is expected to end in May 2022 with the **approval of the final evaluation report.**

The **Dissemination Phase**, specifically the virtual Final Presentation Seminar with the Reference Group and project stakeholders, donor community, the implementing partners etc. will be held approximately two weeks after the approval of all final deliverables.

1.4 INTRODUCTION TO THIS DRAFT FINAL EVALUATION REPORT

This Draft Final Evaluation Report only covers the **NESP 2-Mid-Term Evaluation** component of the assignment.

This report is structured according to the OECD-DAC Evaluation Criteria plus the EU-specific criteria (EU-added value) and the main cross-cutting issues. The findings are based on the agreed Evaluation Matrix outlined in the inception report and included as Annex 5. The report also includes the overall- and specific conclusions, lessons learned and recommendations as well as the necessary annexes as outlined in the Terms of Reverence for this Assignment.

The EUD Task Manager will share this Draft Report with the members of the Reference Group and (other stakeholders considered relevant) and will then provide consolidated comments to the team within 2 weeks from the date of the presentation of this report.

The team will then incorporate all comments and submit and upload the Final Report and the Executive Summary for official approval.

2 ANSWERED QUESTIONS & FINDINGS

The Chapter below contains the main findings of this mid-term evaluation by providing answers to the evaluation questions in the agreed evaluation matrix, based and structured on the 6 DAC-criteria (+ Cross-cutting Issues and "EU-added value").

2.1 RELEVANCE

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?

❑ Coherence with national development strategies

The intervention is coherent with national development strategies that include:

1. Sustainable Energy for All (SE4ALL-AA) Action Plan for Nigeria, adopted in 2016; that is in line with the global United Nations SE4ALL initiative, targeting universal access to modern energy services (see fig 3 for the progress to-date); doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in global energy mix by 2030 compared to 2010;

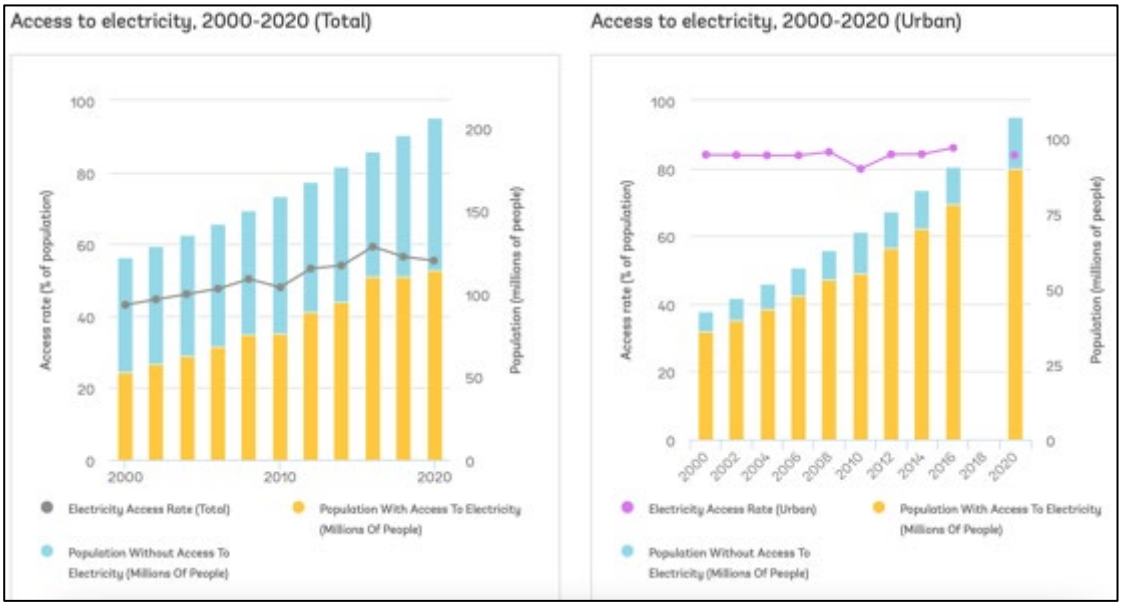

Figure 2 : Screen shot of SGD 7 tracker on June 6, 2022

2. The Power Sector Recovery Plan (PSRP) (2017-2021), approved in March 2017 by the Federal Executive Council, is the country's current reform program with the overall goal of resetting the industry and restoring stakeholder confidence. The PSRP includes measures to improve the financial viability of sector companies, increase power supply, strengthen sector governance and contract enforcement, de-risking the sector for private investment and putting it on a path to long-term sustainability. The government was to undertake financial interventions to support the establishment of a sustainable electricity tariff by 2021; technical interventions to rehabilitate and reinforce existing assets to meet baseline power supply; governance interventions to improve the perceived lack of transparency especially by market participants; and policy interventions to increase energy access through frameworks for renewable energy projects and mini-grids. It is estimated that the sector will require about $1.5 billion annually for the next five years (2017 to 2021) to achieve sector viability with

viability predicated on taking the steps outlined in the PSRP but also the national economy is losing $29.3 billion annually, due to the lack of adequate power.

❑ Coherence with national energy sector policies

The intervention is coherent with national energy sector policies, these include:

1. **Vision 30-30-30**, aims to achieve 30,000 megawatts of electricity by the year 2030, with at least 30% from renewable energy sources; the status today stands at 19,128MW and 10% from renewables based on the 30/30/30 tracker (see figure 2 below). Judging by the progress to-date, a lot remains to be done in terms of increasing generation and the share of RE if the 30/30/30 targets are to be achieved.

Figure 3 : Screen shot from 30/30/30 tracker taken on June 6, 2022

2. **National Renewable Energy and Energy Efficiency Policy, (NREEP**) adopted in 2015; promotes the development of an enabling framework to allow for faster electrification in partnership with the private sector, through both on-grid and off-grid RE solutions and advances an energy efficiency policy. Based on the figures presented in this policy, about 40% of the Nigerian population has access to grid connected electricity, out of which 72% reside in urban areas and 28% in rural areas. Out of the estimated 16.4 million rural households in the country, only about 4.6 million are connected to the electricity grid, and it is estimated that between NGN 317.8 billion and NGN 525.8 billion [a minimum of NGN 50billion per annum] up to the year 2040 to deliver 100% electricity service to all rural household. It is also estimated that a service extension to additional 471,000 rural households each year will be required from 2015 to 2020; and an annual additional 513,000 rural household connections from 2020 to 2040;
3. As part of the Vision 30/30/30, the **National Renewable Energy Action Plan (NREAP)** was also developed and adopted in 2016, presents the expected development and expansion of renewable energies in Nigeria in order to achieve the national target under ECOWAS Renewable Energy Policy (EREP), and thus Nigeria's contribution to the overall ECOWAS target of 23 % and 31% renewable energy in 2020 and 2030. The NREAP includes baseline data and information on renewable energy sources and technologies, various activities and programmes in Renewable Energy (RE), in Nigeria, barriers to the development and promotion of RE in the country, and suggested achievable RE targets, incl. gender disaggregated indicators based on national potentials and socio-economic assessments. An overview on concrete policy and regulations, laws, incentives and measures, to be implemented by the country to achieve the targets are also included.

4. **The Nigerian Rural Electrification Policy** and by extension the **Rural Electrification Strategy and Implementation Plan (RESIP)** 2016 aim to expand access to electricity as rapidly as possible in a cost-effective manner. This implies full use of both grid and off-grid approaches, with subsidies being primarily focused on expanding access rather than consumption. The Goal of Federal Government of Nigeria is to increase access to electricity to 75% and 90% by 2020 and 2030 respectively and at least 10% of renewable energy mix by 2025 as contained in the National Electric Power Policy (NEPP) of 2001 and the Rural Electrification Policy of 2005 respectively
5. **The Nigeria Electrification Project (NEP)** is a federal government scheme designed in 2018 with the World Bank, the African Development Bank (AfDB), and other partners to provide energy access to under- and unserved communities in Nigeria using renewable sources. It is a private sector-driven nationwide initiative implemented by the country's Rural Electrification Agency (REA). The Project promotes electricity access for households, micro, small, and medium enterprises (MSMEs), and public education institutions. It specifically aims to provide cost-effective power to 250,000 MSMEs and 1 million households through off-grid and mini-grid systems by 2023 via four main components:
    - Solar Hybrid Mini-grids – Mini-grid systems installed in 250 sites.
    - Standalone Solar Systems (SHS) – 24,500 productive use solar PV appliances installed.
    - Energizing Education Programme (EEP) – Mini-grids installed in 15 federal universities.
    - Technical Assistance – Institutional capacity strengthening provided to REA and private organizations in the ecosystem by international partners.

❑ **Coherence with EU-country strategies with Nigeria**

1. The access to secure, affordable, clean and sustainable energy services has been identified by the European Union's Agenda for Change as one of EU's priorities and a key driver for inclusive growth. The EU strongly supports the United Nations' (UN) Sustainable Development Goal 7 (SDG), on affordable and clean energy, and has been one of the leaders in the UN initiative on Sustainable Energy for All (SE4ALL) aiming at: a) ensuring universal access to modern energy services; b) doubling the share of renewable energy in the global energy mix; and c) doubling the global rate of improvement in energy efficiency. The EU's target is to help developing countries to provide access to sustainable energy services to 500 million people by 2030. These are in line with targets established within the Africa-EU Energy Partnership;

2. The intervention is fully aligned with the objectives of the European Green Deal. Within the context of the Green Deal, the aim is to strengthen the engagement with Africa for the wider deployment and trade of sustainable and clean energy. Renewable energy and energy efficiency are key to closing the energy access gap in Africa while delivering the required reduction in CO2. The intervention will also reinforce the efforts to implement the Africa-Europe Alliance and contribute to the EIP pillar 3 by improving the investment climate.

❑ **Coherence with Global initiatives**

1. The action will contribute to SDG 1 (End poverty in all its forms), SDG 7 (Ensure access to affordable, reliable, sustainable and modern energy for all), SDG 8 (Promote sustained, inclusive and sustainable economic growth and full and productive employment), SDG 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation), SDG 11 (Makes cities and human settlements inclusive, safe, resilient and sustainable) and SDG 13 (Climate Change);

2. Paris Agreement and COP 26 that commit countries to deployment of clean power generation and energy efficiency in their economies in order to respond to the threat of climate change by reducing carbon emissions.

❑ **The extent to which logic of the log-frame holds through**

The Addendum approved in 2020 not only increased the EU contribution by 15 M€ and extended the project lifespan by 24 months. It also revised logframe and potentially improved efficiency and effectiveness of the project and new items were added including:

1. The extension includes additional funds of EUR 15 million from the EU to scale up the current activities with special focus given to solar battery recycling, clean cook stoves, promoting the diversification of the energy mix in the renewable energy space, new business models for on-grid energy access within DisCo's networks,
2. More funds were allocated and time extended enabling the implementation of a number of activities that otherwise would not have been accomplished, this includes the 23 solar mini grids under the IMAS where developers were provided with in-kind grants. Through the IMAS Project, the development of the mini-grids across 11 states, approximately 28,000 households (138,000 people -about 67,000 females) will be served and these projects are expected to be completed before end of the Programme.

There were several changes in the log-frame as tabulated below in Table 1 below:

Description	Original	Revised (Addendum 2020)
Overall[4] objective	To contribute to Nigeria's economic and social development through a better access to reliable and sustainable energy	To contribute to the use of affordable, reliable, sustainable and modern energy by all Nigerians including the most vulnerable
Specific objectives	○ Enabling and fostering investments in a domestic market for Renewable Energy and Energy Efficiency" ○ Improving access to electricity for disadvantaged, mostly rural communities"	• Enabling and fostering investments in a domestic market for Renewable Energy and Energy Efficiency" • Improving access to electricity for rural communities (including conflict affected areas) particularly women and people living in vulnerable situations.
Impact Indicators	NIL	• Number of MWs of renewable energy produced in Nigeria • Number of tones of tCO2 p.a. of energy saved as a result of new sustainable energy solutions
Specific indicators	• Procurement of on-grid solar PV capacity in a structured bidding approach • Deployment of sustainable energy solutions in the agro-processing sector • Provide access to power through sustainable and scalable solutions to previously un-electrified rural people • The overall efficiency of the transmission grid and bulk trading system – measured in	• 6 Million Euros of new private direct investments (in Millions of Euros) attracted in the RE, EE and Energy Access segments • Procurement of on-grid solar PV capacity in a structured bidding approach • Number of improved standards or concepts for the optimised integration of RE put in place by the sector stakeholders. • Number of frameworks (legislation, policy, regulation, guideline, incentives) approved promoting RE and EE (the recycling of batteries, hydro, biomass) -disaggregated by type of framework.

[4] It has been noted that the "4th NESP 2 Progress Report 2021" prepared by GIZ still reveres to the "old" Overall Objective.

	load shedding due to excess frequency – has been increased	• 400 SME OR social institutions use improved, emission- reduced cook stoves • Provide access to power through sustainable and scalable solutions to previously un-electrified rural people.
Component 1	Building framework and pre-conditions in the RE/ EE sector to enable policy decisions, coherent electrification planning and to foster investment	Electrification Planning and Data Management
Component 2	Improving access to electricity through RE and EE, providing the applicability of sustainable business models	Sustainable Energy Access (on-grid & off-grid)".
Component 3	Strengthening technical market capabilities	Enabling Environment for RE & EE Investments Result 2.4: "*The usage of Energy Efficiency measures has increased*" and its related activities were moved from the second component to the third component; the respective result is now included under Result 3.1

Table 1 : Changes in log-frame

A number of these changes were made to reflect the changes in policies and strategies in the Country, and realities on the ground thus improving the intervention logic and the related indicator matrix; these include:

1. The earlier envisaged support the Federal Government of Nigeria (FGN) with an open competitive process for large scale on-grid solar power of about 500MW was not implemented attributed to the Government decision to go for unsolicited bids. The Government chose to develop about 30 grid-connected solar projects with a total planned capacity of 5.3 Gigawatt (GW) in addition to a possibility of increasing the capacities of existing large hydropower plants, such as Kainji or Shiroro, by allowing their hybridisation with solar. This has not yet materialized mainly due to the protracted negotiations on commercial issues relating to Partial Risk Guarantees, tariff and currency in addition to the limitations on the absorption capacity of the network following a study facilitated by NESP. Consequently, with the extension, this indicator was adjusted to 100 MW. In addition, due to this development in the on-grid sector, NESP looked into alternative models to support the FGN in the promotion of large and medium scale on-grid renewable capacities; during the extension, NESP is exploring medium scale RE generation feeding into the distribution network (Embedded Generation) in a bid to deliver even more tangible results. This approach combines the Embedded Generation and Franchising Models into what NESP calls Premium Grids targeting industrial areas with a view to support Nigeria's economic development;
2. Delays in the realization of the MAS that was started in February 2019 that has now been combined with IMAS to create the 23 mini-grids for which materials were handed over in March 2022 (after 3 years) and are expected to be completed before the end of the year. If the extension had not been granted, this would have been difficult to realize. It was revealed in the interviews, that the delay has led to some changes in the grant to the developers; the original amount of Euro 1.1M for each developer was reduced to Euro 0.7M due to the increased costs of materials given the time lapse since the project was launched resulting into a reduction in the materials quantity, developers that had initially identified off-grid sites had to identify new sites that are interconnected to the Grid and the Programme had to raise the in-kind contribution through supply of panels that were not initially on the list. The developers were left to meet the cost of land, batteries, inverters and installation costs;

3. During the imposed curfew, the general technical approach of the data collection was slightly modified as a response to the COVID-19 and the overall security situation. NESP stopped the conventional field work and focused on drone data collection instead, which follows GIZ imposed COVID-19 rules and regulations. More specifically, personal contacts were minimised (lower number of people required to operate drones) and third-party exposure was basically eliminated; and this delayed the data collection process this negatively impacted on the mapping exercise and energy audits;
4. Initially the programme was planned to be implemented from December 2017 until November 2020. Given the initial delays on the recruitment and conclusion of consultancy contracts in the first year and the additional funds of EUR 15 million granted by the EU, the commissioning parties (EU and the BMZ) agreed to extend the programme by 24 months. During the NESP II extension, the programme will expand its activities and up-scale geographically (including the Northeast, provided the security situation permits it) while extending its measures to strengthening the support to the Nigerian Government in the areas of solar battery recycling, new business models for on-grid energy access within DisCos networks, support to alternative electrification models for low income areas, which could for example involve companies offering a wide range of modern energy products like SHS, LPG-based clean cookstoves etc
5. With regards to clean cooking, NESP will extend its activities towards LPG-based clean cookstoves (incl. for households). These activities may end-up being linked with NESP's activities on electrification, e.g. support to alternative electrification models for low income areas, which could for example involve companies offering a wide range of modern energy products like SHS, LPG-based clean cookstoves etc;

❑ **Extent to which the assumptions in the logframe holds through**

Three key assumptions were made, and two of these held through, there are:

1. The Federal Government of Nigeria remains committed to the promotion of renewable Energy, energy efficiency and rural electrification and approves relevant promotion strategies/ instruments as well as providing funding for these;
2. The Federal and State institutions (FMP, NERC, etc.) are fully committed to foster the development of RE and EE.

However, the third assumption of maintaining political stability still remains a challenge especially in the North East despite the continued Government efforts.

Based on the assessment of project relevance to local and national energy priorities, policies and strategy of the Federal Government of Nigeria, to EU/ Global strategic priorities and objectives, overall project relevance is considered to be **HIGHLY SATISFACTORY**.

2.2 COHERENCE

EQ2: *To what extent is NESP-II compatible with other interventions in the energy sector?*

❑ **Level of coherence with other donor funded interventions in the energy sector**

NESP II is compatible with other interventions in the energy sector; these include:

1. Nigeria Electrification Project (NEP) aimed at increasing electricity access for households, public educational institutions, and undeserved enterprises nationwide. NEP comprises four components: (i) Component 1: Solar Hybrid Mini-Grids for Rural Economic Development: Funding the rollout of a minimum subsidy tender for mini-grids in 250 sites across six geopolitical zones in the country; (ii) Component 2: Productive Appliances and Equipment for Off-Grid Communities: Funding performance-based grants to both mini-grid and stand-alone solar installation companies that increase the number of productive appliances in their operations; (iii) Component 3: Energizing Education (Phase 3): Financing the installation of dedicated power systems for eight federal universities across the country's six geopolitical zones; and (iv) Component 4: Institutional Capacity Strengthening: Providing technical assistance and capacity building to REA and other relevant stakeholders to support national rural electrification scale-up activities. The $1.2billion Programme implemented by REA, is funded by:
    a. African Development Bank (AfDB) – $150 million (loan)
    b. Africa Growing Together Fund (AGTF) - $50 million (loan)
    c. World Bank – $350 million (loan)
    d. Government of Nigeria - $5 million (counterpart funding)
    e. Others (Private Sector) – $660 million (commercial financing)
2. USAID through the Nigerian Power Sector Programme (NPSP) that covered the costs of development and operation of the tender platform for the mini-grid tenders for MAS and IMAS;
3. NESP has established a collaboration with the Nigerian Power Sector Programme (NPSP) funded by the United States Agency for International Development (USAID) and implemented by Deloitte. The collaboration is now in its implementation phase. NESP supported mini-grid tenders, Mini-grid Acceleration Scheme (MAS) and Interconnected Mini- grid Acceleration Scheme (IMAS), are being executed using the Odyssey Energy Solutions online platform. The costs of the development and operation of the tender platform are covered by NPSP.
4. Further collaboration with USAID exists in the field of Capacity Development to jointly issue certificates on competency only to successful trainees, who obtain up to 70% in the certification examination conducted by NESP
5. USAID in Capacity Development to jointly issue competency certificates to successful candidates under NESP;
6. EU and Agence Française de Devéloppement (AFD) co-funded SUNREF project implemented through Manufactures Association of Nigeria (MAN), that facilitated the industry dialogue with RE Associations to ensure more professionals are certified;
7. There is ongoing coordination between the NESP 2 programme and the programmes implemented by the Agence Française de Développement (AFD) and co-funded by the European Union - the National Power Training Institute of Nigeria (NAPTIN), which is a sequel to NESP I and the Sustainable Use of Natural Resources and Energy Finance (SUNREF) Programme.
8. International Finance Cooperation (IFC) on the adoption and implementation of the Building Efficiency Energy Code within the framework of the Lagos State Green Buildings Initiative.

❑ **Level of coherence with national /government funded interventions in the energy sector**

The sole mission of the Rural Electrification Agency (REA) is to provide access to reliable electric power supply for rural dwellers irrespective of where they live and what they do, in a way that would allow for reasonable return on investment through appropriate tariff that is economically responsive and supportive of the average rural customer. To achieve this, the Rural Electrification Fund [REF] was established by virtue of the section 88 sub-section II of the Electric Power Sector Reform Act of 2005 to provide support for the development of the on and off grid sectors for the power/energy sector to thrive, by:

1. Achieving more equitable regional access to electricity;
2. Maximizing the economic, social and environmental benefits of rural electrification; subsidies;
3. Promoting expansion of the grid and the development of off-grid electrification;
4. Stimulating innovative approaches to rural electrification, provided that no part of the REF shall be used as subsidies for consumption.

Funds are used to promote cost-effective expansion of electricity access in un-electrified rural areas, using renewable off-grid and on-grid electrification solutions through partial one-off capital subsidies and technical assistance to ensure access to reliable and affordable electricity, with the ultimate goal of improving the living standard, socio-economic and environmental conditions of rural dwellers.

Recently NESP offered technical support to REA tenders under the 1st REF completed in 2020 serving electricity to around 11,875 people and now the ongoing 2nd REF with a total 51 mini-grid projects (41 isolated mini-grid projects and 10 interconnected mini-grids) will lead to about 17,000 new connections (approximately 85,000 people).

❑ **Level of coherence with private sector driven interventions in the energy sector**

The Private Sector has mainly intervened in 3 areas that are complimentary to NESP II (some of these firms were interviewed during the Field Mission); these are:

1. **Energy Efficiency**: a number of firms have embarked on energy efficiency measures that include replacement of all incandescent bulbs with LEDs, establishment of solar PV systems to replace the diesel generators; this does not only lead to cost savings but also in reduction of the dangerous gas emissions.
2. **Mini-grid development**: a number of firms are engaged in the establishment of solar mini-grids to serve the unserved population or to provide more reliable supply to grid connected customers that are presently poorly served by the DISCOs due to the poor grid performance, thereby increasing access and utilization of modern energy.
3. **Training:** a number of firms are engaged in providing the much-needed skills training in solar systems and energy management; this will provide the much-needed expertise in order to enhance investments and utilization of RE and EE technologies.

❑ **Synergies used successfully**

The synergies that were complimentary to the Programme include:

1. **Concerns over Climate Change**: Nigeria is party to the Paris Agreement and COP 26 and as such, is supportive of measures to reduce carbon emissions through efforts to implement the Nationally determined contributions (NDCs) - the long-term goals to reduce national emissions and adapt to the impacts of climate change. One of the aspects in the Nigerian NDCs is to Expand sustainable energy sources and decentralize transmission in order to expand

sustainable energy sources and decentralize transmission in order to reduce vulnerability of energy infrastructure to climate impacts.

2. **Fuel crisis:** partly attributed to the on-going Russia – Ukraine conflict, the price of diesel in Nigeria has sharply increased driving the population that was dependent on diesel generators to seek alternatives, and solar offers the best alternative. The average cost paid by Nigerian consumers for a litre of diesel recorded a significant increase of 28.12% from N224.9 per litre recorded in January 2021 to N288.1 in January 2022[5].This is according to the diesel price watch report released by the National Bureau of Statistics (NBS).

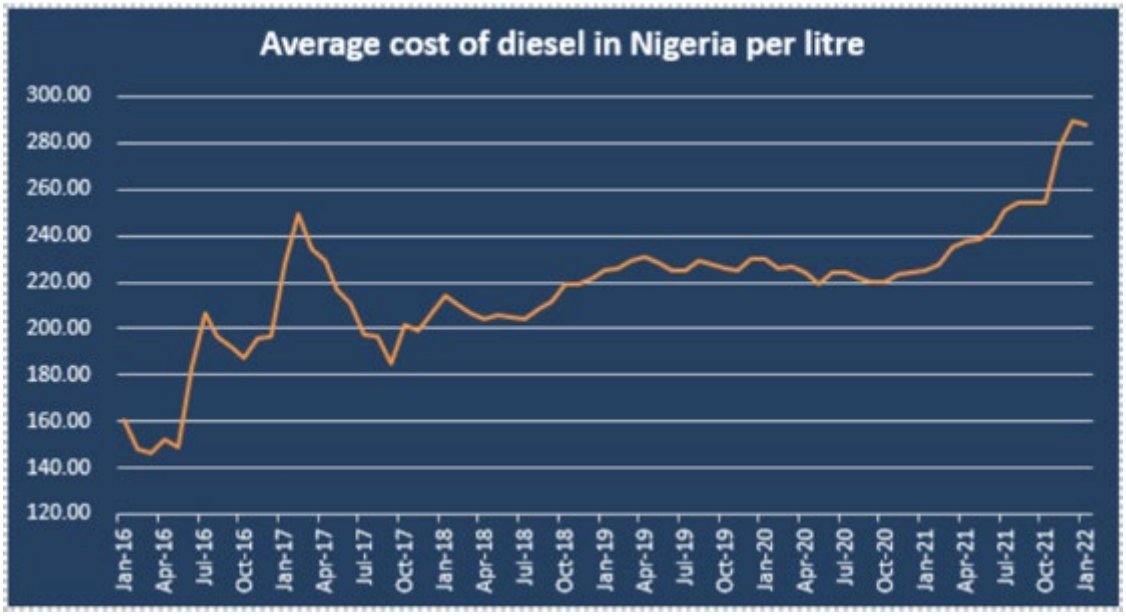

Figure 4 : Trends in average cost of diesel

Technological advances in solar technology: this industry has dramatically advanced in improving the efficiency while lowering the costs. Figure 5[6] shows the trend in the solar PV module prices from 1978 to 2016. These prices measured in cost (in dollars) per unit energy output (Watt peak: Wp) show that the prices of PV modules per energy output are reducing annually from about $66.10 in 1976 to $0.62 in 2016. This is evident from the increase in the cumulative solar PV capacity in Figure 6 below. This reduction shows that developing countries like Nigeria can adopt solar energy on a large scale at these prices

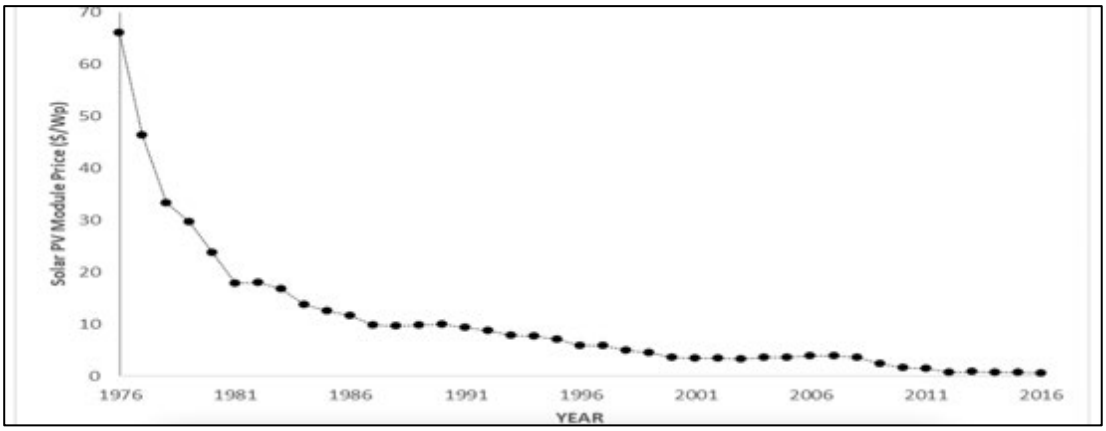

Figure 5 : Trends in solar panel prices

[5] https://nairametrics.com/2022/02/18/cost-of-diesel-in-nigeria-surges-by-28-1-in-january-2022-as-fuel-scarcity-lingers/
[6] https://www.sciencedirect.com/science/article/pii/S2405844021011191

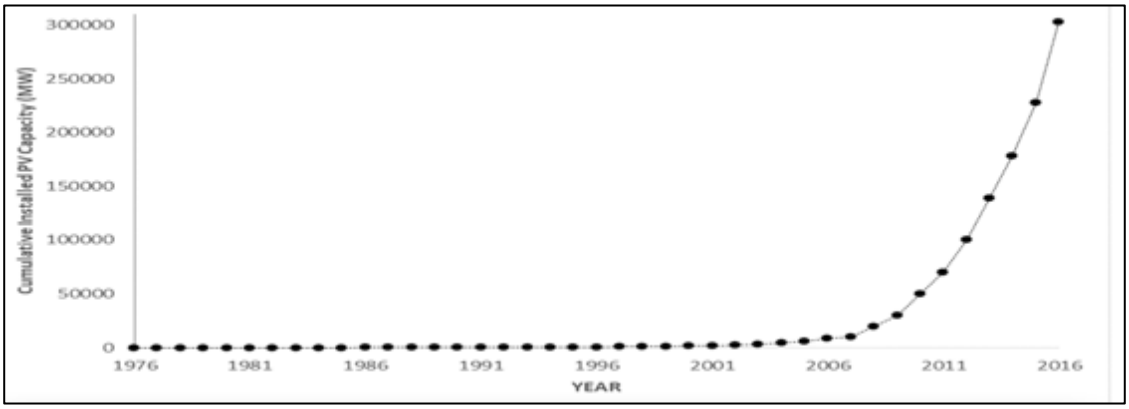

Figure 6 : Global cumulative capacity of solar photovoltaic (PV) technology in megawatts (MW).

