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JUST ENERGY TRANSITIONS AND PARTNERSHIPS IN AFRICA: A NIGERIA CASE STUDY

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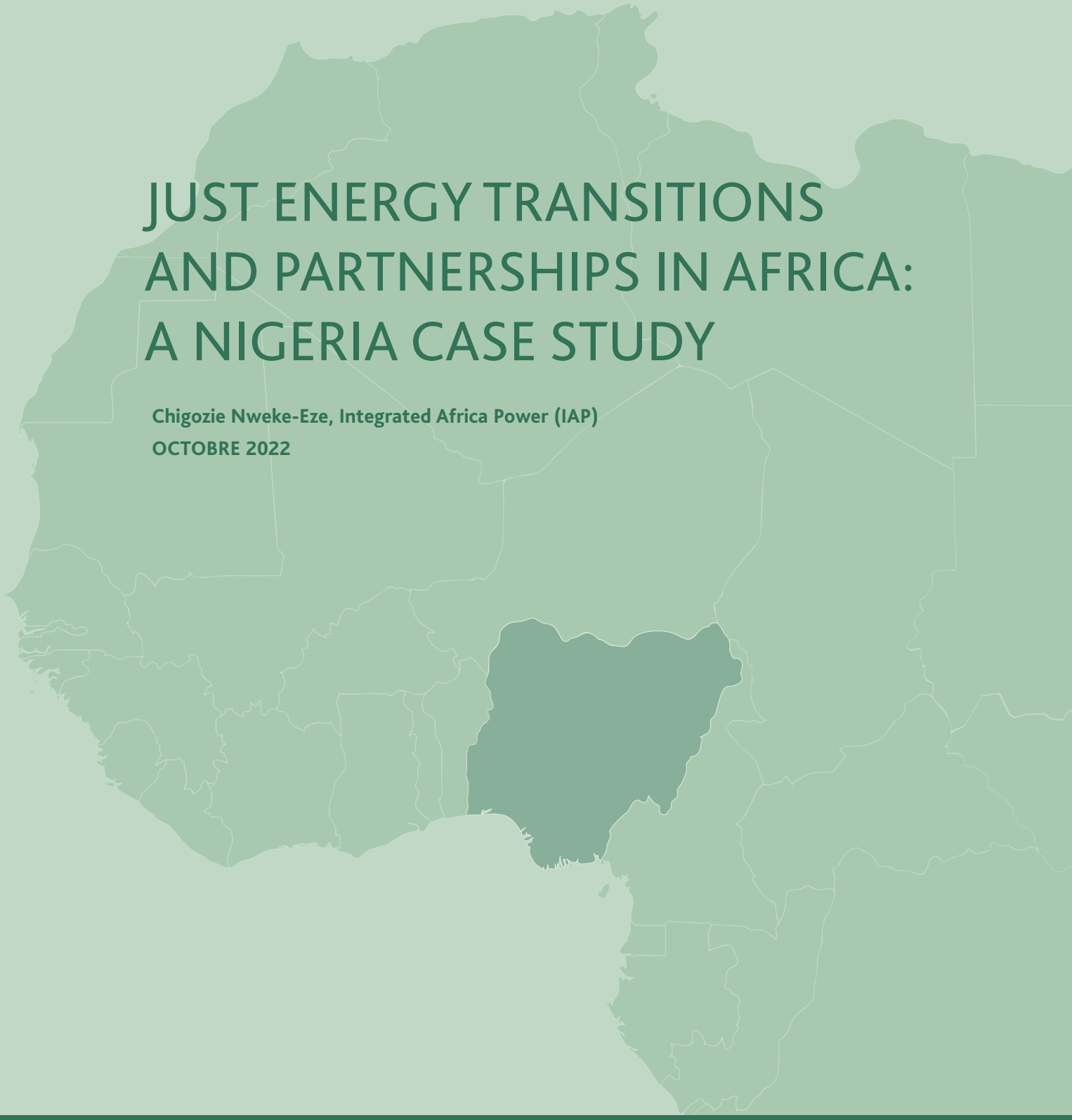

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The Ukama platform aims at building an informal dialogue process between a diversity of African and European experts bringing together perspectives of the Europe-Africa cooperation, including Climate, Sustainable Development, Economic transformation, International Cooperation, Finance and Trade to facilitate the emergence of such shared expectations. The main objective of the platform is to convene critical thinkers to help set out the themes and issues that are relevant for shared sense of prosperity for Africa and Europe.

ENERGY TRANSITIONS AND JUST ENERGY TRANSITION PARTNERSHIPS IN NIGERIA

A summary of the landscape – socioeconomic situation, policy, outlook

Nigeria, located in West Africa with an area of 924,000km^2, is blessed with abundant Renewable Energy Resources (RER), which can potentially provide enough capacity for substantial electricity generation. Yet, Nigeria is one of the lowest renewable energy consumers per capita in Africa, with the country still largely dependent (75%) on gas fire powered stations for its electricity. The current primary energy- mix for electricity generation of Nigeria is about 70% thermal, and it is predominantly from inefficient natural gas technology alongside some poor-burning coal-fired generating stations. The remaining electricity supply is from the hydro sources with negligible contributions from Renewables (wind and solar). A large portion of the country's population depends on inefficient and costly diesel and petrol combustion engine generators to meet their inevitable energy needs.

