

# Nigeria's Green Bond Programme:

## Aspirations, Realities and Solutions

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# **Nigeria's Green Bond Programme:** Aspirations, Realities and Solutions

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# Acknowledgement

This report is the intermediate outcome of a longer-term effort to raise awareness and build capacity among civil-society organizations and the media with regards to Nigeria's Green Bond Programme and issues of green finance more broadly. It is a group effort between the lead author and a team of sector experts, civil-society activists and media practitioners dedicated to ensuring that the public funds mobilized under the Green Bond Programme are effectively used for efforts in line with the country's Nationally Determined Contributions in support of the Paris Climate Agreement.

Specifically, the people who helped to shape the project assessment framework and went out into the field to apply it were Tracy Keshi, Ruth Tene, Wutana Dalia, Sa'ad Kamal-Deen, Taiwo Ibiyemi, Isaac Anyaogu, Abdulkareem Mojeed, Razak Fatai, and Eno Abasi.

Most of them participated in a training workshop on green project finance organized by the Heinrich Böll Foundation Abuja Office in November 2020.

## About the Author

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# Abbreviations

BAU	Business as Usual
BUK	Bayero University, Kano
CBI	Climate Bonds Initiative
DMO	Debt Management Office
EEP	Energizing Education Programme
ERGP	Economic Recovery and Growth Plan
ESIA	Environmental and Social Impact Assessment
FGN	Federal Government of Nigeria
FMF	Federal Ministry of Finance
GBPs	Green Bond Principles
GHG	Greenhouse Gas
MDAs	Ministries, Departments and Agencies
MoE	Ministry of Environment (Federal)
MTCO <sub>2</sub> e	Metric Tons of Carbondioxide Equivalent
NAU	Nnamdi Azikiwe University
NDC	Nationally Determined Contribution
OAGF	Office of Accountant General of the Federation
OONP	Old Oyo National Park
PV	Photovoltaic
REA	Rural Electrification Agency
SDG	Sustainable Development Goal
UNFCCC	United Nations Framework Convention on Climate Change

# Introduction

To deliver on its nationally determined contributions (NDCs) to the Paris Climate Agreement, the Nigerian government issued the first sovereign green bond in Africa in 2017 and a second green bond series in 2019. In doing so, the country raised NGN 10.69 billion and NGN 15 billion in 2017 and 2019 respectively to finance energy and land-use projects, among others. Unfortunately, independent reports on the environmental, social and economic performance of financed and implemented NDC-aligned projects have been unavailable.

Against this backdrop, this study was motivated not only by the urgency and significance of raising funds via the issuance of green bonds to achieve the country's NDC targets, but also by the desire to help ensure the actual achievement of the set environmental, social and economic targets and outcomes expected from NDC-aligned projects.

The implementation and effects of most human and infrastructure development projects in Nigeria remain obscure due to a lack of transparency and accountability, low community inclusion and the flagrant absence of sustainability checks and scalability mechanisms. This includes other “green” finance projects such as the NGN 9.2 billion clean-stove initiative of 2016 and the Great Green Wall project.<sup>1</sup> It is crucial to ensure that projects funded and implemented with green bond proceeds do not fall into the same trap and that they live up to the sustainability standards that were set for them.

This report hopes to make a meaningful contribution towards ensuring that mechanisms for transparency, accountability, sustainability and value for money are put in place throughout the processes of green bond issuances in Nigeria. The unresolved issue of the causes of previous development setbacks signals a warning of imminent pitfalls for green-bond-financed projects if deliberate, proactive institutional reforms are not put in motion to address existing gaps.

Ultimately, the study hopes to help ensure that the NDC-aligned projects funded by green bond proceeds are not only labelled “green” but are indeed green, sustainable, economically viable, socially inclusive, gender sensitive and represent good value for money.

# Scope and Methodology

Besides taking a critical look at the overall green bond framework, the study covers selected NDC-related projects, based on their allocated share of the total green bond proceeds and priority ranking in the country's NDC commitments to cut carbon emissions and build resilient adaptation safeguards.

The projects selected for evaluation are in the power and agroforestry sectors: two renewable-energy projects under the Rural Electrification Agency's Energizing Education Programme and one agroforestry project. Specifically:

- renewable energy installations at Bayero University, Kano,
- renewable energy installations at Nnamdi Azikiwe University Akwa,
- an agroforestry project in Old Oyo National Park. Akwa.

The following data-collection methodologies were adopted for the study:

- a review of all relevant information available in the public domain related to Nigeria's green bond issuances and the NDC-aligned projects financed and implemented. This includes information available from the websites of the relevant government ministries, departments and agencies (MDAs) and the Green Bond Investment Prospectus and its supplementary documents. Investment Prospectus and its supplementary documents.
- physical visits to the selected projects sites.
- interviews with beneficiaries, operators and other stakeholders.
- outcomes from stakeholder forums with relevant implementing MDAs.

While the selection of three projects provides only a snapshot, the lessons drawn cover a range of issues of relevance to the wider Green Bond Programme and its governance framework.



# Introduction to Green Bonds and their Principles and Standards

## Comparing traditional and green bonds

A traditional bond is a type of investment (a fixed income debt instrument) that represents a loan between a lender and a borrower. In this case, the lender is known as the “investor”, while the borrower, generally a government or corporation, is known as the “issuer”. The proceeds of the debt instrument are then invested in any project the issuer deems fit.

“Green bonds”, also referred to as “climate bonds”, are a relatively new asset class through which the proceeds of the debt instrument are invested in specific projects that will either mitigate the causes of climate change and/or help to adapt to the effects of climate change. A “green” or “climate” label indicates a commitment to exclusively use the proceeds of the bond to finance or re-finance green projects, assets or business activities. A climate action taxonomy is used to classify and assess projects that are eligible for green bonds.

