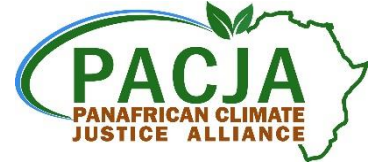




**ALEX EKWUEME FEDERAL
UNIVERSITY NDUFU-ALIKE**



Energy sector analysis of Nigeria's NDCs

Sponsor: Climate and Sustainable Development Network of Nigeria (CSDevNet) / Pan African Climate Justice Alliance (PACJA)

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Climate and Sustainable Development Network of Nigeria (CSDevNet)

CSDevNet, the national platform for the Pan African Climate Justice Alliance (PACJA), is a continental coalition of civil society organizations in the African continent, brought together by the common goal of promoting and advocating for climate-friendly and equity-based development. With a membership of 300 organizations cutting across the six geo-political zones in Nigeria, Climate and Sustainable Development Network of Nigeria (CSDevNet) brings together community associations, pastoralists, youth and women groups, media networks, faith-based and civil society organizations working on sustainable development goals to commonly promote and advocate pro-poor, climate-friendly and equity-based responses to climate change and sustainable development. CSDevNet aspires to unify and coordinate isolated civil society efforts on climate change advocacy in Nigeria to ensure that people-centered response mechanisms accord desirable attention and relevance as climate change is increasingly mainstreamed into national and global poverty reduction and sustainable development strategies and actions.

Pan African Climate Justice Alliance (PACJA)

PACJA includes Pan African Institutions such as the African Union Commission, the UN Economic Commission for Africa, The UN Environment, SADC, COMESA, ECCAS, EAC, and ECOWAS. PACJA seeks to actively engage these actors by creating strong pillars in countries hosting RECs and Pan African Institutions to ensure consistent and sustainable outreach. This approach is relevant in the context of the Paris Agreement, particularly as countries embark on realigning their national and sub-national development frameworks to support implementation through Nationally Determined Contributions (NDCs). The project seeks to enhance the Nigerian/African CSOs' engagement in the climate governance discourse at national and regional levels, enabling them to be at the center-stage in the region's acceleration on the transition to a low carbon, climate-resilient, sustainable development through effective implementation of NDCs.

CSDevNet/PACJA, in its strategic plan 2018-2020, is implementing a Project titled "Deepening African Civil Society Engagement in International Post-Paris Climate Change Dialogue and Response Strategies" across Africa and building robust platforms in specifically selected eight countries including Nigeria, as pillars policy advocacy. In the project, PACJA has identified the eight countries and key inter-governmental continental actors (UN, AUC & RECs such as ECOWAS for West Africa) to engage, lobby, and support in its ambitious vision for an inclusive, pro-poor, people centered, equitable, climate-resilient and low-carbon development pathway. The eight countries include Kenya, Botswana, Zambia, Tanzania, Ethiopia, Gabon, Cote d' Ivoire, and Nigeria.

Objectives

Energy Sector in the Nigerian's Nationally Determined Contribution (NDC)

- Identify gaps and inform existing policies in the selected sectors above and cross-cutting issues about climate change response actions and strategies.
- Assess the contributions per sector targets in the implementation of the Nationally Determined Contributions.
- Analyze and provide a map analysis of climate finance flows in the selected sectors and cross-cutting issues.

- Identify and map-out policy gaps and recommendations in the selected sectors (Energy) and cross-cutting issues.
- Identify knowledge and information to support the integration of Climate Governance into the activities of the Energy sector.
- Where possible, identify and clarify the Private sector's role in supporting the national governments and regional bodies to meet the NDCs commitments.

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1. Introduction

1.1. Background

To implement the Paris Agreement on climate change, a rapid shift to decarbonizing economies and improving climate resilience is required. This brings new challenges to national climate governance, which is how climate change decisions are taken and implemented. While there are many dimensions to climate governance that are important, in this study, we focus on the central question of how the state (as opposed to non-state actors) governs climate change and on the associated institutional arrangements and governance processes. State climate governance arrangements and practices impact governments' ability to set the overall direction for actions, coordinate implementation of those objectives, and mobilize other actors through incentives, constraints, and normative influences. To implement the Paris Agreement's overall goals and the specific objectives set in countries' nationally determined contributions (NDCs), national climate governance mechanisms and practices need to be assessed and strengthened, with a clear understanding of existing weaknesses.

1.2. Nigeria's record in international and domestic climate change action

Nigeria's efforts at tackling Climate Change started with establishing the Federal Environmental Agency (FEPA) in 1992. Nigeria then joined the League of Nations in their efforts towards mitigating Climate Change by becoming a party to the United Nations Framework Convention on Climate Change (UNFCCC) of 1994 as a Non-Annex 1 party, and the ratification of the Kyoto Protocol in 2004. In 2012, the Federal Executive Council adopted the National Climate Change Policy Response and Strategy (NCCPRS) to foster low-carbon, high growth economic development and build a climate-resilient society. Additionally, in 2015, Nigeria submitted an Intended Nationally Determined Contribution (INDC) in the lead-up to the Paris Agreement negotiations; the country ratified the Paris Agreement on Climate Change in 2017. This has pledged to reduce greenhouse gas emissions by 20% by 2030 compared to "business-as-usual" levels. This pledge rises to 45% on the condition of international support. Since the last decade, Nigeria has also adopted a range of national and sectoral policies, plans, and strategies to decarbonize the economy while meeting broad developmental objectives. To enable the development and implementation of these policies, the country created an elaborate system of climate governance, with several new institutions and consultative and decision-making processes (Figure 1 in Chapter 1 provides a timeline of climate-related policy by sector).

1.3. Aims and importance of this study

As countries worldwide move forward with implementing the Paris Agreement, many review their domestic governance frameworks and develop mechanisms that seek to enable their domestic transition to low-carbon and climate-resilient development [1]. Strong national governance is also essential in ratcheting up ambition on climate change under the Paris Agreement after 2020. The objective of this policy report is to review the governance landscape and the existing institutional framework mandated to advance climate change response actions and strategies and identify some of the emerging challenges in climate governance in Nigeria's energy sector concerning the Nationally Determined Contributions (NDCs) and potential solutions, drawing out lessons for the country. This study undertakes a review of national climate governance and policy implementation in Nigeria, aiming to generate lessons for broader learning. The purpose of the analysis is to aid policymakers and key stakeholders in Nigeria in identifying barriers and opportunities in existing governance structures to enhance climate policy implementation. The lessons we identify are also relevant for other developing economies as they set out on the path to implementing the Paris Agreement domestically.

2. Governance concepts

The term *governance* has multiple meanings and uses in academic research and practice. Given the multiplicity of meanings and uses, this section defines governance as it applies to analyzing climate and energy sector governance in Nigeria. Generally, the definition of governance is delineated along two dimensions: structure and process. The structure dimension involves actors and institutions, while the process dimension involves mechanisms or governance modes [2]. Several studies provide definitions of governance and extant characteristics (see [3]). For this study, governance refers to actions by the public only, public and private, and private only activities aimed at achieving social order based on intentionality at the minimum.

Furthermore, several governance modes exist: governance by the government, governance with government, and governance without government. In governance by the government, state actors use state powers or power of coercion to implement public decisions. In governance with government, state actors possess or exert no direct coercion power. In governance without government, private actors self-coordinate to achieve their stated common good. The governance by the state is characterized by the presence of hierarchy, while the absence of hierarchies often describes the latter two governance types.