The daily solar energy density is around 12.6 MJ/m^2/day in the southern part and 25.2MJ/m^2/day in far north close to the Sahara with a mean generation capacity factor of 27%[1]. The estimated generation capacity for solar PV in Nigeria is around 43,000 MW using the data obtained for the solar energy-rich northern and central regions, of which a very little portion has been yet utilized[2]. There is moderate potential for wind energy production in some part of the north and the coastal region of the country; with a pilot wind farm being constructed in Katsina[3]. Nigeria is rich in energy resources that can make the country a world leader but this abundance of resources has not translated into commensurate levels of energy prosperity for the populace. Nigeria's vast resources are not just the available hydrocarbon but also the superabundant renewable energy resources. Regarding hydrocarbons, Nigeria has coal, crude oil, and natural gas. The country is well situated in the Tropical Savanna and is under the sunbelt. This is why there is an even distribution of sunshine across the country. Other renewable energy sources include wind, biomass, small hydro, and large hydro.

According to the World Bank, almost 45% of the Nigerian population are still without access to electricity[4]. This means that about 99 million Nigerians do not have access to electricity. The Energy transition, therefore, to Nigeria is not just an opportunity to change the energy production sources from fossil to clean sources that are less environmentally damaging but also a chance to realise potential economic gains that increased energy access, using modular renewable energy technologies, can bring. The majority of the Nigerian people use biomass for their cooking. Energy transition, for Nigerians, is still a mix of moving from woodfuel to comparatively cleaner energy sources. With the tested capacity of clean energy technologies, especially solar PV, there is an advantage of increasing energy access especially to the last mile communities, in Nigeria. The country hopes to attain Net Zero by 2060.

Nigeria ranks 19th in the world with 36 billion barrels of proven crude oil reserves. The Natural gas reserves are at 5, 760 billion cubic meters as of 2021 (OPEC, 2021). The Director of the Department of Petroleum Resources (DPR), a body vested with the responsibility of regulating the Nigerian oil and gas industry before the implementation of the updated Petroleum Industry Bill (PIB), disclosed that efforts are being exerted to increase the gas reserves of the country through increased exploration activities (DPR, 2021). The fight against climate change has called for cleaner use of energy resources, and even at this, Nigeria is not at a disadvantage. The federal government of Nigeria is currently investing in the available renewable energy resources through its operating agency, the Rural Electrification Agency (REA). Activities of the REA are

geared at utilizing the abundance of solar energy in Nigeria towards filling the energy gap ravaging the country. The intermittent nature of solar energy is a perceived challenge that needs to be solved. Hydrogen fuel is seen as one potential solution to solve the challenge of energy storage of renewable energy sources (RES) by converting the energy produced, through solar photovoltaics, into hydrogen. This energy that is easily stored, and for longer, can then be converted into electricity for various uses. This creates an opportunity to diversify the usefulness of the growing mini-grid portfolio across Nigeria, leading to more economic gain for the country.

There are several other less used energy resources in Nigeria such as coal and lignite, tar sands, small and large hydro, fuelwood, wastes from bio-agricultural produce and energy crops.

Nigeria's installed electricity grid capacity currently comprises 28 generation stations – three hydroelectric stations (Shiroro, Kainji, and Jebba) and 25 gas-fired stations[5]. These generation stations have an installed capacity of 13,000 MW, of which roughly 5,000 MW is currently being distributed to Nigerians. In 2021, the national grid provided for 51.2% of power, gensets contributed 48.6% of power, and the off-grid renewable energy sector amounted to a mere 0.1% of power[6,7]. While distribution is limited due to barriers such as gas shortages, water levels in hydroelectric dams, and poor infrastructure, ongoing efforts including

1 Ohunakin et al., 2014. https://www.sciencedirect.com/science/article/abs/pii/S1364032114000240

2 Africa-EU Energy Partnership, 2015, https://energy.ec.europa.eu/topics/international-cooperation/key-partner-countries-and-regions/sub-saharan-africa/africa-eu-energy-partnership_en

3 Brimmo et al., 2017. https://ideas.repec.org/a/eee/rensus/v74y2017icp474-490.html

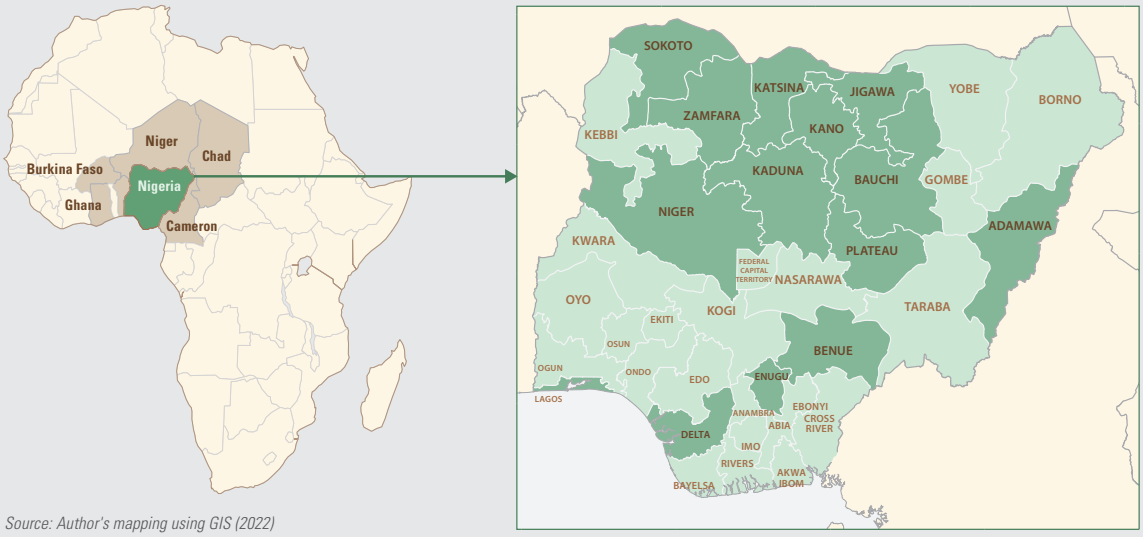
4 Access to electricity (% of population) - Nigeria | Data (worldbank.org), Source: https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=NG