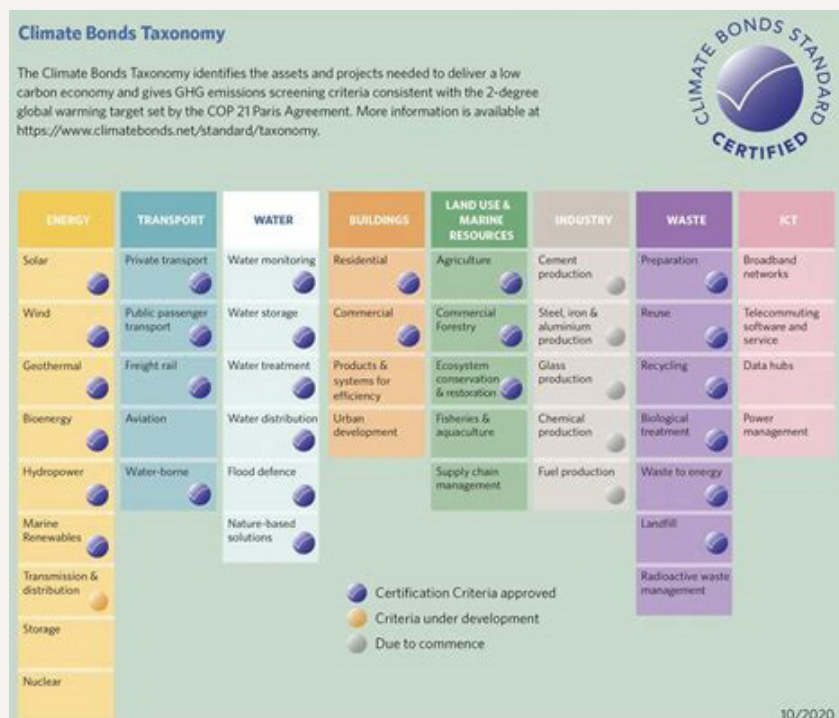


Figure 1. Climate Bonds Taxonomy<sup>2</sup>

In addition to the specific and traceable use of proceeds, green bonds require periodic reporting on environmental, social and economic goals/impacts, which is not the case for traditional bonds.

Apart from the guiding principles and pillars described below, green bonds have the same financial characteristics as traditional bonds. Both green and traditional bonds use comparable risk/reward profiles and follow the same issuance procedures. The credit risk lies with the issuer of the bond.

Green bonds are backed by the issuer's balance sheet or cash-flow revenue expected from the financed project(s). Green bonds help investors diversify their investment portfolio and signal an organization's green credentials by investing for environmental purposes. Both issuers and investors can take advantage of a familiar product and, at the same time, signal and report a commitment to sustainability.

Typical Steps to Issue a Bond	Additional Steps for a Green Bond
<ul style="list-style-type: none"> <li>• Get rated</li> </ul>	<ul style="list-style-type: none"> <li>• identify potential projects</li> </ul>
<ul style="list-style-type: none"> <li>• Get market intelligence on the target currency tender and size</li> <li>• Decide on underwriters based on the above</li> <li>• Register with local securities and exchange regulators</li> <li>• Issue Prospectus</li> </ul>	<ul style="list-style-type: none"> <li>• Develop green bond framework;               <ul style="list-style-type: none"> <li>» define green bond criteria and project selection process</li> <li>» set up processes and controls for the use and management of proceeds</li> <li>» define monitoring and reporting processes</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• Comfort letter/Due diligence (if applicable)</li> </ul>	<ul style="list-style-type: none"> <li>• Get an external review</li> </ul>
<ul style="list-style-type: none"> <li>• Roadshows and marketing</li> </ul>	<ul style="list-style-type: none"> <li>• Allocate proceeds to the projects</li> </ul>
<ul style="list-style-type: none"> <li>• Launch bond</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor use of proceeds and projects</li> </ul>
<ul style="list-style-type: none"> <li>• Price and allocate bond</li> </ul>	<ul style="list-style-type: none"> <li>• Undertake post-issuance audit</li> </ul>
<ul style="list-style-type: none"> <li>• Communicate the bond issue to the capital market for listing</li> <li>• Monitor secondary market for interested investors and managing subscribed investors</li> </ul>	<ul style="list-style-type: none"> <li>• Publish reports on environmental, social and economic goals/impacts</li> </ul>

Table 1. Snapshot of Traditional vs Green Bond Cycle<sup>3</sup>

Green bonds have been issued by a handful of issuers around the world, ranging from nations and sub-national entities to banks and other organizations. The global green bond issuance reached a record high of US\$269.5 billion at the end of 2020, and the Climate Bonds Initiative (CBI) estimates that it could reach US\$400–\$450 billion by the end of 2021. According to CBI, the cumulative green and climate-aligned bonds issuance currently stands at US\$1.7 trillion.

However, there is still a long way to go in combating and adapting to climate change as well as reducing net carbon emissions to zero by 2050. In the salient areas of zero-carbon technology, including electric vehicles, renewables and hydrogen, among others, the estimated cost is US\$50 trillion.

## **The green bond principles: Four pillars**

Principles and standards to guide the issuance and utilization processes of green bonds have been developed by the World Bank Group and globally adopted by capital markets and securities and exchange commissions. The Green Bond Principles (GBPs) are set out in four components or pillars.<sup>4</sup>

### **Pillar 1: Use of green bond proceeds**

Projects financed with the proceeds of any green or climate bond must provide clear and quantifiable environmental benefits alongside socio-economic benefits. They must also link with key target areas of the NDCs of the issuer's country, where the financed green project is situated. The benefits of the green project should also be aligned with the United Nations' Sustainable Development Goals (SDGs).

### **Pillar 2: Green bond eligible projects: Evaluation and selection**

This pillar states that an issuer should communicate the environmental sustainability objectives of the project, the process to determine the eligibility of the projects, and the related eligibility criteria applied to identify and manage potential environmental and social risks associated with the projects.

### **Pillar 3: Management of proceeds**

The net proceeds of the green bond should be credited to a sub-account, moved to a sub-portfolio or otherwise tracked by the issuer in an appropriate manner, and attested to by the issuer in a formal internal process linked to the issuer's lending and investment operations for green projects. Where the green bond is outstanding, the issuer should disclose periodic reconciliation of the green account against project expenditures and how and where the unallocated balance is placed. The use of an auditor or third party to verify the internal tracking and allocation process is encouraged.

### **Pillar 4: Reporting**

This pillar recommends annual reporting of the amounts allocated and results of the eligible green projects until full allocation, and thereafter in the case of any material developments. The pillar also recommends the use of qualitative and, when feasible, quantitative perform-

-ance measures and indicators. Where confidentiality agreements or competitive considerations exist, information can be published in generic terms or on an aggregated portfolio basis.