Batteries that are a key component in solar systems too have been declining in cost[7], see fig 7 below:

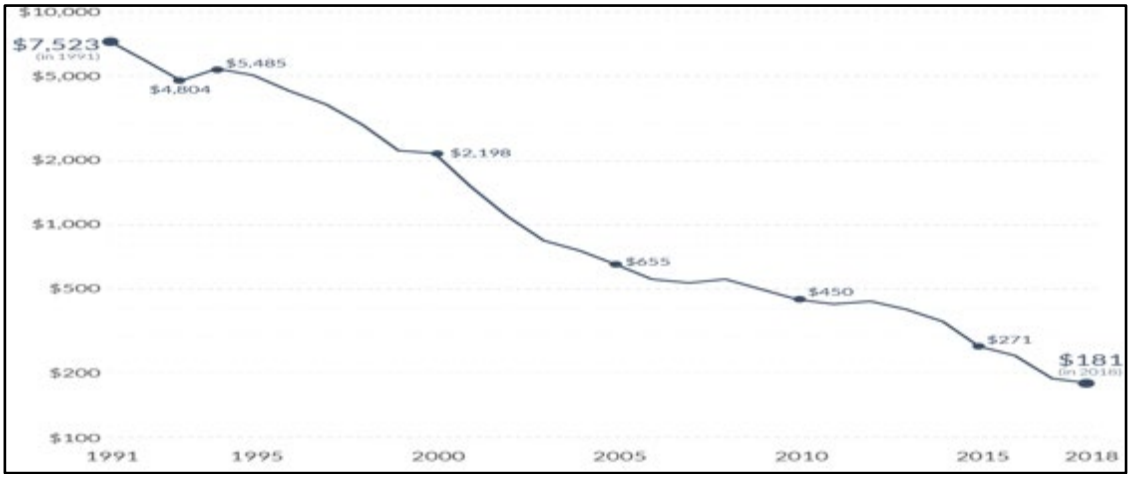

Figure 7 : Trend in lithium-ion battery cells per kWh (logarithmic axis)

❑ Potential synergies not used

1. Hybridization: Nigeria is well endowed with water resources in the Norther Region, and a hybrid of solar with mini-hydros would provide a major boost to the power deficit in the country that is environmentally friendly, this is yet to be fully harnessed;
2. Integration of solar systems with the Grid: The benefits of integrating solar systems with the Grid include savings on battery storage and optimal utilization of the energy source; this too is not harnessed yet;
3. Solar thermal: is another area that should be exploited further; the continued usage of electric water heaters when there is such a power shortage is not optimal utilization of the resources – it was noted that during Phase I a solar water heater pilot project was implemented in Kuru Government Secondary School, Plateau State providing over 1000 students with access to clean hot water;
4. Other areas include e-mobility, green hydrogen,etc.

Based on the assessment of programme compatibility with other interventions in the Sector, the Coherence of the Programme considered to be **HIGHLY SATISFACTORY**.

[7] https://ourworldindata.org/battery-price-decline

2.3 EFFECTIVENESS:

EQ3: *To what extent has NESP-II achieved or is likely to achieve its specific objectives and its results considering the progress made so far including any differential results across groups?*

- **Progress towards specific objectives**

1. **6 Million Euros of new private direct investments** (in Millions of Euros) attracted in the RE, EE and Energy Access segments

Currently, in the effort to unlock local access to finance, NESP organised structured training for local and international financial institutions. One of the local banks, FCMB, as a beneficiary of this training has now created a product to fund the IMAS project directly to the tune of 750,000 EUR/developer or 25% of the total project cost (which could be up to 6 Mio EUR in total for all IMAS developers) to draw down. The condition for accessing the loan are also very friendly for the nature of mini-grid projects which includes using the Due Diligence Tool developed by NESP to assess the projects/developers. NESP equally anticipate assumes that the project developers selected through the IMAS/MAS are able to commit up to 1.44 million EUR in equity for the approximately twenty-five (25) planned interconnected mini-grid projects.

This brings the total to Euro 7.44 million (124%) surpassing the target in the RE projects alone.

2. **Procurement of on-grid solar PV capacity in a structured bidding approach**

Progress attained so far is 350kW made up of 200kW at Jubaili Bros Engineering Limited and 150kW at International Breweries Sagamu, yet the target is 100MW; representing 3.5% progress.

3. **Number of improved standards or concepts for the optimised integration of RE put in place by the sector stakeholders.**

The Programme has offered the following support:

a. Adoption and launch of 38 standards for solar PVs, batteries, inverters, charge controllers and meters for Standards Organisation of Nigeria;
b. Adoption of ISO 50001:2018 on Energy Management System as a Nigerian Industrial Standard; the Standard was adopted to enable organisations to establish the systems and processes necessary to continually improve energy performance, including energy efficiency, energy use and energy consumption;
c. Development of simplified Guidelines for Environmental Social and Management Plan for solar mini-grids in Nigeria in conjunction with FMEnv; these were launched on March 17, 2022;
d. Development and adoption of the Guidelines for Inspecting Mini-grids Projects in Nigeria for NEMSA.

The Programme has over exceeded the original target of 3.

4. **Number of frameworks (legislation, policy, regulation, guideline, incentives) approved promoting RE and EE (the recycling of batteries, hydro, biomass) -disaggregated by type of framework**.

The Programme has offered the following support:

a. FMEnv: Development of a Baseline Study on Mini-grids for Electrification and Waste Battery Management within the framework of developing a strategic Action Plan for the environmentally friendly and safe disposal of ULAB and other batteries that are used in RE or power back-up systems;

b. FMEnv: Development a National Policy for Waste Battery Management; this Policy will support the Nigerian Government's efforts to ensure the ESM of waste batteries resulting from the accelerating use of renewable energy solutions, such as solar mini-grids.
c. NERC:
    i. Amendment of the Distribution Code Regulations, ReFiT, and Embedded Generation Regulations;
    ii. Review of two (2) regulations (Distribution Code Regulations and Embedded Generation Regulations) and provided input to the regulators, held workshop to agree on the areas that require adjustment,
    iii. Development of Simplified Procurement Guideline for Embedded Generation, Connection Charge Methodology for Embedded Generation, and Standard of Performance for the Distribution Code.
    iv. Development of the following frameworks:
        - Simplified Mini-grid Multi Year Tariff Order (MYTO),
        - DUoS Tool,
        - Mini-grid Online Application Portal
        - Update of the Mini- grid Regulation;
        - Update of the Mini-grid MYTO and Online Application Portal

The Programme has over exceeded the target of 3 frameworks.

5. 400 SME OR social institutions use improved, emission- reduced cook stoves

NESP and the FMEnv agreed in 2019 on a structured tender approach, NICCAS, with the aim to select cook stove manufacturers, which will provide clean cook stoves to 400 agro-processing businesses and the tender was awarded to the winner, SOSAI Renewable Energies Ltd. Recently, it was agreed to shift to Modern Energy Products[8], with focus on LPG based clean cooking to be in line with the FGN's recently adapted approach on clean cooking via LPG. NESP is now providing technical assistance to the winner to refine its business plan on LPG based cookstoves. NESP's support to SOSAI further includes the provision of promotional materials aiming at increasing LPG adoption, market penetration, and awareness creation for clean cookstoves. SOSAI has partnered with approved stove-manufacturers to ensure that reliable and affordable 400 units of LPG based stoves will get to the targeted MSMEs. In addition, and upon the request from FMEnv, NESP has also delivered a series of webinars that continues to support the expansion and adoption of LPG based cookstoves. NESP is providing technical support to serve as an introduction to the preparation of business plans for institutional clean cookstoves with a view to improve the local capacities of stove manufacturers in Nigeria. Part of the intervention of NESP will further improve regulatory framework, support business plan development of selected LPG retailers (through a tender-selection process) as a pilot, and further improve capacity of financial institutions to invest in the sector. This will unlock more funding for private companies. The Programme is expected to achieve the target of 400.

6. Provide access to power through sustainable and scalable solutions to previously un- electrified rural people.

[8] Modern Energy Products refers to any energy products contributing to reduce Gas Emissions and that can be sold as such to individual energy consumers for their self-consumption e.g. LPG Stoves, Solar Homs Systems etc.

Through the IMAS Project, where in-kind grants were recently handed over for the development of 23 mini-grids across 11 states, approximately 28,000 households (138,000 people -about 67,000 females) will be served and these projects are expected to be completed before end of the Programme. It was also noted that a total of 19,375 new connections (96,875 people) will be achieved through REA tenders bringing the overall total to 47,375 connections (236,875 people) far exceeding the target of 130,000.

- **Further progress towards specific objectives likely to be achieved during the remaining lifespan of the Program**

1. **6 Million Euros of new private direct investments** (in Millions of Euros) attracted in the RE, EE and Energy Access segments

With a total of Euro 7.44 million (124%) surpassing the target in the RE projects alone achieved, this is not likely to change given the limited time frame.

2. **Procurement of on-grid solar PV capacity in a structured bidding approach**

Progress attained so far is 350kW representing 3.5% progress of the targeted 100MW; it is likely that further progress might be attained through:

a. Premium grids totalling 94MW that include 10MW Kano Solar Project, 54MW embedded generation for the premium grid in Challawa industrial area, 30MW embedded generation for the premium grid in Kudenda area under the Kaduna DisCo,
b. 300 MW solar plant in Shiroro hydropower plant; this plant is being developed in three (3) phases - the first pre-phase is currently ongoing and will lead to 15 MW of solar PV

If achieved, this would add 109MW leading to a new total of 109.35MW; **an achievement of 109%**

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3. **Number of improved standards or concepts for the optimised integration of RE put in place by the sector stakeholders.**

No additional support is further expected during the remaining timeframe

4. **Number of frameworks (legislation, policy, regulation, guideline, incentives) approved promoting RE and EE (the recycling of batteries, hydro, biomass) -disaggregated by type of framework.**

The Programme might offer additional support during the remaining time frame in the development of policies and guidelines for recycling and disposal of solar equipment

5. **400 SME OR social institutions use improved, emission- reduced cook stoves**

No additional change is further expected during the remaining timeframe

6. **Provide access to power through sustainable and scalable solutions to previously un-electrified rural people.**

The MAS/IMAS development of the 23 mini-grids will be accomplished, that will be achieved during the remaining lifespan of the Programme.

EQ4: *To what has the project strengthened the capacity of the various agencies under Federal Ministry of Power and other line ministries like Federal Ministry of Trade?*

- **Who has been trained?**

There is not enough data to fully confirm the actual extent to which NESP II has strengthened the human capacity in the RE and EE technology given that some of the beneficiaries do not complete the

Certification process but based on the interview findings and considering the needs of the Country; more capacity building is still required.

The following achievements were noted:

1. Training of Trainers (ToT) on Solar Photovoltaic/ Solar Photovoltaic Installation Supervision/Mini-Grid Design and Energy Auditor/Energy Management concluded for all 9 training partners; these partners have carried out basic training on solar design and installation to about 100 participants.
2. Training modules (including technical, business and leadership topics) were developed and selected developers (over 50 companies) trained;
3. Capacity building and organisational development was extended to REA focusing on (1) short term efforts by supporting ad-hoc data clinics on concrete tasks, (2) medium term efforts by delivering practical trainings and (3) long term efforts by providing technical assistance on Organisational Development, about 100 staff involved;
4. Internship scheme for Women: Six (6) women have successfully completed the internship programme and 53 women received scholarship in solar PV and mini-grid design courses;
5. 22 SON staff took part in the Continuous Quality Improvement (CQI);
6. Entrepreneurship training for E-mobility;
7. Training of ten (10) EEN participants on Compressed Air System Optimisation (CASO);
8. Training for Mini-Grid Training for Developers;
9. 14 Engineers from TCN on advanced planning;
10. Twenty-four (24) Professional Energy Auditors (PEAs) to carry out energy audits in Buildings trained;
11. 35 Participants of the AEE energy audit training have achieved the AEE CEAs credentials.
12. Ten (10) Energy Managers trained on Measurement and Verification have now achieved the AEE Certified Measurement and Verification Professional (CMVP) credentials
13. 48 building professionals trained on building energy audit;
14. Training of 46 plant and consultant energy engineers on the concept of Energy Efficiency Networks and profitability calculation.
15. Training on ISO 50001 standard for 27 plant and consultant energy engineers.
16. 73 Policy makers and plant/energy engineers trained on industrial energy audit.

In summary, it was noted that while the Programme carried out many training programs covering a very wide array of areas, the concern raised was on the numbers (not the quality) being small compared to the needs of the country, hence the likely limited impact and continued call for more.

- **Is the training considered "successful" by the trainees? (Why? Why not?)**

Based on the trainees interviewed, the training was considered "successful" especially those that achieved certification after the training; however, the concern was on the numbers being too few to make a national impact in such a big country. Others also were concerned on the level, there was demand for more advanced training. Finally, while credit was given for the preparation of training modules and conducting Training of Trainers, the majority of the intended beneficiaries cannot afford the fees and given the weak enforcement of standards, the market is more concerned with "cheapest" services as opposed to the quality.

- **Staff-turn-over of trainees after the training.**

This was not determined as a critical issue as the number of the people trained were very few compared to the Sector needs and where there was movement it was still within the Sector.

- **Nature and effectiveness of other capacity building efforts implemented**

Other capacity building efforts have included:

1. **Mapping Exercise**: FMP website (nigeriase4all.gov.ng) and web-based CDMS is open to public since 10.11.2020 and to date around 60,1883 km of the electricity grid, 3,937 settlements and 3.2 million buildings have been mapped; in total, data for 22 Nigerian states was collected and integrated as opposed to the planned 20. The Training portal migrated to Open Source solution and opened to public
2. **Certification process**: In the industrial sector, 35 participants of the Association of Energy Engineers (AEE) energy audit training have achieved AEE Certified Energy Auditors (CEAs) credentials. Additionally, 10 trained energy managers have now achieved the AEE Certified Measurement and Verification Professional (CMVP) credentials. In addition, the Industry Skills Advisory Committee (IAC) has approved the certification framework which will serve as the guiding framework for the COREN-PPD&C Unit to operationalise the scheme. Henceforth, examinations, accreditation of training institutes, issuance of certificates and the maintenance a national register of certified personnel will be executed and managed by COREN. Finally, NESPII has facilitated the harmonisation with the Economic Community of West African States (ECOWAS) Centre for Renewable Energy and Energy Efficiency (ECREEE), through COREN on the introduction of a regional certification scheme in solar PV installation.
3. **Independent online learning platform**: aimed at further support to capacity development on electrification planning learning, NESP II has developed the platform (https://learning.nigeriase4all.gov.ng/), including a variety of training materials and recordings, that will be open to partners and the general public to enroll for free self-paced courses. This platform along with the ongoing trainings to partners will contribute to improved electrification assessment and modelling of the Nigerian energy sector and strengthen the contributions of key public-sector stakeholders;
4. **Tools:** Programme has supported NERC in developing the Distribution Use of System (DUoS) calculation tool aiming at fast-tracking negotiations between DisCos and private developers in developing interconnected mini-grids. Likewise, the programme supported in conducting M&E and Demand Stimulation Methodology;
5. **Regulations:** Programme supported NERC in the review of three (3) regulations, namely, the Embedded Generation Regulations, the Renewable Energy Feed in Tariff Regulation (REFiT), and the Distribution Code, which aim to increase RE in the system energy mix.
6. **Workshops:** have been conducted covering review of different policies, these include National Waste Battery Management Policy, Environmental Impacts Assessment, NEMSA Guidelines; New standards for Solar Equipment, Solar Hybridization Mainstream Guidelines and Import process(es) of RE&EE equipment
7. NESP has prepared a report recommending the baseline data that should be used for the LEAP Modelling that will be undertaken by FMEnv that their consultants;
8. **Franchising Regulations**; the following annexes were prepared:
    a. Electricity Distribution Franchising MYTO
    b. Business Model Manual (incl. Franchising Agreements for Revenue Protection and Premium Grids)

c. Concept for Consultation Process

9. **Capacity of Survey companies**: NESP improved capacities of the following companies in following fields:
    a. Reddfox - general knowledge on electrification, mobile mapping systems, remote mapping, field data collection
    b. Creeds-general knowledge on electrification, remote mapping, field data collection
    c. Hanovia - field data collection
10. **Studies:** NESP has carried out a number of studies that include: updated Solar Integration Study; Mini-Grid Least Cost Modelling; Market Study on RE Embedded Generation; Meter Asset Provider; Guidelines on Mini-Grid Cost Reduction Strategies; Environmental Social Impact Assessment (ESIA) Guidelines;
11. **Surveys:** Carried out baseline survey on assessing the demand potential for promoting institutional LPG based cook stoves;
12. **Job fair:** Hybrid (presence and virtual) job fair in Abuja and Lagos in collaboration with REEEA-Alliance. for sustainability;
13. **NEMSA:** with additional capacity building activities in inspection of solar mini grids.

EQ5: *Which factors have influenced the achievement of the interventions' objectives? What were the factors that prevented the achievement of the objectives?*

❑ **Positive factors**

1. **Implementing Partner:** GIZ the Implementing partner, has a good track record in the energy sector across the world and a long history of development cooperation in Nigeria in the energy sector in particular and has considerable credibility with the Nigerian government for having successfully implemented several development programmes in the past; this was confirmed by the consistently positive comments made about GIZ and the programme by the interviewees representing counterpart institutions;
2. **Institutional arrangement:** this played a vital role in ensuring smooth operation of the Program and the fact that FMP served as the focal point ensured the vital continued Government support.
3. **NESP I:** Experiences and lessons learned during implementation of NESP I were gainfully put to use; these include:
    a. Reform plans in the energy sector are usually implemented with considerable delays, often only partly and sometimes not at all, partially due to lack of implementation capacities, lack of coordination and lack of proper data. However, experience shows that professional capacity of the respective and relevant parts of the administration can be enhanced in order to improve the planning process and – with some trickle-down effect –its implementation.
    b. Finally, procurement and import of goods to Nigeria has shown to be a potential delaying factor and has to be planned for carefully. Some remedies are further operationalising the institutions involved and careful attention to the implementation of duty waivers.
4. **Conducive environment:** The Programme operated at the most opportune time as:
    a. Rising fuel costs making continued self-generation using generators untenable;

b. Increased awareness of the dangers of carbon emissions and the need to address Climate Change
c. International support that has grown over time providing alternative energy solutions
d. Continued improvements in solar systems efficiency
e. The sudden sharp increase in the price of diesel partly attributed to the Russia-Ukraine conflict and the depreciation of the Naira made operation of diesel generators untenable and the population turned to solar systems;
f. The related sharp increase in LPG, the bulk of which is imported; a 12.5kg cylinder has increased from NGN 3,000 to NGN 12,000 in 6 months;
g. Flexibility in adding/ deleting activities in response to the changing environment, for example in Year 1 the Programme was engaged in 22 activities that grew to nearly 100 by year 4;
h. Availability of local financing mechanisms fir solar project developers about Naira 35million per project is now readily available with local banks.

❑ **Negative factors**

1. **COVID 19:** interfered with the Programme immensely following the travel restrictions imposed in the Country;
2. **Lack of awareness** – among the policy makers and grid operators has limited the introduction of RE and EE technologies. This was compounded further by lack of:

    a. Trained staff to design and install such systems – the few inexperienced ones that attempted resulted into poor performance of such systems and hence the negative publicity;
    b. Weak enforcement of standards resulting into importation of sub-standard (fake) products;
    c. Previously, readily available diesel/ petrol generators and cheap fuel;
    d. Financing Mechanism to meet the required high up-front cost of installation of RE and EE technologies; it was reported that it takes more than 2 years to negotiate such a package, this is mainly attributed to lack of knowledge in the financial institutions; this was mitigated by the Programme conducting awareness programs for bankers.
3. **Insecurity:** this restricted access especially during the Mapping Exercise though the Programme devised other measures like using drones;
4. **Training Fees:** Inability by potential beneficiaries to afford the training fees set by the Training Institutions limited their participation; this has been mitigated by identifying sponsors for some trainees and utilizing on-line platform;
5. **Employers:** inability to allow days off for employees to attend the training sessions; some of them lasted more than a month and were residential. This resistance by employers may also be attributable to lack of awareness of benefits of such training among the decision makers and potential trainees and inability to find suitable replacements; this was mitigated by success stories through institutions like Manufacturing Association;
6. **Limited number of women:** with necessary basic skills and interest to benefit from such training programs;

7. **Lack of Tax incentives:** Imports of solar equipment still attract taxes (20% on batteries and 7.5% on solar panels); this will be mitigated by continued policy dialogue

8. **Depreciation of the Naira**: from about 1$ = 300 in 2021 to nearly 1$=600 in 2022;

Based on the assessment of what the programme has achieved or expected to achieve its objectives, and its results including any differential results across groups, the Programme effectiveness is considered to be **SATISFACTORY**.

2.4 EFFICIENCY

EQ6: To what extent does the intervention deliver (or is likely to deliver) results in an economic and timely way?

❑ **Progress in implementing programme activities**

1. Component 1: Electrification Planning and Data Management

Specific progress in Component 1 activities: Framework and pre-conditions in the RE and EE Sector

Out of a total 41 planned activities, 1 was cancelled and progress on the remaining 40 is as follows:

a. 30 activities have been fully implemented (75%);
b. 10 (25%) are still on-going in the last stages of implementation and should be completed before the end of the Programme, except for one activity covering off-grid mapping in the northern states where insecurity might hamper progress despite innovative methods like geo-spatial mapping. It should be noted that the initial target for data gathering on electrification (on-grid & off-grid) in 20 states was exceeded as 22 states were covered and for length of grid data collected (measured in km) to support TCN, DisCos or franchisees in planning 60,183km mapped exceeding the initial target of 10,000km.

The Programme succeeded in launching the Central Data Management System (CDMS) (see picture 2) on the website, (nigeriase4all.gov.ng) and mapped 22/36 states; installed a Grid Tracker and RE monitoring tool on the same website, this will provide to the public and the private sector the much-needed data for their own planning activities.

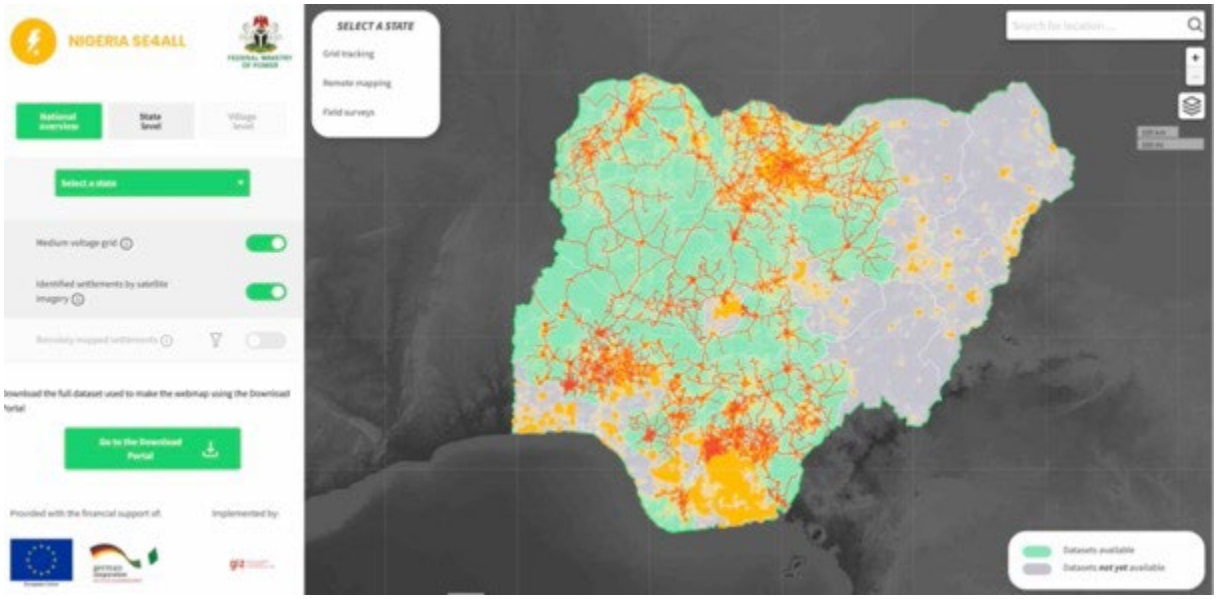


Figure 8 : Screenshot of the Central Data Management System (CDMS) (www.nigeriase4all.gov.ng)

At this stage, the CDMS is not yet fully utilized by most stakeholders, nevertheless, these tools will potentially boost the effectiveness towards Result No.1 in the near future if utilized.

It has been observed that the result oriented "*outcome indicators*" in the log-frame include in fact both, output and outcome-oriented indicators and targets. Regarding the achievement of targets, the picture is mixed, as shown in table 2 below.

R1) Institutional and Regulatory Frameworks and Planning Mechanisms improved			
Result indicator (logframe)	**Target**	**Achievement (Nov. 2021)**	
1.1.1. Number of stakeholders (e.g. FMPWH, TCN, REA, states) that use synchronized data management systems for their planning and decision-making processes	3	3	✓
1.1.2. Number of sites surveyed in order to support Government (FMP and REA) in collecting data on mini- grid potential.	200	4	X
1.1.3. Length of grid data collected (measured in km) to support TCN, DisCos or franchisees in planning	10,000	60,183	✓
1.1.4. Number of surveying companies trained on an advanced methodology on electrification surveys.	1	0	X
1.1.5. Number of frameworks (legislation, policy, regulation, guideline, standards, incentives) supported promoting RE and EE (incl. battery recycling small and medium scale hydro, biomass)	6	6	✓

Table 2 : Indicator matrix for Result 1

It has also been established that the activities varied from year to year as shown in table 3 below:

Year	1	2	3	4
Activities	4	18	21	40

Table 3 : Programme activities per year for Component 1

Observation:

The biggest achievement under this Component is the successful launch of ESMP Guidelines, CDMS, mapping 22/36 states; installing a Grid Tracker and RE monitoring tool on the same website that will provide to the public and the private sector the much- needed data for their own planning activities in addition to conducting a wide variety of training programs. It is noted however, while the mapping of 22 states exceeded the planned number of 20, the important element is the capacity and availability of resources of the Ministry to map the remaining states and sustain this website and carry on the necessary updates as will be required.

2. Specific progress in Component 2 activities: Scaled up sustainable RE and EE Sector

For this Result 2, out of a total 39 activities planned initially, 2 were merged, 3 were cancelled; 1 is on hold and 1 was addressed under 1 leaving a total of 33 activities of which, 25 (76%) have been fully implemented and 8 (24%) are ongoing in the last stages of implementation these include the IMAS Project where developers received in kind grants for 23 mini grids and these will be completed well before end of Programme

The Programme is yet to achieve the desired outcome as it has only recently launched the Interconnected Mini-Grid Acceleration Scheme (IMAS) through the in-kind contribution of materials for 23 mini-grids across in 11 states expected to connect about 28,000 households (138,000 people - about 67,000 females); construction is expected to commence very soon and all activities are expected to be completed before end of the Programme.

R2) Scaled up sustainable RE and EE business models and Implementation Mechanisms			
Result indicator (logframe)	**Target**	**Achievement (Nov. 2021)**	
2.2.1. Number of tenders of sustainable electricity solutions' procurement supported	6	4	X
2.2.2. Number of sustainable energy project pipelines (off-grid mini grid, interconnected mini grid, hydro, small or medium scale hydropower, medium scale on-grid solar projects, household/ institutional stoves) developed	4	6	✓
2.2.3. Number of financial products (incl. risk mitigation) to support sustainable energy solutions	2	2	✓
2.2.4. Number of EE measures in the buildings and industrial sector (with at least 15per cent energy savings) implemented by the Nigerian industry	20	54	✓
2.2.5. Number of states where energy efficiency measures from the National Building Energy Efficiency Code have been supported in construction sites	4	2	X
2.2.6. Number of focal persons appointed by the Government to align the agenda with climate targets.	3	14	✓

Table 4 : Indicator matrix for Result 2

It has been established that the activities varied from year to year as shown below:

Year	1	2	3	4
Activities	7	14	25	33

Table 5 : Programme activities per year for Component 2

Therefore, it can be assumed that the programme will be effective and will gain the desired result, an increased access to Sustainable Energy when the IMAS is fully implemented and in the mid-term beyond the IMAS itself.

Observation:

The biggest achievement under this Component is the successful conducting of a wide variety of related training programs and launch of the 23 MAS/IMAS mini-grids after a delay of 3 years and as noted earlier, the important element is whether there is adequate capacity in the Country to replicate the process in other areas.

3. Specific progress in component 3 activities: Enabling Environment for RE & EE Investments

And for result 3, out of a total 29 activities, the progress has been as follows:

a. 18 activities have been fully implemented (62%);
b. 11 (38%) are still on-going in the last stages of implementation and include installation of AC Testing facility at SON, the building is ready and the equipment is expected to arrive soon in the country.

The Programme has been very instrumental in the formulation of a number of frameworks that are expected to facilitate RE and EE investments; but it is difficult at this stage of implementation, to assess the effectiveness of these outputs; as having policy frameworks by itself is not enough; they have to be applied. Again, the indicators at the result level are to some extent output- rather than outcome indicators. In any case, it can be firmly assumed that the programme improved the "enabling environment" for relevant investments by providing and supporting these outputs (even if not all targets in the matrix below have been/will be reached).

R3) Improved the technical market capacities, standards, conductive framework and services of the energy sector			
Result indicator (logframe)	**Target**	**Achievement (Nov. 2021)**	
3.1.1. Number of EE standards SON developed in consultation with consumer associations and the private sector	3	38	✓
3.1.2. Number of standards SON has been supported with, for supervision in compliance with (new) RE/EE standards	2	38/5	✓
3.1.3. Number of audits executed in the building and the industry sector from national auditors (sex disaggregation for auditors)	10	7	X
3.1.4. Number of guidelines on import processes for RE and EE equipment developed between Ministry of Finance, FMP, SON and customs	1	0	X
3.1.5. Number of central information platforms openly accessible (one-stop-shop) for RE and EE to provide information to investors	1	1	✓
3.1.6. Number of dedicated RE sector alliances established to drive the development of the clean energy sector (RE and EE)	1	1	✓
3.1.7. Number of initiatives (with DisCo) on electricity data collection and assessment in order to support implementation of energy efficiency measures in buildings and industries	1	0	X
3.1.8. Number of NESP II – supported training institutions that offer RE / EE trainings with nationally certified degrees	5	No data	?
3.1.9. Number of national certification processes for RE/EE courses that have been operationalized.	5	No data	?
3.1.10. Number of existing training institutions in the training partnership network on RE/EE	6	9	✓
3.1.11. Number of training courses for which Mixed-learning approaches (MOOC & Hands-on training) have been developed.	1	0	X
3.1.12. Number of female training graduates whose practical skills have been supported	30	52	✓
3.1.13. Number of universities, associations and public households reached through national awareness campaigns FOR EE Universities Associations Households	 3 4 1000	 0 0 0	X
3.1.14. Number of Job fairs on RE/EE 0 2 supported	2	0	X

Table 6 : Indicator matrix for Result 3

It has been established that the activities varied from year to year as shown below:

Year	1	2	3	4
Activities	14	20	22	29

Table 7 : Programme activities per year for Component 3

Observation:

The biggest achievement under this Component is the successful development of 38 standards for solar equipment, initiating EE activities though these were hampered by the COVID pandemic and conducting a wide variety of related training programs. Again, it is noted that the attainment of the set targets is not critical but rather whether ability has been created and resources will be availed to sustain the efforts and commitment sustained to cover more ground.