5 "Why Nigeria's Power Sector Suffers Low Gas Supply Despite having Africa's Largest Reserve," 2021. https://www.premiumtimesng.com/news/top-news/450482-analysis-why-nigerias-power-sector-suffers-low-gas-supply-despite-having

6 Nnodim, Okechukwu. "Generators provide 48.6% of electricity in Nigeria –NBS." Punchng.org. 19 December 2021. Source: https://punchng.com/generators-provide-48-6-of-electricity-in-nigerianbs/#:~:text=Generators%20powered%20by%20petrol%2C%20diesel,the%20National%20Bureau%20of%20Statistics.

7 Anumihe, Isaac. "Generator economy: Nigerians spend $22bn yearly on fuel –Report" Sun News Online. 20 April 2021. Source: https://www.sunnewsonline.com/generator-economy-nigerians-spend-22bn-yearly-on-fuel-report/

Figure 1. Map of Africa highlighting Nigerian boarders and Nigerian Map showing states with RER potentials



Source: Author's mapping using GIS (2022)

Nigeria's Presidential Power Initiative (PPI) signal progress for the sector[8]. The PPI has the potential to mobilize strategic infrastructure investments and targets increasing power delivered to Nigerians to 7,000 MW, 11,000 MW, and 25,000 MW by 2021, 2023, and 2025 respectively.

This current electricity generation capacity is grossly inadequate to meet the current electricity demand of the country which presently stands at 50,820 MW and is projected to reach 77,450 MW by 2025 and 119,200 MW by 2030. As a result, nearly 77 million Nigerians are currently without access to electricity[9]. In addition, the country's power grid has been plagued with frequent system collapses that have resulted in nationwide blackouts. Main issues that need to be addressed include infrastructure constraints, End-User Tariffs/Pricing, and inconsistency in sector governance[10]. According to data from the Transmission Commission of Nigeria (TCN) from 2013-2020, the grid has experienced 84 and 43 complete and partial collapses respectively[11]. To overcome these challenges, there is a need for increased investments in the sector while tariff management is made a priority. This would mean that consumers are properly priced in a way that reflects the cost of electricity production. The investments will go a long way in reducing the infrastructural debacle in the transmission sector of the Nigerian electricity supply industry.

With a GDP of NGN 157.1 trillion (US$405 billion) and a growing population (currently 201 million), around 45% of Nigerians are still without access to electricity supply[12]. Due to the unreliable electricity supply from the national grid, Nigerians spend an estimated NGN 5 trillion (US$14 billion) annually on power generation using small petrol or diesel generators that are both expensive and release harmful emissions into both the immediate and global environments [13].

8 "Nigeria's Power Sector in 2020," Energy Central, 2020. Source: https://energycentral.com/news/nigeria%E2%80%99s-power-sector-2020

9 ACE TAF, "Stand Alone Solar Market Update Nigeria," 2021

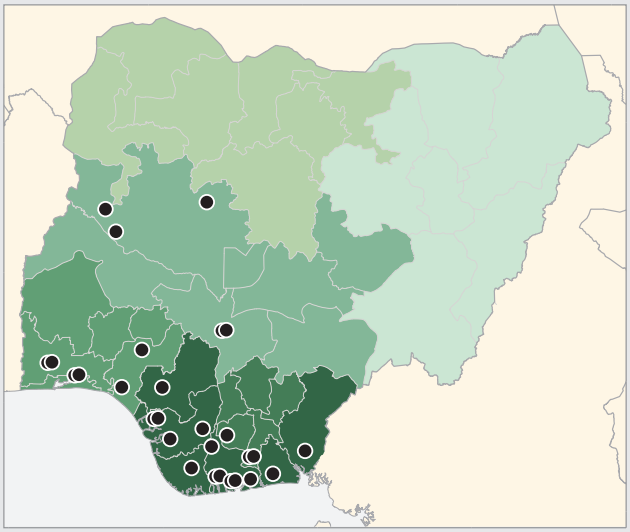
10 "Challenges and Interventions Needs in the Nigerian Electricity Supply Industry (NESI)," Centre for the Study of Economics of Africa, Source: https://cseaafrica.org/challenges-and-interventions-needs-in-the-nigerian-electricity-supply-industry-nesi/

11 "Nigeria's National Power Grid Collapses Plunging Parts of Country into Blackout," Newsweek, 2021

12 "Population, Total – Nigeria," The World Bank, Source: https://data.worldbank.org/indicator/SP.POP.TOTL?locations=NG

13 "Making Nigeria Generator Free: The Solar Killed the Generator Star" Project.," AE21, 2019. Source: https://a2ei.org/resources/uploads/2019/06/A2EI_solar_killed_the_generator_star.pdf

Figure 2. Summary of Access to Electricity and Location of Power Stations in Nigeria



Reference: Adewuyi, Kiptoo, Afolayan, Amara, Alawode & Senjyu (2020). Challenges and prospects of Nigeria's sustainable energy transition with lessons from other countries' experiences, Energy Reports, Vol. 6: 993-1009. https://www.sciencedirect.com/science/article/pii/S2352484719308832

Source: Adapted from Adewuyi et al (2020)

What is the state of the debate/ discourse on energy transition and JETP?