## Tracking green bond proceeds

Segregating green flows is also a defining characteristic of green bonds. Under Pillar 3, an issuer (e.g. in the case of Nigeria, the federal government, through the Ministry of Environment and the Debt Management Office) is obligated to track and report the flow of green bond proceeds from the moment the bond is issued until proceeds are reconciled against expenditures of the eligible green projects.<sup>5</sup> The primary reason for this is that investors care not only about the financial returns, but also about their association with the specific green portfolio as declared by the issuer. This is particularly relevant for public issuers that also manage investment areas such as infrastructure or defence expenses that green bond investors may prefer not to be associated with. While money is fungible, these investors welcome transparency in the use of proceeds and support issuers who can invest equivalent amounts in green projects within a reasonable amount of time after bond issuance, typically six months to a year.

To track the net proceeds of a green bond, issuers may use one of the following procedures:

- **separate green account:** The issuer creates a separate bank account to deposit the bond proceeds, which is then debited as the green projects require funding.
- **green sub-account:** The issuer credits green bond proceeds to a general account in which all other funding is deposited, and simultaneously sets up a green sub-account to transfer funds only when the green projects require funding.
- **“virtual” green account/cash account:** The green bond proceeds are treated the same as all other bonds and funding (transferred to a general account), and the green proceeds and project expenditures are tracked and reported remotely and online as an accounting entry initially credited with the bond amount and gradually debited as projects require funding. The actual transfers to the projects take place through the issuer’s own financial management system, with the virtual green account reconciling equivalent debits to the original bond amount.<sup>6</sup>

## Post-issuance reporting

Green bond issuers are also required to provide investors with disclosures on the expected environmental benefits of eligible green projects. The increasing percentage of investors who require such impact disclosures has pushed issuers' readiness to determine and provide them. Traditionally, capital markets are not very familiar with the technical details of bond-funded projects. Data-gathering would generally be limited, for example, to goods and services purchased or construction results. It would not necessarily include estimates of environmental and social outcomes such as emissions reductions, water and soil quality improvements, livelihoods impacts and so on.

Issuers can use some simple procedures that capital market operators and other agencies can follow to effectively and accurately track and monitor the impact of financed green projects. Notably, the chances of sustaining a reporting function are higher when the requirements are commensurate to the existing capacity and systems in place. Each issuer will need to tailor the information flow according to its circumstances.

Annual reports should continue until the bond matures or until the green projects are completed, whichever comes later. The rationale for reporting until financed projects are completed is to inform investors whether there was any significant deviation from the information provided in previous reports.

An annual report in a condensed format that is relatively simple and concise should be available to issuers that have worked through a green bond framework. The report should provide at least the following information:

- the project name or designation of eligible expenditure.
- amount of green bond financing approved.
- amount allocated or spent at year end.
- percentage of allocation disbursed to date.
- a brief description of the project, including the context and scale of the project and the main items being built or developed.

# Nigeria's Sovereign Green Bond Programme

In a bid to combat climate change and safeguard the lives and livelihoods of its population, Nigeria joined other developing, least-developed and developed countries in 2015 to endorse the United Nations Framework Convention on Climate Change (UNFCCC)'s Paris Agreement. Every country committed to specific and measurable targets toward cutting carbon emissions significantly by 2030 and spurring investment into climate-resilient projects and infrastructure and climate-mitigation projects across critical carbon-intensive sectors.

Nigeria's initial NDCs under the Paris Agreement prioritise greenhouse gas (GHG) reduction projects that will help to diversify the economy from oil, boost sustainable growth and help millions of people out of poverty. Under a business-as-usual (BAU) growth scenario, the country's GHG emissions are predicted to increase to around 900 million metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e) per year by 2030. Consequently, the Federal Government of Nigeria (FGN) committed to reducing its total GHG emissions by 20 per cent unconditionally by 2030 or by 45 per cent if there is sufficient international support (see Table 2).

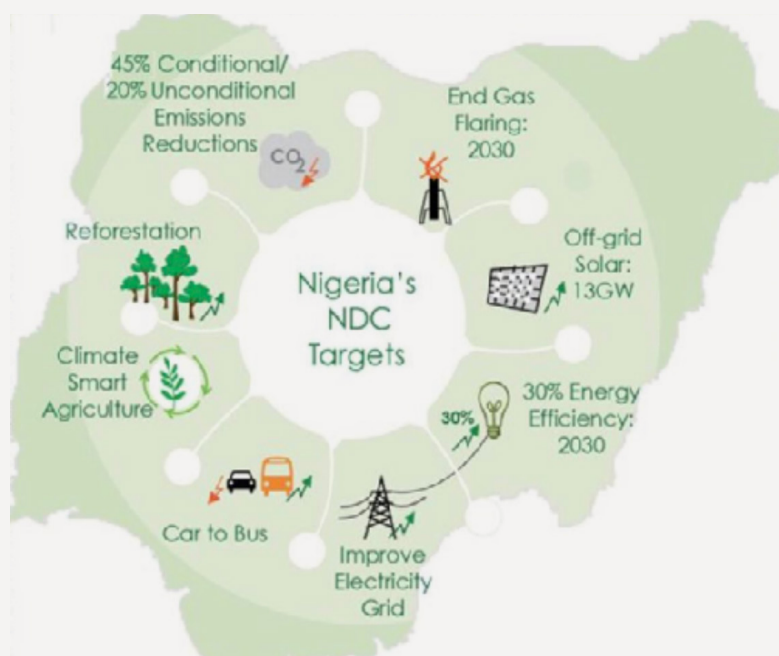


Figure 2. Nigeria's Nationally Determined Contributions<sup>7</sup>

Apect	Detail
Type of Objective	Reduction from Business as Usual (BAU)
Target Year	2030
Implementation Period	2015 - 2030
Base Data Period	2010 - 2014
Summary of Objective	Economic and Social Development: Grow economy 5% per year, improve standard of living, electricity access for all
Unconditional and Conditional Mitigation Objectives	<ul style="list-style-type: none"> <li>• 20% Unconditional</li> <li>• 45% Conditional</li> </ul>
Key Measures	<ul style="list-style-type: none"> <li>• Work towards ending gas flaring by 2030</li> <li>• Work towards off-grid solar PV of 13GW</li> <li>• Efficient gas generators</li> <li>• 2% per year energy efficiency (30% by 2030)</li> <li>• Transport shift from car to mass transit</li> <li>• Improve electricity grid</li> <li>• Climate smart agriculture and reforestattion</li> </ul>
Emissions per US\$ (real) GDP	<ul style="list-style-type: none"> <li>• 0.873 kg CO<sub>2</sub>e (2015)</li> <li>• 0.491 kg CO<sub>2</sub>e (2030)</li> </ul>
GDP per Capita (US\$)	<ul style="list-style-type: none"> <li>• 2,950 (2014)</li> <li>• 3,964 (2030; real 2015 US\$)</li> </ul>
Estimated Emissions per Capita	<ul style="list-style-type: none"> <li>• Current: around 2 tonnes CO<sub>2</sub>e</li> <li>• 2030 BAU: around 3.4 tonnes CO<sub>2</sub>e</li> <li>• 2030 Conditional: around 2 tonnes CO<sub>2</sub>e</li> </ul>
Global Warming Potentials Used	IPCC Fourth Assessment Report
Cost Estimate Data	<ul style="list-style-type: none"> <li>• National Cost = \$142 Billion</li> <li>• National Benefits = \$304 Billion</li> </ul>
Gases Covered	CO <sub>2</sub> , N <sub>2</sub> O, CH <sub>4</sub>
Emissions as % of Global Total	<1% (2010)
Historical Emissions (1850 - 2010)	2,564.02 million tonnes