Conclusion

From the above tables, it is observed that in some cases the Programme achieved more than had been planned but as noted the attainment of the targets is not critical but rather whether ability has been created and resources will be availed and the current level of commitment will be maintained in order to sustain the efforts and cover more ground. As a lesson learned, it is concluded from the above, that the Programme's main achievement was to create pilot projects in order to stimulate further actions and provide necessary training to carry on with the activities. As was learned in NESP I, reform plans in the energy sector are usually implemented with considerable delays, often only partly and sometimes not at all, partially due to lack of implementation capacities, lack of coordination and lack of proper data. However, experience shows that professional capacity of the respective and relevant parts of the administration can be enhanced in order to improve the planning process and – with some trickle-down effect –its implementation.

- **Organization set up with clear roles and responsibilities with adequate internal controls and monitoring mechanisms**

The organizational set-up in place was conducive to reaching the programme's objectives based on the following:

1. Federal Ministry of Power is the focal point thus according high-level attention to the Programme;
2. The programme is indirectly managed through a Delegation Agreement (under PAGoDA 2) with GIZ, a very experienced international Agency as the implementing organization, which is responsible for hiring a team of both national and international experts to run the programme in close collaboration with the Nigerian partner institutions;
3. The management structure of the Action comprises two principal levels;
    a. Programme Steering Committee (PSC); that provides strategic guidance and monitoring of the progress of the activities of the programme and works to ensure alignment, approval of workplans and reports, coordination and ownership amongst the programme and Nigerian sector institutions.;
    b. Programme Management and Coordination Committee (PMCC) responsible for operational matters, in which past and forthcoming activities and strategies are reviewed and support provided to build and uphold the linkages with participating partner institutions and serves to align and coordinate with FMP internal planning processes;
    c. Technical activities are jointly developed and monitored through Technical Working Groups (TWG). These groups are chaired by Nigerian public stakeholders and serve as a sounding board for technical approaches and work plans. Six technical working groups have been established in the areas of 1) Electrification Planning; 2) Sustainable Energy Access On- Grid; 3) Sustainable Energy Access Off-Grid; 4) Energy Efficiency in Buildings; 5) Energy Efficiency in Industries; 6) Access to Finance/ Services. TWGs meet every quarter.
    d. State Steering Committees that oversee the activities in each State comprised of representatives from the State Government, the Federal Government and GIZ.

By setting up the above governance structure, the ownership of the Programme was placed with FGN and that explains to a large extent the achievements of the Programme amidst a very challenging environment. An important lesson learned from this is that recipient countries of donor funds should

be made part of the decision-making process so as to enhance ownership and optimize local knowledge of the socio-political environment.

- **Adequate staffing**

It was established that:

1. **During Year 1**: The programme encountered implementation delays due to difficulties finding qualified staff for the second phase during the first year. Regarding national personnel, several positions had to be re- advertised with all staff being recruited by July 2018. International experts' recruitment proved to be additionally difficult for the location Nigeria with technical experts for on-grid and off-grid only starting in October 2018;
2. **During Year 2**, the Head of Programme and the Head of Admin and Finance changed but, all seven planned posts for international staff and all 11 planned posts for national staff (excluding administrative staff) are were all filled. During the year, two additional technical positions were created within the third component "Enabling Environment for RE/EE investments". In July and August 2019, a national expert on capacity development as well as a national expert on finance and services were successfully recruited;
3. **During Year 3**, the Head of Admin and Finance changed during the reporting period. Aside from this, all seven planned posts for international staff and ten (10) out of eleven (11) planned posts for national staff (excluding administrative staff) are currently filled. During the period, the Head of Component 3 'Enabling Environment for RE and EE Investments' and the National Advisor on RE & EE Standards left the programme.
4. **During Year 4**:
    a. The Head of Component 3 'Enabling Environment for RE and EE Investments' left the programme and a replacement has not been found yet. Generally, the recruitment of staff for managerial positions is not so easy in the region, due to security challenges and difficulties arising out of the worldwide Covid-19 pandemic. A recruitment process is ongoing and should be finalised in the first quarter of 2022. In the meantime, the national Advisor for EE on industries will be acting interim Head of Component
    b. A new Junior Advisor to support the Component started in February 2021. Furthermore, the recruitment of two (2) new advisors on Standards and Import Process is ongoing.
    c. In June 2021 the Head of Component 2: 'Sustainable Energy Access' left the project and was replaced by the national Senior Advisor on off-grid and Deputy Head of Component since July 2021. Furthermore, one (1) international Advisor on off-grid/monitoring and one (1) national Advisor on off-grid/finance left the programme in March 2021 and November 2021 respectively. Two new national Junior Advisors, one (1) on finance and one (1) on legal topics, have been recruited and are supporting the programme since September 2021.
    d. Within the first Component "Electrification Planning and Data Management", the international advisor relocated to Germany and is now supporting the programme via a traveller contract: This means that the advisor will be in Nigeria at least 100 days per year besides being based in Germany.

The Evaluation Team based on the achievements of the Programme did not find any evidence to show that the named changes had in any way impacted negatively on the progress; possibly this was due to the well-defined internal controls and level of expertise available on the Programme.

❑ **Appropriateness of the budget, absorption capacity and rate of spending**

The budget has been and still is adequate to cover all planned activities; while the absorption capacity and -rate started slowly attributed to recruitment of staff delays especially due to lack of required expertise in the Country these have substantially improved over the lifespan of the programme.

In April 2022, at the time of the field phase of this evaluation, a total of M€ 28.2 out of a total of M€45.0 have been disbursed and further M€ 10.3 have been committed. The remaining M€ 6.5 is considered adequate to wind up remaining activities and to run the project till its foreseen end in November 2022 (EU) and March 2023 (BMZ), respectively given that the annual average requirement to-date is more than M€ 10.

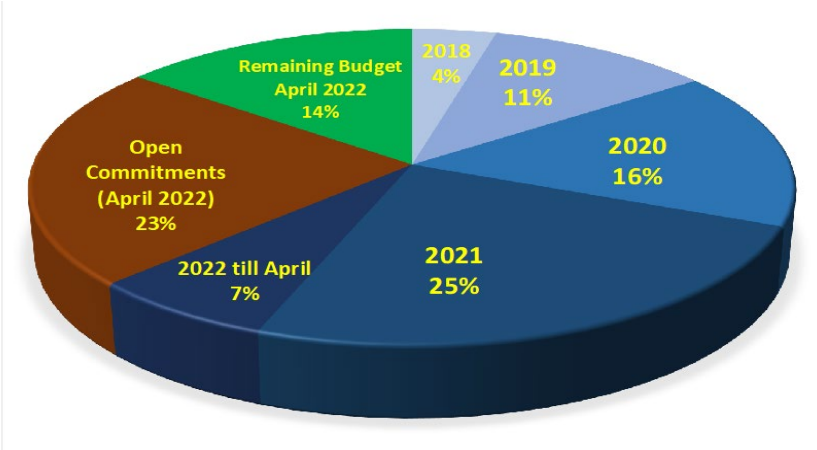


Figure 9: programme spending

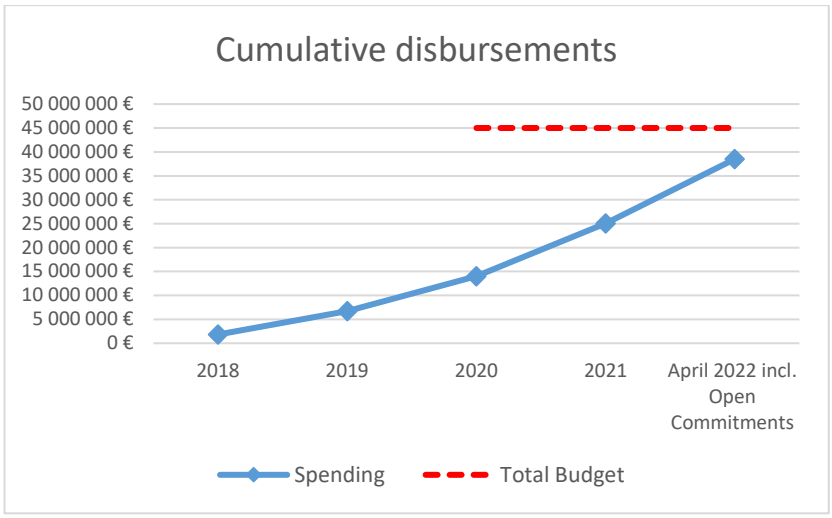


Figure 10: Programme cumulative disbursements

❑ **Issues improved through the addenda**

The Addenda improved efficiency and effectiveness of the project in a number of new items were added; they include:

1. The extension includes additional funds of EUR 15 million from the EU to scale up the current activities with special focus given to solar battery recycling, clean cook stoves, promoting the diversification of the energy mix in the renewable energy space, new business models for on-grid energy access within DisCo's networks;

2. More funds were allocated and time extended enabling the implementation of a number of activities that otherwise would not have been accomplished, this includes the 23 solar mini grids under the MAS/IMAS where developers were provided with in-kind grants; these mini grids are expected to be completed within this year.
3. The earlier envisaged support the Federal Government of Nigeria (FGN) with an open competitive process for large scale on-grid solar power of about 500MW was not implemented due to initially attributed to the Government decision to go for unsolicited bids. This is attributed to the Government's intention to develop about 30 grid-connected solar projects with a total planned capacity of 5.3 Gigawatt (GW) in addition to a possibility to increase the capacities of existing large hydropower plants, such as Kainji or Shiroro, by allowing their hybridisation with solar. This has not materialized mainly due to the protracted negotiations on commercial issues relating to tariff and currency in addition to the revelation on the limited absorption grid capacity of the network following a study facilitated by NESP for TCN. Consequently, NESP explored medium scale RE generation feeding into the distribution network (Embedded Generation) in a bid to deliver even more tangible results. This approach combines the Embedded Generation and Franchising Models into what NESP calls Premium Grids targeting industrial areas with a view to support Nigeria's economic development;
4. To further support capacity development on electrification planning NESP is developing an independent online learning platform (https://learning.nigeriase4all.gov.ng/), including a variety of training materials and recordings, which will be open to partners and the general public to enrol for free self-paced courses at the beginning of 2022. This platform along with the ongoing trainings to partners will contribute to improved electrification assessment and modelling of the Nigerian energy sector and strengthen the contributions of key public-sector stakeholders.

Based on the assessment of the extent NESP II delivering or likely to deliver the results in an economic and timely manner, the Programme efficiency is considered to be **HIGHLY SATISFACTORY**.

2.5 IMPACT

EQ7: *To what extent has NESP II generated or is likely to generate significant positive or negative intended or unintended higher-level effects?*

- **Progress attained towards the Overall Objective**

1. Number of MWs of renewable energy produced in Nigeria;

Progress attained so far is 350kW made up of 200kW at Jubaili Bros Engineering Limited and 150kW at International Breweries Sagamu, yet the target is 100MW; representing 3.5% progress.

2. Number of tonnes of CO2 p.a. of energy saved as a result of new sustainable energy solutions

Progress so far attained is 1,865 tCO2 composed of 365 t CO2 per year by the replacement of a diesel generator at National Reference Laboratory of the National Center for Disease Control after NESP supported the construction of a 260 kWp solar system and 1,500 t CO2 from five (5) Nigerian Industries (PZ Cussons, Dangote Cement, GB Foods, Nigerian Foundries, Flour Mills of Nigeria) after the application of the recommended energy saving measures as part of receiving the ISO 50001 Energy Management System Certification. **For a target set at 3,000 tCO2, this achievement represents 62% progress.**

- **Likely future progress towards the Overall Objectives in the remaining lifespan of the Programme**

1. Number of MWs of renewable energy produced in Nigeria;
More progress will be through:
   a. Premium grids totaling 94MW that include 10MW Kano Solar Project, 54MW embedded generation for the premium grid in Challawa industrial area, 30MW embedded generation for the premium grid in Kudenda area under the Kaduna DisCo,
   b. 300 MW solar plant in Shiroro hydropower plant; this plant is being developed in three (3) phases - the first pre-phase is currently ongoing and will lead to 15 MW of solar PV

If achieved, this would add 109MW leading to a new total of 109.35MW; **an achievement of 109%**

2. Number of tonnes of CO2 p.a. of energy saved as a result of new sustainable energy solutions
Further progress will be made when more industries apply recommended energy saving measures as part of receiving the ISO 50001 Energy Management System Certification.

Overall, the Programme has made some good progress towards achieving the overall objectives and in some cases has already over-achieved, but the prospects of full achievement are very good.

Based on the assessment of the extent NESP II delivering or likely to contribute towards its overall objectives., the Programme Impact is considered to be **SATISFACTORY**.

2.6 SUSTAINABILITY

EQ8: *To which extent are existing or foreseen structures and capacities appropriate to ensure appropriate and sustainable funding and maintenance of the projects' physical outputs beyond the lifespan of the EU-funded interventions?*

❑ Maintenance of physical outputs

The physical outputs established under NESP II include 23 mini-grids, AC Test Centre at SON, Solar System at NCDC,

1. The 23 mini-grids under MAS/IMAS have been developed with in-kind grant contributions in the form of equipment procured by NESP in addition to the TA, to this, the developers add their own equity (or debt) to develop the mini-grids; the subsidy ensures both that the tariffs the mini-grid operators charge to users are affordable and that the operators can make a profit. The developers then undertake to exploit and maintain the mini-grids for a period of 15 – 20 years, during which they charge agreed tariffs (estimated at NGN 120 – 180 per kWH compared to NGN 55-60 per kWH for the grid connected) and take responsibility for O&M, including battery replacement. Their commercial success – and profit – depends on how well they handle O&M and on how satisfied their customers are. It was confirmed that all the beneficiaries have current experience in the management of these grids, for example Haven is already managing 30 mini-grids.
2. The AC Test Centre at SON, will form part of other test facilities already existing and will be maintained as part of the SON assets;
3. In December 2020, the programme supported the FGN efforts to fight the Covid-19 pandemic by deploying and commissioning a 260 kWp solar system at the National Reference Laboratory (NRL) of the Nigerian Centre for Disease Control (NCDC) dependent on the Federal Ministry of Health (FMH); the new technical solution will replace with advantage, in economic terms and in terms of the availability of electricity and the quality of the services provided, previously used solutions based on the use of diesel generators. In addition to this, the availability of PV electricity and of battery storage allows people to adapt the way in which they use electricity – and particularly the quantities used – both to their needs and to the resources available, in ways that are more flexible than when the energy is being produced, say, by a diesel-powered generator. On the other hand, the performance of the new hardware in the medium and especially in the long run is strongly dependent on appropriate maintenance, with costs that tend to concentrate at particular times and on the occasion of particular events, such as the disposal and replacement of expensive items like batteries. It would for this reason seem very important for both projects to train the prospective owners of the new equipment (be they state governments, public institutions or private agents) in lifecycle planning and the corresponding investment strategy, to avoid fluctuations in the quality of performance.

❑ Management of physical outputs

The Management of the physical outputs will fully be managed by the beneficiaries.

❑ Funding for maintenance and replacement of physical outputs

Maintenance costs will be borne by the beneficiaries and the savings generated due to usage of cheaper solar PV systems compared to diesel generation will be adequate to maintain and replace as necessary. The long run performance of the new photovoltaic hardware depends strongly on

appropriate maintenance, with costs that tend to concentrate at particular times and are associated with particular events, such as the disposal and replacement of expensive items, e.g. batteries. An awareness of the principles and practice of lifecycle planning and the associated investment strategy will help the owners of the new equipment improve maintenance and the quality of performance.

- **Staff-turnover**

The Agencies did not report high staff turnovers and in the limited cases where these occurred this did not affect the performance and the movement was still within the Sector.

- **Further capacity building /training plans**

All Agencies interviewed requested for additional capacity building programs both in quantity and level as they are very deficient of manpower especially in the middle levels; some Agencies reported that they had not recruited new staff during the last 15 years!

- **Existence & quality and coherence of a programme-exit strategy**

The country is still in urgent need of this Programme so exit at this stage may undermine all gains secured so far. For this reason, a coherent exit strategy is not clearly apparent.

While it is true that there are good prospects for the sustainability of the programme based on:

1. Increased awareness of RE & EE benefits as a result of the NESP interventions in both the policy makers and system operators;
2. Capacity building programmes have been carried out equipping many local Nigerians with adequate technical skills especially in RE & EE but the numbers are still inadequate;
3. Firms that have carried out EE programs have realized the benefits and are now serving as change agents;
4. Benefits that accrue from better knowledge and greater capacities for data collecting and processing and for planning and decision making if that knowledge and those capacities are regularly used in actual decision-making processes;
5. Improved availability of cheaper electricity

Based on the assessment of the extent to which the existing or foreseen structures and capacities are appropriate to ensure appropriate and sustainable funding and maintenance of the projects' physical outputs beyond the lifespan of the EU-funded interventions; the sustainability of the Programme is considered to be **SATISFACTORY**

2.7 CROSS-CUTTING ISSUES

EQ9: *To what extent have environment and climate change, gender and 'Good Governance' been mainstreamed and reflected in the design and implementation of the project?*

- **Environmental issues mainstreamed in the project design.**

1. Project developers for the mini-grids were required to develop ESMPs for their sites and submit them to the Ministry for review and issue of Permits;
2. National Waste Battery Management Policy is being developed
3. National Battery End of Life Management Policy is also being developed.

An area of concern, however, was on monitoring of ESMPs for the mini-grids being developed under MAS/IMAS. Based on the interviews, it was confirmed that while the developers were responsible for development of the ESMPs for their sites, there is no independent mechanism to monitor compliance as FMEnvt lacks necessary resources to do so.

- **Positive environmental impact achieved or likely**

It is generally agreed that access to modern energy is expected to generate the following positive impacts:

1. Reduction in gaseous emissions especially due to replacement of diesel generators;
2. Reduction in health hazards attributed to indoor air pollution.

There is however need for effective implementation of National Waste Management policies to deal with the hazardous toxic materials associated with solar panels and batteries that can lead to environmental degradation and possibly pose a public hazard if they get into ground water supply.

- **Climate change related issues mainstreamed in the project design.**

The programme was expected to lead to a reduction of 3,000 tonnes of CO2 p.a. of energy saved as a result of new sustainable energy solutions that included deployment of solar mini-grids to replace diesel generators and application of energy saving measures.

- **Positive climate change-impact achieved or likely.**

The increased use of renewable energies will reduce the need for the combustion of fossil fuels (diesel and petrol generators). The measures designed to improve energy efficiency, at local and national level, will increase energy efficiency in households, the private businesses and the public sector. Both increased use of RE and improved EE will ensure sustainable global benefits in slowing the growth rate of greenhouse gas emissions resulting from the production and consumption of electric power.

- **'Good governance' related issues mainstreamed in the project design.**

GIZ has well developed robust procedures and processes to ensure "good governance" so this well taken care of.

- **'Good governance' -impact achieved or likely.**

The best practices and procedures introduced by GIZ during this Programme will go a long way in continued improvement of governance. As a result of close cooperation with government institutions at federal and state level, and of the involvement of relevant stakeholder groups, transparency of planning, participatory development and good governance of the energy and related sectors were improved. This has been further strengthened through the introduction of TWGs. Likewise, the

harmonization of interventions of actors and capacity building at Federal and State level have contributed to this goal.

- **Gender issues mainstreamed in the project design.**

The GIZ recruitment processes promote gender equality and do not discriminate against religion or ethnicity. GIZ also has developed a gender policy that addresses gender specific risks at work, and NESP has a gender focal point. NESP's data gathering activities follow a gender disaggregated approach and capacity building activities include affirmative action measures. Tenders under the programme also gives the opportunity to women entrepreneurs to receive technical assistance on project development. Finally, gender specific risks are addressed e.g. through its activities regarding the promotion of improved cookstoves and promotion of LPG.

- **Gender -impact achieved or likely.**

The direct gender impact of project activities is likely to be limited owing to the limited numbers of female participants in the industry.

Indirectly, in general, rural electrification as such is not specifically gender-oriented but clearly electrification will have favourable impacts over both genders: creating jobs through boosting economic activities, supporting MSEs, improving private households through the availability of good quality lighting for studying, reading, etc., possibility of access to radio – TV broadcasts, possible availability of domestic appliances, possibility of home-based economic activities (sewing, embroidery, cooking, etc.).

Nevertheless, international and regional experience from previous projects suggests, that the impact of rural electrification efforts may slightly differ for women and men and that women and children gain specifically from electrification of rural communities. Potential areas of improved living conditions for women and children include (but not limited to):

1. Improved safety conditions for women and girls due to improved lighting in the villages.
2. Improved learning conditions for pupils since schools are benefitting in several ways from electrification. Firstly, electric lights provide a better learning environment in the classrooms and allow for a longer use of classrooms for teaching and learning which is particularly important for pupils from non-electrified homes. Secondly, computers can be used now for teaching and learning. Finally, and probably most importantly, the electrified staff houses now offer decent living conditions even in rural areas, which attracts qualified and committed teacher in areas which may had to deal so far with unqualified personnel or teachers who have been transferred to the remote rural areas as punishment for various reasons.
3. Women (and children) are expected to benefit specifically from improved health-services due to the electrification of Rural Health Facilities. These health facilities can now attend more effectively, and provide a 24-hour service, to emergencies and very importantly to women giving birth. Equally important is that vaccines are now available in these clinics since they can be stored in fridges. According to studies in other countries in Africa, these factors are expected to improve maternity health as well as decrease under-5-mortality-rates in the clinics' catchment areas.
4. Many women in rural and peri-urban areas try to improve their livelihoods by running (informal and formal) micro- and small-businesses such as small shops, kitchens, hair- saloons, etc. Such small businesses usually benefit significantly from access to electricity.

Additionally, specific NESP 2 components such as the 'clean cook stoves' initiative obviously will concern women more than men and are likely to have a direct positive impact on women's living conditions.

Based on the assessment of the extent to which "environment and climate change', 'gender' and 'good governance' been mainstreamed and reflected in the design and implementation of the project, this is considered to be **HIGHLY SATISFACTORY**.

2.8 EU ADDED VALUE

EQ 10: *To what extent have the projects achieved (or are likely to achieve) additional benefits to what would have resulted from EU Member States' interventions only?*

❑ **specific EU-strength used for the project**

The specific EU strengths used for the Project include its:

1. Ability to provide sizeable grants that made it possible for BMZ/GIZ to come in and run a significant and very ambitious programme;
2. Active participation in the formalised donor coordination group established in 2012 that has improved coordination among donors, allowing for exchange of information regarding their programmes as well as recent developments in the power sector and taking harmonized action vis-à-vis the Federal Ministry of Power (FMP).
3. Leadership role as Chair of the Power Sector Coordination Group in Nigeria; this strengthens EU's role in the NESP initiatives and its leading role in supporting the donor coordination in the sector;
4. Wide knowledge of the Country by virtue of the long history of association in a broad range of sectors hence proven credibility as a reliable and committed development partner
5. Known ability to deal with policy dialogue; a necessary strength in the high-level policy dialogue involving key government agencies, other development partners and civil society.
6. Commitment to helping developing countries to provide access to secure, affordable, clean and sustainable energy services with a target of 500 million people by 2030 in line with targets established within the Africa-EU Energy Partnership;
7. Strong support to the United Nations' (UN) Sustainable Development Goal 7 (SDG), on affordable and clean energy, and being one of the leaders in the UN initiative on Sustainable Energy for All (SE4ALL) aiming at: a) ensuring universal access to modern energy services; b) doubling the share of renewable energy in the global energy mix; and c) doubling the global rate of improvement in energy efficiency;

❑ **specific EU related challenges encountered**

There were no specific EU related changes identified by the Team

❑ **efficiency of cooperation and coordination mechanisms**

The continued support from Phase I now moving to Phase III is testimony that there is good cooperation among FGN, EU and the Federal Government of Germany and this has been facilitated by the continuous information exchange coordinated through the Federal Ministry of Power.

A number of development partners have been supporting the FGN in the energy sector, across the power value chain. In addition to support by the European Union (EU)/ German Corporation for

International Cooperation (GIZ), current support in the sector is provided by the World Bank, African Development Bank, United States Agency for International Development (USAID), the UK's Department for International Development (DFID), French Development Agency (AFD), and Japan International Cooperation Agency (JICA), among others. Development partner (DP) activities in the power sector are coordinated through the Development Partner Coordination Group for the Power Sector. The Coordination Group meets regularly to exchange information on the activities of the various donors in the sector and to discuss pertinent issues of power sector policy; this provides the Government an appropriate forum to provide more guidance on its future plans and policies thereby enhancing coordination of the efforts from donors.

- **synergies identified and used**

The synergies that were identified and used in this intervention include:

1. The appointment of GIZ, an experienced firm to manage the process that adopted a very innovative flexible approach that pro-actively engaged the stakeholders and made quick timely responses and made necessary changes to respond to the changes in the environment;
2. The effective Donor coordination in Nigeria that facilitates coordination of development efforts and enhances efficiency in aid utilization;
3. Global desire to support RE and EE – this follows the global SE4ALL United Nations Global Initiative and the concerns over the global climate;
4. Global trends in technology that have resulted in improved efficiency in RE technologies with corresponding drastic reduction in costs;
5. Increased ability by the Private Sector (both local and foreign) to taken on roles more efficiently originally a preserve of the public Sector;

Based on the assessment of EU added value considers the extent to which the Programme achieved (or is likely to achieve) additional benefits to what would have resulted from EU Member States' interventions only; this is adjudged as **SATISFACTORY**.

3 Overall Assessment

The Nigerian Energy Support Programme (NESP) is a technical assistance programme funded by the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in collaboration with the Federal Ministry of Power (FMP) in Nigeria.

The Programme that commenced in June 2013 with NESP I, supported improved access to energy through renewable energy and energy efficiency measures, as well as measures for forestry development in northern Nigeria. The programme comprises contributions from the 10th EDF (EUR 27 000 000) and from the German Federal Ministry for Economic Cooperation and Development (BMZ) (EUR 1 500 000). The original implementation period of the Action was from June 2014 – 9/2017, but was extended twice cost-neutrally until December 2017. The second phase (NESP II) of the programme which started from December 2017 was supposed to end in November 2020 under EU contribution while under BMZ contribution, it run till March 2021, was later extended by 24 months until November 2022 for the EU contribution and until May 2023 for the BMZ contribution was approved in 2020 by the European Commission. The extension includes additional funds of EUR 15 million from the EU to scale up the current activities with special focus given to solar battery recycling, clean cook stoves, promoting the diversification of the energy mix in the renewable energy space, new business model for on-grid energy access within DisCos networks, etc.

NESP II builds on a first phase that ran from March 2014 to December 2017. The programme aims to assist the Nigerian Government in enabling and fostering investments in a domestic market for Renewable Energy (RE) and Energy Efficiency (EE) and in improving access to electricity for disadvantaged, mostly rural, communities. Focus is given to the improvement of framework and pre-conditions in the RE and EE sector to enable policy making and coherent electrification planning, scaling up of RE and EE business models to increase the access to electricity and to the introduction of technical market capacities and RE and EE standards.

NESP II has since capitalised on the achievements from NESP I to technically assist the realisation of more projects, the introduction of necessary standards and the upscaling of all activities from NESP I. NESP II has delivered very crucial market intelligence for the sector with the www.nigeriase4all.gov.ng platform for the upscaling of projects in the future while taking up additional intervention lines in conjunction with additional funding of 15,000,000 Euro from the EU. NESP II engaged all RE&EE sector players, states and the donor communities to support more projects in Nigeria.

Against this background, this mid-term evaluation was carried out to provide the relevant services of the European Union and any other interested stakeholders with:

1. an overall independent assessment of the past performance of Nigeria Energy Support Programme, paying particular attention to its 'intermediate' results measured against its expected objectives; and the reasons underpinning such results;
2. key lessons learned, conclusions and related recommendations in order to improve current and future Interventions.

Based on the evaluation results, it has been established that the Programme NESP II:

1. Was very ambitious given the size of the country, population and magnitude of problems being faced by the Nigerian energy sector;
2. Was highly relevant to the local and national energy priorities, policies and strategy of the Federal Government of Nigeria, to EU/ Global strategic priorities and objectives in supporting the socio-economic development of the country;

3. Highly efficient and effective in implementing the impressive list of programme activities basically targeting the entire energy sector and the entire country; the important ones include the following:
    a. Creating awareness on RE/EE technologies and their potential to contribute effectively to solving the power crisis in the country through workshops, job fairs, etc.;
    b. Conducting a wide variety of training programs that equipped the beneficiaries with the necessary tools and developing online training modules;
    c. Conducting technical studies, these include Solar Grid Integration, Hybridization, Franchising, Embedded Generation aimed at enhancing RE development;
    d. Developing a wide variety of policy frameworks, standards, guidelines and codes that will guide the development of RE/EE across the country;
    e. Supporting the development of mini grids with in kind grants 23 mini-grids in 11 states expected to connect about 28,000 households (138,000 people -about 67,000 females);
    f. Supporting various stakeholders like REEEA, NCDC, SON and COREN with material support in order to boost their performance;
    g. Development of a certification process for RE/EE training courses;
    h. Supporting several selected industries in energy audit training and ISO 50001 Certification;
4. Achieved more than had been planned but on further examination, it is should be noted that that the programme can only support and enable the environment “point at the right direction” and implement pilot initiatives but recognisable and sustainable impact can only be achieved in mid- to long-term based on full commitment of the government and the private sector.

Based on the evaluation findings the **overall assessment** for the Nigeria Energy Support Programme 2 is considered **HIGHLY SATISFACTORY.**

4 Conclusions, Lessons learned & Recommendations

4.1 CONCLUSIONS

Based on the evaluation findings the following are the major conclusions:

1. **Relevance**: Nigeria is in urgent need to address the low access rate to modern energy and reduce the over-reliance on self-generation mainly from diesel generators especially given the concerns on climate change; so, this Programme with its focus on RE and EE technologies came at an opportune moment. Therefore**, Relevance** is rated as **HIGHLY SATISFACTORY** given the Programme project relevance to local and national energy priorities, policies and strategy of the Federal Government of Nigeria, to EU/ Global strategic priorities and objectives;
2. **Coherence**: The Programme utilizing the EU grants has established a conducive environment that has attracted other partners and this combined effort is expected to improve the performance of the Sector. Therefore, **Coherence** is rated as **HIGHLY SATISFACTORY** given that the Programme was fully compatible with the other interventions in the Sector
3. **Effectiveness**: Combining Technical Assistance and intensive capacity building with in-kind grants is driving the Mini-grid development that will increase access to reliable modern energy in rural areas and enhanced energy efficiency in the Industrial Sector**.** The extensive training programs conducted by the Programme combined with the Certification process will create a highly desired competent work force to support the development. Nevertheless, given the size of the sector, a lot more training beyond the NESP initiative is still required. **Effectiveness** is rated as **SATISFACTORY** as the Programme has achieved or expected to contribute to the achievement of most of its expected results. However, this will need more time and full commitment of the programme partners to fully materialize.
4. **Efficiency**: The Programme is efficiently managed and made impressive progress in implementing the planned activities and producing the targeted good quality outputs. Consequently, **Efficiency** is rated as **HIGHLY SATISFACTORY** given that the intervention has (all in all) successfully implemented its workplan and already delivered (or is likely to deliver) on the vast majority of the outputs.
5. **Impact:** The programme is expected to contribute towards its Overall- and Specific Objectives in mid-term by building capacity and contributing to an enabling environment for the development of the sustainable energy sector in the country. **Impact** is rated as **SATISFACTORY** given that the intervention cannot fully meet the demands of the problem at hand since Nigeria is a big country with a huge population and, so far, a very poorly functioning power sector currently facing enormous challenges. At best the Programme kick-starts a development in the “right direction”, with a hope that more interventions may enhance the impact and sustainability; there is a lot more to be done, driven by the government and the private sector beyond the lifespan and capacity of the NESP.
6. **Sustainability** of the gains of this Programme is at a critical stage; while awareness of RE and EE has substantially increased and necessary regulatory frameworks developed, meaningful actualization is still dependent on a number of factors that included continued FGN support achieved through targeted incentives, continued support by donors in offering grants that can be leveraged to buy down cost of RE and EE technologies, creation of a critical mass of competent personnel in RE and EE, availability of financing at competitive rates, etc. All in all, **Sustainability** is rated as **SATISFACTORY**, assuming, that the government and all programme partners will continue to be committed to the development of a sustainable energy sector in the country.