Nigeria is a country rich in energy resources, including coal, biomass, crude oil and natural gas. The country also has abundant natural resources that favour it in being a major renewable energy producer. In 2019, primary energy consumption for Nigeria was 1.7 quadrillion btu[14]. Generally, Nigeria's energy consumption is predominantly traditional biomass and waste. These accounted for 73.5% of the country's primary energy consumption in 2018. Fossil fuels supplied 26.4% of the energy consumed, and hydropower was responsible for the remaining 1%[15].

Nigeria's energy supply comes predominantly from biomass and petroleum products. 80% of the country's electricity is produced using natural gas[16]. The remainder of power generation is from oil and the country is acknowledged even by the International Energy Agency (IEA) as the biggest user of oil-fired backup generators in Africa. In addition, universal energy access in Nigeria is still a far cry, as the 2030 target may need some doubling down if it will be achieved. Currently, energy access is at 57%, according to the World Bank[17], and socio-economic development is an issue of major concern in Nigeria.

Innovative solutions are being deployed in solar off-grid across the country, with specific attention given to rural communities without electricity.

In 2020, the federal government has announced the "decade of gas" expressing the willingness to ramp up local consumption of natural gas, helping those in rural communities and urban dwellers to adopt the use of natural gas for cooking purposes, away from traditional biomass. The use of gas is also allotted a prominent role in the country's Energy Transition Plan of 2022. With an average low emission level compared

14 Nigeria Primary energy consumption, 1949-2021 - knoema.com, Source: https://knoema.com/atlas/Nigeria/Primary-energy-consumption

15 (PDF) A Review of Nigerian energy Policy Implementation and Impact (researchgate.net) Source: https://www.researchgate.net/publication/332118886_A_Review_of_Nigerian_energy_Policy_Implementation_and_Impact

16 Nigeria Energy Outlook – Analysis - IEA, Source: https://www.iea.org/articles/nigeria-energy-outlook

17 Nigeria to Improve Electricity Access and Services to Citizens (worldbank.org), Source: https://www.worldbank.org/en/news/press-release/2021/02/05/nigeria-to-improve-electricity-access-and-services-to-citizens

Figure 3a. Nigerian primary energy supply forecast with the least development effort possible on all options

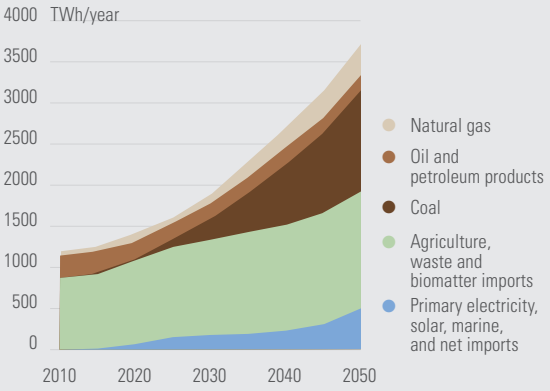
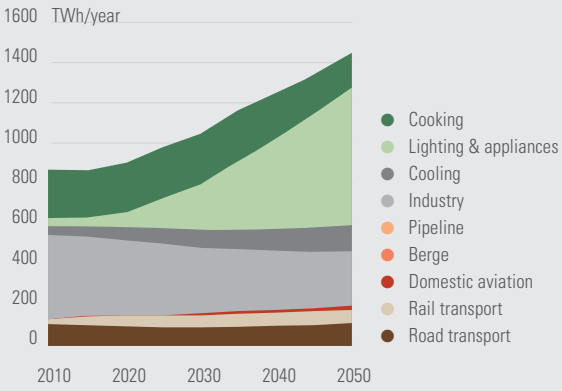


Figure 3b. Nigerian energy demand forecast by sector with the least development effort possible on all options



Reference:
Musbaudeen O B, Abdallah D, Adetunji A, Ahmed S, Ahmed Y, Ayoola B, Idowu A, Isa K, Oluwadamilola P and Wasiu S (2019).
A review of Nigerian energy policy implementation and impact. DOI: 10.13140/RG.2.2.10422.14408
https://www.researchgate.net/publication/332118886_A_Review_of_Nigerian_energy_Policy_Implementation_and_Impact?channel=doi&linkId=5ca216b5a6fdcc1ab5ba077d&showFulltext=true

Source: Adapted from, Musbaudeen et al. (2019)

to fuel oil and coal, natural gas emits 12.3%eq CO_2 to produce one kWh of energy. The Energy transition, therefore, to Nigeria is not just an opportunity to change the energy production sources from fossil to clean sources that are less environmentally damaging but is also seen as a chance to realize potential economic gains that increased energy access, using modular renewable energy technologies, can bring. Currently, the majority of Nigerian people use biomass for their cooking.

Energy transition, for Nigerians, is still a mix of moving from wood fuel to cleaner energy sources like solar PV, biofuels and other clean energy sources. With the tested capacity of clean energy technologies, especially solar PV, there is an advantage of increasing energy access, especially to the last-mile communities in Nigeria. Since Nigeria's economy is heavily dependent on oil and gas, both for local economic activities and economic spending, as a result of the revenue generated from them.

However, Nigeria must now look at diversifying its energy business to avoid stranded assets in a world where countries are deliberately cutting off their consumption of fossil fuels for clean energy. The country hopes to attain Net Zero by 2060. In terms of Natural gas consumption, Nigeria ranked 38th in the world as of 2017. This is about 0.5% of the world's total consumption of 132,290,211 MMcf[18]. In achieving energy transition in Nigeria, the government of Nigeria has identified natural gas as a major enabler helping the country edge closer to its decarbonisation goals. It is believed that gas will emerge as a significant player in establishing baseload energy capacity, and stabilization of the national grid alongside the integration of variable renewable energies. It is also going to help reduce the clean cooking gap through the use of Liquefied Petroleum Gas (LPG) in the country[19].

