

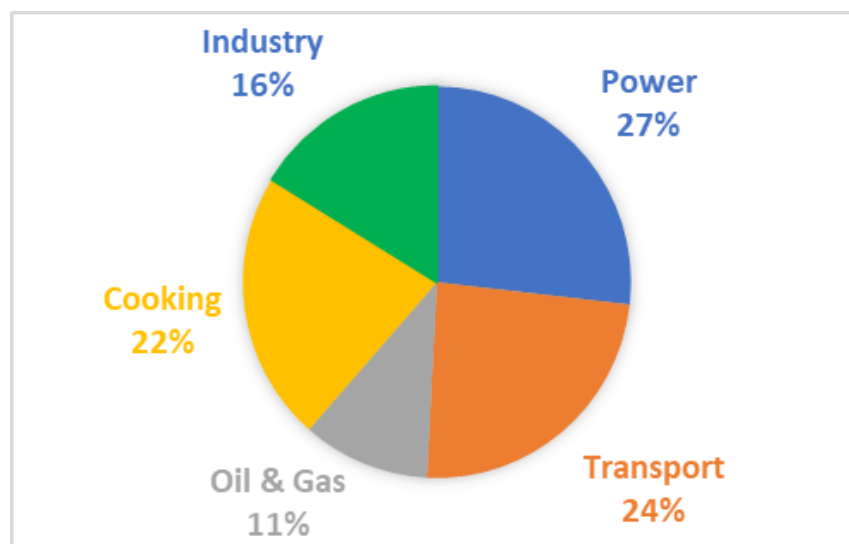
Making Nigeria's energy transition plan a reality

Nigeria wants to achieve a net-zero emissions energy system

In November 2021, at the United Nations climate change conference (COP26) held in Glasgow, President Muhammadu Buhari announced Nigeria's commitment to achieving net-zero emissions by 2060. Following this, Vice President Prof. Yemi Osinbajo launched Nigeria's Energy Transition Plan (ETP) on August 24, 2022, establishing the country's strategy to reach a net-zero emissions energy system by 2060.¹ Nigeria's energy sector accounts for about 65% of the country's total greenhouse gas emissions (see figure 1 for a breakdown of the energy sector emission profile).

The ETP is commendable. But Nigeria's past efforts to make its energy system more sustainable, including the Nigerian Renewable Energy Master Plan, have fallen far short of their goals. Analysis suggests Nigeria might now have a difficult time realizing the key objectives of the ETP for the same reasons: this policy (like others before it) fails to prioritize economic development coupled with poor planning, and weak institutional and fiscal frameworks.² How can Nigeria's ETP avoid similar setbacks? Because decarbonization strategies are often far too expensive and detached from the day-to-day reality of low-income populations, Nigeria's capacity to reach net zero is contingent on raising its population out of poverty, first and foremost. With this lens, a critical analysis of the Nigerian ETP reveals additional and complementary actions that could be taken to realize a net-zero emissions energy system.

FIGURE 1: Nigeria's energy sector emission profile in 2020³



Complementary actions needed to realize Nigeria's Energy Transition Plan

- **Identify (and support) low-carbon energy solutions that work for low-income Nigerians:** The ETP envisages the adoption of clean technologies, such as electric vehicles and electric stoves, irrespective of income strata. However, over 40% of Nigerians live in poverty.⁴ Poor people tend to buy items with the least upfront cost, regardless of their carbon footprints. For example, research has shown income to be the determining factor for the adoption of clean cooking facilities.^{5,6} Given the significant population living in poverty today, research on low-carbon energy solutions for low-income households is needed, especially in the rural and peri-urban areas of Nigeria, to identify appropriate and affordable low-cost technologies.
- **Innovation in natural gas infrastructure development:** Nigeria's ETP sees the role of natural gas as a transition fuel on its journey to a net-zero economy. However, natural gas lead time and infrastructure lifetime mean it can take decades to change energy systems, potentially risking carbon lock-in. Nigeria should therefore invest in developing dual-use infrastructure, for example, pipelines and distribution that can also be used for green hydrogen or synthetic fuels. This is hypothetically possible but will require support for innovative materials and techniques.⁷
- **Modernize biomass utilization:** About 70% of Nigeria's primary energy supply is from biomass, primarily used for cooking in the residential and commercial sectors and harvested in an unsustainable manner.⁸ The ETP targets expanded use of biomass for liquid fuels in transportation and agricultural industries and for direct combustion for industrial purposes. But this will not be possible without a broader re-engineering of how biomass is cultivated. If Nigeria intends to continue biomass use, the government must outline a strategy for industrial cultivation in a sustainable manner and at a greater scale.
- **Improve energy efficiency in small and medium enterprises (SMEs):** The ETP is silent on the role of energy efficiency in driving a net-zero emissions energy system. Energy efficiency is an essential tool in reducing carbon emissions in Nigeria because it will reduce power demand, and subsequently, the amount of fossil fuel that would have been burnt by the conventional gas power plants. SMEs account for 70% of Nigeria's industrial employment and about 50% of manufacturing output.⁹ Given the role of SMEs in Nigeria's industrial sector, large-scale adoption of energy-efficient technologies (e.g., advanced electric motors, fans, boilers, etc.) will be required to accelerate the transition to net zero by 2060 by reducing total power requirements in the sector.
- **Focus on natural carbon removal solutions:** The ETP also emphasizes the role of Bioenergy with Carbon Capture and Storage (BECCS) in achieving net zero by 2060 which implies large-scale deployment of CCS technology within the next 38 years. While this ambition is commendable, it is worth noting that Nigeria is not ready for CCS anytime soon, given the high cost of implementation and uncertainty about the overall geological storage potential in Nigeria. Expanding the forest cover in Nigeria through

large-scale afforestation and reforestation projects can offer a safer, cost-effective carbon sink in the short term while waiting on CCS technology to catch up.