Table 2. Detailed aspects of Nigeria's NDC <sup>8</sup>



Nigeria recently also concluded and submitted its updated NDCs to the UNFCCC.<sup>9</sup> This includes an updated baseline for BAU projections, using more accurate and recent economic growth projections. Estimated BAU 2030 emissions are now at 453 million MTCO<sub>2</sub>e, increasing 31 per cent from a 2018 baseline of 347 million MTCO<sub>2</sub>e. The update also raises economy-wide mitigation targets to 47 per cent if international support is forthcoming. In addition, the updated ambition includes improved reduction projections for the waste sector and new gases, including short-lived climate pollutants and hydrofluorocarbons.

## **Issuances, processes and framework**

In 2017, the Nigerian government launched the Economic Recovery and Growth Plan (ERGP), a medium-term developmental initiative focused on restoring growth. Part of the ERGP's objectives is the regular issuance of green bonds to finance projects aligned with the country's NDCs.

Nigeria has issued two green bonds to date. In December 2017, the government issued Africa's first sovereign green bond and first Climate Bonds Standard Certified bond, worth NGN 10.69 billion. A second issuance of NGN 15 billion followed in June 2019. The bonds were listed on the Nigerian Stock Exchange and the FMDQ Securities Exchange, a private financial-market infrastructure group.<sup>10</sup>

The debut green bond was oversubscribed by 1.12 per cent, with pension-fund administrators subscribing to 73 per cent of the issued amount. The second green bond was oversubscribed by 220 per cent, demonstrating increased awareness and interest in the market.

The process of determining projects for green bond funding begins with the respective ministries, departments, and agencies (MDAs), which are expected to source and originate green or NDC-aligned projects and submit these to the Inter-ministerial Committee on Climate Change for screening and approval. The approved pool of green or NDC-aligned projects requiring funding is moved to the Federal Ministry of Finance (FMF) for necessary allocations in an appropriation bill. Upon review and approval by the ministry, the Debt Management Office (DMO) commences the process of issuing the green bond without any material review of the project origination.

In line with the Securities and Exchange Commission rules on green bond issuance, the DMO works with the Office of Accountant General of the Federation (OAGF) to establish a dedicated account to hold the green bond proceeds. The new account details are communicated to the Central Bank of Nigeria (CBN).

The MDAs that originated the approved NDC-aligned projects inform the Ministry of Budget and National Planning (MoBNP) of the projects that will be funded by the green



bond proceeds upon issuance. CBN funds the green bond account with the green bond proceeds upon issuance, and the MoBNP links the green bond account with the respective NDC-aligned projects. The account disburses the bond proceeds directly to the respective approved projects based on MDAs' requests and project readiness.