7. **Cross-cutting issues**: The Programme emphasized sufficiently on the main cross-cutting issues. Nevertheless, sustained attention is still required. (For example, unabated corruption can wipe out all the gains made so far and inadequate attention to environmental issues may impact on the national performance with respect to CO_2 emissions, there is also concern over lack of an independent monitoring mechanism for the ESMP during implementation of the mini-grids). Gender and vulnerable groups are expected to benefit equally specifically from rural electrification, assuming that the rates for offered services are affordable for all. By large, **Cross-cutting issues** are rate as **HIGHLY SATISFACTORY** given that they were adequately addressed during design and implementation of the Programme

8. **EU Added Value:** The main value added by the **EU** is the significant funding contribution, which allows the programme to operate on a large scale with a very wide mandate and over a long period, compared to what a bi-lateral programme with only one member-state could have afforded. Nevertheless, EU-support is still required to sustain and consolidate the gains made to-date. **EU added Value**: is rated as **SATISFACTORY** given that the major benefit was the availability of Grants.

   A summary evaluation of the Programme ratings is given in the table below:

Evaluation Criterion	Rating
Relevance	Highly Satisfactory
Coherence	Highly Satisfactory
Effectiveness	Satisfactory
Efficiency	Highly Satisfactory
Impact	Satisfactory
Sustainability	Satisfactory
Cross Cutting issues	Highly Satisfactory
EU added value	Satisfactory
Overall Rating	**Highly Satisfactory**

Table 8 : Summary of programme ratings

4.2 LESSONS LEARNED

Lessons learned include:

1. The Programme's main achievement was to create pilot projects in order to stimulate further actions rather than provide a final solution as this would require resources and time well beyond what can be provided by any single intervention. In the case of the mapping exercise for example, the issue is not the number of states mapped rather the ability in form of human capacity and resources to carry on with the work until all states are covered, update the data as may be necessary and utilize the resource for planning; etc. As was learned in NESP I, reform plans in the energy sector are usually implemented with considerable delays, often only partly and sometimes not at all, partially due to lack of implementation capacities, lack of coordination and lack of proper data. However, experience shows that professional capacity of the respective and relevant parts of the administration can be enhanced in order to improve the planning process and – with some trickle-down effect –its implementation.
2. Capacity building programs can make a difference in developing a market for solar energy by simultaneously lowering the technical, information and awareness, capacity, financial and policy barriers in a holistic approach
3. In promoting solar energy, it is not only important to involve the usual energy sector stakeholders, but also stakeholders from related sectors that will apply the solar energy service in social, productive and household applications, such as stakeholders from rural development, agriculture, finance, infrastructural works, water, telecommunications and education sectors
4. Continuation of awareness campaigns (radio, TV, trade fairs) and the dissemination of information materials (not only in English but also in local languages) on SHS, solar refrigerators (for shebeens and rural shops), PVP, SWH (policy, life-cycle costs, availability of finance and credit) in cooperation with the REEE Institute (to be established) in 2006. Target groups are: teachers and civil servants, school children, communal farmers, commercial farmers as well as public and private building owners;
5. Plans have been drawn to enhance utilization of clean cookstoves but a parallel effort is not being made in the restoration of the forests; question is where will the wood come from? An integrated approach covering all aspects along the value chain should be the optimal way to avoid "white elephants" in future.
6. The Programme can only create pilot projects in order to stimulate further actions rather than provide a final solution as this would require resources and time well beyond what can be provided by a single intervention;
7. Awareness creation is an invaluable tool especially where new technology Is being introduced and this should include live talk shows on radio and TV, road shows, school talks, and include publicity of the Programme successes; expert services should be engaged to carry out this noble exercise.

4.3 RECOMMENDATIONS

RE and EE have a huge potential to provide the energy needs of the country given the abundant unexploited resources, provided that adequate measures are taken to raise confidence among the system operators, policy makers and investors given that integrating solar resources pose distinct operational challenges for power systems due to their variability (i.e., their change in output over various timescales due to the underlying fluctuation in resource) and uncertainty (i.e., the inability to perfectly predict resource availability and generator output).

In view of the above, it is recommended that:

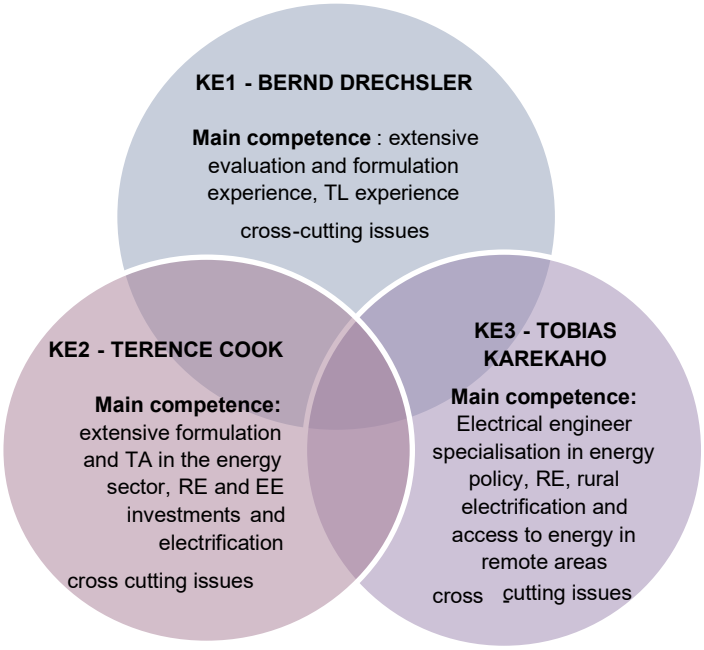
1. Given the level of commitment exhibited by the Government in initiating necessary reforms to improve the financial viability of the energy sector companies, increase power supply, strengthen sector governance and contract enforcement, de-risk the sector for private investment and putting it on a path to long-term sustainability, enhance the role of RE and EE technologies, the international community should sustain its support so that the goals can be attained;
2. EU should support the launch of Phase III in order to sustain the gains of Phases I and II, and **all efforts should be made to ensure a seamless transition from Phase II to III** and the same implementation arrangements sustained given the excellent job done**;**
3. The following areas should be considered under Phase III:
    a. Establishment of necessary regulations to support investments in collection, recycling and disposal of batteries and renewable energy equipment given the high number of Solar Home Systems and Mini-grids, all making use of batteries that are being established in the Country to mitigate the likely severe environmental and public health risks;
    b. More awareness programs should be carried out; these may include live talk shows on radio and TV, road shows, school talks, and should include publicity of the Programme successes;
    c. **More capacity building** should be considered at all levels aimed at supporting the shift towards enhanced RE and EE development; this may include:
        i. Basic: for the installation technicians
        ii. Intermediate: for system planners in RE mini-grid design and operation
        iii. Advanced: for system planners and operators in load flow studies, feasibility studies, integration studies and stability studies for integration of RE into the grid;
    d. **Experienced personnel** should be embedded in the Agencies supported by the Programme on a medium to long term basis in order to enhance skills transfer;
    e. More support on the current activities like completion of the mapping exercise in the remaining 14/36 states, more mini-grids under MAS/IMAS, EE in industries and buildings, etc;
    f. Expansion of activities in new areas that include solar hybridization with mini-hydros, solar thermal, e-mobility, green hydrogen, solar water pumping storage, etc;

5 Annexes

Annex 1: TOR (cf TOR)

Annex 2: The Team

The Team consisted of three highly experienced experts:



Bernd Drechsler, Team leader (Cat I): Bernd Drechsler was the Team Leader specialised in complex evaluations as well as in identification & formulation missions for EU programmes in the Energy Sector and beyond.
Bernd has more than 25 years of relevant long- and short-term experience predominantly in Sub-Saharan Africa (including West Africa and Nigeria itself), but also in Asia, the Caribbean and the Pacific, covering (inter alia) institutional capacity building, public infrastructure, sustainable rural livelihood development and natural resource management. Also has experiences encompassing private sector development and investment promotion, good governance, civil society and conflict prevention. To date, he is part of a core team of a quite similar EU-programme in Zambia. Bernd combines an academic background in Engineering (MSc) with a MSc in Climate Change & Development, a MSc in Sustainable Development, a Master of Public Administration and a MBA. This unique combination perfectly covers all necessary aspects for this holistic programme.

Terence Cook, KE2 Formulation expert (Cat I): Mr. Cook has 25 years development cooperation experience, with 10 years' renewable energy experience implementing projects with the EU in Sub-Saharan Africa to address renewable energy electrification planning for both On-Grid and Off-Grid. Between 2013 and 2018 he was Key Expert (Renewables) for the EU Sustainable Energy for All Technical Assistance Facility for East & Southern Africa (EU TAF) supervising EU missions in 24 countries to provide an enabling environment for RE and EE investments. He has produced project formulation documents under the new NDICI and has prepared diagnostic studies for EU Investments in the RE and EE sectors in close collaboration with private and public partners (KfW, the Asian Development Bank, and the World Bank) to support leveraging private investment. He combines practical experience with the EU and other international donors with his academic work as Research Fellow with the Open University Faculty of Science, Technology, Engineering and

Mathematics (STEM). He co-authored a book 'Renewable Energy from Europe to Africa', published by international academic publisher Palgrave Macmillan (2018) drawing on experience from programmes in the EU and Africa of the energy transition.

Tobias Karekaho, KE3 Evaluation expert (Cat II):

Mr Tobias Karekaho is an electrical engineer with more than 40 years of professional experience. He started his professional career at Uganda Electricity Board as a Manager for over twenty years culminating in the Executive post of General Manager Projects in 1998. He has vast experience in all utility operations ranging from the daily operations to budgeting, investment planning, project evaluation, procurement and project supervision including policy formulation mostly in areas of sustainable energy.

In July 2003, together with others, he set up an Engineering and Management Consulting firm, and was appointed as the Managing Director. Since its establishment, the firm has undertaken a number of assignments in Uganda mainly in the area of energy policy, RE, rural electrification and access to energy in remote areas as Uganda is aggressively pursuing the objective of increasing access to modern energy services.

From April 2005 to June 2009, he was engaged by the United Nations to serve as the Regional Project Manager for the Regional Power Trade Project under the Nile Basin Initiative. This multi-donor funded project whose objective was to facilitate power trade development among the 9 Nile riparian countries was managed by the World Bank and hosted by the Ministry of Energy and Minerals, in Dar es Salaam, Tanzania. The key achievements included the establishment of a Project Management Unit that successfully carried out several key studies and conducted a number of capacity building programs that are fundamental in the development and establishment of regional power trade;

Over a period of ten last years, he accomplished almost 10 different evaluations mission for different institutions donors such as EU, SIDA, AfDB but also for Uganda Electricity Transmission Company Limited

Annex 3: Evaluation Methodology and Approach

General Approach

The evaluation followed the streamlined EuropeAid guidelines and recommended methodologies. In principle, evaluation as well as formulation have been considered highly related components of the same programme cycle.

The process has been be supervised by the Project Manager on behalf of the EU Delegation to Nigeria and the Reference group. The reference group was tasked with monitoring and supervising the mid - term evaluation of NESP 2 as well as the formulation of NESP 3. The reference group validated the evaluation questions presented in the inception report.

Evaluation Approach

The evaluation methodology aimed to assess the project based on the 6 OECD-DAC Criteria (Relevance, Coherence, Effectiveness, Efficiency, Impact & Sustainability) plus the EU-specific criterion "EU added value" vis-à-vis the intervention logic.

figure 11 : OECD-DAC criteria versus log-frame

Apart from DAC considerations, methods for the evaluation are integrated into the EU approach to Project Cycle Management (PCM) and the logical framework approach. In general, the method used has been essentially **participatory**.

Energy and electrification projects are usually seen as technical interventions by definition. Nevertheless, **the approach for this evaluation reached far beyond engineering considerations**.
The evaluation emphasised highly on result-based assessments based on the projects' intervention logic and Theory of Change including all relevant cross-cutting issues, such as *socio-economic sustainability, environmental considerations, gender issues, climate-change issues etc.*

Main tools for this assignment have been:

- An intensive desk research
- Briefings with the EUD and the project implementer (GIZ)
- Semi-structured interviews with stakeholders (online and face-to-face)
- Detailed discussions with key-stakeholders
- Field-visits and meetings with local beneficiaries
- Debriefings and feedback sessions

Implementation approach:

- As a first step, kick-off-meetings have been arranged with the EUD as well as GIZ as the implement agency. Based on these meetings and a initial key-document review, a list of questions for the evaluation and formulation to guide this assignment have been drafted.
- Further documents have been gathered and consulted,
- As a next step, after the presentation and approval of the inception report, the desk-phase continued with gathering, research and consulting of further documents and other available sources of information from stakeholders and online.
- In parallel, key-stakeholders have been contacted to set-up online-meetings. These meetings contributed to preliminary findings to the questions as well as to guide further steps such as fine-tuning the workplan and list of stakeholders and contribute to the detailed planning of the field-phase. Those stakeholders, who could not be interviewed remotely has been included in the detailed planning for the field mission for face-to-face meetings.
- Despite the fact that the Desk Phase and the Field Phase are following each other, in practice, document gathering, and consultations and stakeholder-consultations happened to some extent in parallel and through-out the assignment.
- In principle, information gathered through document research has been cross-checked, updated, and verified during the interviews and the other way round.
- Specifically, the meetings and debriefings with the EUD, the reference group and GIZ have been used to discuss preliminary observations and findings to avoid a one-sided view.
- The synthesis phase was mainly used to formulate the conclusions and recommendation.
- The formulation has been developed hand in hand with the evaluation.

Management of the Assignment

The assignment has been managed by the Task Manager of the EUD, Mr. Godfrey Ogbemudia, who will worked closely with the Team throughout the assignment.

All phases of the assignment have been closely followed by the Reference Group consisting of representatives of the

- Federal Ministry of Power,
- Federal Ministry of Finance,
- Budget and National Planning, and the
- EU Delegation.

The core team for this assignment consisted of three consultants, namely:

- The Team Leader (Bernd Drechsler) who was responsible for the overall coordination of the assignment, high quality and timely delivery of outputs, etc
- KE2 (Terence Cook) was the main responsible or the Formulation component of the assignment.
- KE3 (Tobias Karekaho) took the main lead for the evaluation component.

The Core-Team has been supported by SUEZ-Consortium's Backstopping Team, led by Luc Ponchon who was the responsible Project Manager from the side of the implementing consortium. The backstopping included all necessary technical and operational support including quality control measures, etc.

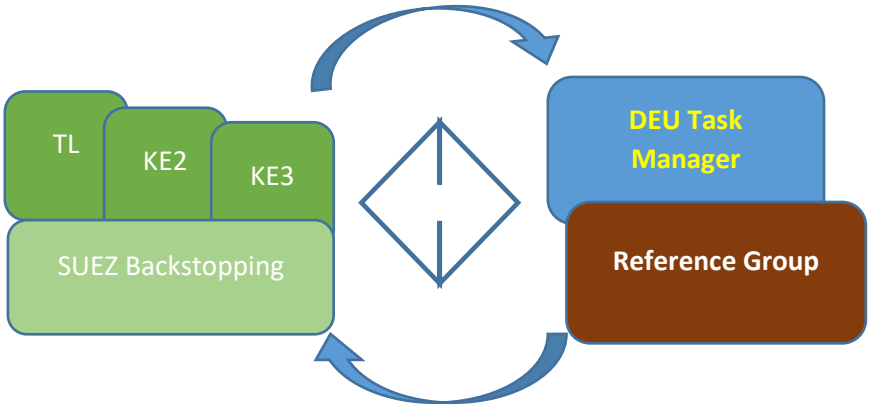


figure 12: Management Structure

The team submitted and presented progress-updates to the Task Manager and the Reference Group at the end of every phase of the assignment (according to the schedule for deliverables included in the Annex).

Comments on the Terms of Reference

The Terms of Reference (ToR) are well drafted and detailed, and the project seemed feasible within the proposed timeframe and experts' resource.

Scope of the evaluation

The ToR state that *"the evaluation will be restricted to its initial duration (December 31st 2017-November 30th 2020) in order to appraise if the project was on course to deliver on its original goal. In addition, to substantiate a need for a third phase in terms of impacts, assuming the project ended when it was supposed to end"*.

However, the evaluation team proposed to evaluate the entire intervention (including the extension up to November 2022).

Main reasons for this included:

- Spending during the first three years (up to November 2020) was very low (reasons for this will be subject of this evaluation) and activities and spending increased in year 4.
- This evaluation was a "MTR" supposed to look at an ongoing intervention.
- The evaluation provides a basis for the formulation for NESP 3. Therefore, latest activities and achievements are key for the formulation of the next steps.

This proposal has been discussed and approved during the Inception Report Presentation Meeting on 24th of February.

Main risks and assumptions

No major risks or challenges have been encountered during this assignment so far.
Some risks have been pre-identified during the inception phase, to which we proposed relevant risk mitigation measures. This approach worked out well so far.

The table below summarises the main risks and assumptions identified during the inception phase.

Potential Risks	Impact	Prob.	Mitigation Strategies
Desk Phase			
Deliverables are not approved on time and the following phases are delayed	H	L	The Team worked closely with the EU Programme Manager to ensure that the workplan is adapted accordingly.
The existing documents do not provide useful data for this evaluation.	M	L	Close cooperation from kick-off meetings with relevant counterparts have been fundamental to ensure ease of access to other data in case the existing one is insufficient or inadequate.
Key documents are not freely accessible or available	H	L	The EU Programme Manager facilitated accessibility to all information sources and relevant documents.
Field Phase			
Stakeholders and Counterparts are overworked and find it difficult to accommodate the schedule	H	L	The Team had a wide experience of institutional deficits and explained carefully the reasons for the schedule and adjusted if needed.
High turnover of stakeholder-staff involved in implementation undermines the availability of respondents with institutional memory	H	M	The Team had accounted for this risk in developing the methodology and devised its communication accordingly, eg: by mapping who these respondents are, contact them when possible or make contact with other equivalent staff.
Key stakeholders are not available for interviews or focus group discussions.	M	M	To avoid this, we undertook a detailed preparation for the field trips and clear communication with interview partners to ensure proper execution of the evaluation. All relevant stakeholders have been approached in advance to set appointments for meetings and followed up with Skype/telephone meetings if in-person appointments cannot be obtained.
Interview partners are reluctant to share their true standpoints with the interviewer or tend to provide biased responses rather than critical ones.	H	M	The Team used a variety of triangulation methods. Limitations concerning the reliability of data or data collection tools were made explicit.
Synthesis & Validation Phase			
The Management Group is unable to agree on the comments.	H	M	The EU Programme Manager is responsible for facilitating the finalisation of comments.
Dissemination Phase			

Potential Risks	Impact	Prob.	Mitigation Strategies
Key stakeholders unwilling to accept conclusions and recommendations	M	M	The final conclusion and recommendation will be sustained by evidence.

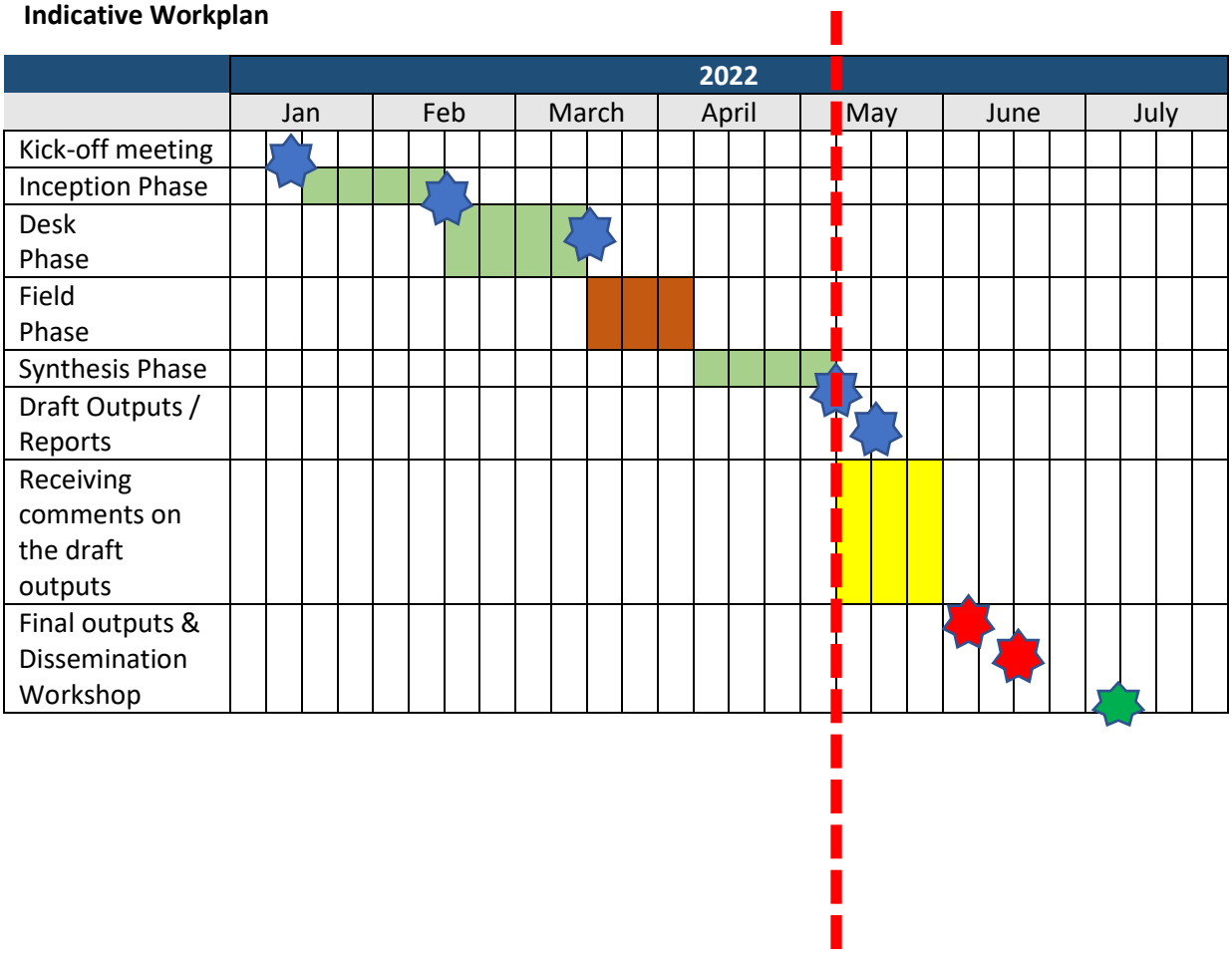
Table 9 : main risks and assumptions identified at the inception phase

Annex 4: Updated Schedule and Workplan

Updated Indicative Schedule for Deliverables

Title	Indicative Submission date for the draft deliverables	Indicative Date for the Presentation	Done
Inception report	Draft Inception Report submitted	Presented on 24/02/2022	☑
Desk Note	Draft Desk Note submitted	Presented on 14/03/2022	☑
Debriefing with EUD and the Reference Group with Slide Presentation of key findings of the field phase	-	Presented on 08/04/2022	☑
Draft final evaluation report	Draft Evaluation Report submitted	06/05/2022	☑
Draft formulation report	Draft Formulation Report submitted	06/05/2022	☑
Draft Action Document for NESP3	18/05/2022	23/05/2022	
Final report	30/05/2022	-	
Final formulation report	30/05/2022	-	
Action Document for NESP3	07/06/2022	-	
Dissemination Workshop	15/06/2022	20/06/2022	

Indicative Workplan



Annex 5: Evaluation Matrix

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?				
Evaluation criteria covered	**Relevance**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 1.1 - Level of relevance with national development priorities, government strategies and energy sector priorities	I 1.1.1 – coherence with national development strategies	Country strategy & policy documents	Ministries and other stakeholders	Document review, semi-structured interviews
	I 1.1.2 - coherence with national energy sector policies	Energy Sector strategy & policy documents	Ministries and other stakeholders	Document review, semi-structured interviews
	I 1.1.3 - coherence with EU-country strategies with Nigeria	EU-Nigerian Policy Documents	DEU	Document Review
	I 1.1.4 - coherence with Global initiatives	Global energy policy documents	DEU	Document review
JC 1.2 - Level of coherence of the intervention logic	I 1.2.1 – extent to which the logic of the logframe holds through	NESP-logframes	Ministries and other stakeholders	Document review, semi-structured interviews
	I 1.2.2 - extent to which the assumptions in the logframe holds through	NESP logframes	Ministries and other stakeholders	Document review, semi-structured interviews

EQ2: To what extent is NESP-II compatible with other interventions in the energy sector?				
Evaluation criteria covered	**Coherence**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 2.1 - Level of coherence with other interventions in the energy sector	I 2.1.1 - Level of coherence with other donor funded interventions in the energy sector	Relevant Project-/programme documents	EUD and other international development partners	Document review, semi-structured interviews
	I 2.1.2 - Level of coherence with national /government funded interventions in the energy sector	Relevant Project-/programme documents	Relevant Ministries and other Stakeholders	Document review, semi-structured interviews
	I 2.1.3 - Level of coherence with private sector driven interventions in the energy sector	Relevant Project-/programme documents	Private sector Stakeholders,	Document review, semi-structured interviews
JC 2.2 - Level of synergies with other interventions used successfully.	I 2.2.1 – synergies used successfully	Relevant Project-/programme documents	Relevant Stakeholders	Document review, semi-structured interviews
	I 2.2.2 – potential synergies not used	Relevant Project-/programme documents	Relevant Stakeholders	Document review, semi-structured interviews

EQ3: To what extent has NESP-II achieved or is likely to achieve its specific objectives and its results considering the progress made so far including any differential results across groups?				
Evaluation criteria covered	**Effectiveness**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 3.1 – Progress in achieving the specific Indicators in the Log-frame	I3.1.1 –progress towards specific objectives	NESP documents	Project implementers	Document review, semi-structured interviews

EQ3: To what extent has NESP-II achieved or is likely to achieve its specific objectives and its results considering the progress made so far including any differential results across groups?				
Evaluation criteria covered	**Effectiveness**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
			(GIZ), stakeholders & beneficiaries	
JC 3.2 – What further progress is likely to be achieved in the remaining lifespan of the project?	I3.2.1 - Further progress towards specific objectives likely to be achieved during the remaining lifespan of the Program	NESP documents	Project implementers (GIZ), stakeholders & beneficiaries	Document review, semi-structured interviews

EQ4: To what extent has the project strengthened the capacity of the various agencies under Federal Ministry of Power and other line ministries like Federal Ministry of Trade?				
Evaluation criteria covered	**Effectiveness**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 4.1 - To what extent has the project strengthened human capacity	I 4.1.1 – Who has been trained?	Project documents	Project implementers (GIZ) & beneficiaries	Document review, semi-structured interviews
	I 4.1.2 – Is the training considered "successful" by the trainees? (Why ? Why not?)	Trainees	Beneficiary Agencies	semi-structured interviews
	I 4.1.3 – Staff-turn-over of trainees after the training.	Staff records of benefiting institutions	Beneficiary Agencies	Document review, semi-structured interviews
JC 4.2 –what extent has the project strengthened capacity beside training of staff.	I 1.2.1 – nature and effectiveness of other capacity building efforts implemented	Project documents	Project implementers (GIZ) & beneficiaries	Document review, semi-structured interviews

EQ5: Which factors have influenced the achievement of the interventions' objectives? What were the factors that prevented the achievement of the objectives?				
Evaluation criteria covered	**Effectiveness**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 5.1 - factors that influenced the achievement of the interventions' objectives positively	I 5.1.1 – positive factors	Relevant Project-/programme documents	Relevant Stakeholders	Document review, semi-structured interviews
JC 5.2 - factors that prevented the achievement of the objectives	I 5.2.1 -negative factors	Relevant Project-/programme documents	Relevant Stakeholders	Document review, semi-structured interviews

EQ6: To what extent does the intervention deliver (or is likely to deliver) results in an economic and timely way?				
Evaluation criteria covered	**Efficiency**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 6.1 – Progress in implementing programme activities	I 6.1.1 – Progress in implementing programme activities	Programme team	DEU, BMZ, beneficiaries	Document review, semi-structured interviews
JC 6.2 – Appropriateness and efficiency of the organizational set-up	I 6.2.1 - Organization set up with clear roles and responsibilities with adequate internal controls and monitoring mechanisms	Programme team	DEU, BMZ, beneficiaries	Document review, semi-structured interviews
	I 6.2.2 – Adequate staffing	Programme team	DEU, BMZ, beneficiaries	Document review, semi-structured interviews
JC 6.3 - To what extent has the implementing partner	I 6.3.1 – appropriateness of the budget (incl. budget	Programme team	DEU, BMZ, beneficiaries	Document review, semi-structured interviews

EQ6: To what extent does the intervention deliver (or is likely to deliver) results in an economic and timely way?				
Evaluation criteria covered	**Efficiency**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
been able to make the best use of the funds allocated for the project?	lines), absorption capacity and rate of spending			
JC 6.4 – The extent to which the project addenda improved efficiency and effectiveness of the project	I 6.4.1 – issues improved through the addenda	Project team	DEU, BMZ, beneficiaries	Document review, semi-structured interviews