Climate change governance (or climate governance, for brevity) consists of all purposeful mechanisms and measures, by either state or non-state actors, aimed at steering social systems toward preventing, mitigating, or adapting to climate change threats [4]. This definition follows the two described dimensions of governance. First, it accounts for the structure, which implies the actors and institutions. Secondly, it accounts for the process that means steering social systems to achieve the common good — preventing, mitigating, or adapting to climate change threats. For an effective climate change governance within the context of economic sectors, certain factors have to be considered, namely: the precise role of the state and the hierarchical structures that exist, the allocation of governance responsibility (or the suitable level of governance) to responsible entities to foster the drive to a low carbon economy, and the quest for sustainable growth and development.

3. Nigeria's national climate change governance system

This section provides an overview of national climate governance's critical features in Nigeria, including the leading institutions, mechanisms for their interaction, and relevant policy frameworks. National climate change governance in Nigeria is the product of more than two decades of policy evolution and has been shaped by an elaborate landscape of executive policies, strategies, regulations, and institutions. Following Article 4 of the UNFCCC, Nigeria submitted its first National Communication (NC) in 2003, presenting its gross national emissions of GHGs by sources and sinks. However, the first document guiding climate change policy was the 2011 National Adaptation Strategy and Plan of Action for Climate Change in Nigeria (NASPA-CCN), followed by the 2012 National Climate Change Policy Response and Strategy (NCCPRS). It contains policy elements and short-, medium- and longer-term national strategies that will enable the country to mainstream mitigation and adaptation into its national development efforts. The NASPA-CCN and NCCPRS formed the basis for the content of Nigeria's pledge to the NDC to the Paris Agreement. Nigeria also submitted two additional national communications to the UNFCCC, in 2014 and 2020, and one biennial update report in 2018. The overarching national climate change framework and the objectives pledged under the NDC are also influenced by several pieces of legislation and sectoral action plans with specific provisions for climate change (e.g., the National Climate Change Policy Response and Strategy (NCCPRS), 2012).

Nigeria's National Climate Change Policy Response and Strategy

A key policy setting out the vision and overall policy framework is the National Climate Change Policy Response and Strategy (NCCPRS), approved by the Federal Executive Council in 2012. The NCCPRS document is the output of a national participatory and stakeholders' consultative approach to place a well-defined national climate change response framework and implementation plan that incorporates critical elements of mitigation and adaptation. Other national and international commitments informed its goals.

Flagship programs

The NCCPRS also established eight 'Near-term Priority Flagship Programmes,' capturing the leading adaptation and mitigation actions that serve as mechanisms for the DEA to work with other government departments. As they are known, these flagships target climate change response public works; water conservation and demand management; renewable energy; energy efficiency and energy demand management; transportation; waste management; carbon capture and sequestration; and adaptation research. They are designed, among other things, to target major emitting sectors and to test, develop, and scale up a range of policy mechanisms and methods of implementation. Several essential adaptation and mitigation policy mechanisms in Nigeria have been developed from these flagships, targeting different sectors. The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), for example, was scaled up as part of the renewable energy flagship program.

Mitigation and adaptation

The NCCPRS set out national priorities for climate change and was intended to build on existing mechanisms and policy proposals concerning mitigation and adaptation. It names numerous strategies concerning adaptation (e.g., identifying priority sectors and addressing adaptation interventions in sector plans) and mitigation.

Climate change policies at the sectoral level

While several policies operate across multiple sectors, some are targeted at avoiding emissions or supporting more specific sectors. The development of these sectoral level policies in Nigeria is skewed by the greenhouse gas emissions profile of the country, with high-emissions sectors having more developed climate policy landscapes. The majority of substantive national-level policies have been focussed on the energy sector [5,6]. This includes the Roadmap for Power Sector Reform of 2010 and updated in 2013, Renewable Energy Master Plan (REMP) of 2005 and updated in 2012, and National Renewable Energy and Energy Efficiency Policy (NREEEP) of 2015.

There are more variations in the industry, waste, agriculture, and transport sectors. In other sectors (industry, waste, agriculture, and transport), the policy development process relating to climate change-specific policies has been varied. For example, even though the industry has received more attention than other sectors from policymakers, it has taken a while to develop and implement policies. For the sectors with lower greenhouse gas emissions, policy development and implementation have been slower despite being flagship programmes allocated to each. For example, there is not yet an approved overarching climate change strategy for agriculture, with both the sector plan and the climate-smart agriculture strategic framework still in draft form and undergoing consultation. The waste sector has also not seen any significant climate change-specific policies developed. Transport, a major sector in terms of greenhouse gas emissions, also does not have an overarching national strategy focusing on mitigation actions. Broader national policies to support public transport, extend electrification to vehicles or support modal shifts from road to rail do not currently exist.

Horizontal and vertical dimensions of climate change governance

To provide a comprehensive response to governing climate change, a range of supporting policies must be developed for action in each sector. To ensure sustainable development and a just

managed transition to a low-carbon economy and society, these policies need to be aligned both vertically (from national to local levels) and horizontally (between national departments) to achieve common goals. The federal government leads the design and development of domestic climate change policy in Nigeria with the Department of Climate Change (DCC).

The DCC is the central coordinating agency responsible for establishing overall targets and frameworks for policy implementation. The DCC is also responsible for representing Nigeria in the UNFCCC process, coordinating climate change policy and action, and tracking interventions and progress to achieve Nigeria's NDC. The DCC has led to overarching climate change policies and draft legislation. The development and implementation of the policies required to meet the targets set out in the NCCPRS intersect with, and cross-cut, many of the priorities and responsibilities of other government ministries, departments, and agencies (MDAs). These MDAs play critical roles in climate change governance and are essential stakeholders in supporting the DCC in designing and mainstreaming/implementing climate change-relevant policies. For example, the Federal Ministry of Power (FMoE) and Federal Ministry of Petroleum Resources (FMoPR) is responsible for long-term energy policy and planning.

Furthermore, institutions given an explicit role in mainstreaming climate-resilient development and policy agendas under the NCCPRS include the Ministry of Finance, Agriculture and Water Resources; Energy Commission of Nigeria; Nigerian National Petroleum Corporation (NNPC); Ministry of Foreign Affairs; Nigerian Meteorological Agency (NIMET); Industries; NGOs; and Academia. The NCCPRS, including through the flagship programmes, gives many of these different MDAs roles to contribute to realizing climate commitments. Most sector departments, especially those targeted in the NCCPRS, have developed some form of climate change plan and strategy or have taken action to mainstream climate change into other policies and plans.

Private sector and civil society participation in climate governance

The private sector, state-owned enterprises, academic research centers, civil society, and trade unions are other major players in climate governance in Nigeria. Nigeria has a comprehensive and robust stakeholder engagement process through which every climate change-related policy must pass. The extensive consultation processes often culminate in acrimony, conflict, and threats of legal challenges or litigation.

The private sector

Individual companies and associations may also be represented or consulted at the project level (e.g., through the flagship programmes), and the private sector lobbies the Government directly. Business associations and other private sector representative groups may also provide additional forms of climate governance, e.g., by promoting and guiding private sector action on climate change and providing supportive networking facilities and discussion platforms. The private sector shapes and is significantly impacted by climate mitigation and adaptation governance and policy. Through the development of emerging business opportunities, alongside corporate social responsibility (CSR) activities, the setting and implementation of energy reduction plans and targets, and providing access to alternative funding mechanisms (e.g., the Global Environment Facility), the private sector is a route through which climate change mitigation and adaptation can be implemented and upscaled. The private sector is a major stakeholder in climate change governance and its constructive engagement is fundamental to maximising opportunities, as well as ensuring the practicability, acceptability, and buy-in of policy decisions and interventions. The private sector is represented in consultative climate fora both by large individual companies and through business associations. The different national and state chapters of the Chambers of Commerce are some of the most notable private sector groups in the climate governance arena.