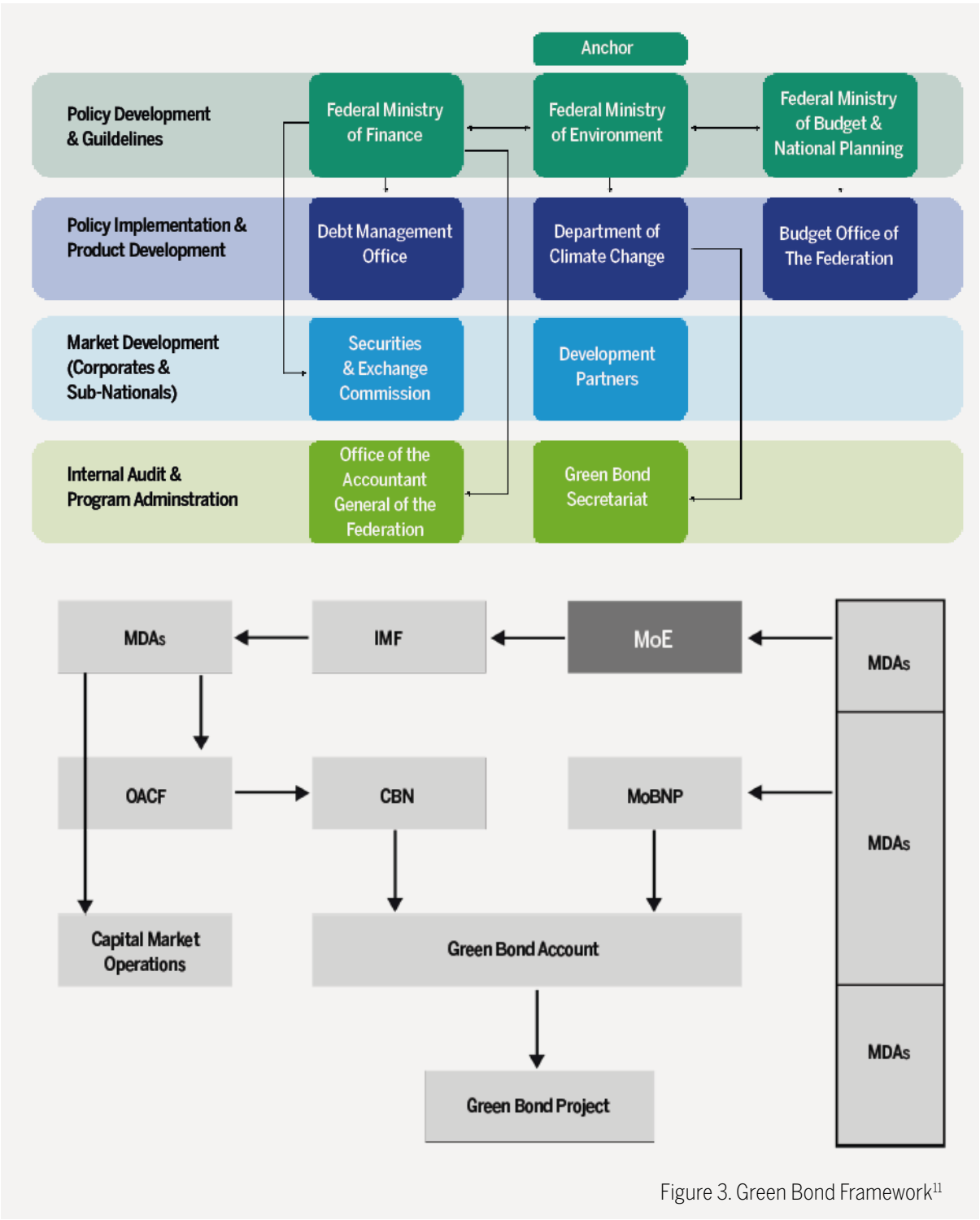


Figure 3. Green Bond Framework<sup>11</sup>

## First and second series of the green bond issuance

First Series*				
Project (Use of Green Bond Proceeds)	Implementing Ministry/Agency	Project Objective	Climate Action Taxonomy	Cost(N)
Energizing Education	Power/Rural Electrification Agency	To develop off-grid Independent Power Plant type projects for the generation and provision of 24/7 power supply for 37 federal universities and 7 teaching university hospitals	Mitigation Energy: Solar	8,550,000,000
Afforestation Programme	Environment	To increase forest coverage through plantation of seedlings to cover 131,000 hectares of land	Mitigation Land Use: Forestry	1,990,000,000
Renewable Energy Micro-Utilities in 45 Communities	Power/Rural Electrification Agency	To provide energy access for 45 unserved rural communities across the country by employing mini-grids with distributed loads of 33–50KW per community	Mitigation Energy: Solar	150,000,000
		<b>TOTAL</b>		<b>10,690,000,000</b>
*The proceeds from the first green bond series were mostly allocated to three key project categories. All the selected projects were fully budgeted for in the 2017 national budget.				

Table 3. Use of Green Bonds Proceeds: First Series<sup>12</sup>

Second Series*			
Project (Use of Green Bond Proceeds)	Implementing Ministry/Agency	Climate Action Taxonomy	Cost(N)
Energizing Education & RE Micro-Utilities	Power/Rural Electrification Agency	Mitigation Energy: Solar	7,777,000,000
Afforestation Programme	Environment	Mitigation Land Use: Forestry	1,220,877,357
10MW Katsina Wind Farm	Power	Mitigation Energy: Wind	487,000,000
Solar Powered Tricycles	Transport	Mitigation Transport: Electric Public Transport	500,000,000
Abuja Rail Mass Transit	Federal Capital Territory	Mitigation Transport: Public Mass Transit	1,597,122,872
National Irrigation Programme	Water Resources	Adaptation & Mitigation	405,000,000
Agroforestry	Agriculture	Mitigation Land Use: Agriculture	600,000,000
		<b>TOTAL</b>	<b>15,000,000,000</b>
*The proceeds from the second green bond series were allocated to seven projects and programmes in various sectors. All the selected projects were fully budgeted for in the 2019 national budget.			

Table 4. Use of Green Bonds Proceeds: Second Series<sup>13</sup>

# Selected Projects: Findings and Recommendations

For this study, three projects financed with proceeds from the first green bond series were selected and visited to assess their impact, using an assessment matrix that covered environmental, social and economic aspects (Table 5).

Environmental Impact Metrics								
Project type	Sector	Implementing agency/ MDA(s)	Appointed private sector contractor(s) and role	Target environmental impacts, i.e. carbon/ CO <sub>2</sub> emissions reductions	Actual estimated CO <sub>2</sub> emissions reductions	Compliance with ESIA (if required)	Waste management plan for the project	Degree of responsiveness to environmental issues and threats from the project
Economic Impact Metrics								
Project cost/ budget	Allocated green bond proceed amounts vs actual-on-ground (value for money)	Project completion status (%)	Workability status (i.e. meeting the set demand, scalable, technically suitable, number of breakdowns and repairs, need for additional support, speed of maintenance)	Impact on local livelihood and income from existing productive activities	Direct and indirect impact on the productive turnover of the target	Accessibility and affordability of the cost of the project or its by-products for the target beneficiaries or host	Host community's perception of economic importance	Renewable energy: number of installations/ electrified homes, businesses/ people affected
Social Impact Metrics								
Target direct green (and non-green jobs)		Actual est. direct green (and non-green jobs)		Gender inclusion/participation (i.e. women's perception of the project; benefits for women; extent of women's involvement)			Level of community participation before and after project implementation and execution	

Table 5. Impact-Tracking Matrix

## Energizing education programme

The Federal Government set up the Energizing Education Programme (EEP) to provide a reliable power supply to 37 federal universities and seven university teaching hospitals across the country. The universities and teaching hospitals have an estimated electricity demand of 90 MW. The programme includes the provision of independent power plants, the upgrading of existing distribution infrastructure, street lighting, and the development of renewable-energy training centres. The project is implemented by the Rural Electrification Agency (REA).

The EEP projects are being deployed in phases. Phase 1 was set to deliver 28.5 MW to nine federal universities and one university teaching hospital, using solar-hybrid and/or gas-fired captive power plants. Phase 1 is designed to benefit 127,000 students, 28,000 university staff and 4,700 staff in teaching hospitals; power 2,850 streetlights; and result in

the decommissioning of hundreds of small and large diesel generators.

Solar-hybrid power systems combine solar power from a photovoltaic (PV) system with another power-generating energy source. One common type is a photovoltaic-diesel hybrid system combining photovoltaics and diesel generators or gensets, as PV has hardly any marginal cost and is treated with priority on the grid. The diesel gensets constantly fill in the gap between the present load and the actual generated power of the PV system.