- **Explore strategies for an integrated energy system:** The ETP provides sectoral decarbonization strategies but has no integrated energy system plan. A net-zero emission energy system dominated by electrified end-uses and variable renewable energy supply needs top-down, integrated planning of the entire energy system in order to succeed. Achieving the targets of Nigeria's ETP cost-effectively requires increased integration of the electricity sector, transportation, cooling, and heating sectors to improve the efficiency and flexibility of the entire energy system as well as its reliability, adequacy, and cost. For instance, Nigeria should explore the potential of integrating bidirectionally-charging electric vehicles and mini-grids into the main grid. This can create a cost-effective and flexible electricity supply system.
- **Incentivize change in transportation choices:** The ETP proposes reducing transportation emissions through mode-shifting but does not provide any incentives to make it happen. While behavioral changes toward low carbon transportation can lead to huge emissions reduction opportunities, citizens need a reason to do so. In the USA, about 90% of households own a car but most households in Nigeria do not.¹⁰ The demand for private car ownership could rapidly rise as household incomes rise. Practical strategies will be needed to provide alternative pathways for Nigerians to change their travel behaviors. For example, high-speed intra- and inter-city rail running on renewable electricity needs to be developed as an alternative to private cars.
- **Reduce dependency on foreign climate finance:** Nigeria will need \$410bn to deliver the ETP. Over the years, Nigeria has depended on external funds to finance its energy/climate plans which has resulted in delays in project implementation due to uncertainties in donor funding.¹¹ Over-reliance on external financing will limit Nigeria's ability to implement its ETP. Experience over the years has also shown that Nigeria's energy challenges cannot be addressed without substantial doses of domestic financing. Nigeria must look inwards to mobilize all the financial resources for its ETP before seeking external funding. The World Bank prescribes a debt service to revenue ratio of not more than 22.5%; Nigeria's debt service to revenue ratio is over 60%.¹² It may be imperative for Nigeria, through its ministries of environment and foreign affairs, to explore debt-for-climate swaps as a means of raising domestic funds indirectly. This mechanism allows funds that would have been used to service external debts to be mobilized for domestic climate initiatives.
- **Harmonize climate-related policies:** Nigeria has over 15 different policy frameworks related to a sustainable energy transition, including the National Energy Masterplan, National Biofuel Policy, Renewable Energy Masterplan, and its Nationally Determined Contribution, among others.¹³ These policy frameworks sometimes have different targets (e.g., the shares of renewable energy technologies targeted for a given year). Several uncoordinated government institutions manage these policy frameworks, including the Energy Commission of Nigeria, Rural Electrification Agency, and Ministry of Environment. To ensure that the ETP is implemented successfully, relevant institutions should coordinate to harmonize policies, strategies, and targets.

Conclusion

Nigeria and, indeed, many developing countries, compare poorly with the western world in terms of their capacity to fight climate change. This lack of capacity is strongly linked to Nigeria's low level of economic development. The above complementary action points are not exhaustive but can catalyze the realization of Nigeria's ETP. The ETP requires significant investment from the government and support from its citizens. However, a large share of Nigeria's population is more concerned with how to provide their "daily bread" than with reducing their carbon footprint. If anything near Nigeria's ambitious target is to be achieved, the government should first focus on developing programs to break the perpetual circle of poverty, which in turn would increase citizens' ability to purchase climate-friendly technologies. Additionally, the government should place greater emphasis on innovation in new energy infrastructure development, the effective use of domestic funding, and the harmonization of different energy policy frameworks. Failure to take these complementary actions could make Nigeria's ETP more of a fantasy than a credible vision for the future.

Endnotes

1. <https://www.energytransition.gov.ng/>
2. <https://www.sciencedirect.com/science/article/pii/S0301421519302320>
3. <https://www.energytransition.gov.ng/>
4. <https://guardian.ng/business-services/40-of-nigerian-population-live-below-poverty-line-says-report/>
5. <https://www.sciencedirect.com/science/article/pii/S0301421522003433>
6. This understanding is further reflected in the Environmental Kuznets Curve, which hypothesizes the nexus between environmental sustainability and income. <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/environmental-kuznets-curve>
7. <https://www.siemens-energy.com/global/en/news/magazine/2020/repurposing-natural-gas-infrastructure-for-hydrogen.html>
8. <https://theenergyintelligence.com/nigerias-trees-suffer-as-firewood-replaces-expensive-clean-cook-fuel/>
9. Ogunmuyiwa, M.S. and Okunleye, B.A. (2019), "Small and medium enterprises and sustainable economic development in Nigeria," *Izvestiya Journal of Varna University of Economics*, Vol. 63 No. 3, pp. 171-182.
10. <https://www.valuepenguin.com/auto-insurance/car-ownership-statistics#:~:text=We%20found%20that%2091.55%25%20of,up%20from%2090.82%25%20in%202015>
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