Civil society, NGOs and international donors

Civil society actors and international donor communities play an essential role in the design and delivery of climate policy and action, including through participation on advisory panels and steering committees and capacity-building and lobbying for the interests of more vulnerable groups. In support of this function, civil society provides additional consultation fora and, again, civil society may directly lobby the government. Non-governmental organizations (NGOs) and other development actors (e.g., the United Kingdom Department for International Development (DFID) and German development agency (GIZ) – which, among others, have played major roles in supporting DCC on climate policy) also support the delivery of climate projects at a technical and program level and are key actors in the downscaling and mainstreaming of climate policy into local development activities. Civil society may also provide capacity-building support to increase climate finance access, including for more vulnerable groups. The broader capacity of civil society to engage in climate change and influence decisions seems to be generally weaker than that of the private sector. Limited resources and capacity curtail their ability to engage in all the fora.

4. Nigeria’s energy sector

4.1. Central energy supply and demand trends

Over the past decades, energy demand has steadily increased across all sectors, including residential, transport, industry, commercial, and agriculture, and is expected to continue to grow. Nonetheless, in 2019, Nigeria's per capita energy consumption stood at 0.8 tonnes of oil equivalent (toe) per capita versus the global average of 1.81 toe, representing 44 percent of the world's average [7,8].

4.2. Energy consumption

Nigeria's Total final consumption (TFC) increased by 38 percent within the recent decade from 2010 to 2018, with significant growth across all sectors (Figure 1-1). More than half of the increase came from the residential sector, which accounted for 75 percent of TFC in 2018, including non-energy consumption.

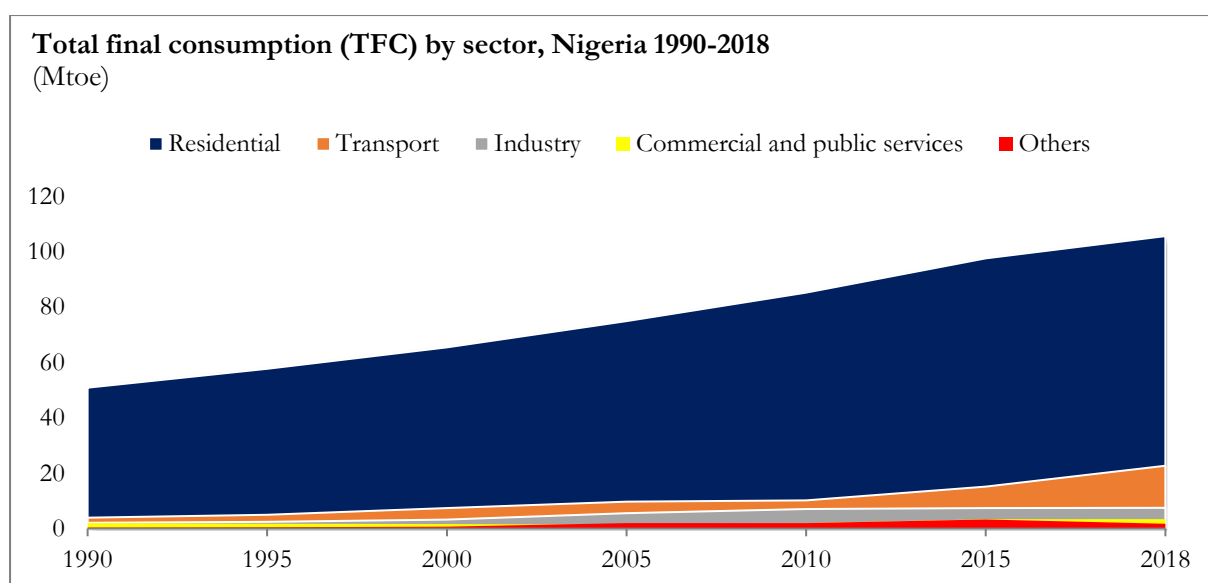


Figure 4-1. Total final consumption (TFC) by sector in Nigeria, from 1990 to 2018

Source: Key energy statistics for Nigeria [9]

Furthermore, biofuels and waste constituted the largest share of TFC. Oil products, such as premium motor spirit (PMS), Diesel, and household kerosene (HHK), also accounted for the second most consumed energy in Nigeria during the period. Other smaller consumed energy sources are natural gas, electricity, and coal (see Figure 1-2).

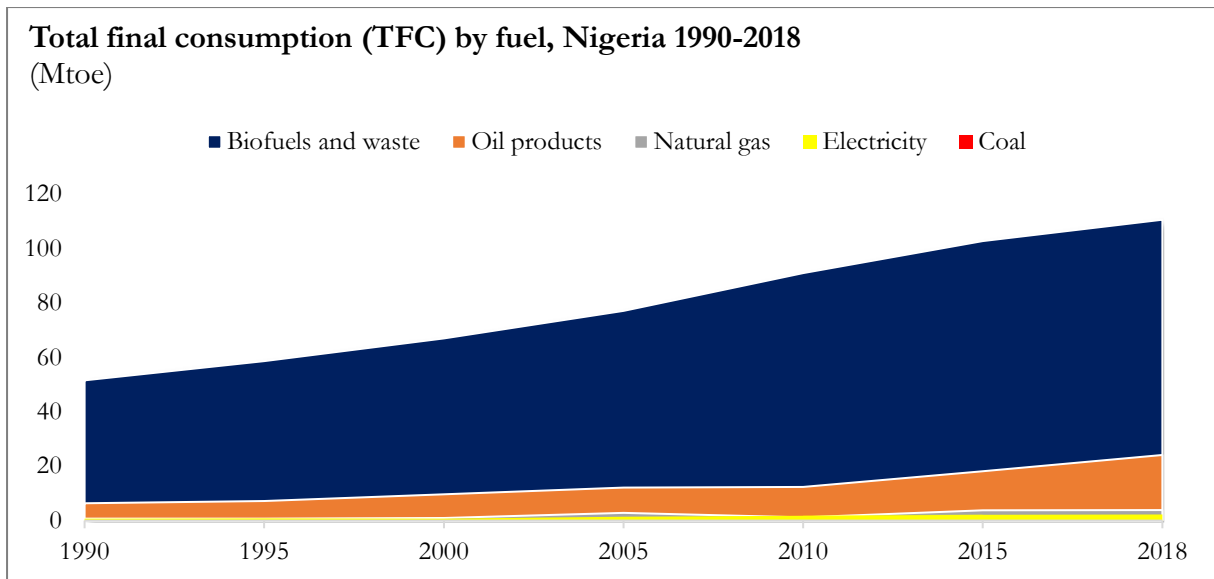


Figure 4-2. TFC by Fuel in Nigeria from 1990 to 2018

Source: Key energy statistics for Nigeria [9]

The residential sector consumes a mix of biofuels and waste, wood/ wood waste, charcoal, HHK, PMS, Diesel, and liquified petroleum gas (LPG), with biofuels and waste, wood/ wood waste, charcoal representing 99.8 percent of total consumption (Figure 1-3) [5,10].