EQ7: To what extent has NESP II generated or is likely to generate significant positive or negative intended or unintended higher-level effects?				
Evaluation criteria covered	**Impact**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 7.1 – Progress in achieving the Impact Oriented Indicators in the Log-frame	I 7.1.1 – Progress attained towards Impact Oriented Indicators in the Log-frame	NESP documents	Project implementers (GIZ) and other stakeholders & beneficiaries	Document review, semi-structured interviews
JC 7.2 – What further progress is likely to be achieved in the remaining lifespan of the Programme?	I 7.2.1 – Likely progress towards the Overall Objectives in the remaining lifespan of the Programme	NESP documents	Project implementers (GIZ), stakeholders & beneficiaries	Document review, semi-structured interviews

EQ8: To which extent are existing or foreseen structures and capacities appropriate to ensure appropriate and sustainable funding and maintenance of the projects' physical outputs beyond the lifespan of the EU-funded interventions?				
Evaluation criteria covered	**Sustainability**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 8.1 – potential sustainability of the project's physical outputs	I 8.1.1 – maintenance of physical outputs	project documents	Project implementers and other stakeholders & beneficiaries	Document review, semi-structured interviews
	I 8.1.2 – management of physical outputs	project documents	Project implementers and other stakeholders & beneficiaries	Document review, semi-structured interviews
	I 8.1.3 – funding for maintenance and replacement of physical outputs	project documents	Project implementers and other stakeholders	Document review, semi-structured interviews
JC 8.2 - potential sustainability of the project's capacity building outputs	I 8.2.1 – staff-turnover	project documents, ministry records	Governmental stakeholders & beneficiaries	Document review, semi-structured interviews
	I 8.2.2 – further capacity building /training plans	project documents	Governmental stakeholders & beneficiaries	Document review, semi-structured interviews
JC 8.3 - potential sustainability of the project's outcomes and impact	I 8.3.1 – existence & quality and coherence of a project-exit strategy	NESP documents	Project implementers (GIZ) and other stakeholders & beneficiaries	Document review, semi-structured interviews

EQ9: To what extent have environment and climate change, gender and 'Good Governance' been mainstreamed and reflected in the design and implementation of the project?				
Evaluation criteria covered	**Cross-cutting Issues**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 9.1 – Level of mainstreaming environmental issues	I 9.1.1 – environmental issues mainstreamed in the project design.	project documents	Project implementers and other stakeholders & beneficiaries	Document review, semi-structured interviews
	I 9.1.2 – positive environmental impact achieved or likely.	project documents	Project implementers and other stakeholders & beneficiaries	Document review, semi-structured interviews
JC 9.2 - Level of mainstreaming climate change	I 9.2.1 – climate change related issues mainstreamed in the project design.	project documents	Project implementers and other stakeholders & beneficiaries	Document review, semi-structured interviews
	I 9.2.2 – positive climate change-impact achieved or likely.	project documents	Project implementers and other stakeholders & beneficiaries	Document review, semi-structured interviews
JC 9.3 - Level of mainstreaming "good governance"-related issues	I 9.3.1 – 'good governance' related issues mainstreamed in the project design.	project documents	Project implementers and other stakeholders & beneficiaries	Document review, semi-structured interviews
	I 9.3.2 – 'good governance' - impact achieved or likely.	project documents	Project implementers and other stakeholders & beneficiaries	Document review, semi-structured interviews
JC 9.4 - Level of mainstreaming gender issues	I 9.4.1 – gender issues mainstreamed in the project design.	project documents	Project implementers and	Document review, semi-structured interviews

			other stakeholders & beneficiaries	
	I 9.4.2 – gender -impact achieved or likely.	project documents	Project implementers and other stakeholders & beneficiaries	Document review, semi-structured interviews

EQ10: To what extent have the projects achieved (or are likely to achieve) additional benefits to what would have resulted from EU Member States' interventions only?				
Evaluation criteria covered	**EU-added Value**			
Judgement criteria (JC)	**Indicators (Ind)**	**Information sources**		**Methods / tools**
		Primary	**Secondary**	
JC 10.1 – specific benefits achieved through the nature of the EU-support	I 1.1.1 – specific EU-strength used for the project	EU-policy documents Project documents	Project implementers, DEU, BMZ, other EU member-states' development agencies and developing partners, beneficiaries	Document review, semi-structured interviews
	I 1.1.2 – Specific EU-related challenges encountered	EU-policy documents Project documents	Project implementers, DEU, BMZ, other EU member-states' development agencies and developing partners, beneficiaries	Document review, semi-structured interviews

JC 10.2 – level of energy sector cooperation and coordination between the EU an its member-states and among EU-member-states	I 1.2.1 – efficiency of cooperation and coordination mechanisms	EU-policy documents Project documents	Project implementers, DEU, BMZ, other EU member-states' development agencies and developing partners, beneficiaries	Document review, semi-structured interviews
	I 1.2.2 – synergies identified and used	EU-policy documents Project documents	Project implementers, DEU, BMZ, other EU member-states' development agencies and developing partners, beneficiaries	Document review, semi-structured interviews

Annex 6: NESP 2 Logframe (revised and original)

Intervention Logic (Objectives and Results)	Indicators	Baseline[9] (2017)	Target[10] (2022)	Sources of Verification	Assumptions
Overall objective To contribute to the use of affordable, reliable, sustainable and modern energy by all Nigerians including the most vulnerable.	**1. Number of MWs of renewable energy produced in Nigeria[11]**	2143	2243	IRENA Renewable Capacity Statistics (report)	NA
	2. Number of tonnes of CO2 p.a. of energy saved as a result of new sustainable energy solutions [matching with EURF indicator 2.2.1]	0 t CO2 p.a. savings	3.000 t CO2 p.a savings	Monitoring reports of projects supported by NESP 15	
Specific objective 1: Enabling and fostering investments in a domestic market for Renewable Energy and Energy Efficiency	1.1. The value of new private direct investments (in Millions of Euros) attracted in the RE, EE and Energy Access segments	0 €	6.000.000 €	Monitoring reports of solar mini-grid projects in Nigeria by REA/NESP NESP progress report[12]	The Federal Government of Nigeria and State institutions (e.g. FMPWH, NERC, etc.) remain committed to the
	1.2. Number of MWs of sustainable electricity solutions procured **[matching with EURF indicator 2.10]**	0MW	100MW	Procurement documents	

9 In some cases those might be set within the first months of implementation

10 expected to be achieved by the end of programme implementation

11 Nigeria has a target of 30 GW of overall power generation capacity by 2030, of which 30% is expected to come from renewables, as set out in the Nigeria Vision 30-30-30 energy policy

12 The indicator currently only includes CO2 savings from cookstoves activities. CO2 savings monitoring processes will be set up in the inception phase of the programme

	1.3. Number of improved standards or concepts for the optimized integration of RE put in place by the sector stakeholders	0	3	Documents on new processes, Dispatch Records of Power Plants, Re-Dispatch Records of TCN, Surveys of key staff,	promotion of RE, EE and rural electrificationand approve relevant promotion instruments as well as budgetary and human resources for these. Government is committed to adopting and enforcing the policies, regulations and standards developed with the support of the project. Government is committed to aligning RE/EE agenda with climate targets
	1.4. Number of frameworks (legislation, policy, regulation, guideline, incentives) approved promoting RE and EE (the recycling of batteries, hydro, biomass) -disaggregated by type of framework.	0	3	Framework documents produced by Nigerian Regulators with the support from NESP	
	Number of SMEs or social institutions that use improved, emission-reduced cookstoves	0	400	Test Reports of Cookstoves, Field Surveys	
Specific objective 2: Improving access to electricity for rural communities (including conflict affected areas) particularly women and people living in vulnerable situations	**2.1. Number of people gaining access to energy through sustainable and scalable solutions (disaggregation: sex and region)** **[matching with EURF indicator 2.9]**	**0**	**130.000 (40% women = 52.000)**	NESP progress report (based on one-off site verification missions and Commissioning Reports by developers), Federal Ministry of Power, Rural Electrification Agency	
R1) Institutional and Regulatory Frameworks	1.1.1. Number of stakeholders (e.g. FMPWH, TCN, REA, states) that use synchronized data management systems for their	0	3	Data Systems, Handbooks, Protocols regar	The Federal Government of Nigeria and State

and Planning Mechanisms improved	planning and decision-making processes			ding Coordination and use, Surveys of key staff	institutions (e.g. FMPWH, NERC, etc.) remain committed to the promotion of RE, EE and rural electrification and approve relevant promotion
	1.1.2. Number of sites surveyed in order to support Government (FMP and REA) in collecting data on mini-grid potential.	0	200	Central Data Base Management System NESP progress report	
	1.1.3. Length of grid data collected (measured in km) to support TCN and DISCO's or franchisees in planning.	0	10,000	Central Data Base Management (CDMS) System, network locations	

	1.1.4. Number of surveying companies trained on an advanced methodology on electrification surveys…	0	1	NESP progress report	instruments as well as budgetary and human resources for these. Corruption in the Infrastructure Sector is contained. Nigeria Electricity Regulatory Commission (NERC) is provided with the investment and political commitment to carry out is mandate.
	1.1.5. Number of frameworks (legislation, policy, regulation, guideline, standards, incentives) supported promoting RE and EE (incl. battery recycling small and medium scale hydro, biomass)	0	6	NESP Progress report / Framework documents produced by Nigerian Regulators with the support from NESP	
R2) Scaled up sustainable RE	2.2.1. Number of tenders of sustainable electricity solutions' procurement supported	0	6	NESP Progress report	The Federal Government of

and EE **business models and Implementation Mechanisms**	2.2.2. Number of sustainable energy project pipelines (off-grid mini grid, interconnected mini grid[13], hydro, small or medium scale hydropower, medium scale on-grid solar projects[14], household/institutional stoves[15]) developed	0	4	Mini-Grid Business Plans Hydro business plan Implementation documents On-grid solar business plan Stove business plan	Nigeria and State institutions (e.g. FMPWH, NERC, etc.) remain committed to the promotion of RE, EE and rural electrification and approve relevant promotion
	2.2.3. Number of financial products (incl. risk mitigation) to support sustainable energy solutions	0	2	Documentation used to develop the risk mitigation mechanism Documentation used to develop the financial product	
	2.2.4. Number of EE measures in the buildings and industrial sector (with at least 15per cent energy savings) implemented by the Nigerian industry	0	20	Site Reports, Audit Reports	instruments as well as budgetary and human resources for these.
	2.2.5. Number of states where energy efficiency measures from the National Building Energy Efficiency Code have been supported in construction sites	1	4	Construction Reports based on Guidelines from National Building Code	
	2.2.6. Number of focal persons appointed by the Government to align the agenda with climate targets.	0	3	NESP progress report	

13 Min. of 50 mini-grids per pipeline

14 Min. of 50 MW

15 Min. of 2,000 stoves

R3) **Improved the technical market capacities, standards, conductive framework and services of the energy sector**	3.1.1. Number of EE standards SON developed in consultation with consumer associations and the private sector	0	3	Official Gazette, Protocols of StakeholderCoordination Process	The Federal Government of Nigeria and State institutions (e.g. FMPWH, NERC, etc.) remain committed to the promotion of RE, EE and rural electrificationand approve relevant promotion instruments as well as budgetary and human resources for these. Electricity tariffs allow for cost recovery SON and other custodians of regulations implement the incentive and
	3.1.2. Number of standards SON has been supported with, for supervision in compliance with (new) RE/EE standards	0	2	Documentation on training of staff, Results of Analysis of Laboratory Quality Control Standards by SON	
	3.1.3. Number of audits executed in the building and the industry sector from national auditors (sex disaggregation for auditors)	0	10	Audit Reports	
	3.1.4.Number of guidelines on import processes for RE and EE equipment developed between Ministry of Finance, FMP, SON and customs	0	1	Import Regulations, Process Descriptions,	
	3.1.5. Number of central information platforms openly accessible (one-stop-shop) for RE and EE to provide information to investors	0	1	Platform is openly accessible via internet	
	3.1.6.Number of dedicated RE sector alliances established to drive the development of the clean energy sector (RE and EE)	0	1	Sector Mapping on RE / EE Organizations, Protocols of Association Meetings, Training Documentation of Members	
	3.1.7.Number of initiatives (with DisCo) on electricity data collection and assessment in order to support implementation of energy efficiency measures in buildings and industries	0	1	MoU and initiative concept with at least one DisCo is available	

	3.1.8.Number of NESP II – supported training institutions that offer RE / EE trainings with nationally certified degrees	0	5	National Certification, Course Catalogues	enforcement measures as per their mandate SON has the capacity to oversee implementation and compliance of the developed standards Streamlined import process is approved by relevant government authorities
	3.1.9.Number of national certification processes for RE/EE courses that have been operationalised.	0	5	Certification exams by national body; Examination registry	
	3.1.10. Number of existing training institutions in the training partnership network on RE/EE	0	6	Training registry/ documentation	
	3.1.11. Number of training courses for which Mixed-learning approaches (MOOC & Hands-on training) have been developed.	0	1	MOOC platform established; resources & software developed; updated curricula	
	3.1.12. Number of female training graduates whose practical skills have been supported	0	30	Programme certifications	
	3.1.13. Number of universities, associations and public households reached through national awareness campaigns FOR EE Universities	0	3	NESP progress report NESP	

	Associations Households	0 0	4 1000	progress report NESP progress report	
	3.1.14. Number of Job fairs on RE/EE supported	0	2		

Main activities by Results	**Means**	**Hypothesis**
R1) Institutional and Regulatory Frameworks and Planning Mechanisms improved Better framework and pre-conditions in the RE/EE sector • Support to FMPWH in revising policy documents in order to harmonize the existing sector strategies and action plans • Organizational development for FMP~~WH~~, REA, selected states	**35.000.000 MEUR** ***Human resources:*** Programme Management: 1 Programme Director, 1 Head of Admin and Finance, 1 Programme Management Assistance, 1 Communication Expert	Security situation does not hinder implementation of activities.
• Development and implementation of data-management systems and planning tools • Establishment of a clear data collection and monitoring process including MDAs and state levels • Development and Implementation of tariff-modelling and regulation tools for NERC • Development and execution of electrification surveys and potentially integrated resource plan	and the Administrative Staff and Support Staff. Technical Staff: 2 Component Managers, 13 Technical Advisors and 3 Integrated Experts	

• Support NERC to develop and apply regular cost-benefit analysis of generation options • Support NERC to develop systematic compliance monitoring (e.g. grid code compliance, capacity expansion and procurement plans, tender audits) • Support NERC to enhance tariff review methodologies and processes towards market-driven models • Support the Government and private operators in the monitoring of mini-grids and franchising projects in Nigeria and the improvement of their operations, namely via demand stimulation and KeyMaker Model. • Support private developers on advanced mini-grid project development. • Support the Government in the monitoring of the operations from stove manufacturers. • Support NERC and other regulators like FMEnv or NEMSA in the enforcement of regulations. • Support Government in establishing an enabling framework for small and medium scale hydro. • Support Government to assess the potential of RE generation sources (biomass, hydro) in Nigeria. • Support Government (FMP and REA) in collecting data on mini-grid potential. • Support TCN and DisCo's in collecting and managing data on the state of power network. • Support Government in data collection to plan Generation projects. • Support relevant stakeholder in planning potential franchise/concession areas. • Institutional support to NERC for developing technical standards for electrification data collection and management. • Supporting Government in least cost modelling (based on collected data). <u>Procedures and planning methods</u> • Capacity Development to NBET and NERC based on institutional needs assessment • Promotion of consultation mechanisms and knowledge exchange dealing with energy efficiency and rural electrification • Development and introduction of cost-benefit analysis into RE/EE planning procedures • Improvement of planning and RE integration procedures and concepts for TCN (e.g.	***Material resources:*** IT equipment and facilities Office Furniture, Office equipment, Office Machinery Low value asset Telephone equipment Tools/machinery/equipment Consumables Intangible Asset Other technical facilities Vehicles	

Support for the enforcement and monitoring of grid code compliance, system operation guidelines, system adequacy forecast) • Develop and enroll an implementation plan for scheduled activation of free governor control • Introduce the use of communication tools at NCC for improved response times between System Operator, Gencos and Discos • Implement reporting and communication process between TCN-ISO and NERC on system performance indices		

R2) Scaled up sustainable RE and EE **business models and Implementation Mechanisms** RE procurement • Implementation of a structured procurement mechanism including approval processes and management of the stakeholder coordination process • Support the design of competitive processes for the procurement of small and medium scale hydro, on-grid solar and improved cookstoves (incl. • Support the Government in the design of new/advanced competitive processes for the procurement of RE projects (incl. on-grid solar, small and medium scale hydro, stoves). • Support TCN to evaluate the absorption capacity of the grid for variable RE for the determination of the potential capacity to be procured competitively Disco Performance • Organizational Development Support to selected Discos[16] • Development of business plans for selected Discos • Identification of further support mechanisms to Discos • Support DisCos in the design and implementation of franchising tenders for rural and peri-urban areas. Off-grid and on-grid energy access including financing options • Support to Mini-grid developers to implement commercially viable mini-grids • Organizational and capacity development support to the REA based on REA needs assessment • Carrying out technical and economic feasibility and design studies for the selected projects • Technical and partially financial support to project implementation via a grant and TA facility • Monitoring & evaluation and information dissemination of the project results		

16 Discos to be selected taking into consideration complementarity with other development partners interventions

• Support to selected cookstove manufacturers • Support the Government and/or selected developers in the development of project pipelines (mini-grids, on- grid solar, improved cookstoves and small and medium scale hydro). • Support the Government in the development and implementation of a small or medium scale hydro project. <u>The usage of Energy Efficiency measures</u> • Identification of and capacity development for project partners in industry and building sector • EE measures in industries and buildings (Incl. e.g. Zero emission house) will be developed in cooperation with the private sector		

• Implementation of Building codes in collaboration with partner states • Capacity Building for partner states to enable them to enforce building codes • Scaling upon training measures using MooCs for trainings • 10 Additional EE measures in the buildings and industrial sector (with at least 15per cent energy savings) have been implemented • Support large scale national awareness campaigns on EE • Job creation concepts (e.g through EE/RE job fairs, through adapting curricula to industry needs etc.) developed and implemented • Support to align RE/EE agenda with climate targets		
R3) **Improved the technical market capacities, standards, conductive framework and services of the energy sector** <u>SONs capacities to perform its tasks re RE and EE</u> • Institutional assessment of SON in order to assess Organisational development (OD) and Capacity Development (CD) needs and tailor a CD / OD strategy • OD and CD support to SON • Support to the installation of testing facilities for SON <u>Local expertise on EE services</u> • Capacity Development for national auditors through training courses • EE Audits in Buildings and Industry Sector • Awareness Raising via partner platforms like Energy Efficiency Networks, Manufacturers Association of Nigeria (MAN) etc. <u>Services and Processes for EE/RE market participants</u> • Gap analysis of the current import process including identification of its relevant stakeholders • Support to the stakeholder process to improve the current import process and establishment of roles and responsibilities		

• Information and training of interested entrepreneurs on the process • Implementation of a data hub (one-stop-shop) for RE / EE investors • Support to the establishment of OR creation of a new sector association • Development of ESCO models • Development of a concept for EE on institutional level, based on the European Energy Efficiency Directive and Energy Agencies operating in EU Member States		

• Launching an electricity data collection and assessment initiative in collaboration with DisCos, in order to support implementation of energy efficiency measures in buildings and the development of new products and services (Innovation Hubs) • Support to policy and standards implementation on battery recycling and safe disposal including support to private actors across the value chain • Support the Government and/or private banks in the development of financial mechanisms (incl. risk mitigation) for mini-grids, on-grid solar and improved cookstoves. <u>Capacities for RE and EE</u> • Implementation of a Mentorship Programme for female graduates in collaboration with MDAs and the private sector • Support to NESP I Training Partner Network Institutions on RE and EE matters • Development of a national certification process, including identification of a national body for certification and operationalising the national certification process for RE/EE courses • Expansion of existing Training Partner Network in RE/EE • Developing a Mixed-learning approach (LMS & Hands-on training) for NESP developed courses on Human Capacity Development (HCD)		

Previous version of logframe before Addendum

NESP II Logical Framework Matrix

No	Intervention Logic (Objectives and Results)	Indicators	Baseline[17]	Target 21[18]	Sources of Verification	Assumptions and Risks
OO	**Overall objective** Contribute to Nigeria's economic and social development through a better access to reliable and sustainable energy.					
SO	**Specific objectives** Enabling and fostering investments in a domestic market for Renewable Energy and Energy Efficiency Improving access to electricity for disadvantaged, mostly rural, communities.	**Specific objective indicators** • Procurement of on-grid solar PV capacity in a structured bidding approach • Deployment of sustainable energy solutions in the agro-processing sector • Provide access to power through sustainable and	0MW 0 t CO2 p.a. savings	500MW 10.000 t CO2 p.a savings	NBET procurement documents Monitoring reports of EE projects[19]	Assumptions: • Political stability in Nigeria is maintaine d. • The Federal Government of Nigeria remains committed to the promotion

17 In some cases those might be set within the first months of implementation

18 expected to be achieved by the end of programme implementation

19 The indicator currently only includes CO2 savings from cookstoves activities. CO2 savings monitoring processes will be set up in the inception phase of the programme

No	Intervention Logic (Objectives and Results)	Indicators	Baseline[20]	Target[21]	Sources of Verification	Assumptions and Risks
		scalable solutions to previously un-electrified rural people. • The overall efficiency of the transmission grid and the bulk trading system – measured in load shedding due to excess frequency - has been increased	0 Y	100.000 Y + X	Site Verification Missions, Commissioning Reports Monitoring Data of the Transmission Grid	of renewable energy, energy efficiency and rural electrification and approves relevant promotion strategies / instruments as well as provides funding for these. • The Federal and State institutions (e.g. FMPWH, NERC, etc) are fully committed to foster the development

No	Intervention Logic (Objectives and Results)	Indicators	Baseline[20]	Target[21]	Sources of Verification	Assumptions and Risks
						of RE and EE.
C 1	**Institutional and Regulatory Frameworks and Planning Mechanisms**					
R 1	Framework and pre-conditions in the RE/EE sector have been improved to enable policy making, coherent electrification planning and to foster investment					Risks: • High Risk of Corruption persists in the Infrastructu re Sector

No	Intervention Logic (Objectives and Results)	Indicators	Baseline[20]	Target[21]	Sources of Verification	Assumptions and Risks
R 1.1	Key stakeholders on federal and state level in the sector are able to collect and assess data and thus monitor the implementation of policies	1.1.1 3 stakeholders (e.g. FMPWH, TCN, REA, states) use synchronized data management systems for their planning and decision-making processes 1.1.2 3 improved instruments or new processes have been developed for NERC to perform according to its mandate	0 Actors X	3 Actors X+3	Data Systems, Handbooks, Protocols regarding Coordination and use, Surveys of key staff, Analysis of approved bills and regulations Surveys of key staff,	
R 1.2	Procedures and planning methods are improved	1.2.1 3 improved standards or concepts for the optimized integration of RE are in use by NBET, NERC or TCN	0	3 improved standards or concepts	Documents on new processes, Dispatch Records of Power Plants, Re-Dispatch Records of TCN, Surveys of key staff,	

No	Intervention Logic (Objectives and Results)	Indicators	Baseline[20]	Target[21]	Sources of Verification	Assumptions and Risks
C 2	**Business Models and Implementation Mechanisms**					
R 2	Access to electricity has been improved through scaling up of sustainable RE and EE business models					Risks: • FX restrictions or a further devaluation of the Naira limit import of RE equipment or render financial models of projects unsustainable
R 2.1	RE procurement is improved	2.1.1 A competitive process for the procurement of on-grid RE is concluded by the mandated institutions	0	1	Documentation of NBET and NERC on procurement process	
R 2.2	Disco performance is improved	2.2.1 2 Discos have developed new, technically and economically sound business models	0	2 Business Models	Reporting from NERC, Analysis of Disco Business Models regarding technical and commercial viability	

No	Intervention Logic (Objectives and Results)	Indicators	Baseline[20]	Target[21]	Sources of Verification	Assumptions and Risks
R 2.3	Off-grid energy access including financing options has improved	2.3.1 20 mini-grids have been implemented of which 10 have combined public and private funds 2.3.2 400 SMEs or social institutions use improved, emission-reduced cookstoves	X Mini Grids 0	X + 20 Mini-Grids 400 SMEs or Institutions	Mini-Grid Business Plans, Documentation on Project Implementation Test Reports of Cookstoves, Field Surveys	
R 2.4	The usage of Energy Efficiency measures has increased	2.4.1 10 EE measures in the buildings and industrial sector (with at least 15per cent energy savings) have been implemented 2.4.2 In 3 to 5 additional states energy efficiency measures from the National Building Energy Efficiency Code have been implemented in construction sites	X 1 state	X+10 measures 4 to 6 states	Site Reports, Audit Reports Construction Reports based on Guidelines from National Building Code	

No	Intervention Logic (Objectives and Results)	Indicators	Baseline[20]	Target[21]	Sources of Verification	Assumptions and Risks
C 3	**Market Development, Standards and Services**					
O 3	Technical market capacities and standards and conducive frameworks have been improved					Assumptions: • Electricity tariffs allow for cost recovery • SON and other custodians of regulations implement the incentive and enforcement measures as per their mandate
R 3.1	SONs capacities have been improved to perform its tasks re RE and EE	3.1.1 SON has implemented 3 new EE Standards developed in consultation with consumer associations and the private sector 3.1.2 SON is enabled to supervise compliance with 2 (new) RE/EE standards	X X	X+3 X+2	Official Gazette, Protocols of Stakeholder Coordination Process Documentation on training of staff, Analysis of Laboratory	

No	Intervention Logic (Objectives and Results)	Indicators	Baseline[20]	Target[21]	Sources of Verification	Assumptions and Risks
					Quality Control Standards	
R 3.2	Local expertise on EE services has been developed	3.2.1 10 EE audits have been executed in the building and the industry sector from national auditors	X	X+10 audits	Audit Reports	

R 3.3	Services and Processes for EE/RE market participants have improved	3.3.1 A Streamlined import process for RE and EE equipment has been established and approved between Ministry of Finance, FMPWH, SON and customs 3.3.2 A central information platform (one- stop-shop) for RE and EE has been set up to provide information to investors 3.3.3 A dedicated RE sector association drives the development of the clean energy sector (RE and EE)	0 0 0	1 process 1 platform 1 organization	Import Regulations, Process Descriptions, Platform is openly accessible via internet Sector Mapping on RE / EE Organizations, Protocols of Association Meetings, Training Documentation of Members	
R3.4	Capacities for RE and EE have improved	3.4.1 5 NESP I – supported training institutions offer RE / EE trainings with nationally certified degrees 3.4.2 The practical skills of 30 female training graduates have been improved	0 organizations offer nationally certified training 0 female graduates	5 organizations 30 female graduates	National Certification, Course Catalogues Programme certifications	

Main activities by <u>Objective and Results:</u>

<u>Objective 1:</u>

<u>Result 1.1:</u> Key stakeholders on federal and state level in the sector are able to collect and assess data and thus monitor the implementation of policies

- Support to FMPWH in revising policy documents in order to harmonize the existing sector strategies and action plans
- Organizational development for FMPWH, REA, states
- Development and implementation of data-management systems and planning tools
- Establishment of a clear data collection and monitoring process including MDAs and state levels
- Development and Implementation of tariff-modelling and regulation tools for NERC
- Development and execution of electrification surveys and potentially integrated resource plan
- Support NERC to develop and apply regular cost-benefit analysis of generation options
- Support NERC to develop systematic compliance monitoring (e.g. grid code compliance, capacity expansion and procurement plans, tender audits)
- Support NERC to enhance tariff review methodologies and processes towards market-driven models

<u>Result 1.2:</u> Procedures and planning methods are improved

- Capacity Development to NBET and NERC based on institutional needs assessment
- Promotion of consultation mechanisms and knowledge exchange dealing with energy efficiency and rural electrification
- Development and introduction of cost-benefit analysis into RE/EE planning procedures
- Improvement of planning and RE integration procedures and concepts for TCN (e.g. Support for the enforcement and monitoring of grid code compliance, system operation guidelines, system adequacy forecast)
- Develop and enroll an implementation plan for scheduled activation of free governor control
- Introduce the use of communication tools at NCC for improved response times between System Operator, Gencos and Discos

- Implement reporting and communication process between TCN-ISO and NERC on system performance indices

Objective 2:

Result 2.1: RE procurement is improved

- Implementation of a structured procurement mechanism including approval processes and management of the stakeholder coordination process

Result 2.2:Disco Performance is improved

- Organizational Development Support to selected Discos [23]
- Development of business plans
- Identification of further support mechanisms to Discos

Result 2.3: Off-grid energy access including financing options has improved

- Support to Mini-grid developers to implement commercially viable mini-grids
- Organizational and capacity development support to the REA based on REA needs assessment
- Carrying out technical and economic feasibility and design studies for the selected projects
- Technical and partially financial support to project implementation via a grant and TA facility
- Monitoring & evaluation and information dissemination of the project results
- Support to selected cookstove manufacturers

Result 2.4: The usage of Energy Efficiency measures has increased

- Identification of and capacity development for project partners in industry and building sector
- EE measures in industries and buildings (Incl. e.g. Zero emission house) will be developed in cooperation with the private sector
- Implementation of Building codes in collaboration with partner states
- Capacity Building for partner states to enable them to enforce building codes

Objective 3:

Result 3.1: SONs capacities have been improved to perform its tasks re RE and EE

23 *Discos to be selected taking into consideration complementarity with other development partners interventions*

- Institutional assessment of SON in order to assess Organisational development (OD) and Capacity Development (CD) needs and tailor a CD / OD strategy
- OD and CD support to SON
- Support to the installation of testing facilities for SON

Result: 3.2: Local expertise on EE services has been developed

- Capacity Development for national auditors through training courses
- EE Audits in Buildings and Industry Sector
- Awareness Raising via partner platforms like Energy Efficiency Networks, Manufacturers Association of Nigeria (MAN) etc.