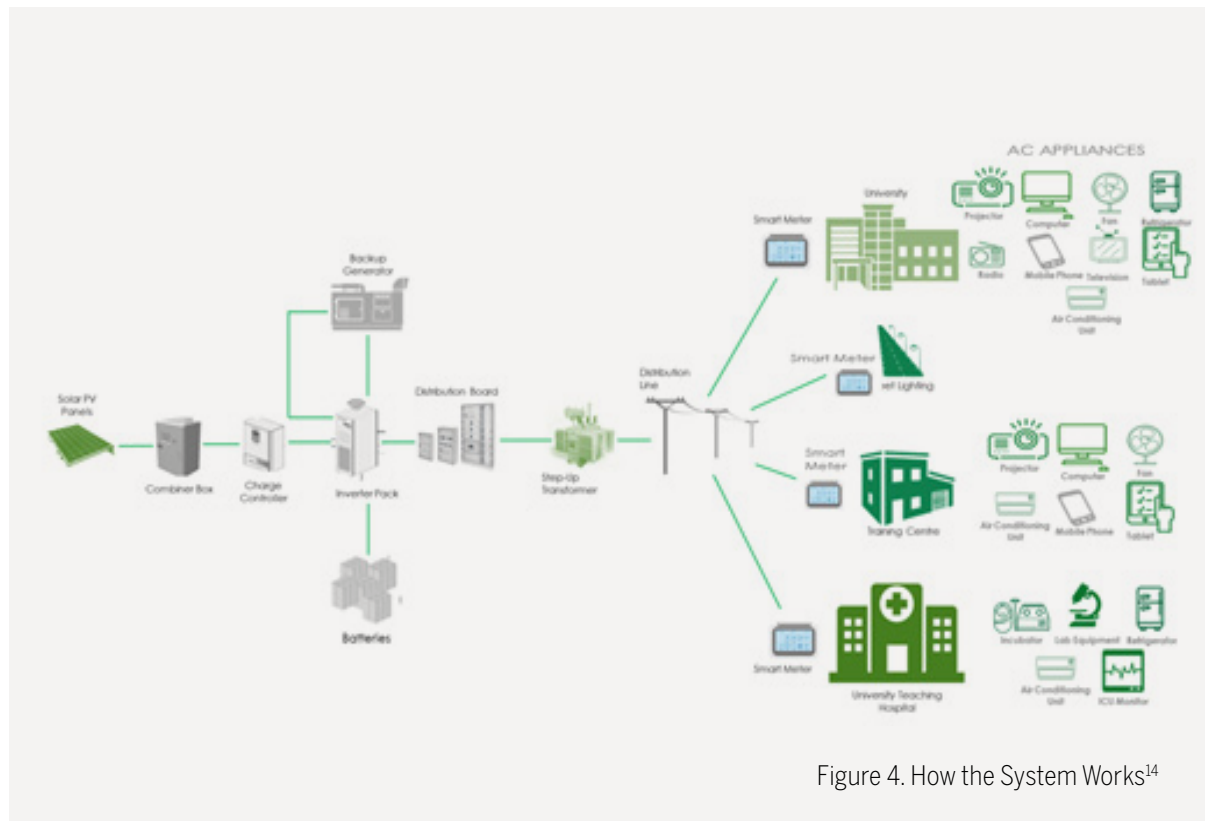


Figure 4. How the System Works<sup>14</sup>

Phase 1 includes:

- Abubakar Tafawa Balewa University, Bauchi
- Bayero University, Kano
- Federal University of Agriculture, Makurdi, Benue
- Federal University of Petroleum Resources Effurun, Delta
- Federal University Ndufu-Alike Ikwo, Ebonyi
- Nnamdi Azikiwe University, Anambra
- Obafemi Awolowo University/Teaching Hospital, Osun
- University of Lagos, Lagos
- Usmanu Danfodiyo University, Sokoto.

Phase 1 was fully funded by the federal government, with seven out of the nine listed institutions benefitting from solar-hybrid projects financed with the green bond proceeds. Subsequent phases are to be funded by the Nigeria Electrification Project, which is a federal government project in partnership with the World Bank and the African Development Bank.

Geo-Political Zones	Universities	Plant Type	Total Installed Capacity (MW)
SE	Nnamdi Azikiwe University, Anambra (NAU)	Solar Hybrid	4.38
NC	Federal University of Agriculture Markurdi (FUAM)	Solar Hybrid	8.25
SE	Alex Ekwueme Federal University Ndufu-Alike Ikwo, Ebonyi (AE - FUNAI)	Solar Hybrid	2.80
NW	Usman Danfodiyo University Sokoto (UDUS)	Solar Hybrid	4.39
NW	Bayero University Kano (BUK)	Solar Hybrid	7.10
NE	Abubakar Tafawa Balewa University, Bauchi (ATBU)	Solar Hybrid	1.12
SS	Federal University of Petroleum Resources Effurun (FUPRE)	Solar Hybrid	1.35
	<b>TOTAL</b>		<b>29.39</b>

Table 6. EEP Phase One<sup>15</sup>

The National University Commission selected the beneficiaries of the pilot project with the objective of making the universities self-reliant for their energy needs and saving on energy costs. These projects seem to have been chosen because of their geographical spread across the six geopolitical zones in the country, the presence of a federal government university and possible gaps in electricity supply.

For our impact assessment, two of the nine EEP universities were selected for evaluation: Nnamdi Azikiwe University (NAU) in Akwa, Anambra State and Bayero University, Kano (BUK) in Kano State. This was based on their state of completion (both have been commissioned and are operational), and that they are both solar-hybrid systems (relatively easier to assess than gas power plants), funded by the green bond, and their geographical spread in the northern and southern parts of Nigeria.

The NAU project has a total installed capacity of 4.4 MW (including the 2 MW solar PVs, diesel generators totalling about 2 MW and 5.4 MWh of backup batteries).<sup>16</sup>

The project was commissioned in December 2020. The system powers 9.5 kilometres of streetlights, a renewable-energy training centre and major academic buildings, classrooms, administrative buildings, business centres and administrative blocks on the Akwa campus. The total contractual amount of the project is about NGN 3.5 billion, with a total amount paid to date of about NGN 3.2 billion.<sup>17</sup>

The BUK solar-hybrid power infrastructure has a total installed capacity of 7.1 MW (including a total of 3.5 MW solar PV and a fossil (diesel) backup generator of 2.8 MW). The project was commissioned on 3 September 2019. It powers the university's new main campus, covering 277 academic buildings, 29 student hostels, 478 staff quarters, 120 commercial buildings and 694 streetlights.<sup>18</sup> The project also delivered a renewable-energy centre to provide facilities for training and research for the university. The budget for the project was NGN 5.6 billion.

## Findings

The green bond proceeds allocated to the two projects were utilised to purchase solar panels, batteries, inverters and backup diesel generators. At each university, some hectares of land were allocated for solar PV panel installations and streetlights were installed across the campuses.

METKA Power West Africa, a European provider of fully integrated turnkey power-generation projects, was appointed as the private-sector contractor to carry out engineering, procurement and construction, following a build-and-transfer model for both projects.