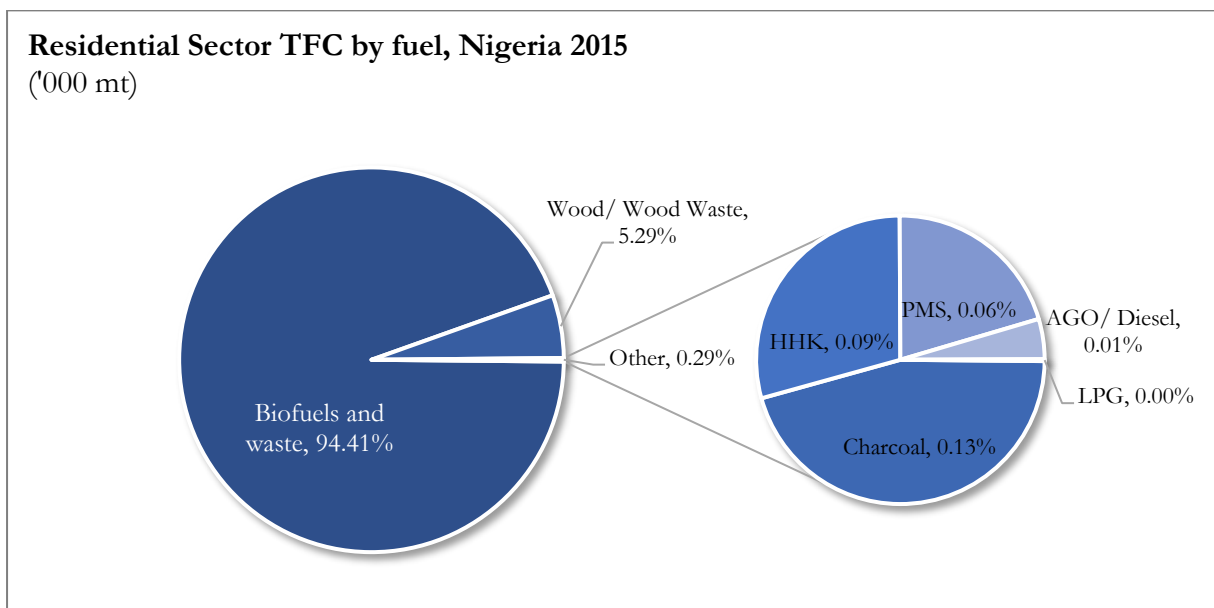


Figure 4-3. Residential sector TFC by fuel in Nigeria in 2015

Source: Key energy statistics for Nigeria [9]

The transport sector is the second-largest energy consumer at 16 percent of TFC in 2018, dominated by oil fuels such as PMS and Diesel [5].¹ Transport energy demand more than doubled between 2010 and 2018. The industrial sector is the third-largest energy consumer at 5 percent of

¹ About 87.2 percent of total PMS consumed in the country is used in the transport sector of which about 4.2 percent and 95.8 percent go to the domestic water navigation and road transport sub-categories respectively [5].

TFC in 2018, where diesel and residual fuel oil (RFO) consumption contributed to own-use electricity generation operating of plants [5]. The commercial and public services contributed 2 percent to TFC during the same period, while the "others" category, which comprises agriculture, forestry, non-energy use, and non-specified sectors, contributed 1 percent to TFC.

4.3. Primary Energy Supply

The rapid growth in TFC and power generation to supply rising electricity demand has led to a rapid increase in total primary energy supply (TPES). From 2010 to 2018, TPES increased by 26 percent, primarily met by biomass and waste for residential heating and cooking and oil for transport and industry (Figure 1-4). Nigeria is a major producer of oil and natural gas, bioenergy, and coal. In 2018 Nigeria's total primary energy supply (TPES) was 159.88 million tonnes of oil equivalent (Mtoe), with all supplies nearly covered by domestic production. In 2018, biofuels and waste accounted for 75 percent of total consumption. Oil is the second most crucial energy source with 15 percent, followed by gas with 10 percent. Hydropower and coal, by contrast, were not able to satisfy growing demand, and their share of power TPES was 0.4 percent [7].

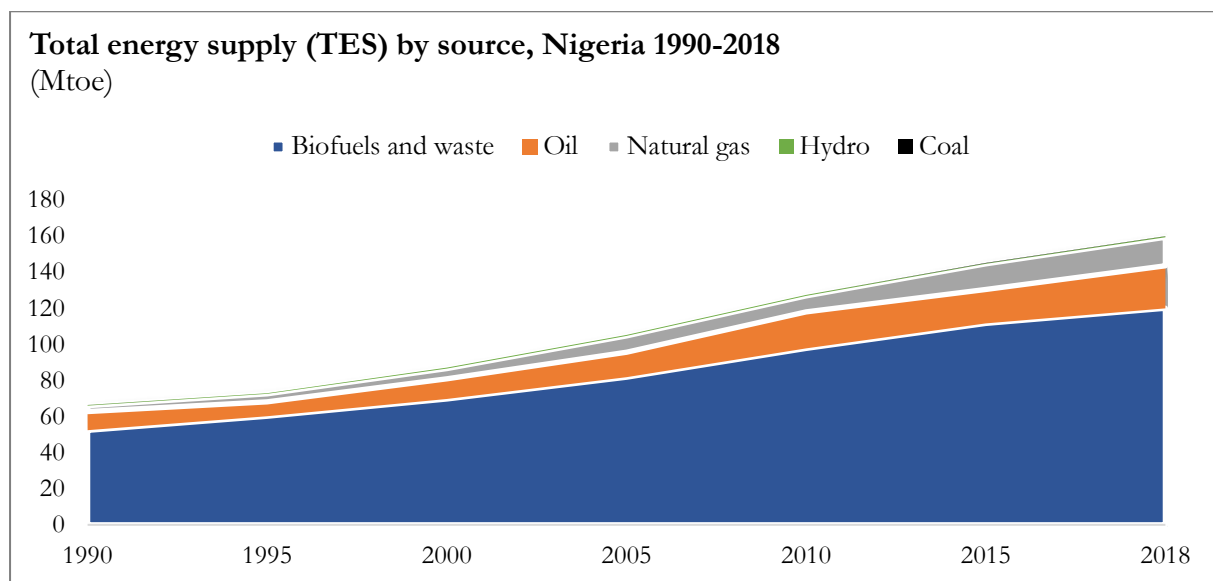


Figure 4-4. Total energy supply (TES) by the source in Nigeria from 1990 to 2018
Source: Key energy statistics for Nigeria [9]

4.4. Energy-related GHG Emissions

In 2016 within the fuel combustion sub-sector, Energy Industries was the highest contributor with 41 percent of total emissions, followed by transport (28 percent), Other sectors² (22 percent), and Manufacturing, Industries & Construction (9 percent) (Figure 1-5).

² The "Other sector" category includes Commercial/Institutional, Residential, and Agriculture/Forestry/Fishing.