The Nigerian Inter-Ministerial Energy Transition Implementation Working Group (ETWG), supported by the Energy Transition Office (ETO) stated during the launch of the Energy Transition Plan (ETP) that for ETP to be actualized, it will require USD 410 billion until 2060 to deliver and achieve the goals on renewable energy, power sector reforms, clean cooking, etc. This translates to a cost of $10 billion annually.

The objective of the Nigerian Energy Transition Plan includes:

- Serving as a guide to Nigeria in its commitment and ambition to achieving carbon neutrality
- Reducing energy poverty among Nigerians and ensuring reduced poverty rates among 100 million people by successfully managing the long-term job loss in the petroleum sector that will arise from decarbonization
- Driving economic growth in all commercial industries and sectors in the country
- Creating awareness of energy transition planning in other African countries to achieve a just and equitable climate future for all. The plan does lay out the strategy with which this will be done; however, bilateral agreements with neighbouring African countries are expected to be engaged
- Creating novel opportunities for solar energy companies to obtain results-based finance from the Universal Energy Facility
- Mobilizing support from international partners for the country's energy transition by showcasing existing support for data-driven energy transition planning from international partners
- Increasing electricity access for Nigerians, achieving universal power access by 2030
- Mobilizing investments and private sector involvement by creating significant market opportunities in the energy transition process

The ETP indicates that gas consumption will grow by about 25% above the 2019 baseline by 2030, before declining to approximately 50% of the 2019 value as we approach our 2060 deadline for carbon neutrality. In 2019, Gas Consumption in Nigeria was about 2.9 trillion cubic feet (tcf), with Buildings(Cooking), Power, Industry and Export accounting for approximately 1.7 tcf (60%). Post-2030, gas consumption is expected to reduce due to declining global demand and transition activities.

18 Nigeria Natural Gas Reserves, Production and Consumption Statistics - Worldometer (worldometers.info), Source: https://www.worldometers.info/gas/nigeria-natural-gas/

19 Natural Gas – Nigeria Energy Transition Plan, Source: https://www.energytransition.gov.ng/natural-gas/#:~:text=Nigeria%E2%80%99s%20Energy%20Transition%20Plan%20%28ETP%29%20recognizes%20the%20role,considerations%2C%20Gas%20features%20critically%20in%20the%20nation%E2%80%99s%20ETP.

Nigeria has a total installed generation capacity of 13 GW, a growth from the 4.5 GW point that was recorded in 2015. The majority of the electricity generation is from natural gas and the rest comes from hydro and some other renewable energies. As of 2020, 20% of the total electricity capacity in Nigeria was from renewables. According to the World Bank, about 47% of the Nigerian population is still without access to electricity[20]. This means that about 99 million Nigerians do not have access to electricity. Reportedly, in 2020, about 84% of people in the urban region had access to electricity[21], while just 24.6 % of those in the rural communities had access to electricity.

With several initiatives in place like the Presidential Power Initiative (PPI) and the Institutional development of the Rural Electrification Agency, Nigeria plans to ramp up its energy access and close the energy access gap through a range of interventions, including the use of renewables and gas.

Main fuels used in Nigeria for cooking are kerosene, LPG, charcoal, wood, and electricity, when and where available. Animal and crop residues are also used in some rural communities[22]. According to the Heinrich Boll Foundation in Nigeria[23], 68.3% of all households use solid biomass for cooking in Nigeria[24], while only 10.5% use gas and 19.8% use kerosene. Only 1% of Nigeria's households use electricity for cooking. With current population estimates, more than 180 million Nigerians lack access to clean-cooking fuels and technologies.

There is a strong elasticity between income level and fuel type used. When household income increases, the use of firewood decreases in favour of LPG. In the Nigerian Energy Transition plan, the Nigerian government plans to reduce emissions primarily by a shift to electricity and biogas-based cooking mainly in rural homes post-2030. There will be a speedy replacement

20 Access to electricity (% of population) - Nigeria | Data (worldbank.org), Source: https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=NG

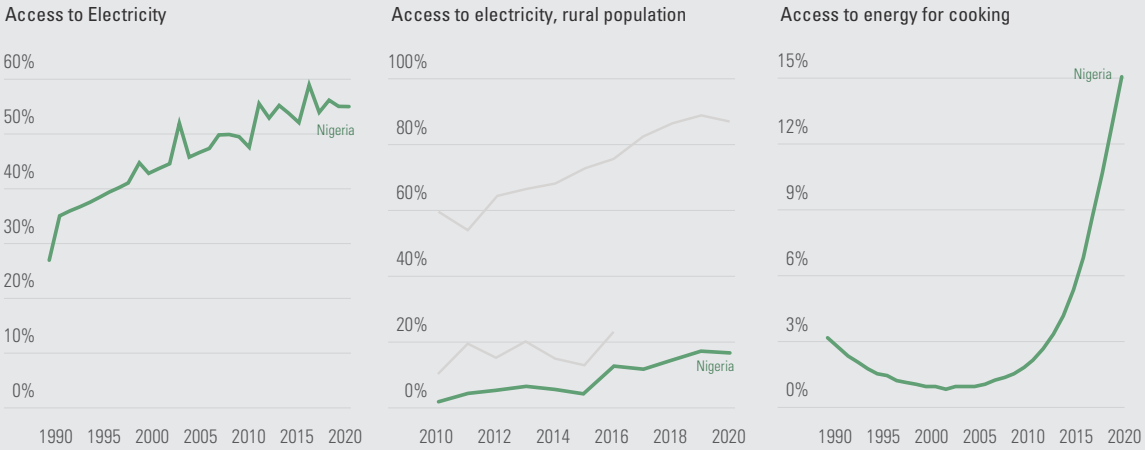
21 Access to electricity, urban (% of urban population) - Nigeria | Data (worldbank.org), Source: https://data.worldbank.org/indicator/EG.ELC.ACCS.UR.ZS?locations=NG