The NAU project has been able to save about 76 tons in carbon emissions, based on a recent project update report from the REA.<sup>19</sup> The backup generator is expected to run for two hours to charge the backup batteries. However, on rainy days, it operates for longer hours.

Regarding the performance status, the field visit to the NAU project revealed that the system met the installed solar-energy capacity of 2 MW in only six months of operations. Due to additional structures being built, among other factors, the energy load of the university is expected to possibly increase to 5 MW. At the time of the field inspection, the administrative buildings and business centres were disconnected from the system to manage the load. The site manager explained that the hybrid solar-power systems combine solar power and battery storage, to store energy for later use, and the average use of the diesel generators is between 6 a.m. and 8 a.m. (except during the rainy season) to reduce carbon emissions. Information from key users of the NAU system suggests that there has been a significant increase in power supply for up to 8–10 hours a day.

The BUK solar-hybrid system has displaced diesel and petrol generators, resulting in an annual carbon-dioxide emissions saving of 49 tons. Before the introduction of the new system, BUK spent over NGN 4.5 million monthly to power its learning and research facilities and offices at the old and new campuses.<sup>20</sup>

At BUK, the new campus requires about 5 MW of electricity. The solar component of the installed plant can only guarantee 3 MW. However, the REA reported the last peak generation as 1.3 MW on 20 October 2020, which is about one year after commissioning. That is less than 50 per cent of the installed capacity of the solar component. For the entire system of 7.1 MW to have only peak generation of 1.3 MW from solar means that the renewable-energy component is providing only 18 per cent of the installed capacity.

The field inspection also discovered that some sections of the university – specifically the small commercial business units in the Coke Village, which were among the initial 120 commercial units – have been disconnected from the solar-hybrid system. These units, like the entire university, were previously connected to the Kano Electricity Distribution Company. They moved to the BUK solar-hybrid system only to be disconnected a few months after installation. Information from the school authority and business owners on the school premises confirms that the commercial units were disconnected due to system failure and battery spoilage from overload. This forced the disconnected business to return to diesel generators.

In summary, the BUK project's sub-optimal peak of 1.3MW of solar, overall failure to meet the energy demand of 5MW, and shedding of previously connected commercial businesses from the solar-hybrid system expose its actual performance to be below what is expected of a green bond investment.

The situation at both universities shows that the initial electricity demand audits underestimated actual and future demand, resulting in the disconnection of parts of the system. It is important to note that the installed hybrid-solar power plants were built according to the energy audit conducted by the universities themselves, and not the appointed contractor, METKA.

All of this raises questions around the technical competence of those who executed the energy audit and why METKA was not asked to do it. It also presents flaws in the integrity of the system and its design for “smart” operations, i.e. using meters to avert system overloads, or to meet the electricity demand in the nearest future.

METKA operated the solar-hybrid power infrastructure at the two universities for one year. The company also trained selected staff and students in their works and engineering departments to continue the necessary operations and maintenance activities. However, as the electricity is provided to the universities entirely for free, the projects do not generate any cash flows to ensure optimal operations and/or cover maintenance costs.

Despite these performance issues, it is important to point out that the projects have positively affected the lives of students and staff (academic and non-academic) still connected to the system. This was confirmed in many interactions with beneficiaries during the field visits. According to the REA, more than 58,000 staff and students receive adequate and reliable power. Women accounted for 40 per cent of the workforce involved in the construction and delivery of the projects and in the operations and maintenance



aspects. Forty female students in science, technology, engineering and mathematics at NAU and BUK have graduated from an EEP internship programme.<sup>21</sup>

## Recommendations

Although powering higher education with free and clean electricity is a commendable effort, its long-term sustainability and the government's ability to maintain and grow its commitment along with rising electricity demands should be taken into consideration.

The two EEP projects visited could potentially be commercially viable if commercial businesses on the premises were connected, metered and charged a reasonable tariff and the universities' budgets for grid electricity and cut-off generator fuel and maintenance were channelled towards the new systems. Such an arrangement would attract private-sector participation in these or similar projects and could involve the issuing of a local, private green bond or raising commercial debt from local banks. With private-sector participation, the government and EEP would stand to enjoy the following benefits:

- Before the commencement of any project, private-sector operators would likely carry out more sound and detailed energy audits and load profiling for each university as well as segment and profile the various energy end-users (students, university staff, businesses on campus).
- The projects would be operated, maintained and monitored more sustainably by technically competent and experienced companies.
- Private-sector provision of the required capital and operation of the EEP would reduce the government's debt profile and/or allow it to allocate scarce bond proceeds to projects where no private sector incentives exist. The universities would also save money because of the competition in the private sector.
- The government would still be entitled to track, monitor and report environmental, social and economic achievements in line with SDGs and NDC targets.

In any case, a comprehensive operational plan should have been developed and better integrated into the REA's deployment of the project before handover to the universities. This planning should have considered:

- metering and billing the university a token fee for energy consumed to cover operations and maintenance expenses.
- creating a long-term operations and maintenance agreement between the university and a qualified service provider.
- adopting technology to drive transparency and accountability, i.e. deploying publicly



accessible electronic platforms that report the real-time performance of the system.

## **Afforestation programme**

Afforestation was the second major area of intervention to be funded with proceeds from the first series of green bonds in Nigeria. The Ministry of Environment's national afforestation programme intends to increase forest coverage by planting seedlings on 131,000 hectares of land. Three sites in Old Oyo National Park (OONP) were identified for the first phase of the green-bond-funded programme: Igbeti, Alaguntan and Tede. Each project site is five hectares in size and was to be planted with a variety of trees.

## **Findings**

The OONP project aimed to plant agroproductive trees that double as a carbon-capture tool and a form of livelihood for local farmers. Commercially viable producers such as cashew, mango, orange and rosewood trees were planted. The allocated green bond proceeds have been utilised to procure and plant tree seedlings. About 500 seedlings per plant group were supplied and site managers confirmed these were planted by OONP staff and members of the community in November 2019. The project is classified as fully completed and operational, with an annual projection to offset 12,969 tonnes of carbon emissions upon maturity of the planted trees.

A typical tree can absorb about 21 kilograms of carbon dioxide a year when fully grown. Young saplings, like the ones seen at the project sites, absorb significantly less than this, dramatically decreasing the project's current potential for capturing carbon dioxide in the atmosphere.