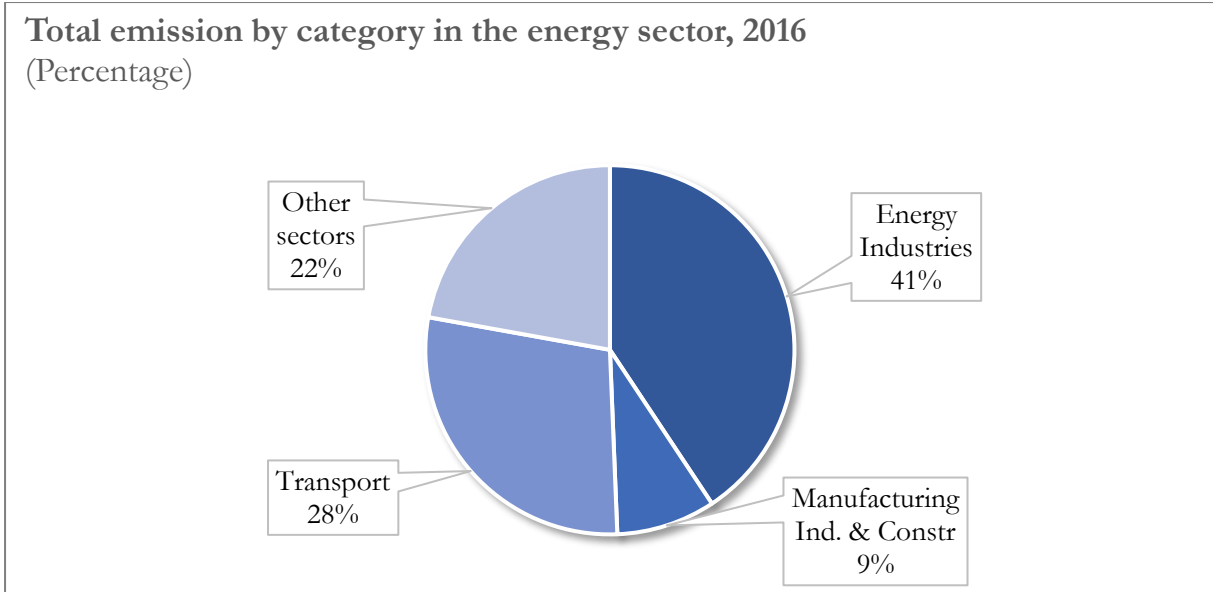


Figure 4-5. Total emission by category in the energy sector

During the period 2000 to 2016, emissions increased by 85.5 percent for Energy Industries, 114 percent for transport, and 47.5 percent for Other Sectors. Conversely, it decreased by 13.7 percent for the Manufacturing Industries and Construction sector.

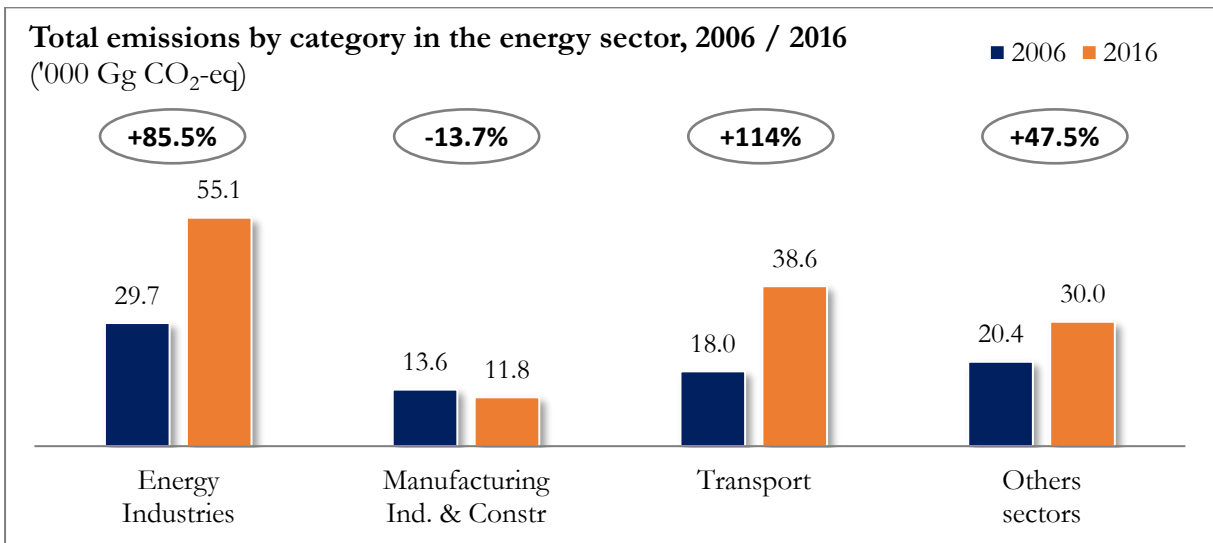


Figure 4-6. Change in total emissions by category in the energy sector in Nigeria in 2006 and 2016

Total aggregated emissions from the Energy sector increased from 116,057.44 Gg CO₂-eq in 2006 to 206,452.45 Gg CO₂-eq in 2016. Of the two primary sources, Fuel Combustion Activities recorded an increase of 206 percent compared to a decline of 1 percent for Fugitive emissions during the period 2000 to 2016. Fuel Combustion Activities contributed 65.6 percent of the energy sector’s total emissions in 2016, with the remaining 34.4percent originating from fugitive processes [6].

5. Energy sector governance — Policy Framework, Laws and Regulations

The Federal Government of Nigeria (FGN) presides over the extensive energy portfolio, including policy. The energy policy of Nigeria mainly encompasses the development and regulation of the petroleum and electricity industry. Both sectors were characterized by extensive government agencies responsible for many activities but have undergone significant changes in recent years. At

the federal level, Nigeria does not have one single ministry in charge of energy policy. The FGN has at least two ministries with responsibilities for energy: the Federal Ministry of Power (FMoP) and the Federal Ministry of Petroleum Resources (FMoPR) [10].

5.1. Electricity Market Policy and Strategy

All policy stems from the Electric Power Sector Reform Act of 2005. In line with its goals, a National Energy Master Plan (NEMP) was formulated with a short-term horizon of 18 months, culminating in an Electricity Master Plan in 2008. A roadmap for the sector's reform was drawn up and approved in 2010, based on which MYTO II was issued in 2012, while the grid and distribution codes were likewise set. In 2015 MYTO 2.1 was put into effect, delivering a revalidation of ATC&C losses as well as a minor tariff review. The TEM commenced with effect from 1 February 2015. The TEM is characterized by "contract-based arrangements for electricity trading and the introduction of competition for entry into the Market" [74]. This means that contracts bind all electrical trading arrangements. Hence Power Purchase Agreements (PPA), Vesting Contracts, and Gas Supply Agreements, executed during the privatization process, are effective now [75].

This overall process coincided with the preparation of the Gas Master Plan. During this period, the Renewable Electricity Action Programme, launched in 2006, was shored up first, in 2010, by the National Policy and Guidelines on Renewable Energy, and then in 2012 by the Renewable Energy Master Plan. The plan still has to be enacted but is consistent with the MYTO 2.1 tariff provisions for renewables. A National Renewable Energy and Energy Efficiency Policy (NREEEP) was developed in 2013–14 by the FMP and approved by the Federal Executive Council in May 2015. The draft Energy Efficiency Bill still awaits enactment. The same situation prevails regarding rural electrification. Despite having released an initial Rural Electrification Strategy and Implementation Plan in 2006 and this having progressed in various forms to culminate in the Rural Electrification Strategy and Plan, no legislation other than the general Power Sector Reform Act has been forthcoming. This means investors face a conundrum: The policy intention of buttressing renewables and rural electrification is clear, but as yet, there is no firm regulatory regime governing them. It remains to be seen whether the relatively high-level NREEEP can fill this void. Other than the Renewable Electricity Action Programme and the industry incentives for Renewable Energy (e.g., MYTO 2.1), to date, no mainline national programs are in place that complements the policy mix. These two programs are intended to support policymaking, but without clearly enacted laws or approved master plans, it is hard to see their impact. The central bodies of legislation (policy mix) and the various programs to support are targeted toward renewable energy sources, rural electrification, and energy efficiency measures in Nigeria [10].

5.2. Petrol Market Policy and Strategy

Several policy objectives have been developed in the fuel petrol sector. Firstly, the federal government in 2012 planned to remove subsidies paid for oil consumption in Nigeria. The subsidy savings were meant to be channeled to a fund (i.e., the Subsidy Reinvestment and Empowerment Programme [SURE-P]) and invest in infrastructural projects promoting private sector-led refining capacity and social empowerment initiatives. Secondly, the government developed a draft Petroleum Industry Bill (PIB), which defines all aspects governing Nigeria's petroleum sector's exploitation, administration, and organisation. Additionally, the PIB requires the management and allocation of petroleum resources through good governance, transparency, sustainable development, and economic value-added. The PIB is meant to supersede all previous petroleum-related laws. However, for several years, successive governments attempted to pass the PIB but without success. The current federal government has re-introduced a new PIB to the Parliament. The Bill passed its first reading in the Senate on 1 October 2020. The new Bill seeks

to provide legal, governance, regulatory, and fiscal framework for the Nigerian petroleum industry, host communities, and related matters.