22 The millennium development goals and household energy requirements in Nigeria | SpringerPlus | Full Text (springeropen.com), Source: https://springerplus.springeropen.com/articles/10.1186/2193-1801-2-529#:~:text=Fuel%20for%20cooking%20As%20indicated%20in%20section%201%2C,residues%20are%20also%20used%20in%20some%20rural%20communities.

23 Expanding Demand EDITED_Draft 1.pdf (boell.org), Source: https://ng.boell.org/sites/default/files/2021-05/Expanding%20Demand%20EDITED_Draft%201.pdf

24 This comprises three-stone fire (43.1%), self-built biomass stove (14.6%) and manufactured biomass stove (10.6%)

Figure 4. Nigeria, access to Electricity and to energy for cooking



Source: World Bank *Source: Data (worldbank.org)* *Source: WHO, Global Health Observatory (2022)*

Table 1. Key Performance Indicators (04/10/2022)

Electricity connections through Mini Grids	11263
Households headed by women with Mini Grids	615
PV capacity of renewable energy installed	4084 kW
Electricity Connections through SHS	896145
MSMs connections through SHS	4498
Energy Deployed by SHS	27819 kW

Source: Nigeria Electrification Project – Powering Nigeria, one community at a time (rea.gov.ng)

of traditional firewood, kerosene and charcoal by Liquefied Petroleum Gas (LPG) to achieve SDG7 by 2030. It is apparent that expanding clean-cooking access would bring about gains in multiple sectors and for the most vulnerable segments of the population – yet progress has been stubbornly slow. It is against this background that the Federal Ministry of Environment is aiming to launch a programme to reach 10 million households with clean-cooking solutions by 2025[25]. The government is also workins assiduously to promote rural energy access and that effort is chaired by the Nigerian Rural Electrification Agency (REA)[26].

25 Expanding Demand EDITED_Draft 1.pdf (boell.org), Source: https://ng.boell.org/sites/default/files/2021-05/Expanding%20Demand%20EDITED_Draft%201.pdf

26 Nigeria Electrification Project – Powering Nigeria, one community at a time (rea.gov.ng), Source: https://nep.rea.gov.ng/

A fundamental question is how, in the context of a country that produces oil and gas, that has signed the Paris Agreement, it can proceed with a partnership for a just energy transition? Nigeria's economy is highly dependent on proceeds from the sale of oil in the international market. This makes the business a lucrative one for the country and even individuals that lead cabals in the oil and gas sector. Transitioning completely away from oil and gas could, at this point, stage an economic and social problem for the country, causing increase in poverty level and a higher level of dependence on foreign technology. It is therefore not a simple challenge for Nigeria. The transition must be properly planned and phased with consideration for it to be effective, efficient and just.

For the country to provide answers, it must look at investing in its abundant clean energy resources, mitigating any negative occurrences that may want to impact its energy independence and economic development.

Who are the key actors, and what are their positions and interests?

See **Table 2** and **Table 3**.

Table 2. Key actors in the Transition

Key actors in the Transition	Position and Interests
Federal Government of Nigeria and the following stakeholders 1. Nigerian National Petroleum Company Limited 2. Ministry of Power 3. Ministry of Environment 4. REA (Nigerian Rural Electrification Agency) 5. Ministry for Women Affairs 6. Ministry of Youth Development	• Energy sovereignty of the country for socio-economic development and security of energy supply • Optimization of the energy mix through modeling • Universal access to modern energy services for territorial and gender equity to reduce energy inequalities and injustices • More financial flows for oil and gas investments • Expansion of clean cooking initiatives • Employability of youth and women • Partnerships
State governments	• Territorial equity in access to modern energy services with a territorialization approach to boost the local economy. • Promotion of decentralized energy for local enterprises • Need to transfer energy as a competence of local authorities in the framework of the decentralization process (this has already been legalised by the Electricity Bill of 2022) • Reduction of energy costs
CSOs (Civil Society Organizations)	• Universal access to modern energy services for households, businesses, schools and health facilities. • Strengthening the local content of the energy transition • Support for technology transfer at all levels • Designing demand-side energy models • Strengthening the dialogue among all stakeholders
Private sector	• Public-private partnerships for infrastructures and projects • Favourable policies and incentives to protect investments • Win-win partnership with foreign private companies

Source: Various documents; Interviews, 2022

Table 3. Energy policies, strategies, and regulations governing the Nigerian energy sector.