Result 3.3: Services and Processes for EE/RE market participants have improved

- Gap analysis of the current import process including identification of its relevant stakeholders
- Support to the stakeholder process to improve the current import process and establishment of roles and responsibilities
- Information and training of interested entrepreneurs on the process
- Implementation of a data hub (one-stop-shop) for RE / EE investors
- Support to the establishment of OR creation of a new sector association

Result 3.4: Capacities for RE and EE have improved

- Implementation of a Mentorship Programme for female graduates in collaboration with MDAs and the private sector
- Support to NESP I-supported Training Institutions on RE and EE matters
- Development of a nationwide certification process

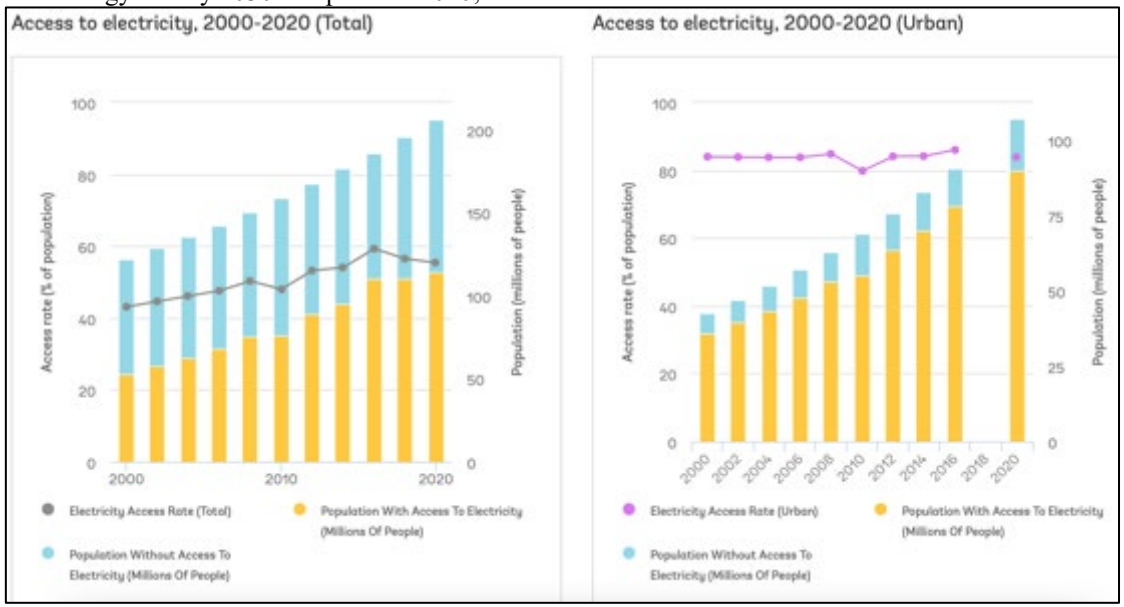
Annex 8: List of Documents Consulted

REGULATION (EU) 2021/947 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 June 2021 establishing the Neighbourhood, Development and International Cooperation Instrument
EU PRAG Practical Guide – December 2021
NESP 2 Progress Report Year 2
NESP 2 Progress Report Year 3
Consolidated ROM Report 2020
Nigerian Energy Support Programme (NESP) II 4th Progress Report December 2020 – November 2021
IRENA Nigeria Energy Profile 2021
"Strengthening the Nigerian Clean-Cooking Business Ecosystem" Author María Yetano Roche ICEED Heinrich Boll Stiftung (April 2021)
Presidential Power Initiative Nigeria (https://new.siemens.com/ng/en/products/energy/topics/presidential-power-initiative-nigeria.html)
Electrification Roadmap for Nigeria (Siemens Value Proposition supports reliable and affordable power supply) siemens.com/nigeria
Scaling-up Energy Investments in Africa for Inclusive and Sustainable Growth. (Report of the Africa–Europe High–Level Platform for Sustainable Energy Investments in Africa)
The Nigerian power market experiment: a critical appraisal of the PHCN privatisation DLA Piper Global Law Firm (15 MAR 2019)
Electric Power Crisis in Nigeria: A Strategic Call for Change of Focus to Renewable Sources. Obafemi Olatunji et al 2018 IOP Publishing
ENERGIZING EDUCATION PROGRAMME Alex Ekwueme Federal University, Ndufu Alike-Ikwo (FUNAI) JULY 2019 Rural Electrification Agency
Africa needs gas to prosper, despite COP26 declaration. Energy Voice 08/12/2021 https://www.energyvoice.com/opinion/370704/cop26-funding-gas-african/
World Bank PRESS RELEASE FEBRUARY 5, 2021 « Nigeria to Improve Electricity Access and Services to Citizens » https://www.worldbank.org/en/news/press-release/2021/02/05/nigeria-to-improve-electricity-access-and-services-to-citizens
Jorge Peters et al, Impacts of Rural Electrification revisited; The African Context, , Revue d'économie du développement, 2015 ; https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjButOQ7pD2AhWXilwKHUisBEMQFnoECAIQAQ&url=https%3A%2F%2Fwww.tandfonline.com%2Fdoi%2Fabs%2F10.1080%2F19439342.2016.1178320&usg=AOvVaw16DJRjiCG5pniKQyep1Szt
Nicholas Moore et al, Effects of access to electrification interventions on socio-economic outcomes in low and middle outcomes countries, Independent Evaluation, Asian Development Bank, 2020; https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjo7Mfp7ZD2AhUUXMAKHaGQAzQQFnoECAgQAQ&url=https%3A%2F%2Fwww.3ieimpact.org%2Fevidence-hub%2Fpublications%2Fsystematic-reviews%2Feffects-access-electricity-interventions-socio&usg=AOvVaw3LtQTEQHHp8dx6lKavD_hJ
Edwin Muchapondwa et al, Addressing the challenges of sustainable electrification in Africa through comprehensive impact evaluations, Working Paper Series CC-011, African Economic Research Consortium, 2021; https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwj_2tPA7ZD2AhXKT8AKHWTeDRkQFnoECAYQAQ&url=https%3A%2F%2Fwww.africaportal.or

g%2Fpublications%2Faddressing-challenges-sustainable-electrification-africa-through-comprehensive-impact-evaluations%2F&usg=AOvVaw0QRitvjiyc2nUZZPh705LF
Humphrey Otombosoba, Constraints to efficient electricity supply in Nigeria, International Association of Energy Economists, 2021; https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiW4uOA7ZD2AhVLSsAKHcB3BeEQFnoECAIQAQ&url=http%3A%2F%2Fwww.iaee.org%2Fen%2Fpublications%2Fnewsletterdl.aspx%3Fid%3D952&usg=AOvVaw3YX_XmAoxQPW8Dk__nYxhu
National Renewable Energy Action Plans (2015-2020)
Nigerian Sustainable Energy for All Action Agenda, 2016
National Renewable Energy and Energy Efficiency Policy (NREEP); 2015
Power Sector Recovery Programme, 2017-2021
Rural Electrification Strategy and Implementation Plan (RESIP); 2016
NESP II Progess Reports 1,2,3 and 4
NESP I ROM Report dated 29/10/2020
Quarterly Report, Fourth Quarter 2020; Nigerian Electricity Regulatory Commission
Environmental and Social Management Guidelines for Solar Mini-Grid Projects in Nigeria; Federal Ministry of Environment, March 2022
Action Document for "EU Support to Energy Sector in Nigeria- Phase 2
Action Document for "EU Support to Energy Sector in Nigeria- Phase 2- Nigeria Energy Support Programme (NESP 2) (Rider)
Annex I to the European Union Indirect Management Delegation Agreement number <FED/2017/389-191 >
NESP 3 Draft Concept Paper (2 Pager) GIZ
https://trackingsdg7.esmap.org/country/nigeria on June 6, 2022
https://reader.elsevier.com/reader/sd/pii/S2405844021011191?token=67F2CF79D3FAD49CB56D9115302AD004C06CB9604FE1D3B42FF7CCB4EE913E8D056D3F5FDD4EF46B895AF421600C2FC4&originRegion=eu-west-1&originCreation=20220609110004 on June 8, 2022

Annex 9: Detailed Answers to the Evaluation Questions

RELEVANCE

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?		
		Evaluation Assessment
JC 1.1 - Level of relevance with national development priorities, government strategies and energy sector priorities	I 1.1.1 – coherence with national development strategies	The intervention is coherent with national development strategies that include: • Sustainable Energy for All (SE4ALL-AA) Action Plan for Nigeria, adopted in 2016; that is in line with the global United Nations SE4ALL initiative, targeting universal access to modern energy services (see fig 3 for the progress to-date); doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in global energy mix by 2030 compared to 2010;  *Figure 13 : Screen shot of SGD 7 tracker on June 6, 2022*

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?		
		• The Power Sector Recovery Plan (PSRP) (2017-2021), approved in March 2017 by the Federal Executive Council, is the country's current reform program with the overall goal of resetting the industry and restoring stakeholder confidence. The PSRP includes measures to improve the financial viability of sector companies, increase power supply, strengthen sector governance and contract enforcement, de-risking the sector for private investment and putting it on a path to long-term sustainability. The government was to undertake financial interventions to support the establishment of a sustainable electricity tariff by 2021; technical interventions to rehabilitate and reinforce existing assets to meet baseline power supply; governance interventions to improve the perceived lack of transparency especially by market participants; and policy interventions to increase energy access through frameworks for renewable energy projects and mini-grids. It is estimated that the sector will require about $1.5 billion annually for the next five years (2017 to 2021) to achieve sector viability with viability predicated on taking the steps outlined in the PSRP but also the national economy is losing $29.3 billion annually, due to the lack of adequate power.
	I 1.1.2 - coherence with national energy sector policies	The intervention is coherent with national energy sector policies, these include: • **Vision 30-30-30**, aims to achieve 30,000 megawatts of electricity by the year 2030, with at least 30% from renewable energy sources; the status today stands at 19,128MW and 10% from renewables based on the 30/30/30 tracker (see figure 2 below). Judging by the progress to-date, a lot remains to be done in terms of increasing generation and the share of RE if the 30/30/30 targets are to be achieved.

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?		

Figure 14 : Screen shot from 30/30/30 tracker taken on June 6, 2022

- **National Renewable Energy and Energy Efficiency Policy, (NREEP**) adopted in 2015; promotes the development of an enabling framework to allow for faster electrification in partnership with the private sector, through both on-grid and off-grid RE solutions and advances an energy efficiency policy. Based on the figures presented in this policy, about 40% of the Nigerian population has access to grid connected electricity, out of which 72% reside in urban areas and 28% in rural areas. Out of the estimated 16.4 million rural households in the country, only about 4.6 million are connected to the electricity grid, and it is estimated that between NGN 317.8 billion and NGN 525.8 billion [a minimum of NGN 50billion per annum] up to the year 2040 to deliver 100% electricity service to all rural household. It is also estimated that a service extension to additional 471,000 rural households each year will be required from 2015 to 2020; and an annual additional 513,000 rural household connections from 2020 to 2040;
- As part of the Vision 30/30/30, the **National Renewable Energy Action Plan (NREAP)** was also developed and adopted in 2016, presents the expected development and expansion of renewable energies in Nigeria in order to achieve the national target under ECOWAS Renewable Energy Policy (EREP), and thus Nigeria's contribution to the overall ECOWAS target of 23 % and 31% renewable energy in 2020 and 2030. The NREAP includes baseline

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?		
		data and information on renewable energy sources and technologies, various activities and programmes in Renewable Energy (RE), in Nigeria, barriers to the development and promotion of RE in the country, and suggested achievable RE targets, incl. gender disaggregated indicators based on national potentials and socio-economic assessments. An overview on concrete policy and regulations, laws, incentives and measures, to be implemented by the country to achieve the targets are also included. • **The Nigerian Rural Electrification Policy** and by extension the **Rural Electrification Strategy and Implementation Plan (RESIP)** 2016 aim to expand access to electricity as rapidly as possible in a cost-effective manner. This implies full use of both grid and off-grid approaches, with subsidies being primarily focused on expanding access rather than consumption. The Goal of Federal Government of Nigeria is to increase access to electricity to 75% and 90% by 2020 and 2030 respectively and at least 10% of renewable energy mix by 2025 as contained in the National Electric Power Policy (NEPP) of 2001 and the Rural Electrification Policy of 2005 respectively • **The Nigeria Electrification Project (NEP)** is a federal government scheme designed in 2018 with the World Bank, the African Development Bank (AfDB), and other partners to provide energy access to under- and unserved communities in Nigeria using renewable sources. It is a private sector-driven nationwide initiative implemented by the country's Rural Electrification Agency (REA). The Project promotes electricity access for households, micro, small, and medium enterprises (MSMEs), and public education institutions. It specifically aims to provide cost-effective power to 250,000 MSMEs and 1 million households through off-grid and mini-grid systems by 2023 via four main components: o Solar Hybrid Mini-grids – Mini-grid systems installed in 250 sites. o Standalone Solar Systems (SHS) – 24,500 productive use solar PV appliances installed. o Energizing Education Programme (EEP) – Mini-grids installed in 15 federal universities. o Technical Assistance – Institutional capacity strengthening provided to REA and private organizations in the ecosystem by international partners.; • **National Renewable Energy Action Plan (NREAP**) adopted in 2016, that presents the expected development and expansion of renewable energies in Nigeria in order to achieve the national target under ECOWAS Renewable Energy Policy (EREP), and thus Nigeria's contribution to the overall ECOWAS target of 23 % and 31% renewable energy in 2020 and 2030.
	I 1.1.3 - coherence with EU-country strategies with Nigeria	• The access to secure, affordable, clean and sustainable energy services has been identified by the European Union's Agenda for Change as one of EU's priorities and a key driver for inclusive growth. The EU strongly supports the United Nations' (UN) Sustainable Development Goal 7 (SDG), on affordable and clean energy, and has been one of the leaders in the UN initiative on Sustainable Energy for All (SE4ALL) aiming at: a) ensuring universal access to modern energy services; b) doubling the share

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?		
		of renewable energy in the global energy mix; and c) doubling the global rate of improvement in energy efficiency. The EU's target is to help developing countries to provide access to sustainable energy services to 500 million people by 2030. These are in line with targets established within the Africa-EU Energy Partnership; • The intervention is fully aligned with the objectives of the European Green Deal. Within the context of the Green Deal, the aim is to strengthen the engagement with Africa for the wider deployment and trade of sustainable and clean energy. Renewable energy and energy efficiency are key to closing the energy access gap in Africa while delivering the required reduction in CO2. The intervention will also reinforce the efforts to implement the Africa-Europe Alliance and contribute to the EIP pillar 3 by improving the investment climate.
	I 1.1.4 - coherence with Global initiatives	• The action will contribute to SDG 1 (End poverty in all its forms), SDG 7 (Ensure access to affordable, reliable, sustainable and modern energy for all), SDG 8 (Promote sustained, inclusive and sustainable economic growth and full and productive employment), SDG 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation), SDG 11 (Makes cities and human settlements inclusive, safe, resilient and sustainable) and SDG 13 (Climate Change); • Paris Agreement and COP 26 that commit countries to deployment of clean power generation and energy efficiency in their economies in order to respond to the threat of climate change by reducing carbon emissions.
JC 1.2 - Level of coherence of the intervention logic	I 1.2.1 – extent to which the logic of the logframe holds through	The Addendum approved in 2020 not only increased the EU contribution by 15 M€ and extended the project lifespan by 24 months. It also revised logframe and potentially improved efficiency and effectiveness of the project and new items were added including: 1. The extension includes additional funds of EUR 15 million from the EU to scale up the current activities with special focus given to solar battery recycling, clean cook stoves, promoting the diversification of the energy mix in the renewable energy space, new business models for on-grid energy access within DisCo's networks, 2. More funds were allocated and time extended enabling the implementation of a number of activities that otherwise would not have been accomplished, this includes the 23 solar mini grids under the IMAS where developers were provided with in-kind grants. Through the IMAS Project, the development of the mini-grids across 11 states, approximately 28,000 households (138,000 people -about 67,000 females) will be served and these projects are expected to be completed before end of the Programme. There were several changes in the log-frame as tabulated below in Table 1 below:

Description	Original	Revised (Addendum 2020)

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?					
		Overall[20] objective	To contribute to Nigeria's economic and social development through a better access to reliable and sustainable energy	To contribute to the use of affordable, reliable, sustainable and modern energy by all Nigerians including the most vulnerable	
		Specific objectives	○ Enabling and fostering investments in a domestic market for Renewable Energy and Energy Efficiency" ○ Improving access to electricity for disadvantaged, mostly rural communities"	• Enabling and fostering investments in a domestic market for Renewable Energy and Energy Efficiency" • Improving access to electricity for rural communities (including conflict affected areas) particularly women and people living in vulnerable situations.	
		Impact Indicators	NIL	• Number of MWs of renewable energy produced in Nigeria • Number of tones of tCO2 p.a. of energy saved as a result of new sustainable energy solutions	
		Specific indicators	• Procurement of on-grid solar PV capacity in a structured bidding approach • Deployment of sustainable energy solutions in the agro-processing sector • Provide access to power through sustainable and scalable solutions to previously un-electrified rural people • The overall efficiency of the transmission grid and bulk trading system – measured in	• 6 Million Euros of new private direct investments (in Millions of Euros) attracted in the RE, EE and Energy Access segments • Procurement of on-grid solar PV capacity in a structured bidding approach • Number of improved standards or concepts for the optimised integration of RE put in place by the sector stakeholders. • Number of frameworks (legislation, policy, regulation, guideline, incentives) approved promoting RE and EE (the recycling of batteries, hydro, biomass) -disaggregated by type of framework.	

[20] It has been noted that the "4th NESP 2 Progress Report 2021" prepared by GIZ still reveres to the "old" Overall Objective.

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?				
			load shedding due to excess frequency – has been increased	• 400 SME OR social institutions use improved, emission- reduced cook stoves • Provide access to power through sustainable and scalable solutions to previously un-electrified rural people.
		Component 1	Building framework and pre-conditions in the RE/ EE sector to enable policy decisions, coherent electrification planning and to foster investment	Electrification Planning and Data Management
		Component 2	Improving access to electricity through RE and EE, providing the applicability of sustainable business models	Sustainable Energy Access (on-grid & off-grid)".
		Component 3	Strengthening technical market capabilities	Enabling Environment for RE & EE Investments Result 2.4: "*The usage of Energy Efficiency measures has increased*" and its related activities were moved from the second component to the third component; the respective result is now included under Result 3.1

Table 11 : Changes in log-frame

A number of these changes were made to reflect the changes in policies and strategies in the Country, and realities on the ground thus improving the intervention logic and the related indicator matrix; these include:

i. The earlier envisaged support the Federal Government of Nigeria (FGN) with an open competitive process for large scale on-grid solar power of about 500MW was not implemented attributed to the Government decision to go for unsolicited bids. The Government chose to develop about 30 grid-connected solar projects with a total planned capacity of 5.3 Gigawatt (GW) in addition to a possibility of increasing the capacities of existing large hydropower plants, such as Kainji or Shiroro, by allowing their hybridisation with solar. This has not yet materialized mainly due to the protracted negotiations

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?			
			on commercial issues relating to Partial Risk Guarantees, tariff and currency in addition to the limitations on the absorption capacity of the network following a study facilitated by NESP. Consequently, with the extension, this indicator was adjusted to 100 MW. In addition, due to this development in the on-grid sector, NESP looked into alternative models to support the FGN in the promotion of large and medium scale on-grid renewable capacities; during the extension, NESP is exploring medium scale RE generation feeding into the distribution network (Embedded Generation) in a bid to deliver even more tangible results. This approach combines the Embedded Generation and Franchising Models into what NESP calls Premium Grids targeting industrial areas with a view to support Nigeria's economic development; ii. Delays in the realization of the MAS that was started in February 2019 that has now been combined with IMAS to create the 23 mini-grids for which materials were handed over in March 2022 (after 3 years) and are expected to be completed before the end of the year. If the extension had not been granted, this would have been difficult to realize. It was revealed in the interviews, that the delay has led to some changes in the grant to the developers; the original amount of Euro 1.1M for each developer was reduced to Euro 0.7M due to the increased costs of materials given the time lapse since the project was launched resulting into a reduction in the materials quantity, developers that had initially identified off-grid sites had to identify new sites that are interconnected to the Grid and the Programme had to raise the in-kind contribution through supply of panels that were not initially on the list. The developers were left to meet the cost of land, batteries, inverters and installation costs; iii. During the imposed curfew, the general technical approach of the data collection was slightly modified as a response to the COVID-19 and the overall security situation. NESP stopped the conventional field work and focused on drone data collection instead, which follows GIZ imposed COVID-19 rules and regulations. More specifically, personal contacts were minimised (lower number of people required to operate drones) and third-party exposure was basically eliminated; and this delayed the data collection process this negatively impacted on the mapping exercise and energy audits; iv. Initially the programme was planned to be implemented from December 2017 until November 2020. Given the initial delays on the recruitment and conclusion of consultancy contracts in the first year and the additional funds of EUR 15 million granted by the EU, the commissioning parties (EU and the BMZ) agreed to extend the programme by 24 months. During the NESP II extension, the programme will

EQ1: To what extent do the objectives and design of NESP-II respond to beneficiaries, global, country, and partner/ institution needs and priorities and continue to do so if circumstances change?		
		expand its activities and up-scale geographically (including the Northeast, provided the security situation permits it) while extending its measures to strengthening the support to the Nigerian Government in the areas of solar battery recycling, new business models for on-grid energy access within DisCos networks, support to alternative electrification models for low income areas, which could for example involve companies offering a wide range of modern energy products like SHS, LPG-based clean cookstoves etc v. With regards to clean cooking, NESP will extend its activities towards LPG-based clean cookstoves (incl. for households). These activities may end-up being linked with NESP's activities on electrification, e.g. support to alternative electrification models for low income areas, which could for example involve companies offering a wide range of modern energy products like SHS, LPG-based clean cookstoves etc;
	I 1.2.2 - extent to which the assumptions in the logframe holds through	Three key assumptions were made, and two of these held through there are: • The Federal Government of Nigeria remains committed to the promotion of renewable Energy, energy efficiency and rural electrification and approves relevant promotion strategies/ instruments as well as providing funding for these; • The Federal and State institutions (FMP, NERC, etc.) are fully committed to foster the development of RE and EE. However, the third assumption of maintaining political stability still remains a challenge despite the continued Government efforts.

COHERENCE

EQ2: To what extent is NESP-II compatible with other interventions in the energy sector?		
		Evaluation Assessment
JC 2.1 - Level of coherence with other	I 2.1.1 - Level of coherence with other donor funded	NESP II is compatible with other interventions in the energy sector; these include: 1. Nigeria Electrification Project (NEP) aimed at increasing electricity access for households, public educational institutions, and undeserved enterprises nationwide. NEP comprises four components: (i) Component 1: Solar Hybrid Mini-Grids for Rural Economic Development: Funding the rollout of a

EQ2: To what extent is NESP-II compatible with other interventions in the energy sector?		
interventions in the energy sector	interventions in the energy sector	minimum subsidy tender for mini-grids in 250 sites across six geopolitical zones in the country; (ii) Component 2: Productive Appliances and Equipment for Off-Grid Communities: Funding performance-based grants to both mini-grid and stand-alone solar installation companies that increase the number of productive appliances in their operations; (iii) Component 3: Energizing Education (Phase 3): Financing the installation of dedicated power systems for eight federal universities across the country's six geopolitical zones; and (iv) Component 4: Institutional Capacity Strengthening: Providing technical assistance and capacity building to REA and other relevant stakeholders to support national rural electrification scale-up activities. The $1.2billion Programme implemented by REA, is funded by: a. African Development Bank (AfDB) – $150 million (loan) b. Africa Growing Together Fund (AGTF) - $50 million (loan) c. World Bank – $350 million (loan) d. Government of Nigeria - $5 million (counterpart funding) e. Others (Private Sector) – $660 million (commercial financing) 2. USAID through the Nigerian Power Sector Programme (NPSP) that covered the costs of development and operation of the tender platform for the mini-grid tenders for MAS and IMAS; 3. NESP has established a collaboration with the Nigerian Power Sector Programme (NPSP) funded by the United States Agency for International Development (USAID) and implemented by Deloitte. The collaboration is now in its implementation phase. NESP supported mini-grid tenders, Mini-grid Acceleration Scheme (MAS) and Interconnected Mini- grid Acceleration Scheme (IMAS), are being executed using the Odyssey Energy Solutions online platform. The costs of the development and operation of the tender platform are covered by NPSP. 4. Further collaboration with USAID exists in the field of Capacity Development to jointly issue certificates on competency only to successful trainees, who obtain up to 70% in the certification examination conducted by NESP 5. USAID in Capacity Development to jointly issue competency certificates to successful candidates under NESP; 6. EU and Agence Française de Devéloppement (AFD) co-funded SUNREF project implemented through Manufactures Association of Nigeria (MAN), that facilitated the industry dialogue with RE Associations to ensure more professionals are certified; 7. There is ongoing coordination between the NESP 2 programme and the programmes implemented by the Agence Française de Développement (AFD) and co-funded by the European Union - the National Power Training Institute of Nigeria (NAPTIN), which is a sequel to NESP I and the Sustainable Use of Natural Resources and Energy Finance (SUNREF) Programme.

EQ2: To what extent is NESP-II compatible with other interventions in the energy sector?		
		8. International Finance Cooperation (IFC) on the adoption and implementation of the Building Efficiency Energy Code within the framework of the Lagos State Green Buildings Initiative.
	I 2.1.2 - Level of coherence with national /government funded interventions in the energy sector	The sole mission of the Rural Electrification Agency (REA) is to provide access to reliable electric power supply for rural dwellers irrespective of where they live and what they do, in a way that would allow for reasonable return on investment through appropriate tariff that is economically responsive and supportive of the average rural customer. To achieve this, the Rural Electrification Fund [REF] was established by virtue of the section 88 sub-section II of the Electric Power Sector Reform Act of 2005 to provide support for the development of the on and off grid sectors for the power/energy sector to thrive, by: 1. Achieving more equitable regional access to electricity; 2. Maximizing the economic, social and environmental benefits of rural electrification; subsidies; 3. Promoting expansion of the grid and the development of off-grid electrification; 4. Stimulating innovative approaches to rural electrification, provided that no part of the REF shall be used as subsidies for consumption. Funds are used to promote cost-effective expansion of electricity access in un-electrified rural areas, using renewable off-grid and on-grid electrification solutions through partial one-off capital subsidies and technical assistance to ensure access to reliable and affordable electricity, with the ultimate goal of improving the living standard, socio-economic and environmental conditions of rural dwellers. Recently NESP offered technical support to REA tenders under the 1st REF completed in 2020 serving electricity to around 11,875 people and now the ongoing 2nd REF with a total 51 mini-grid projects (41 isolated mini-grid projects and 10 interconnected mini-grids) will lead to about 17,000 new connections (approximately 85,000 people).
	I 2.1.3 - Level of coherence with private sector driven interventions in the energy sector	The Private Sector has mainly intervened in 3 areas that are complimentary to NESP II (some of these firms were interviewed during the Field Mission); these are: 1. Energy Efficiency; a number of firms have embarked on energy efficiency measures that include replacement of all incandescent bulbs with LEDs, establishment of solar PV systems to replace the diesel generators. 2. Mini-grid development: a number of firms are engaged in the establishment of solar mini-grids to serve the unserved population or to provide more reliable supply to grid connected customers that are presently poorly served by the DISCOs due to the poor grid performance

EQ2: To what extent is NESP-II compatible with other interventions in the energy sector?		
		3. Training: a number of firms are engaged in providing the much-needed skills training in solar systems and energy management.
JC 2.2 - Level of synergies with other interventions used successfully.	I 2.2.1 – synergies used successfully	The Global events that are complimentary to the Programme include: 1. Concerns over Climate Change: Nigeria is party to the Paris Agreement and COP 26 and as such, is supportive of measures to reduce carbon emissions through efforts to implement the Nationally determined contributions (NDCs) - the long-term goals to reduce national emissions and adapt to the impacts of climate change. One of the aspects in the Nigerian NDCs is to Expand sustainable energy sources and decentralize transmission in order to expand sustainable energy sources and decentralize transmission in order to reduce vulnerability of energy infrastructure to climate impacts; 2. Fuel crisis: partly attributed to the on-going Russia – Ukraine conflict, the price of diesel in Nigeria has sharply increased driving the population that was dependent on diesel generators to seek alternatives, and solar offers the best alternative. The average cost paid by Nigerian consumers for a litre of diesel recorded a significant increase of 28.12% from N224.9 per litre recorded in January 2021 to N288.1 in January 2022[21].This is according to the diesel price watch report released by the National Bureau of Statistics (NBS).

[21] https://nairametrics.com/2022/02/18/cost-of-diesel-in-nigeria-surges-by-28-1-in-january-2022-as-fuel-scarcity-lingers/

EQ2: To what extent is NESP-II compatible with other interventions in the energy sector?		

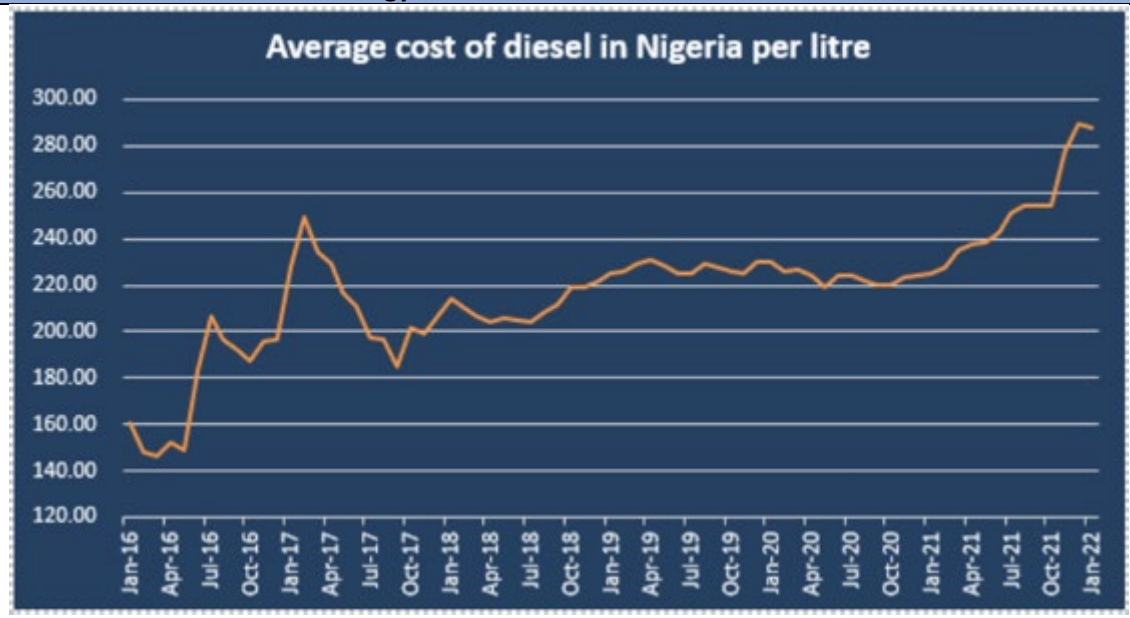


Figure 4 : Trends in average diesel cost in Nigeria

3. Technological advances in solar technology: this industry has dramatically advanced in improving the efficiency while lowering the costs. costs. Figure 5[22] shows the trend in the solar PV module prices from 1978 to 2016. These prices measured in cost (in dollars) per unit energy output (Watt peak: Wp) show that the prices of PV modules per energy output are reducing annually from about $66.10 in 1976 to $0.62 in 2016. This is evident from the increase in the cumulative solar PV capacity in Figure 6 below. This reduction shows that developing countries like Nigeria can adopt solar energy on a large scale at these prices

[22] https://www.sciencedirect.com/science/article/pii/S2405844021011191

EQ2: To what extent is NESP-II compatible with other interventions in the energy sector?		