6. Status of implementation of Nigeria's NDCs and energy sector policies

This section presents an initial review of Nigeria's NDCs. The Paris Agreement reached at the 21st Conference of Parties (COP 21) to the UNFCCC required Parties to pledge individual Nationally Determined Contributions (NDCs) focused on increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low GHG emissions development. This exemplified a shift away from the classifications be previous efforts such as Annex 1 (developing) countries and Non-Annex 1 (developing) countries. The NDC is currently a pivotal commitment to climate change response and action entered into by the Nigerian Government as part of a global agenda to fight climate change.

Table 4-1 presents the summary checklist of DMC INDCs, while Appendix 2 provides the INDC targets, priority measures, and financing requirements concerning ADB focus areas for the ADB active regions.

Table 6-1
Checklist on Nigeria's Nationally Determined Contributions (NDCs)

Target	Conditional	Reduce GHG emissions by 20% from (Business as usual) BAU levels (900 MtCO _{2e}) in 2030
	Unconditional	Reduce GHG emissions by 45% from (Business as usual) BAU levels in 2030
Adaptation	Priority Sectors	<ul style="list-style-type: none"> ▪ Agriculture ▪ Forests ▪ Energy ▪ Transportation and Communications ▪ Industry and Commerce ▪ Vulnerable Groups
Mitigation	Key mitigation measures	<ul style="list-style-type: none"> ▪ Economy-wide energy efficiency ▪ Efficient gas power stations ▪ Work toward ending of gas flaring ▪ Climate-smart agriculture and reforestation ▪ Reduce transmission losses ▪ Renewable energy ▪ Work towards off-grid solar PV

Source: Approved Nigeria NDC [11]

7. Assessing Nigeria's NDCs and energy sector policies

To achieve the Paris Agreement's goal and keep global temperature rise to less than 1.5°C above preindustrial levels, global greenhouse gas emissions must peak as soon as possible and then reduce rapidly to achieve zero net emissions in the second half this century. A rapid reduction in emissions from the consumption and production of energy will be necessary since these account for two-thirds of global emissions. To transition to low-carbon energy systems, renewable energy sources (hydro, solar, wind, bioenergy, and geothermal) need to replace carbon-intensive sources (oil, natural gas, and coal), alongside improved efficiency in the consumption and production of energy. Signatories to the Paris Agreement set out what they intend to achieve by way of emissions reductions in their Intended Nationally Determined Contributions (INDCs), which were submitted to the United Nations Framework Convention on Climate Change (UNFCCC). Upon ratification of the Agreement, these became Nationally Determined Contributions (NDCs), in most cases without change. Governments are now formulating plans for the delivery of NDCs. Collectively, the NDC fall far short of what will be necessary to achieve the Paris Agreement's

goals. However, the Agreement provides an opportunity for countries to review progress and revise their NDCs every five years. It will be a significant challenge for the parties to the UNFCCC to ensure that revised NDCs are as ambitious as possible and include all feasible energy emissions savings. The effectiveness of national energy policy will help achieve the Paris Agreement's objectives and the Sustainable Development Goals (SDGs).

An action plan to reduce energy-related emissions is not fully included in the Nigeria's NDC. It is not clear whether pledges in the NDC are consistent with existing national energy policies and plans. When they are, increased investment in renewable energy does not preclude increased emissions from fossil fuel energy. Access to modern energy services, one of the SDG targets, is mentioned in some NDCs with energy security, adaptation, and a co-benefit of the NDC's mitigation objectives. However, the NDC does not address how synergies between sustainable energy SDG and NDC objectives will be exploited. This work draws from this experience and further analysis to provide a perspective on the alignment of NDCs and national energy plans. Its purpose is to inform dialogue about objectives for energy-related emissions in developing country NDC implementation plans and revised NDCs, by highlighting opportunities for mitigation activities consistent with national energy goals. The study also identifies where revision of energy plans might enhance NDC implementation plans.

This section's objective is to review examples of what might be called good practice in the way NDCs have addressed energy-related greenhouse gas emissions and measures of NDCs that appear to be at odds with the ambition to reduce such energy emissions. To address these questions, the authors reviewed the objectives of Nigeria's NDCs and national energy policies.

7.1. Methodology

The critical questions in the study relate to coherence between NDCs and energy sector plans, the contribution of NDCs to development objectives, and whether national energy plans could help increase the ambition of NDCs. To address these, this study undertook a review of Nigeria's NDCs and energy policies/objectives. This study identified the content of Nigeria's NDCs related to energy production and consumption, which was then compared with the primary objectives identified in their current energy policies and plans. While the NDCs and energy policies often contain high-level objectives, this paper focuses on more specific energy objectives, particularly targets for emission reduction, renewable energy, and fossil fuels, along with projections for the power mix.

The NDCs and national policies and plans were located and accessed online. Also, the study reviewed the analysis and information provided in other cross-country studies or databases (e.g., Climate Action Tracker, Climatescope, International Renewable Energy Agency [IRENA], and International Energy Agency [IEA]). Data on greenhouse gas emissions came from Nigeria's First Biennial Update Report (BUR1), Nigeria's Third National Communication (TNC3), and the World Resources Institute's Climatewatch Data Explorer [12]. Furthermore, more ambitious renewable energy deployment targets were identified from studies that have modeled alternative low-emissions energy scenarios.

7.2. Findings

7.2.1. Nigeria's Nationally Determined Contribution (NDC)

Article 4, paragraph 2 of the Paris Agreement (PA) requires Parties to prepare, communicate, and maintain successive Nationally Determined Contributions NDCs which it wants to achieve. The country's pledges towards meeting the Paris Agreement are known as NDCs. Currently, parties are asked to submit an updated NDC every five years. Submissions are ongoing for 2020 and every five years afterward (e.g., by 2025, 2030). NDCs contain the post-2020 climate action plans of countries highlighting why it is crucial to have the Paris Agreement Work Programme (PAWP) fully agreed upon for robust implementation. Monitoring and accountability.

Nigeria ratified the PA on Climate Change on 16 May 2017. This Nigeria's INDC is a multi-sectoral policy document for the period of 2015-2030. In line with the PA, Nigeria pledged to reduce its GHG emissions as follows:

- a. Unconditional reduction of GHG emissions by 20percent by 2030
- b. Conditional reduction (on international support) of GHG emissions by 45percent by 2030

These reductions are compared to the Business as Usual scenario (BAU).

7.2.2. Energy sector policies, strategies, programs linked to climate change

The policy document search indicated that there exist several energy sector policy documents linked to climate change objectives. Some of these documents include:³

1. National Electric Power Policy (NEPP), 2001
2. National Energy Policy (NEP), 2003
3. National Power Sector Reform Act (EPSRA), 2005
4. Renewable Electricity Policy Guidelines (REPG), 2006
5. Renewable Electricity Action Programme (REAP), 2006
6. Roadmap for Power Sector Reform, 2010 and 2013 (Update)
7. Renewable Energy Master Plan (REMP), 2005 and 2012 (Update)
8. National Renewable Energy and Energy Efficiency Policy (NREEEP), 2015

This study focuses on the National Renewable Energy and Energy Efficiency Policy (NREEEP) of 2015 and the Renewable Energy Master Plan (REMP) of 2005 and 2012. The NREEEP was developed by the Federal Ministry of Power in 2013/14 and was approved by the Federal Executive Council in May 2015. This policy can be regarded as an umbrella document consolidating the various other afore-mentioned policies and strategies in one document stipulates that existing policies lack a coherent and all-encompassing framework that drives the sector and therefore calls for an integrated renewable energy and energy efficiency policy which will serve as a useful vehicle that limits conflicts in the future and promotes development and deployment of renewable energy technologies in Nigeria [13]. This policy on renewable energy and energy efficiency sets out a framework for addressing Nigerians' challenge of inclusive access to modern and clean energy resources, improved energy security, and climate objectives. It aims at raising the national significance of renewable electricity generation activities by providing for the development, operation and maintenance, and upgrading of new and existing renewable electricity generation activities.