Policy, Agency	Description
National Renewable Energy and Energy Efficiency Policy (NREEEP), Federal Ministry of Power	This policy was approved by the Federal Executive Council in 2015 and details the Nigerian government's blueprint for harnessing the country's renewable energy resources to drive sustainable development.
National Renewable Energy Action Plans (NREAP), Federal Ministry of Power	This action plan was approved by the National Council on Power (NACOP) in July 2016 and serves to implement the renewable energy component of the 2015 NREEEP.
National Energy Efficiency Action Plan (NEEAP), Federal Ministry of Power	This action plan was approved by NACOP in July 2016 and serves to implement the energy efficiency component of the 2015 NREEEP.
Rural Electrification Strategy and Implementation Plan (RESIP), Federal Ministry of Power/ REA	This strategy and implementation plan was approved in July 2016 and was prepared by the Federal Ministry of Power, Works and Housing (presently Federal Ministry of Power) to be executed by REA. The document was developed in line with FGN's plan for rural electrification and provides the implementation framework and measures for driving rural electrification across the country using both on and off-grid energy solutions.
NEC Mini-Grid Regulations, NERC	These regulations were released by NERC in May 2017 and are the overarching document governing the development of mini-grid electricity generation (0-100 KW – 1 MW) in Nigeria. The regulation is designed to accelerate the electrification of unserved and underserved areas especially rural and peri-urban communities. It incentivizes and minimizes major risks associated with mini-grid investments and simplifies the process for private sector participation.
Sustainable Energy for All Action Agenda (SE4All-AA), Federal Ministry of Power	Nigeria's SE4All Action Agenda was approved by NACOP in July 2016. The key objectives of the SE4All initiatives globally are to ensure universal access to modern energy services, double the global rate of improvement in energy efficiency, and double the share of renewable energy in the global energy mix by 2030.
NERC Eligible Customer Regulations, NERC	The Eligible Customer Regulations were approved in 2017 by NERC and permit electricity companies and Independent Power Producers (IPPs) to by-pass the Bulk Trader (the Nigerian Bulk Electricity Trading Plc (NBET) and DISCOs in order to sell electricity directly to eligible customers.
Regulation on National Content Development for the Power Sector, NERC	This regulation was approved by NERC in 2014 and aims to promote the deliberate utilization of local human workforce and material resources across the value chain of the Nigerian Electricity Supply Industry (NESI).
Nationally Determined Contribution (NDC), Federal Ministry of Environment	Nigeria's NDCs are its global commitment to sustainable development measures that limit the rate of global warming and negative impacts of climate change. It includes the country's climate targets and plans to achieve them.

Source: Various

Stakeholders in energy transition and energy transition partnerships

This section presents the different stakeholders in the Nigerian energy transition and energy transition partnerships (from the European Union) consisting mainly of national government players and financing and technical partners.

Table 4. Key government stakeholders

Agency	Functions
Federal Ministry of Power	Supervising ministry for the entire power and electricity value chain and response for the overseeing the implementation of electricity and power sector policies and regulations.
Nigerian Electricity Regulatory Commission (NERC)	Independent regulatory body in charge of regulating the electric power industry
Rural Electrification Agency (REA)	Federal government agency tasked with the electrification of rural and unserved communities in Nigeria. The implementing agency of the NEP, EEI and SPN
Nigerian Electricity Management Services Agency (NEMSA)	Established in 2015 by the NEMSA Act to carry out the enforcement of technical standards and regulations, technical inspection, testing, and certification of all categories of electrical installations, electricity meters and instruments.
Federal Ministry of Environment	Oversees environment protection, natural resources conservation, and sustainable economic development
National Environmental Standards and Regulations Enforcement Agency (NESREA)	Parastatal of the Federal Ministry of Environment responsible for the protection and development of the environment, biodiversity conservation and sustainable development of Nigeria's natural resources as well as the coordination, and liaison with relevant stakeholders within and outside Nigeria on matters around the enforcement of environmental standards, regulations, rules, laws, policies and guidelines.
Federal Ministry of Finance	The government body in charge of managing the finances of the country including managing, controlling, and monitoring federal revenues and expenditures
Central Bank of Nigeria (CBN)	The apex monetary authority of the country. The major regulatory objectives of the bank include the maintenance of the external reserves of the country, promotion of monetary stability and a sound financial environment, and to act as a banker of last resort and financial adviser to the FGN.
Standards Organization of Nigeria (SON)	Apex standardization body in Nigeria. Aims and objectives include: preparation of standards relating to products, measurements, materials and processes among others, their promotion at the national, regional and international levels, certification of industrial products, assistance in the production of quality goods, and the improvement of measurement accuracy and circulation of information relating to standards

Source: Various

Table 5. Key EU Energy Transition Partners

Agency	Program	Support Provided	Duration
European Union (EU)/ The German Agency for International Cooperation (GIZ)	Nigeria Electricity Support Program (NESP)	Technical assistance, fundraising support, and policy reform	2017 – 2021
Heinrich Boell Foundation	Nigeria renewable Energy Roundtable (NIRER)	Advocacy, training, information on access to finance	2017 – present
Shell Foundation	Nigeria Off-Grid Market Acceleration Program (NOMAP)	Technical Assistance	2018 – present

Source: Various

Table 6. Technical and Financial Partners

Partners	Initiatives/Programmes
World Bank	Power Sector Recovery Program, Nigerian Electrification Project
GIZ Nigeria NESP I & II(European Union and German BMZ)	Programme provides advisory services with regard to energy policy and management, and imparts technical knowledge for various interest groups
UNDP	Sustainable Fuelwood Management - Project is aimed at reducing GHG emissions from the use of fuel-wood in the domestic, institutional and industrial sectors of Nigeria through integrated and sustainable fuelwood production
AfDB	Nigerian Electrification Project - Project to address critical energy access deficits by channeling private sector investments into mini grid and off-grid solutions.
Energy Deployed by SHS	27819 kW

Source: Various

What are the opportunities for a potential JETP deal in Nigeria?

How would such a deal look like, what would/could be the focus, and what could such a deal achieve?

The objective of a JETP agreement for a just energy transition in Nigeria would be to ensure energy sovereignty with a focus on universal access to low-cost, low-carbon energy services and the economic empowerment of citizens and the competitiveness of industry.