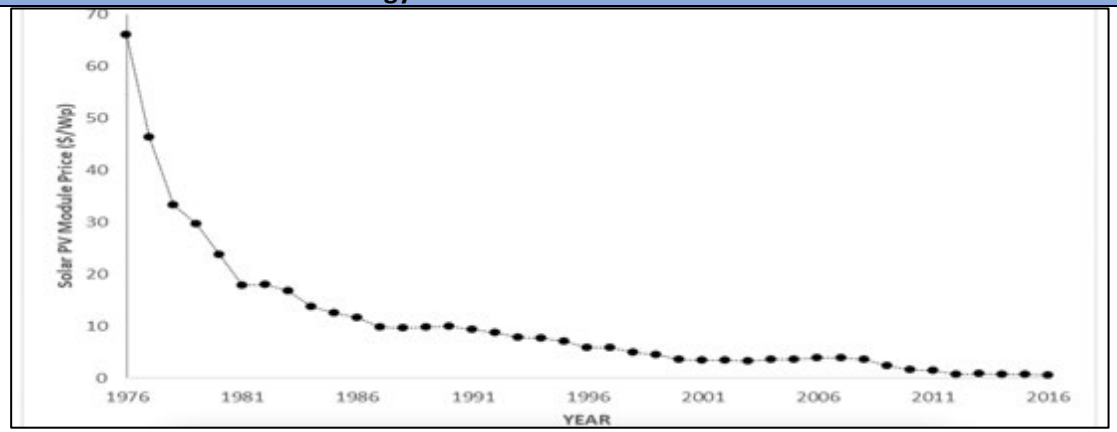


Figure 15 : Trends in solar panel prices

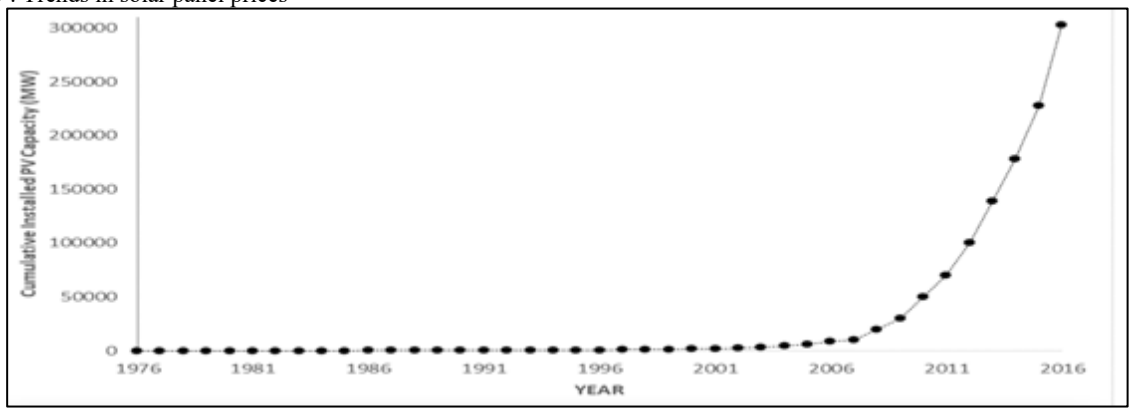
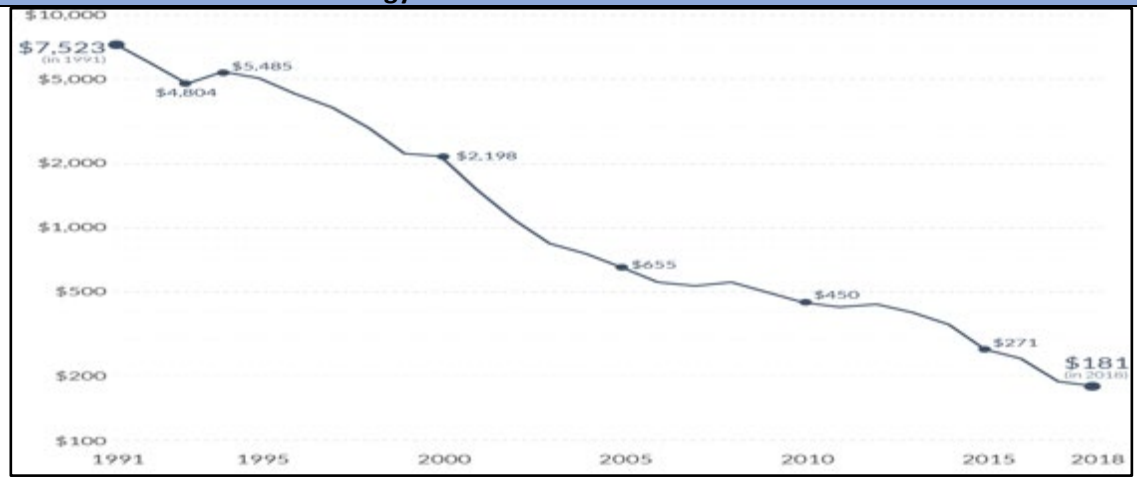


Figure 16 : Global cumulative capacity of solar photovoltaic (PV) technology in megawatts (MW).

Batteries that are a key component in solar systems too have been declining in cost[23], see fig 7 below:

[23] https://ourworldindata.org/battery-price-decline

EQ2: To what extent is NESP-II compatible with other interventions in the energy sector?		
		 Figure 17 : Trend in lithium-ion battery cells per kWh (logarithmic axis)
	I 2.2.2 – potential synergies not used	The potential synergies not used yet include: 1. Hybridization: Nigeria is well endowed with water resources in the Norther Region, and a hybrid of solar with mini-hydros would provide a major boost to the power deficit in the country that is environmentally friendly, this is yet to be fully harnessed; 2. Integration of solar systems with the Grid: The benefits of integrating solar systems with the Grid include savings on battery storage and optimal utilization of the energy source; this too is not harnessed yet; 3. Solar thermal: is another area that should be exploited further; the continued usage of electric water heaters when there is such a power shortage is not optimal utilization of the resources – it was noted that during Phase I a solar water heater pilot project was implemented in Kuru Government Secondary School, Plateau State providing over 1000 students with access to clean hot water; 4. Other areas include e-mobility, green hydrogen,etc.

EFFECTIVENESS

EQ3: To what extent has NESP-II achieved or expected to achieve its specific objectives considering the progress made so far?		
Evaluation criteria covered	**Effectiveness**	
Judgement criteria (JC)	**Indicators (Ind)**	**Evaluation Assessment**
JC 3.1 – Progress towards specific objectives	3.1.1 – specific progress towards specific objectives	1. **6 Million Euros of new private direct investments** (in Millions of Euros) attracted in the RE, EE and Energy Access segments Currently, in the effort to unlock local access to finance, NESP organised structured training for local and international financial institutions. One of the local banks, FCMB, as a beneficiary of this training has now created a product to fund the IMAS project directly to the tune of 750,000 EUR/developer or 25% of the total project cost (which could be up to 6 Mio EUR in total for all IMAS developers) to draw down. The condition for accessing the loan are also very friendly for the nature of mini-grid projects which includes using the Due Diligence Tool developed by NESP to assess the projects/developers. NESP equally anticipate assumes that the project developers selected through the IMAS/MAS are able to commit up to 1.44 million EUR in equity for the approximately twenty-five (25) planned interconnected mini-grid projects. This brings the total to Euro 7.44 million (124%) surpassing the target in the RE projects alone. **2. Procurement of on-grid solar PV capacity in a structured bidding approach** Progress attained so far is 350kW made up of 200kW at Jubaili Bros Engineering Limited and 150kW at International Breweries Sagamu, yet the target is 100MW; representing 3.5% progress. **3. Number of improved standards or concepts for the optimised integration of RE put in place by the sector stakeholders.** The Programme has offered the following support: a. Adoption and launch of 38 standards for solar PVs, batteries, inverters, charge controllers and meters for Standards Organisation of Nigeria;

EQ3: To what extent has NESP-II achieved or expected to achieve its specific objectives considering the progress made so far?		
		b. Adoption of ISO 50001:2018 on Energy Management System as a Nigerian Industrial Standard; the Standard was adopted to enable organisations to establish the systems and processes necessary to continually improve energy performance, including energy efficiency, energy use and energy consumption; c. Development of simplified Guidelines for Environmental Social and Management Plan for solar mini-grids in Nigeria in conjunction with FMEnv; these were launched on March 17, 2022; d. Development and adoption of the Guidelines for Inspecting Mini-grids Projects in Nigeria for NEMSA. The Programme has over exceeded the original target of 3. 4. **Number of frameworks (legislation, policy, regulation, guideline, incentives) approved promoting RE and EE (the recycling of batteries, hydro, biomass) - disaggregated by type of framework**. The Programme has offered the following support: d. FMEnv: Development of a Baseline Study on Mini-grids for Electrification and Waste Battery Management within the framework of developing a strategic Action Plan for the environmentally friendly and safe disposal of ULAB and other batteries that are used in RE or power back-up systems; e. FMEnv: Development a National Policy for Waste Battery Management; this Policy will support the Nigerian Government's efforts to ensure the ESM of waste batteries resulting from the accelerating use of renewable energy solutions, such as solar mini-grids f. NERC: i. Amendment of the Distribution Code Regulations, ReFiT, and Embedded Generation Regulations; ii. Review of two (2) regulations (Distribution Code Regulations and Embedded Generation Regulations) and provided input to the regulators, held workshop to agree on the areas that require adjustment, iii. Development of Simplified Procurement Guideline for Embedded Generation, Connection Charge Methodology for Embedded Generation, and Standard of Performance for the Distribution Code. iv. Development of the following frameworks: • Simplified Mini-grid Multi Year Tariff Order (MYTO), • DUoS Tool,

EQ3: To what extent has NESP-II achieved or expected to achieve its specific objectives considering the progress made so far?		
		• Mini-grid Online Application Portal • Update of the Mini- grid Regulation; • Update of the Mini-grid MYTO and Online Application Portal The Programme has over exceeded the target of 3 frameworks. **5. 400 SME OR social institutions use improved, emission- reduced cook stoves** NESP and the FMEnv agreed in 2019 on a structured tender approach, NICCAS, with the aim to select cook stove manufacturers, which will provide clean cook stoves to 400 agro-processing businesses and the tender was awarded to the winner, SOSAI Renewable Energies Ltd. Recently, it was agreed to shift to Modern Energy Products[24], with focus on LPG based clean cooking to be in line with the FGN's recently adapted approach on clean cooking via LPG. NESP is now providing technical assistance to the winner to refine its business plan on LPG based cookstoves. NESP's support to SOSAI further includes the provision of promotional materials aiming at increasing LPG adoption, market penetration, and awareness creation for clean cookstoves. SOSAI has partnered with approved stove-manufacturers to ensure that reliable and affordable 400 units of LPG based stoves will get to the targeted MSMEs. In addition, and upon the request from FMEnv, NESP has also delivered a series of webinars that continues to support the expansion and adoption of LPG based cookstoves. NESP is providing technical support to serve as an introduction to the preparation of business plans for institutional clean cookstoves with a view to improve the local capacities of stove manufacturers in Nigeria. Part of the intervention of NESP will further improve regulatory framework, support business plan development of selected LPG retailers (through a tender-selection process) as a pilot, and further improve capacity of financial institutions to invest in the sector. This will unlock more funding for private companies. The Programme is expected to achieve the target of 400.

[24] Modern Energy Products refers to any energy products contributing to reduce Gas Emissions and that can be sold as such to individual energy consumers for their self-consumption e.g. LPG Stoves, Solar Homs Systems etc.

EQ3: To what extent has NESP-II achieved or expected to achieve its specific objectives considering the progress made so far?		
		6. Provide access to power through sustainable and scalable solutions to previously un-electrified rural people. Through the IMAS Project, where in-kind grants were recently handed over for the development of 23 mini-grids across 11 states, approximately 28,000 households (138,000 people -about 67,000 females) will be served and these projects are expected to be completed before end of the Programme. It was also noted that a total of 19,375 new connections (96,875 people) will be achieved through REA tenders bringing the overall total to 47,375 connections (236,875 people) far exceeding the target of 130,000.
JC 3.2: Further progress towards specific objectives likely to be achieved during the remaining lifespan of the Program	3.2.1 - **Further progress towards specific objectives likely to be achieved during the remaining lifespan of the Program**	1. **6 Million Euros of new private direct investments** (in Millions of Euros) attracted in the RE, EE and Energy Access segments With a total of Euro 7.44 million (124%) surpassing the target in the RE projects alone achieved, this is not likely to change given the limited time frame. **2. Procurement of on-grid solar PV capacity in a structured bidding approach** Progress attained so far is 350kW representing 3.5% progress of the targeted 100MW; it is likely that further progress might be attained through: a. Premium grids totalling 94MW that include 10MW Kano Solar Project, 54MW embedded generation for the premium grid in Challawa industrial area, 30MW embedded generation for the premium grid in Kudenda area under the Kaduna DisCo, b. 300 MW solar plant in Shiroro hydropower plant; this plant is being developed in three (3) phases - the first pre-phase is currently ongoing and will lead to 15 MW of solar PV If achieved, this would add 109MW leading to a new total of 109.35MW; **an achievement of 109%** . **3. Number of improved standards or concepts for the optimised integration of RE put in place by the sector stakeholders.** No additional support is further expected during the remaining timeframe **4. Number of frameworks (legislation, policy, regulation, guideline, incentives) approved promoting RE and EE (the recycling of batteries, hydro, biomass) - disaggregated by type of framework.**

EQ3: To what extent has NESP-II achieved or expected to achieve its specific objectives considering the progress made so far?		
		The Programme might offer additional support during the remaining time frame in the development of policies and guidelines for recycling and disposal of solar equipment **5. 400 SME OR social institutions use improved, emission- reduced cook stoves** No additional change is further expected during the remaining timeframe **6. Provide access to power through sustainable and scalable solutions to previously un- electrified rural people.** The MAS/IMAS development of the 23 mini-grids will be accomplished, that will be achieved during the remaining lifespan of the Programme.

EQ4: To what extent has the project strengthened the capacity of the various agencies under Federal Ministry of Power and other line ministries like Federal Ministry of Trade?		
Evaluation criteria covered	**Effectiveness**	
Judgement criteria (JC)	**Indicators (Ind)**	**Evaluation Assessment**
JC 4.1 - To what extent has the project strengthened human capacity	I 4.1.1 – Who has been trained?	There is not enough data to fully confirm the actual extent to which NESP II has strengthened the human capacity in the RE and EE technology given that some of the beneficiaries do not complete the Certification process but based on the interview findings and considering the needs of the Country; more capacity building is still required. The following achievements were noted: 1. Training of Trainers (ToT) on Solar Photovoltaic/ Solar Photovoltaic Installation Supervision/Mini-Grid Design and Energy Auditor/Energy Management concluded for all 9 training partners; these partners have carried out basic training on solar design and installation to about 100 participants. 2. Training modules (including technical, business and leadership topics) were developed and selected developers (over 50 companies) trained; 3. Capacity building and organisational development was extended to REA focusing on (1) short term efforts by supporting ad-hoc data clinics on concrete tasks, (2) medium term efforts by delivering practical trainings and (3) long term efforts by providing technical assistance on Organisational Development, about 100 staff involved;

EQ4: To what extent has the project strengthened the capacity of the various agencies under Federal Ministry of Power and other line ministries like Federal Ministry of Trade?		
		4. Internship scheme for Women: Six (6) women have successfully completed the internship programme and 53 women received scholarship in solar PV and mini-grid design courses; 5. 22 SON staff took part in the Continuous Quality Improvement (CQI); 6. Entrepreneurship training for E-mobility; 7. Training of ten (10) EEN participants on Compressed Air System Optimisation (CASO); 8. Training for Mini-Grid Training for Developers; 9. 14 Engineers from TCN on advanced planning; 10. Twenty-four (24) Professional Energy Auditors (PEAs) to carry out energy audits in Buildings trained; 11. 35 Participants of the AEE energy audit training have achieved the AEE CEAs credentials. 12. Ten (10) Energy Managers trained on Measurement and Verification have now achieved the AEE Certified Measurement and Verification Professional (CMVP) credentials 13. 48 building professionals trained on building energy audit; 14. Training of 46 plant and consultant energy engineers on the concept of Energy Efficiency Networks and profitability calculation. 15. Training on ISO 50001 standard for 27 plant and consultant energy engineers. 16. 73 Policy makers and plant/energy engineers trained on industrial energy audit. In summary, it was noted that while the Programme carried out many training programs covering a very wide array of areas, the concern raised was on the numbers (not the quality) being small compared to the needs of the country, hence the likely limited impact and continued call for more.
	I 4.1.2 – Is the training considered "successful" by the trainees? (Why? Why not?)	Based on the trainees interviewed, the training was considered "successful" especially those that achieved certification after the training; however, the concern was on the numbers being too few to make a national impact in such a big country. Others also were concerned on the level, there was demand for more advanced training. Finally, while credit was given for the preparation of training modules and conducting Training of Trainers, the majority of the intended beneficiaries cannot afford the fees and given the weak enforcement of standards, the market is more concerned with "cheapest" services as opposed to the quality..
	I 4.1.3 – Staff-turn-over of trainees after the training.	This was not determined as a critical issue as the number of the people trained were very few compared to the Sector needs and where there was movement it was still within the Sector.
JC 4.2 –what extent has the project	I 1.2.1 – nature and effectiveness of other	Other capacity building efforts have included:

EQ4: To what extent has the project strengthened the capacity of the various agencies under Federal Ministry of Power and other line ministries like Federal Ministry of Trade?		
strengthened capacity beside training of staff.	capacity building efforts implemented	1. **Mapping Exercise**: FMP website (nigeriase4all.gov.ng) and web-based CDMS is open to public since 10.11.2020 and to date around 60,1883 km of the electricity grid, 3,937 settlements and 3.2 million buildings have been mapped; in total, data for 22 Nigerian states was collected and integrated as opposed to the planned 20. The Training portal migrated to Open Source solution and opened to public 2. **Certification process**: In the industrial sector, 35 participants of the Association of Energy Engineers (AEE) energy audit training have achieved AEE Certified Energy Auditors (CEAs) credentials. Additionally, 10 trained energy managers have now achieved the AEE Certified Measurement and Verification Professional (CMVP) credentials. In addition, the Industry Skills Advisory Committee (IAC) has approved the certification framework which will serve as the guiding framework for the COREN-PPD&C Unit to operationalise the scheme. Henceforth, examinations, accreditation of training institutes, issuance of certificates and the maintenance a national register of certified personnel will be executed and managed by COREN. Finally, NESPII has facilitated the harmonisation with the Economic Community of West African States (ECOWAS) Centre for Renewable Energy and Energy Efficiency (ECREEE), through COREN on the introduction of a regional certification scheme in solar PV installation. 3. **Independent online learning platform**: aimed at further support to capacity development on electrification planning learning, NESP II has developed the platform (https://learning.nigeriase4all.gov.ng/), including a variety of training materials and recordings, that will be open to partners and the general public to enroll for free self-paced courses. This platform along with the ongoing trainings to partners will contribute to improved electrification assessment and modelling of the Nigerian energy sector and strengthen the contributions of key public-sector stakeholders; 4. **Tools:** Programme has supported NERC in developing the Distribution Use of System (DUoS) calculation tool aiming at fast-tracking negotiations between DisCos and private developers in developing interconnected mini-grids. Likewise, the programme supported in conducting M&E and Demand Stimulation Methodology; 5. **Regulations:** Programme supported NERC in the review of three (3) regulations, namely, the Embedded Generation Regulations, the Renewable Energy Feed in Tariff Regulation (REFiT), and the Distribution Code, which aim to increase RE in the system energy mix. 6. **Workshops:** have been conducted covering review of different policies, these include National Waste Battery Management Policy, Environmental Impacts Assessment, NEMSA Guidelines; New standards for Solar Equipment, Solar Hybridization Mainstream Guidelines and Import process(es) of RE&EE equipment 7. NESP has prepared a report recommending the baseline data that should be used for the LEAP Modelling that will be undertaken by FMEnv that their consultants; 8. **Franchising Regulations**; the following annexes were prepared:

EQ4: To what extent has the project strengthened the capacity of the various agencies under Federal Ministry of Power and other line ministries like Federal Ministry of Trade?		
		a. Electricity Distribution Franchising MYTO b. Business Model Manual (incl. Franchising Agreements for Revenue Protection and Premium Grids) c. Concept for Consultation Process 9. **Capacity of Survey companies**: NESP improved capacities of the following companies in following fields: a. Reddfox - general knowledge on electrification, mobile mapping systems, remote mapping, field data collection b. Creeds-general knowledge on electrification, remote mapping, field data collection c. Hanovia - field data collection 10. **Studies:** NESP has carried out a number of studies that include: updated Solar Integration Study; Mini-Grid Least Cost Modelling; Market Study on RE Embedded Generation; Meter Asset Provider; Guidelines on Mini-Grid Cost Reduction Strategies; Environmental Social Impact Assessment (ESIA) Guidelines; 11. **Surveys:** Carried out baseline survey on assessing the demand potential for promoting institutional LPG based cook stoves; 12. **Job fair:** Hybrid (presence and virtual) job fair in Abuja and Lagos in collaboration with REEEA-Alliance. for sustainability; 13. **NEMSA:** with additional capacity building activities in inspection of solar mini grids..

EQ5: Which factors have influenced the achievement of the interventions' objectives? What were the factors that prevented the achievement of the objectives?		
Evaluation criteria covered	**Effectiveness**	
Judgement criteria (JC)	**Indicators (Ind)**	**Evaluation Assessment**
JC 5.1 - factors that influenced the	I 5.1.1 – positive factors	1. **Implementing Partner:** GIZ the Implementing partner, has a good track record in the energy sector across the world and a long history of development cooperation in Nigeria in the energy sector in particular and has considerable credibility with the Nigerian government for having successfully implemented several development

EQ5: Which factors have influenced the achievement of the interventions' objectives? What were the factors that prevented the achievement of the objectives?		
achievement of the interventions' objectives positively		programmes in the past; this was confirmed by the consistently positive comments made about GIZ and the programme by the interviewees representing counterpart institutions; **2. Institutional arrangement:** this played a vital role in ensuring smooth operation of the Program and the fact that FMP served as the focal point ensured the vital continued Government support. 3. **NESP I:** Experiences and lessons learned during implementation of NESP I were gainfully put to use; these include: a. Reform plans in the energy sector are usually implemented with considerable delays, often only partly and sometimes not at all, partially due to lack of implementation capacities, lack of coordination and lack of proper data. However, experience shows that professional capacity of the respective and relevant parts of the administration can be enhanced in order to improve the planning process and –with some trickle-down effect –its implementation. b. Finally, procurement and import of goods to Nigeria has shown to be a potential delaying factor and has to be planned for carefully. Some remedies are further operationalising the institutions involved and careful attention to the implementation of duty waivers. **4. Conducive environment:** The Programme operated at the most opportune time as: a. Rising fuel costs making continued self-generation using generators untenable; b. Increased awareness of the dangers of carbon emissions and the need to address Climate Change c. International support that has grown over time providing alternative energy solutions d. Continued improvements in solar systems efficiency e. The sudden sharp increase in the price of diesel partly attributed to the Russia-Ukraine conflict and the depreciation of the Naira made operation of diesel generators untenable and the population turned to solar systems; f. The related sharp increase in LPG, the bulk of which is imported; a 12.5kg cylinder has increased from NGN 3,000 to NGN 12,000 in 6 months; g. Flexibility in adding/ deleting activities in response to the changing environment, for example in Year 1 the Programme was engaged in 22 activities that grew to nearly 100 by year 4;

EQ5: Which factors have influenced the achievement of the interventions' objectives? What were the factors that prevented the achievement of the objectives?		
		h. Availability of local financing mechanisms fir solar project developers about Naira 35million per project is now readily available with local banks
JC 5.2 - factors that prevented the achievement of the objectives	I 5.2.1 - negative factors	1. **COVID 19:** interfered with the Programme immensely following the travel restrictions imposed in the Country; 2. **Lack of awareness** – among the policy makers and grid operators has limited the introduction of RE and EE technologies. This was compounded further by lack of: e. Trained staff to design and install such systems – the few inexperienced ones that attempted resulted into poor performance of such systems and hence the negative publicity; f. Weak enforcement of standards resulting into importation of sub-standard (fake) products; g. Previously, readily available diesel/ petrol generators and cheap fuel; h. Financing Mechanism to meet the required high up-front cost of installation of RE and EE technologies; it was reported that it takes more than 2 years to negotiate such a package, this is mainly attributed to lack of knowledge in the financial institutions; this was mitigated by the Programme conducting awareness programs for bankers. 3. **Insecurity:** this restricted access especially during the Mapping Exercise though the Programme devised other measures like using drones; 4. **Training Fees:** Inability by potential beneficiaries to afford the training fees set by the Training Institutions limited their participation; this has been mitigated by identifying sponsors for some trainees and utilizing on-line platform; 5. **Employers:** inability to allow days off for employees to attend the training sessions; some of them lasted more than a month and were residential. This resistance by employers may also be attributable to lack of awareness of benefits of such training among the decision makers and potential trainees and inability to find suitable replacements; this was mitigated by success stories through institutions like Manufacturing Association; 6. **Limited number of women:** with necessary basic skills and interest to benefit from such training programs; 7. **Lack of Tax incentives:** Imports of solar equipment still attract taxes (20% on batteries and 7.5% on solar panels); this will be mitigated by continued policy dialogue 8. **Depreciation of the Naira**: from about 1$ = 300 in 2021 to nearly 1$=600 in 2022..

EFFICIENCY

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?		
Evaluation criteria covered	**Efficiency**	
Judgement criteria (JC)	**Indicators (Ind)**	**Evaluation Assessment**
JC 6.1.1 – Progress in implementing programme activities	Progress in achieving the specific objectives	**1. Component 1: Electrification Planning and Data Management** Specific progress in Component 1 activities: Framework and pre-conditions in the RE and EE Sector Out of a total 41 planned activities, 1 was cancelled and progress on the remaining 40 is as follows: c. 30 activities have been fully implemented (75%); d. 10 (25%) are still on-going in the last stages of implementation and should be completed before the end of the Programme, except for one activity covering off-grid mapping in the northern states where insecurity might hamper progress despite innovative methods like geo-spatial mapping. It should be noted that the initial target for data gathering on electrification (on-grid & off-grid) in 20 states was exceeded as 22 states were covered and for length of grid data collected (measured in km) to support TCN, DisCos or franchisees in planning 60,183km mapped exceeding the initial target of 10,000km. The Programme succeeded in launching the Central Data Management System (CDMS) (see picture 2) on the website, (nigeriase4all.gov.ng) and mapped 22/36 states; installed a Grid Tracker and RE monitoring tool on the same website, this will provide to the public and the private sector the much- needed data for their own planning activities.

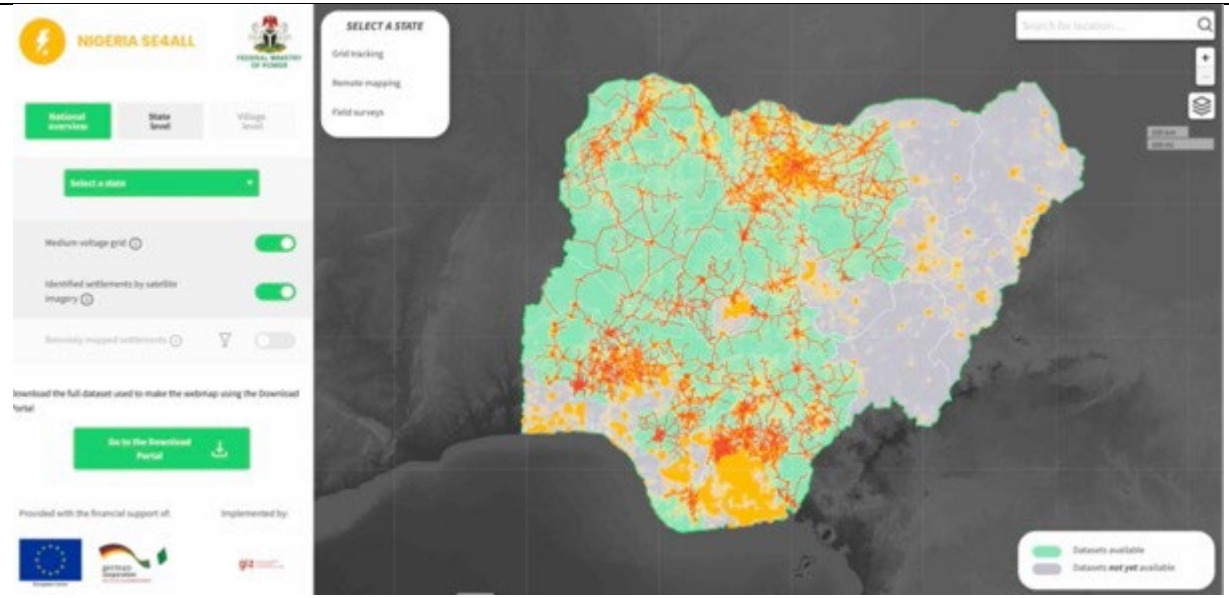


Figure 18 : Screenshot of the Central Data Management System (CDMS) (www.nigeriase4all.gov.ng)

At this stage, the CDMS is not yet fully utilized by most stakeholders, nevertheless, these tools will potentially boost the effectiveness towards Result No.1 in the near future if utilized.

It has been observed that the result oriented "*outcome indicators*" in the log-frame include in fact both, output and outcome-oriented indicators and targets. Regarding the achievement of targets, the picture is mixed, as shown in table 2 below.

R1) Institutional and Regulatory Frameworks and Planning Mechanisms improved			
Result indicator (logframe)	**Target**	**Achievement (Nov. 2021)**	
1.1.1. Number of stakeholders (e.g. FMPWH, TCN, REA, states) that use synchronized data management systems for their planning and decision-making processes	3	3	?
1.1.2. Number of sites surveyed in order to support Government (FMP and REA) in collecting data on mini- grid potential.	200	4	X

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?