Although the intent of the project to serve environmental and socio-economic purposes at the same time is commendable, weak project implementation has inhibited success. The immediate beneficiaries in the community were not consulted about the types of trees relevant to their livelihood, which resulted in the planting of fruit trees that were already in abundance in the area and therefore of low economic value.

The community indigenes and staff of OONP further disclosed that they were not part of the screening and selection process to identify a contractor to procure and plant seedlings. Apparently, the National Park Services within the Federal Ministry of Environment directly appointed the contractor. The identity and profile of the contractor could not be discovered during this research. It is therefore impossible to assess their suitability and technical capability.

However, the replanting of weak plants had to be done twice since the initial planting in November 2019, due to insect infestation and other issues. In addition, no soil testing was conducted on the land used for the trees. The absence of a sustainable irrigation system

also contributed to poor seedling performance. The survival rate for each plant group is unknown.

The participation of the community in project implementation and maintenance has been minimal. Although OONP acknowledges the involvement of a small number of men and women in project implementation, no one was consulted during the project's conceptualisation. A total of 46 people were involved in the project, about half of them women. The overall impact of the project on the community, and women and youth in particular, appears very limited but it is hard to assess at this stage.

This study's independent tracking and assessment pegged the project's completion status at 50 per cent at best. Its entire budget plan and fund allocations are not clear and conclusive. There is no report or documented information in the public domain from the Federal Ministry of Environment or the implementing agency on the state and progress of the project implementation as required.

## Recommendations

The country's national afforestation programme currently lacks a strategic sustainability framework, which would have to be co-created with identified local communities where the trees will be planted. As the field findings from OONP demonstrate, the inclusion and active participation of immediate community beneficiaries in the project's formulation, implementation and management is crucial to its success. Accordingly, the Ministry of Environment should:

- develop an updated and more comprehensive roadmap in collaboration with eligible local communities and afforestation experts across the country
- identify, map out and explore collaborations with organisations and experts within and outside the country who are successfully executing afforestation and agroecology projects for better learning and skills development
- set up zonal afforestation committees that include members from local communities, field experts, experienced academics and relevant government MDAs
- train staff of the local executing institutions, along with members of local communities, in the requisite skills and information related to the needs, execution and sustainability of similar afforestation projects
- ensure proper representation of women and youth from the respective communities in the above interventions.

To maximize the twin benefits of carbon capture and socio-economic development in local communities, the use of agroforestry systems should be central to the afforestation

programme. The combination of cultivating crops and trees would allow people to use the land for food production while sequestering carbon and prevent a situation that pits afforestation against food production in land use.

Where incentives and community buy-in exist, such projects could also tap into the carbon-credit market in order to scale projects that are initiated with green bonds.

On a general note, the findings highlight the importance of transparency in the budget, planning and implementation processes of any successful project. There is a need for openness in the procurement processes and award of contractors. Contractual guarantees need to be placed on public projects to ensure the delivery of goals, including commendation for good performance and stiff sanctions where corruption and defaults are likely. The lack of disclosure in these projects and poor or absent public reporting will compromise the success of the Green Bond Programme. Proper governance evaluation is needed to ensure value for money and accountability.

# Conclusion

The federal government's Green Bond Programme in support of Nigeria's NDC targets has broken new ground and needs to be commended as such. The programme stands out for producing the first certified sovereign green bond in Africa and was one of the first of its kind in the world. After the government set the scene, both Nigerian private-sector organizations and sub-national governments have shown strong interest in issuing their own green bonds and sukuk (sharia-compliant bonds) or have already done so.

However, as the findings from this study demonstrate, there is a need for the government to strengthen elements of the green bond process and conduct a comprehensive end-to-end assessment of all the projects that have been financed and implemented through the first and second green bond issuances.

In this context, some of the most critical observations emerging from this report include:

- *the lack of regular project reporting.* Currently, there are no reports available that would provide up-to-date information on the status of funded projects in line with Pillar 4 of the GBPs. This not only inhibits the proper monitoring and management of the projects by the responsible government ministries and agencies themselves, but also impedes transparency and accountability for green bond investors and the people of Nigeria. Reporting should be done at least annually and be publicly accessible.
- *similarly, the lack of tracking of carbon results.* The project assessment only found projections of CO<sub>2</sub> savings that were developed before the start of projects. The actual amount of carbon dioxide captured or the change in emissions as a result of the green bond projects is not being measured. For the credibility of the programme and to measure the extent to which projects actually contribute to the country's NDCs, this gap needs to be closed.
- *the importance of stakeholder consultation.* The afforestation project demonstrates the importance of stakeholder consultation to ensure project success. This is true at the level of individual projects, including their conceptualization and implementation, and also at the level of the overall green bond framework and process. More opportunities should be introduced for stakeholder consultation and public participation in identifying green investment themes and in selecting projects within these themes. Opportunities to broaden stakeholder engagement and participation exist at the MDA level, where projects are originated, and at the level of the Inter-Ministerial Committee on Climate Change, which screens and approves projects.
- *the need for commercial viability assessments.* As public resources are scarce and the implementation of the NDCs is beyond the financial means of the Nigerian government

alone, the question of mobilizing private capital is crucial. The EEP projects visited are a case in point. Where commercial potential exists, the government should design and roll out policies and processes that will consider, attract and encourage private sector participation, and focus on funding projects where no commercial incentives exist or where such approach is not desirable. Commercial viability indicators should be considered during project origination at the MDA level and when projects are screened by the Inter-Ministerial Committee on Climate Change.

- *the need for innovation and strategic investment of funds.* The afforestation project findings demonstrate the potential that lies in combining climate goals with socio-economic benefits. This could have been maximized through agroforestry systems, but the opportunity was missed. Beyond the level of individual projects, there is a case to be made for using the Green Bond Programme to fund processes that are forward-looking and of systemic value for Nigeria's position in a decarbonizing global economy. Research and development in the use of green hydrogen is but one example.

To address some of the above issues, the government, through the Ministry of Environment, should deploy an electronic registry where details of all green bond-financed and NDC-aligned projects implemented in both the public and private sectors could be recorded for continuous tracking and reporting. This platform could also serve as a point of exchange and input at the various stages of the project cycle, from identification and selection to implementation and monitoring.

In conclusion, this report has identified some of the lapses in Nigeria's first two green bond issuances and highlighted some gaps and missing links in the overall green bond framework. It is hoped that the findings will stir constructive debate and more detailed enquiries into green bond projects as well as spur more innovative and strategic approaches towards achieving the country's NDC targets and related goals.

# Notes

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