More specifically, it will involve mobilizing financing for appropriate investments, developing the external market for energy products, and ensuring technology transfer. The opportunities for a possible JETP agreement in Nigeria could be :

- The development of a culture of multi-stakeholder dialogue and the ease of creating spaces for policy dialogue around the JETP issue.
- A clear political vision of the possibilities for achieving universal energy access in Nigeria and ensure 100% clean cooking development.
- The need to remove subsidies related to fossil fuels.
- The net-zero pathway will result in significant net job creation with up to 340,000 jobs created by 2030 and up to 840,000 jobs created by 2060 driven mainly by the Power, Cooking and Transport sectors
- The country plans to sue gas as transition fuel in Nigeria's net-zero pathway particularly in the Power and Cooking sectors
- The energy transition will create significant investment opportunities such as the establishment and expansion of industries related to solar energy, hydrogen, and electric vehicles.

What would Europe need to do to enhance a JETP in this Case study Country?

To improve the JETP in Nigeria, Europe could:

- Help finance the Nigerian Energy Transition Plan.
- Establish institutional support in the country for the actualization of the Nigerian Energy Transition Plan.
- Promote universal access to energy services to reduce energy poverty.
- Facilitate the mobilisation of funding for the deployment of decentralised renewable energy systems, particularly solar.
- Supporting research and development within frameworks of a development and technology transfer programmes.

What would Nigeria need to do by itself to enhance a JETP in this Case study Country?

Nigeria, having developed its energy transition plan (ETP) has begun the step towards a net zero by 2060 policy. However, a lot still needs to be done for the plan to become a reality. To achieve the objectives of the plan, Nigeria could put a price on carbon. This could help in placing some form of responsibility on high emitting entities as well as the government to take action towards achieving the ETP, Nigeria's NDC and UN's climate goals. The funds generated from these organizations can go into a pool of fund that is channeled towards achieving the ETP.

Also, the country must give room for competitiveness of the renewable energy sector by totally removing subsidies from fossil fuel products in the country. While it is true that financial support from international organizations and partnerships are important. It is also paramount that the country begins to find ingenious ways to source funds locally for the energy transition plan to become a reality.

What are barriers to a successful potential JETP?

Barriers to a successful JETP include:

- Inadequate communication and lack of raising awareness
- Lack of social dialogue and diplomacy
- The tendency of Europe to want to pursue and prioritize its own energy security even if it means to the detriment of other partnering countries.
- Weak of the legal, regulatory and institutional framework for a partnerships

Just energy transition partnerships ahould be partnerships that first of all acknowledges the need for joint actions to meet climate change targets without neglecting importance socio-economic indices in the implementing country. It is built on principles of solidarity and responsibility, and advocates for equality and fairness across board, causing a paradigm shift and transformational change. Such partnership requires effective and efficient allocation of both technology and financial support to spur the transition to low-carbon and climate resilient economy.

What actions demand joint action – between Europe and Nigeria?

- Energy technology transfer: joint implementation in Nigeria, of projects with high potential for transferring clean energy technologies;
- Training and capacity building: training and capacity building of Nigerians to become skilled employees for a just energy transition. Indeed, the existence of proven technical expertise through the partnership combined with the availability of investments for infrastructure will help promote access to energy services but also the development and implementation of territorial climate-energy plans to improve the carbon footprint of territories;
- Development of a communication strategy between the European Union and Nigeria.

Lessons for Just Energy Transition Partnership

- **The specificity of the Nigerian case:** For energy transition, the Nigerian case is peculiar. Nigeria huge oil and gas reserves, with only about 45% of energy access. A just energy transition partnership will consider this in a balance that involves combining climate mitigation with energy access.
- **Catalyzing roles of the Nigerian government:** The important role of government enablement, policies and incentives are important and serves as drivers for foreign partnership, particularly for technical and financing assistance.

Recommendations for Existing Just Energy Transition Partnerships

- **Coordinated actions:** There are already several technical and financial partnerships in Nigeria, with EU donors and also with the US. There should be more communication among partners to ensure coordination of interventions and prevent duplication of programs.
- **National roadmaps as guides**: Interventions should also be guided by nationally published guidelines for interventions and partnerships, such as the Energy Transition Plan and its objectives, so as to ensure that interventions are in line with national government plans and priorities.
- **Awareness and Sensitization:** There should be more campaigns and workshops to ensure increased understanding and awareness of interventions and programs. In this way, the different stakeholders could be more involved and better contribute. Sensitizing of beneficiaries (businesses and consumers) is also important to ensure effectiveness and accountability.
- **Skill transfer and continuity**: Interventions and programs should be structured in way that they are continual even after the time period of the intervention is over. There should be technical skill transfers to relevant government sub-sectors and business to ensure sustainability.

Considerations for Future Just Nigeria-EU Energy Transition Partnership

Based on these, a just and fair energy transition partnership between Nigeria and the EU will therefore:

- increased congruency with national energy transition plans and guidelines
- discuss the issue of gas as a medium-term transition fuel
- aim to simultaneously solve the dual crisis of energy poverty and climate change
- aim for financing instruments and conditions (mainly of grants and concessional loans) that lays less burden on the country.
- increase and emphasize technical assistance in the different energy sub-sectors to spur favorable reforms, increase efficiency and minimize risks.
- consider need for rapid economic growth, socio-economic development and job creation in the country.
- ensure sustainability through technical skill transfers
- increase awareness and sensitization of interventions and programs for ensure involvement of stakeholders

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Solidarity for prosperity