1.1.3. Length of grid data collected (measured in km) to support TCN, DisCos or franchisees in planning	10,000	60,183
1.1.4. Number of surveying companies trained on an advanced methodology on electrification surveys.	1	0
1.1.5. Number of frameworks (legislation, policy, regulation, guideline, standards, incentives) supported promoting RE and EE (incl. battery recycling small and medium scale hydro, biomass)	6	6

Table 12 : Indicator matrix for Result 1

It has also been established that the activities varied from year to year as shown in table 3 below:

Year	1	2	3	4
Activities	4	18	21	40

Table 13 : Programme activities per year

Observation:

The biggest achievement under this Component is the successful launch of ESMP Guidelines, CDMS, mapping 22/36 states; installing a Grid Tracker and RE monitoring tool on the same website that will provide to the public and the private sector the much- needed data for their own planning activities in addition to conducting a wide variety of training programs. It is noted however, while the mapping of 22 states exceeded the planned number of 20, the important element is the capacity and availability of resources of the Ministry to map the remaining states and sustain this website and carry on the necessary updates as will be required.

2. Specific progress in Component 2 activities: Scaled up sustainable RE and EE Sector

For this Result 2, out of a total 39 activities planned initially, 2 were merged, 3 were cancelled; 1 is on hold and 1 was addressed under 1 leaving a total of 33 activities of which, 25 (76%) have been fully implemented and 8 (24%) are ongoing in the last stages of implementation these include the IMAS Project where developers received in kind grants for 23 mini grids and these will be completed well before end of Programme

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?

The Programme is yet to achieve the desired outcome as it has only recently launched the Interconnected Mini-Grid Acceleration Scheme (IMAS) through the in-kind contribution of materials for 23 mini-grids across in 11 states expected to connect about 28,000 households (138,000 people -about 67,000 females); construction is expected to commence very soon and all activities are expected to be completed before end of the Programme.

R2) Scaled up sustainable RE and EE business models and Implementation Mechanisms			
Result indicator (logframe)	**Target**	**Achievement (Nov. 2021)**	
2.2.1. Number of tenders of sustainable electricity solutions' procurement supported	6	4	X
2.2.2. Number of sustainable energy project pipelines (off-grid mini grid, interconnected mini grid, hydro, small or medium scale hydropower, medium scale on-grid solar projects, household/ institutional stoves) developed	4	6	?
2.2.3. Number of financial products (incl. risk mitigation) to support sustainable energy solutions	2	2	?
2.2.4. Number of EE measures in the buildings and industrial sector (with at least 15per cent energy savings) implemented by the Nigerian industry	20	54	?
2.2.5. Number of states where energy efficiency measures from the National Building Energy Efficiency Code have been supported in construction sites	4	2	X
2.2.6. Number of focal persons appointed by the Government to align the agenda with climate targets.	3	14	?

Table 14 : Indicator matrix for Result 2

It has been established that the activities varied from year to year as shown below:

Year	1	2	3	4
Activities	7	14	25	33

Table 15 : Programme activities per year

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?

Therefore, it can be assumed that the programme will be effective and will gain the desired result, an increased access to Sustainable Energy when the IMAS is fully implemented and in the mid-term beyond the IMAS itself.

Observation:

The biggest achievement under this Component is the successful conducting of a wide variety of related training programs and launch of the 23 MAS/IMAS mini-grids after a delay of 3 years and as noted earlier, the important element is whether there is adequate capacity in the Country to replicate the process in other areas.

3. Specific progress in component 3 activities: Enabling Environment for RE & EE Investments

And for result 3, out of a total 29 activities, the progress has been as follows:

e. 18 activities have been fully implemented (62%);
f. 11 (38%) are still on-going in the last stages of implementation and include installation of AC Testing facility at SON, the building is ready and the equipment is expected to arrive soon in the country.

The Programme has been very instrumental in the formulation of a number of frameworks that are expected to facilitate RE and EE investments; but it is difficult at this stage of implementation, to assess the effectiveness of these outputs; as having policy frameworks by itself is not enough; they have to be applied. Again, the indicators at the result level are to some extent output- rather than outcome indicators. In any case, it can be firmly assumed that the programme improved the "enabling environment" for relevant investments by providing and supporting these outputs (even if not all targets in the matrix below have been/will be reached).

R3) Improved the technical market capacities, standards, conductive framework and services of the energy sector

Result indicator (logframe)	Target	Achievement (Nov. 2021)	
3.1.1. Number of EE standards SON developed in consultation with consumer associations and the private sector	3	38	?
3.1.2. Number of standards SON has been supported with, for supervision in compliance with (new) RE/EE standards	2	38/5	?
3.1.3. Number of audits executed in the building and the industry sector from national auditors (sex disaggregation for auditors)	10	7	X
3.1.4. Number of guidelines on import processes for RE and EE equipment developed between Ministry of Finance, FMP, SON and customs	1	0	X

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?

3.1.5. Number of central information platforms openly accessible (one-stop-shop) for RE and EE to provide information to investors	1	1	?
3.1.6. Number of dedicated RE sector alliances established to drive the development of the clean energy sector (RE and EE)	1	1	?
3.1.7. Number of initiatives (with DisCo) on electricity data collection and assessment in order to support implementation of energy efficiency measures in buildings and industries	1	0	X
3.1.8. Number of NESP II – supported training institutions that offer RE / EE trainings with nationally certified degrees	5	No data	?
3.1.9. Number of national certification processes for RE/EE courses that have been operationalized.	5	No data	?
3.1.10. Number of existing training institutions in the training partnership network on RE/EE	6	9	?
3.1.11. Number of training courses for which Mixed-learning approaches (MOOC & Hands-on training) have been developed.	1	0	X
3.1.12. Number of female training graduates whose practical skills have been supported	30	52	?
3.1.13. Number of universities, associations and public households reached through national awareness campaigns FOR EE Universities Associations Households	 3 4 1000	 0 0 0	X
3.1.14. Number of Job fairs on RE/EE 0 2 supported	2	0	X

Table 16 : Indicator matrix for Result 3

It has been established that the activities varied from year to year as shown below:

Year	1	2	3	4
Activities	14	20	22	29

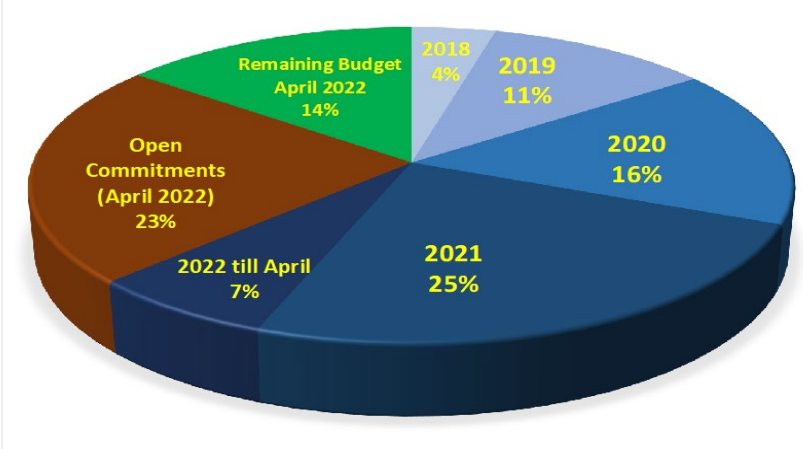
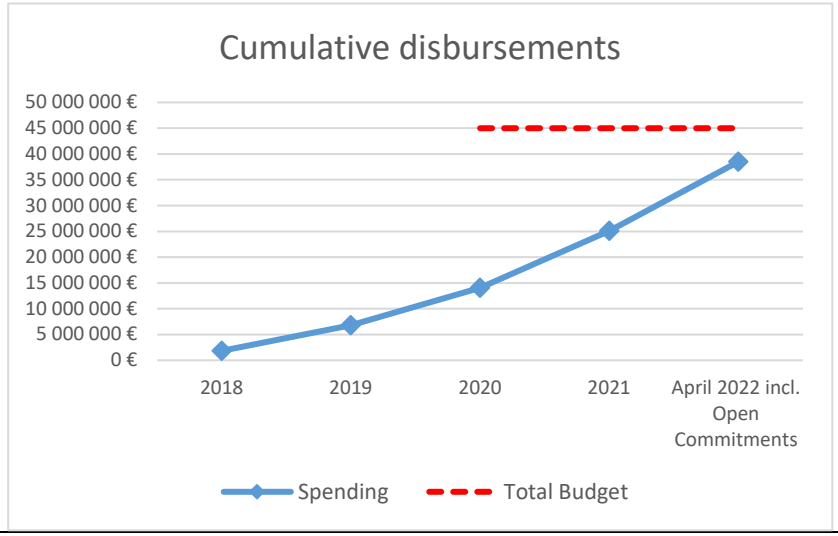
Table 17 : Programme activities per year

Observation:

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?		
		The biggest achievement under this Component is the successful development of 38 standards for solar equipment, initiating EE activities though these were hampered by the COVID pandemic and conducting a wide variety of related training programs. Again, it is noted that the attainment of the set targets is not critical but rather whether ability has been created and resources will be availed to sustain the efforts and commitment sustained to cover more ground. **Conclusion** From the above tables, it is observed that in some cases the Programme achieved more than had been planned but as noted the attainment of the targets is not critical but rather whether ability has been created and resources will be availed and the current level of commitment will be maintained in order to sustain the efforts and cover more ground. As a lesson learned, it is concluded from the above, that the Programme's main achievement was to create pilot projects in order to stimulate further actions and provide necessary training to carry on with the activities. As was learned in NESP I, reform plans in the energy sector are usually implemented with considerable delays, often only partly and sometimes not at all, partially due to lack of implementation capacities, lack of coordination and lack of proper data. However, experience shows that professional capacity of the respective and relevant parts of the administration can be enhanced in order to improve the planning process and – with some trickle-down effect –its implementation.
JC 6.2 – Appropriateness and efficiency of the organizational set-up	I 6.2.1 - Organization set up with clear roles and responsibilities with adequate internal controls and monitoring mechanisms	The organizational set-up in place was conducive to reaching the programme's objectives based on the following: 1. Federal Ministry of Power is the focal point thus according high level attention to the Programme; 2. The programme is indirectly managed through a Delegation Agreement (under PAGoDA 2) with GIZ, a very experienced international Agency as the implementing organization, which is responsible for hiring a team of both national and international experts to run the programme in close collaboration with the Nigerian partner institutions; 3. The management structure of the Action comprises two principal levels; a. Programme Steering Committee (PSC); that provides strategic guidance and monitoring of the progress of the activities of the programme and works to ensure alignment, approval of workplans and reports, coordination and ownership amongst the programme and Nigerian sector institutions.;

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?		
		b. Programme Management and Coordination Committee (PMCC) responsible for operational matters, in which past and forthcoming activities and strategies are reviewed and support provided to build and uphold the linkages with participating partner institutions and serves to align and coordinate with FMP internal planning processes; c. Technical activities are jointly developed and monitored through Technical Working Groups (TWG). These groups are chaired by Nigerian public stakeholders and serve as a sounding board for technical approaches and work plans. Six technical working groups have been established in the areas of 1) Electrification Planning; 2) Sustainable Energy Access On- Grid; 3) Sustainable Energy Access Off-Grid; 4) Energy Efficiency in Buildings; 5) Energy Efficiency in Industries; 6) Access to Finance/ Services. TWGs meet every quarter. d. State Steering Committees that oversee the activities in each State comprised of representatives from the State Government, the Federal Government and GIZ.
	I 6.2.2 – Adequate staffing	Yr 1 Report: The programme encountered implementation delays due to difficulties finding qualified staff for the second phase. Regarding national personnel, several positions had to be re- advertised with all staff being recruited by July 2018. International experts' recruitment proved to be additionally difficult for the location Nigeria with technical experts for on-grid and off-grid only starting in October 2018. Yr 4: the Head of Component 3 'Enabling Environment for RE and EE Investments' left the programme and a replacement has not been found yet. Generally, the recruitment of staff for managerial positions is not so easy in the region, due to security challenges and difficulties arising out of the worldwide Covid-19 pandemic. A recruitment process is ongoing and should be finalised in the first quarter of 2022. In the meantime, the national Advisor for EE on industries will be acting interim Head of Component A new Junior Advisor to support the Component started in February 2021. Furthermore, the recruitment of two (2) new advisors on Standards and Import Process is ongoing. In June 2021 the Head of Component 2: 'Sustainable Energy Access' changed the project. The national Senior Advisor on off-grid and Deputy Head of Component succeeded him and is heading the Component

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?		
		since July 2021. Furthermore, one (1) international Advisor on off- grid/monitoring and one (1) national Advisor on off-grid/finance left the programme in March 2021 and November 2021 respectively. Two new national Junior Advisors, one (1) on finance and one (1) on legal topics, have been recruited and are supporting the programme since September 2021. Within the first Component "Electrification Planning and Data Management", the international advisor relocated to Germany and is now supporting the programme via a traveller contract: This means that the advisor will be in Nigeria at least 100 days per year besides being based in Germany. Year 2: In terms of staffing, the Head of Programme and the Head of Admin and Finance changed during the reporting period. Aside from this, all seven planned posts for international staff and all 11 planned posts for national staff (excluding administrative staff) are currently filled. During the reporting period, two additional technical positions were created within the third component "Enabling Environment for RE/EE investments". In July and August 2019, a national expert on capacity development as well as a national expert on finance and services were successfully recruited Year 3: In terms of staffing, the Head of Admin and Finance changed during the reporting period. Aside from this, all seven planned posts for international staff and ten (10) out of eleven (11) planned posts for national staff (excluding administrative staff) are currently filled. During the reporting period, the Head of Component 3 'Enabling Environment for RE and EE Investments' left the programme. The recruitment process is currently ongoing. Additionally, the National Advisor on RE & EE Standards changed in the first quarter of 2020.
JC 6.3 - To what extent has the implementing partner been able to make the best use of the funds	I 6.3.1 – appropriateness of the budget (incl. budget lines), absorption capacity and rate of spending	The budget has been and still is adequate to cover all planned activities. The absorption capacity and -rate started slowly attributed to recruitment of staff delays especially due to lack of required expertise in the Country but spending increased over the lifespan of the programme.

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?		
allocated for the project?		 *figure 19: programme spending* 

EQ6: To what extent is the organizational set up in place conducive to reaching the programme's objectives and to what extent has the implementing partner been able to make the best use of the funds allocated for the project?		
		Figure 20: Programme cumulative disbursements In April 2022, at the time of the field phase of this evaluation, a total of M€ 28.2 out of a total of M€45.0 have been disbursed and further M€ 10.3 have been committed. The remaining M€ 6.5 are budgeted to wind up remaining activities and to run the project till its foreseen end in November 2022 (EU) and March 2023 (BMZ), respectively.
JC 6.4 – The extent to which the project addenda improved efficiency and effectiveness of the project	I 6.4.1 – issues improved through the addenda	The Addenda improved efficiency and effectiveness of the project in a number of new items were added; they include: • The extension includes additional funds of EUR 15 million from the EU to scale up the current activities with special focus given to solar battery recycling, clean cook stoves, promoting the diversification of the energy mix in the renewable energy space, new business model for on-grid energy access within DisCo's networks, • More funds were allocated and time extended enabling the implementation of a number of activities that otherwise would not have been accomplished.

IMPACT

EQ7: To what extent is NESP II likely to contribute towards its overall objectives?		
Evaluation criteria covered	**Impact**	
Judgement criteria (JC)	**Indicators (Ind)**	**Evaluation Assessment**
JC 7.1 – Progress in achieving the Impact Oriented	I 7.1.1 - Progress attained towards Impact Oriented	1. Number of MWs of renewable energy produced in Nigeria; Progress attained so far is 350kW made up of 200kW at Jubaili Bros Engineering Limited and 150kW at International Breweries Sagamu, yet the target is 100MW; representing 3.5% progress.

EQ7: To what extent is NESP II likely to contribute towards its overall objectives?		
Indicators in the Log-frame	Indicators in the Log-frame	2. Number of tonnes of CO2 p.a. of energy saved as a result of new sustainable energy solutions Progress so far attained is 1,865 tCO2 composed of 365 t CO2 per year by the replacement of a diesel generator at National Reference Laboratory of the National Center for Disease Control after NESP supported the construction of a 260 kWp solar system and 1,500 t CO2 from five (5) Nigerian Industries (PZ Cussons, Dangote Cement, GB Foods, Nigerian Foundries, Flour Mills of Nigeria) after the application of the recommended energy saving measures as part of receiving the ISO 50001 Energy Management System Certification. **For a target set at 3,000 tCO2, this achievement represents 62% progress.**
JC 7.2 – What is the likely progress towards the overall Objectives in the remaining lifespan of the Programme	I 3.2.1 – further progress apparent towards the OO	1. Number of MWs of renewable energy produced in Nigeria; More progress will be through: a. Premium grids totaling 94MW that include 10MW Kano Solar Project, 54MW embedded generation for the premium grid in Challawa industrial area, 30MW embedded generation for the premium grid in Kudenda area under the Kaduna DisCo, b. 300 MW solar plant in Shiroro hydropower plant; this plant is being developed in three (3) phases - the first pre-phase is currently ongoing and will lead to 15 MW of solar PV If achieved, this would add 109MW leading to a new total of 109.35MW; **an achievement of 109%** 2. Number of tonnes of CO2 p.a. of energy saved as a result of new sustainable energy solutions Further progress will be made when more industries apply recommended energy saving measures as part of receiving the ISO 50001 Energy Management System Certification.

SUSTAINABILITY

EQ8: To which extent are existing or foreseen structures and capacities appropriate to ensure appropriate and sustainable funding and maintenance of the projects' physical outputs beyond the lifespan of the EU-funded interventions?		
		Evaluation Assessment
JC 8.1 – potential sustainability of the	I 8.1.1 – maintenance of physical outputs	The physical outputs established under NESP II include 23 mini-grids, AC Test Centre at SON, Solar System at NCDC,

EQ8: To which extent are existing or foreseen structures and capacities appropriate to ensure appropriate and sustainable funding and maintenance of the projects' physical outputs beyond the lifespan of the EU-funded interventions?		
project's physical outputs		The physical outputs established uder NESP II include 23 mini-grids, AC Test Centre at SON, Solar System at NCDC, 1. The 23 mini-grids under MAS/IMAS have been developed with in-kind grant contributions in the form of equipment procured by NESP in addition to the TA, to this, the developers add their own equity (or debt) to develop the mini-grids; the subsidy ensures both that the tariffs the mini-grid operators charge to users are affordable and that the operators can make a profit. The developers then undertake to exploit and maintain the mini-grids for a period of 15 – 20 years, during which they charge agreed tariffs (estimated at NGN 120 – 180 per kWH compared to NGN 55-60 per kWH for the grid connected) and take responsibility for O&M, including battery replacement. Their commercial success – and profit – depends on how well they handle O&M and on how satisfied their customers are. It was confirmed that all the beneficiaries have current experience in the management of these grids, for example Haven is already managing 30 mini-grids. 2. The AC Test Centre at SON, will form part of other test facilities already existing and will be maintained as part of the SON assets; 3. In December 2020, the programme supported the FGN efforts to fight the Covid-19 pandemic by deploying and commissioning a 260 kWp solar system at the National Reference Laboratory (NRL) of the Nigerian Centre for Disease Control (NCDC) dependent on the Federal Ministry of Health (FMH); the new technical solution will replace with advantage, in economic terms and in terms of the availability of electricity and the quality of the services provided, previously used solutions based on the use of diesel generators. In addition to this, the availability of PV electricity and of battery storage allows people to adapt the way in which they use electricity – and particularly the quantities used – both to their needs and to the resources available, in ways that are more flexible than when the energy is being produced, say, by a diesel-powered generator. On the other hand, the performance of the new hardware in the medium and especially in the long run is strongly dependent on appropriate maintenance, with costs that tend to concentrate at particular times and on the occasion of particular events, such as the disposal and replacement of expensive items like batteries. It would for this reason seem very important for both projects to train the prospective owners of the new equipment (be they state governments, public institutions or private agents) in lifecycle planning and the corresponding investment strategy, to avoid fluctuations in the quality of performance.
	I 8.1.2 – management of physical outputs	The management of the physical outputs will fully be managed by the beneficiaries.

EQ8: To which extent are existing or foreseen structures and capacities appropriate to ensure appropriate and sustainable funding and maintenance of the projects' physical outputs beyond the lifespan of the EU-funded interventions?		
	I 8.1.3 – funding for maintenance and replacement of physical outputs	Maintenance costs will be borne by the beneficiaries and the savings generated due to usage of cheaper solar PV systems compared to diesel generation will be adequate to maintain and replace as necessary. The long run performance of the new photovoltaic hardware depends strongly on appropriate maintenance, with costs that tend to concentrate at particular times and are associated with particular events, such as the disposal and replacement of expensive items, e.g. batteries. An awareness of the principles and practice of lifecycle planning and the associated investment strategy will help the owners of the new equipment improve maintenance and the quality of performance. .
JC 8.2 - potential sustainability of the project's capacity building outputs	I 8.2.1 – staff-turnover	The Agencies did not report high staff turnovers and in the limited cases where these occurred this did not affect the performance and the movement was still within the Sector.
	I 8.2.2 – further capacity building /training plans	All Agencies interviewed requested for additional capacity building programs both in quantity and level as they are very deficient of manpower especially in the middle levels; some Agencies reported that they had not recruited new staff during the last 15 years!
JC 8.3 - potential sustainability of the project's outcomes and impact	I 8.3.1 – existence & quality and coherence of a project-exit strategy	The country is still in urgent need of this Programme so exit at this stage may undermine all gains secured so far. For this reason, a coherent exit strategy is not clearly apparent. While it is true that there are good prospects for the sustainability of the programme based on: 1. Increased awareness of RE & EE benefits as a result of the NESP interventions in both the policy makers and system operators; 2. Capacity building programmes have been carried out equipping many local Nigerians with adequate technical skills especially in RE & EE but the numbers are still inadequate; 3. Firms that have carried out EE programs have realized the benefits and are now serving as change agents; 4. Benefits that accrue from better knowledge and greater capacities for data collecting and processing and for planning and decision making if that knowledge and those capacities are regularly used in actual decision-making processes; 5. Improved availability of cheaper electricity.

CROSS – CUTTING ISSUES

EQ9: To what extent have environment and climate change, gender and 'Good Governance' been mainstreamed and reflected in the design and implementation of the project?		
Evaluation criteria covered	**Cross-cutting Issues**	
Judgement criteria (JC)	**Indicators (Ind)**	**Evaluation Assessment**
JC 9.1 – Level of mainstreaming environmental issues	I 9.1.1 – environmental issues mainstreamed in the project design.	1. Project developers for the mini-grids were required to develop ESMPs for their sites and submit them to the Ministry for review and issue of Permits; 2. National Waste Battery Management Policy is being developed 3. National Battery End of Life Management Policy is being developed. An area of concern however, was on monitoring of ESMPs for the mini-grids being developed under IMAS. Based on the interviews, it was confirmed that while the developers were responsible for development of the ESMP for their sites, there is no independent mechanism to monitor compliance as FMEnvt lacks necessary resources to do so.
	I 9.1.2 – positive environmental impact achieved or likely.	It is generally agreed that access to modern energy is expected to generate the following positive impacts: 1. Reduction in gaseous emissions especially due to replacement of diesel generators; 2. Reduction in health hazards attributed to indoor air pollution. There is however need for effective implementation of National Waste Management policies to deal with the hazardous toxic materials associated with solar panels and batteries that can lead to environmental degradation and possibly pose a public hazard if they get into ground water supply.
JC 9.2 - Level of mainstreaming climate change	I 9.2.1 – climate change related issues mainstreamed in the project design.	The programme was expected to lead to a reduction of 3,000 tonnes of CO2 p.a. of energy saved as a result of new sustainable energy solutions that included deployment of solar mini-grids to replace diesel generators and application of energy saving measures.

EQ9: To what extent have environment and climate change, gender and 'Good Governance' been mainstreamed and reflected in the design and implementation of the project?		
	I 9.2.2 – positive climate change-impact achieved or likely.	The increased use of renewable energies will reduce the need for the combustion of fossil fuels (diesel and petrol generators). The measures designed to improve energy efficiency, at local and national level, will increase energy efficiency in households, the private businesses and the public sector. Both increased use of RE and improved EE will ensure sustainable global benefits in slowing the growth rate of greenhouse gas emissions resulting from the production and consumption of electric power.
JC 9.3 - Level of mainstreaming "good governance"-related issues	I 9.3.1 – 'good governance' related issues mainstreamed in the project design.	GIZ has well developed robust procedures and processes to ensure "good governance" so this well taken care of.
	I 9.3.2 – 'good governance' - impact achieved or likely.	The best practices and procedures introduced by GIZ during this Programme will go a long way in continued improvement of governance. As a result of close cooperation with government institutions at federal and state level, and of the involvement of relevant stakeholder groups, transparency of planning, participatory development and good governance of the energy and related sectors were improved. This has been further strengthened through the introduction of TWGs. Likewise, the harmonization of interventions of actors and capacity building at Federal and State level have contributed to this goal.
JC 9.4 - Level of mainstreaming gender issues	I 9.4.1 – gender issues mainstreamed in the project design.	The direct gender impact of project activities is likely to be limited owing to the limited numbers of female participants in the industry. Indirectly, in general, rural electrification as such is not specifically gender-oriented but clearly electrification will have favourable impacts over both genders: creating jobs through boosting economic activities, supporting MSEs, improving private households through the availability of good quality lighting for studying, reading, etc., possibility of access to radio – TV broadcasts, possible availability of domestic appliances, possibility of home-based economic activities (sewing, embroidery, cooking, etc.). Nevertheless, international and regional experience from previous projects suggests, that the impact of rural electrification efforts may slightly differ for women and men and that

EQ9: To what extent have environment and climate change, gender and 'Good Governance' been mainstreamed and reflected in the design and implementation of the project?		
		women and children gain specifically from electrification of rural communities. Potential areas of improved living conditions for women and children include (but not limited to): 1. Improved safety conditions for women and girls due to improved lighting in the villages. 2. Improved learning conditions for pupils since schools are benefitting in several ways from electrification. Firstly, electric lights provide a better learning environment in the classrooms and allow for a longer use of classrooms for teaching and learning which is particularly important for pupils from non-electrified homes. Secondly, computers can be used now for teaching and learning. Finally, and probably most importantly, the electrified staff houses now offer decent living conditions even in rural areas, which attracts qualified and committed teacher in areas which may had to deal so far with unqualified personnel or teachers who have been transferred to the remote rural areas as punishment for various reasons. 3. Women (and children) are expected to benefit specifically from improved health-services due to the electrification of Rural Health Facilities. These health facilities can now attend more effectively, and provide a 24 hour service, to emergencies and very importantly to women giving birth. Equally important is that vaccines are now available in these clinics since they can be stored in fridges. According to studies in other countries in Africa, these factors are expected to improve maternity health as well as decrease under-5-mortality-rates in the clinics' catchment areas. 4. Many women in rural and peri-urban areas try to improve their livelihoods by running (informal and formal) micro- and small-businesses such as small shops, kitchens, hair-saloons, etc. Such small businesses usually benefit significantly from access to electricity. Additionally, specific NESP 2 components such as the 'clean cook stoves' initiative obviously will concern women more than men and are likely to have a direct positive impact on women's living conditions.

EQ9: To what extent have environment and climate change, gender and 'Good Governance' been mainstreamed and reflected in the design and implementation of the project?		
	I 9.4.2 – gender -impact achieved or likely.	The impact is likely to be minimal owing to the limited numbers of female participants in the industry.

EU ADDED VALUE

EQ10: To what extent have the projects achieved (or are likely to achieve) additional benefits to what would have resulted from EU Member States' interventions only?		
Evaluation criteria covered	**EU-added Value**	
Judgement criteria (JC)	**Indicators (Ind)**	**Evaluation Assessment**
JC 10.1 – specific benefits achieved through the nature of the EU-support	I 10.1.1 – specific EU-strength used for the project	The specific EU strengths used for the Project include its: i. Ability to provide sizeable grants that made it possible for BMZ/GIZ to come in and run a significant and very ambitious programme; ii. Active participation in the formalised donor coordination group established in 2012 that has improved coordination among donors, allowing for exchange of information regarding their programmes as well as recent developments in the power sector and taking harmonized action vis-à-vis the Federal Ministry of Power (FMP). iii. Leadership role as Chair of the Power Sector Coordination Group in Nigeria; this strengthens EU's role in the NESP initiatives and its leading role in supporting the donor coordination in the sector; iv. Wide knowledge of the Country by virtue of the long history of association in a broad range of sectors hence proven credibility as a reliable and committed development partner

		v. Known ability to deal with policy dialogue; a necessary strength in the high-level policy dialogue involving key government agencies, other development partners and civil society. vi. Commitment to helping developing countries to provide access to secure, affordable, clean and sustainable energy services with a target of 500 million people by 2030 in line with targets established within the Africa-EU Energy Partnership; vii. Strong support to the United Nations' (UN) Sustainable Development Goal 7 (SDG), on affordable and clean energy, and being one of the leaders in the UN initiative on Sustainable Energy for All (SE4ALL) aiming at: a) ensuring universal access to modern energy services; b) doubling the share of renewable energy in the global energy mix; and c) doubling the global rate of improvement in energy efficiency..
	I 10.1.2 – Specific EU-related challenges encountered	No challenges were identified
JC 10.2 – level of energy sector cooperation and coordination between the EU an its member-states and among EU-member-states	I 10.2.1 – efficiency of cooperation and coordination mechanisms	The continued support from Phase I now moving to Phase III is testimony that there is good cooperation among FGN, EU and the Federal Government of Germany and this has been facilitated by the continuous information exchange coordinated through the Federal Ministry of Power. A number of development partners have been supporting the FGN in the energy sector, across the power value chain. In addition to support by the European Union (EU)/ German Corporation for International Cooperation (GIZ), current support in the sector is provided by the World Bank, African Development Bank, United States Agency for International Development (USAID), the UK's Department for International Development (DFID), French Development Agency (AFD), and Japan International Cooperation Agency (JICA), among others. Development partner (DP) activities in the power sector are coordinated through the Development Partner Coordination Group for the Power Sector. The Coordination Group meets regularly to exchange information on the activities of the various donors in the sector and to discuss pertinent issues of power sector policy; this provides the Government an appropriate forum to provide more guidance on its future plans and policies thereby enhancing coordination of the efforts from donors.
	I 10.2.2 – synergies identified and used	The main synergies identified and used include:

		i. The appointment of GIZ, an experienced firm to manage the process that adopted a very innovative flexible approach that pro-actively engaged the stakeholders and made quick timely responses and made necessary changes to respond to the changes in the environment; ii. The effective Donor coordination in Nigeria that facilitates coordination of development efforts and enhances efficiency in aid utilization; iii. Global desire to support RE and EE – this follows the global SE4ALL United Nations Global Initiative and the concerns over the global climate; iv. Global trends in technology that have resulted in improved efficiency in RE technologies with corresponding drastic reduction in costs; v. Increased ability by the Private Sector (both local and foreign) to taken on roles more efficiently originally a preserve of the public Sector.

Annex 10: NESP Stakeholder Map