7.2.3. Energy objectives in the NDCs and National Renewable Energy and Energy Efficiency Policy

The current NDC recognizes the central role of energy in the growth and development of Nigeria's economy. The NDC describes the energy sector as crucial to the achievement of the Paris Agreement in this regard. The mitigation and adaptation actions included in the NDC in no small extent implement or enforce existing policies or strategies. In terms of mitigation, to attaining the unconditional mitigation target, key measures include: establishing 13 GW of off-grid solar PV; increasing energy efficiency by 20 percent; and ending gas flaring by 2030. Critical steps for attaining the conditional mitigation target, in addition to the measures for the unconditional target,

³ For a brief review of these policies, please see The Nigeria Energy Sector: An overview with a special emphasis on renewable energy, energy efficiency and rural electrification [10].

include further increases in energy efficiency, a significant reduction in the use of generators, and providing energy access to all Nigerians (Table 3-1).

While the NDC demonstrates the commitment of Nigeria to contribute to the success of the Paris Agreement and the sustainable development of the Nigerian economy, the Nigerian economy is heavily dependent on the energy sector's revenues, primarily through the production of oil and gas, which accounts for about 90% of exports and 15% of economic output. Consequently, energy plays a significant role in the country's climate policy. Therefore in revising Nigeria's NDC, the energy sector should be extensively analyzed for future opportunities to improve the environment

Table 7-1.

Energy commitments identified in Nigeria's NDC

NDC target year	Renewable energy	Energy efficiency	Energy access	Fossil fuels	Energy emissions
2030	13 GW solar PV capacity (off-grid)	30 percent energy efficiency improvement by 2030 (at 2 percent annual improvement)	Off-grid PV, Efficient gas generators	End gas flaring by 2030. Biodiesel fuel blending; ending gas flaring by 2030	476 million tonnes potential GHG emissions reductions per year by 203 through: <ul style="list-style-type: none"> ▪ Energy efficiency: 179 ▪ Efficient gas power stations: 102 ▪ Ending of gas flaring: 64 ▪ Reduce transmission losses: 26 Renewable energy: 31

Measures: Clean Technology (Transport shift - car to bus)

Source: Nigeria's NDC (2016): [https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Nigeria First/Approved Nigeriapercen27s INDC_271115.pdf](https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Nigeria%20First/Approved%20Nigeria%20INDC_271115.pdf)

Table 7-2.

Energy commitments identified in the National Renewable Energy and Energy Efficiency Policy

Policy	Target year	Generation capacity	Renewable energy	Energy efficiency	Energy access
		▪ 33 GW installed capacity by 2020	▪ 18 percent of planned capacity for 2020; 20 percent of capacity by 2030	▪ Increase energy efficiency by at least 50 percent by 2030	▪ 100 percent access to electricity by 2030. 80 percent of traditional firewood consumption replaced by improved cookstove technology by 2030
NREEEP	▪ 2025/2030	▪ 68 GW installed capacity (on-grid and off-grid electricity) by 2020	▪ 75 percent electricity generation from renewables by 2025	▪ Increase energy efficiency by at least 40 percent by 2030 (at 2.5 percent annual improvement)	▪
REMP	2025	▪ 10 percent renewable energy share in the total energy consumption	▪ 23 percent increase in renewable electricity planned for 2025	▪	▪

Source: Nigeria's Federal Ministry of Power (2015):
<https://www.power.gov.ng/download/NREEEPpercent20POLICYpercent202015-percent20FECpercent20APPROVEDpercent20COPY.pdf>

7.2.4. Gap analysis of the Nigerian NDC concerning energy sector policies

1. **Differences in Ambition/over-dependence on Solar PV:** the current NDC proposed to achieve, simultaneously, improved access to energy for Nigerians, incremental energy efficiency, and reduction in energy-related emissions. The NDC goal of achieving 13GW through only off-grid solar PV appears rather too ambitious. The NREEEP's goal to generate 68GW from both on-grid and off-grid sources seems more realistic than the NDC's only off-grid source for household and productive uses, which is not reflected in the existing NDC. This suggests that the target of 13 GW renewable energy penetration will not be met due to the excessive dependence on only solar PV electrification. Furthermore, the data and methodology underlying the ambition is weak at best.
2. **Absence of residential energy use and emissions strategy:** the residential sector is the largest consumer of TFC (see Figure 1-1) and contributor to energy-related emissions in Nigeria. Consequently, the residential energy transition is a critical component of socio-economic development and climate change policy-making. The residential sector relies on a mix of non-clean energy sources such as biofuels and waste, wood, wood waste, charcoal, and HHK for cooking and heating energy requirements (Figure 1-3). About 50 percent of the rural population in Nigeria relies on using these non-clean energy sources in the residential sector. According to the IEA, only about 10 percent of the population has access to clean cooking energy sources [9]. The current NDC makes no clear strategy to address the energy transition needs of the residential sector, especially in the rural sector. An ambitious focus on clean cooking alternatives such as off-grid enhanced biomass cookstoves, in line with the National Gas Policy, presents an opportunity to improve the NDC's energy sector goals in the residential sector.
3. **Focus on off-grid renewable energy applications:** the new NDC does not consider on-grid renewable energy applications or policy and institutional frameworks to scaling up mini-grids. Nigeria's mini-grid electricity market is rapidly growing, with emerging best practices in energy generation, while transitioning from grant and seed capital to private debt and equity to support over 9 million households. The mini-grid electricity market could be boosted by proper policy implementation across the country's renewable energy value chain to accelerate its development. Furthermore, the current NDC's focus on off-grid (supply-side) energy solutions does not augur well with expectations that on-grid energy demand increases in the country due to an increase in the formal sector and an increase in on-grid economic activities. Thus, the combination of off-grid and on-grid renewable energy solutions serve as an opportunity to improve current NDC energy generation objectives.
4. **Tracking the progress of implementation of the NDC:** Since signing and ratifying the NDC, the country has shown commitment in implementing projects/initiatives in the energy sector with emission reduction potentials. This is interesting development. However, there is no clear system in place to track the volume of emissions reduced/mitigated from the projects. This definitely affects the reporting of the implementation of the NDC in the country. An exception is the solar hybrid project in the Alex Ekwueme Federal University Ndufu-Alike. The project, which was an initiative of the Rural Electrification Agency's Energizing Education Programme, has a system for recording the amount of carbon dioxide equivalent saved by the project. This may also be

the case with similar other Energizing Education Programme projects currently running in the country. It is also important to note that the Department of Climate Change of the Federal Ministry of Environment, Abuja has created an NDC registry. This registry is open to all stakeholders implementing projects with emission reduction potentials to submit the details of the initiatives on the portal. The Department of Climate Change, perhaps in the future, may collect and collate the details of the projects registered on the portal and analyse where necessary.

5. **Excessive focus on supply-side energy efficiency:** the current NDC does not make clear the different demand- and supply-side energy efficiency strategies. Effectively, the current NDC excessively focuses on the supply side of the energy generation, transmission, and distribution to the detriment of demand-side energy efficiency. The supply-side efficiency is driven by technological advancement (i.e., upgrading gas-fired power plants, more efficient transmission and distribution, and waste heat capture). While useful for reducing energy use, pollution, and productivity growth, these measures may prove exorbitant for a developing country like Nigeria to rely on for efficiency goals. In addition to technological advancement, consumer behavior (demand-side) is a critical driver of efficiency. For example, household adoption of smart energy management systems could moderate or reduce energy consumption and, consequently, emissions. The NREEEP recognizes households' role (demand-side) in energy efficiency through simple household energy management techniques. This informed the 40 percent energy efficiency target by 2030. The policy objective in the NREEEP indicates that the Nigerian government has already set supply-side and demand-side efficiency in motion. By contrast, the NDC is focused mainly on supply-side objectives. An improvement in the objectives and measures to achieve holistic energy efficiency by including the demand-side is necessary for improving Nigeria's NDC. The NREEEP target of 40 percent energy efficiency by 2030 far exceeds the NDC's 30 percent energy efficiency for the same target year: 2030. inattention

8. Mapping of finance flows for renewable energy

Substantial financial resources are needed to support the various aspects of the NAP process in Nigeria. Apart from the country's sheer size, the diversity of ecological and social systems, which require variable adaptation strategies, implies that the NAP process will require significant resources. The funds needed to undertake climate adaptation have to be mobilized from various sources. Climate finance can come from both private and public sources and can flow domestically or internationally. These can be divided into three primary sources: budgetary allocation from the federal (and possibly) state governments; international climate financial support, bilateral and multilateral; and private sector funding.

Table 8-1.

Bilateral and multilateral financial flows for climate change action in the Nigerian energy sector, 2018-2020

Category	Source	Description	Objective	Duration	Amount	Co-funding
Public	Federal Government	For programs and projects with green credentials that will be funded by the Federal budget	Mitigation/ Adaptation	2017	\$29,700,000 (1 st Tranche)	NA
	Green Bonds				\$40,000,000 (2 nd tranche)	

Public	European Development Fund*	Grant - Overarching support for national priorities including Vision 2020 via EU/Nigeria National Indicative Program	Mitigation/ Adaptation	2014-2020	\$686,000,000	NA
Public	EU*	Assistance	Mitigation	2014-2020	£512,000,000	NA
Public	Solar Nigeria	Technical Assistance	Mitigation	2014-2020	£40,734,781	NA
Public	DFID*	Grant - Support for private sector solar projects	Mitigation	2014-2020	\$22,000,000	NA
Public	German Ministry of Cooperation & Development	Grant - Promoting clean energy investment through the Ministry of Power and five states	Mitigation	2013-2018	\$27,000,000	NA
Public	World Bank/Nigeria Erosion & Watershed Management Project (NEWMAP)	Loan/grant - Addressing erosion challenges in eight states	Adaptation/ Mitigation	2012-2018	\$509,500,000	Each state N500m (\$1,515,150)

Note: Funding includes other sectors such as agriculture, water, etc. NA implies "Not applicable."

Source:

9. NDC Implementation Status Specific to the Energy Sector

Nigeria has implemented several programs to achieve the targets set in the energy sector component of the NDC. These programmes are briefly presented below:

Energy

Diversification



Diversification of Nigeria's energy mix with an increasing percentage of rural electrification projects being off-grid renewable energy technologies

Green Bonds



Issuance of foreign green bond and the first Climate Bonds Certified Sovereign Bond. This fund has been allocated to finance three government renewable energy projects – the Renewable Energy Micro-Utilities Programme, the Re-Energizing Education Programme, and the Afforestation Programme.

Professional and technical courses on renewable energy



There is also the development of professional and technical courses on renewable energy and energy efficiency by development partners such as the GIZ in collaboration with the National Power Training Institute of Nigeria and private training centers to build local skills in the sector

10. Case studies of climate change adaptation/mitigation actions in the energy sector

This section presents case studies of climate change adaptation actions in the Nigerian energy sector, with details of the project cycle. These case studies are based on a review of project documents accessed from the relevant implementing entity.

10.1. Case study 1: 1 Megawatt Off-grid Solar Power Plant Rural Electrification

The Nigerian Federal Government, through the Rural Electrification Agency (REA) and the Energizing Education Programme (EEP), is developing off-grid, dedicated, and independent power plants to supply clean and reliable power to 37 federal universities and seven affiliated university teaching hospitals. It will also provide street lighting for illumination and safety and a world-class renewables training center at each of the EEP beneficiary institutions [14]. The current case study focuses on the 1 Megawatt Off-grid Solar Power Plant project implemented in one of the beneficiary institutions — Alex Ekwueme Federal University Ndufu-Alike in Ebonyi State.

Table 10-1.

Installation of 1 Megawatt Off-grid Solar-powered mini-grid rural electrification at Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State

Background Information about the Project

Type of project	Adaptation and Mitigation
Number of beneficiaries	9,519 <ul style="list-style-type: none"> ▪ Students (7,700) ▪ Staff (1,819)
The capacity of Current Petrol and Diesel Generators (to be removed when the solar power project is operational)	1.54 Megawatts
Annual Carbon Dioxide CO ₂ Savings	8,139,208Ibs
Total Installed Capacity of Solar Hybrid Power Plant	2.8 Megawatts
Project status	Operational



Figure 10-1. Solar Power Plant, Alex Ekwueme Federal University Ndufu-Alike, Ebonyi State

Background

Nigeria's per capita on-grid energy consumption is deficient—estimated at 144 kWh per capita annually. The Nigerian electricity grid is unable to provide the needed capacity and reliability to meet expanding demand. In 2019, Nigeria's total on-grid installed capacity was estimated to be about 12,500 Megawatts (MW), while the available on-grid capacity was estimated at between 4000MW and 7,000 MW. Simultaneously, the total on-grid electricity demand was about 51,000 MW. This suggests that the upper limit of the available on-grid capacity was about 86 percent less than the total on-grid demand. Like the rest of Nigeria, the on-grid electricity supply to Ebonyi State is lower than electricity demand. The inadequate electricity generation and distribution have thus forced many households to depend on off-grid, emission-producing, alternative energy sources such as petrol, diesel, kerosene, coal, and fuelwood for their energy need [15].

11. Recommendations

Nigeria has put in place several complex and ambitious climate change governance mechanisms. However, as the country moves towards reviewing its climate objectives contained in the NDC, it needs to address several significant challenges: differences in ambition and over-dependence on solar PV, absence of residential energy use and emissions strategy, focus on off-grid renewable energy applications while ignoring on-grid renewable energy applications, and excessive focus on supply-side energy efficiency. Based on the analysis, the following recommendations were made:

1. Rather than focus solely on solar PV, effort should be geared towards a more robust energy mix that includes other renewable sources such as wind and hydropower;
2. Prioritize the residential sector energy consumption as a critical component of climate policy while driving the adoption of clean cooking and heating technologies such as enhance biomass cookstoves.
3. Integrate off-grid and on-grid renewable energy applications.
4. Recognize the critical role of consumer behavior and demand-side energy efficiency in addition to supply-side driven energy efficiency. Create incentives to boost the demand-side adoption of clean energy technologies.
5. Encourage all stakeholders implementing projects with emission reduction potentials to submit details of the project on the NDC registry. Strengthen and support the Department of Climate Change to collect, collate and analyse all data on projects with emission reduction potentials submit to the registry with a view to tracking the extent of implementation of the NDC.

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