KEYS TO CLIMATE ACTION

How Developing Countries Could Drive Global Success and Local Prosperity

Amar Bhattacharya, Homi Kharas,
and John W. McArthur
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Delivering Nigeria's Green Transition

Belinda Archibong and Philip Osafo-Kwaako

Introduction

African countries today face multiple challenges: recovering from the adverse impacts of the COVID-19 pandemic, creating jobs for their citizens, and making progress on the Sustainable Development Goals (SDGs). In addition, many African countries are highly vulnerable to the adverse impacts of climate change: More extreme weather events could impact agricultural output, and the shift away from fossil fuels could also result in the loss of jobs and revenues for petroleum exporters.

However, the global decarbonization agenda also provides opportunities for African countries to invest in novel industries and leapfrog existing development models. As African countries prepare their post-COVID economic recovery plans, there is a unique opportunity to hit the reset button and place climate action at the center of their development plans. To capture this opportunity, countries need to design targeted policies and build appropriate institutions to drive implementation over the medium term.

In this chapter, we examine the green transition debates for Nigeria—Africa's largest economy and most populous country. We use the term *green transition* to refer broadly to the shift from fossil fuels to renewable energy sources and the adoption of low-carbon economic activities. The focus on Nigeria is important for three reasons. First, Nigeria's current development indicators are very challenging: About 40 percent of the population (approximately 83 million people) live below the poverty line; health and education outcomes are among the lowest globally; and about 45 percent of the population lacks access to electricity (World Bank, 2022a). By 2050, Nigeria is projected to be the third most populous nation

in the world, with a population of almost 400 million, so the human scale of the national challenge stands out in global comparisons. Nigeria's policymakers must therefore work to improve the country's development outcomes, which may be worsened by climate-related factors in the future.

Second, Nigeria is very diverse, geographically and ethnically. The geographical variation ranges from mangrove swamps and rain forests in the south of the country to the semi-arid Sahel savanna in the north. The northern regions—with lower rainfall and lower development indicators—have higher climate vulnerability than the southern regions. The impacts of climate change will therefore be heterogeneous across various regions and groups in the country. In this respect, Nigeria highlights potential political economy challenges of balancing adverse climate change impacts across different parts of a country.

Third, as a major oil producer, Nigeria's public finances are highly dependent on oil revenues. The oil sector accounted for 7 percent of GDP, 89 percent of exports, and 80 percent of government revenues, and it provides direct and indirect jobs in the coastal regions of the country (Archibong, 2022; World Bank, 2022a). Nigeria also has the largest proven natural gas reserves in Africa and the ninth largest in the world as of 2018. The country's gas reserves stand at more than 900 times its total oil reserves by volume (PwC, 2019). A global green transition could therefore create significant fiscal challenges and job losses for Nigeria, so the country's leaders have stressed the importance of ensuring a "just transition" (Osinbanjo, 2022a).

This chapter is aimed at Nigeria's policymakers—at the federal, state, and local government levels. Our central argument is that, while climate change poses a risk to Nigeria's development prospects, it also provides opportunities for Nigeria to rethink the design and implementation of its national development programs. Nigeria's previous national development plans—for example, the Transformation Agenda, the Economic Recovery and Growth Plan, and the Nigeria Economic Sustainability Plan—have not adequately addressed the climate investment opportunity nor implementation models to deliver on climate-related activities. A coherent development plan, with a focus on the climate investment opportunity, could enable Nigeria to improve its development indicators while pursuing its international climate commitments.

Recent publications in the academic and policy literature have discussed the broad opportunities and challenges of the green transition in Africa.[1] We do not intend to restate or summarize recommendations from the literature here. Rather, we aim to provide suggestions that could improve the implementation of Nigeria's green transition agenda, given its political economy context. To do this, we

1. See, for example, Africa Development Bank (2022), Africa Finance Corporation (2022), and Mohammed (2021).

examine episodes of successful policy reform in Nigeria and highlight lessons that could support the implementation of Nigeria's climate-related activities, with an emphasis on improving project delivery across all tiers of the Nigerian government, increasing public awareness, and attracting international financing.

The rest of this chapter is structured as follows. The second section sets the context by discussing interrelated challenges for Nigeria: high climate vulnerability, low human development indicators, low energy access, and high cost of energy. The third section describes Nigeria's sources of greenhouse gas (GHG) emissions and reviews recent government policies and programs to support green transition. The fourth section examines obstacles to achieving Nigeria's green transition goals. The fifth section discusses institutional arrangements and other priorities which can support the implementation of Nigeria's climate-related activities. Conclusions are presented in the final section.

Current Challenges

We set the context by discussing four interrelated challenges for Nigeria: high climate vulnerability; low human development indicators; low energy access for households, schools, and health facilities; and high costs of current energy systems.

Climate Vulnerability

Existing climate models suggest that Nigeria remains highly vulnerable to climate hazards. For example, among the 182 countries included in the Notre Dame Global Adaptation Initiative (ND-GAIN) index, Nigeria is ranked as the 53rd most vulnerable country and 179th most ready country.[2] More anecdotally, policymakers and survey respondents often cite challenges like shifting rainfall patterns and shrinking surface area of Lake Chad as challenges to Nigeria's development (Mohammed, 2021; Selormey et al., 2019).

The impacts of climate change are likely to vary across different parts of the country. A simple model showing the within-country impacts of climate change is presented in Nigeria's Second National Communication to the UN Framework Convention on Climate Change (FME, 2014).

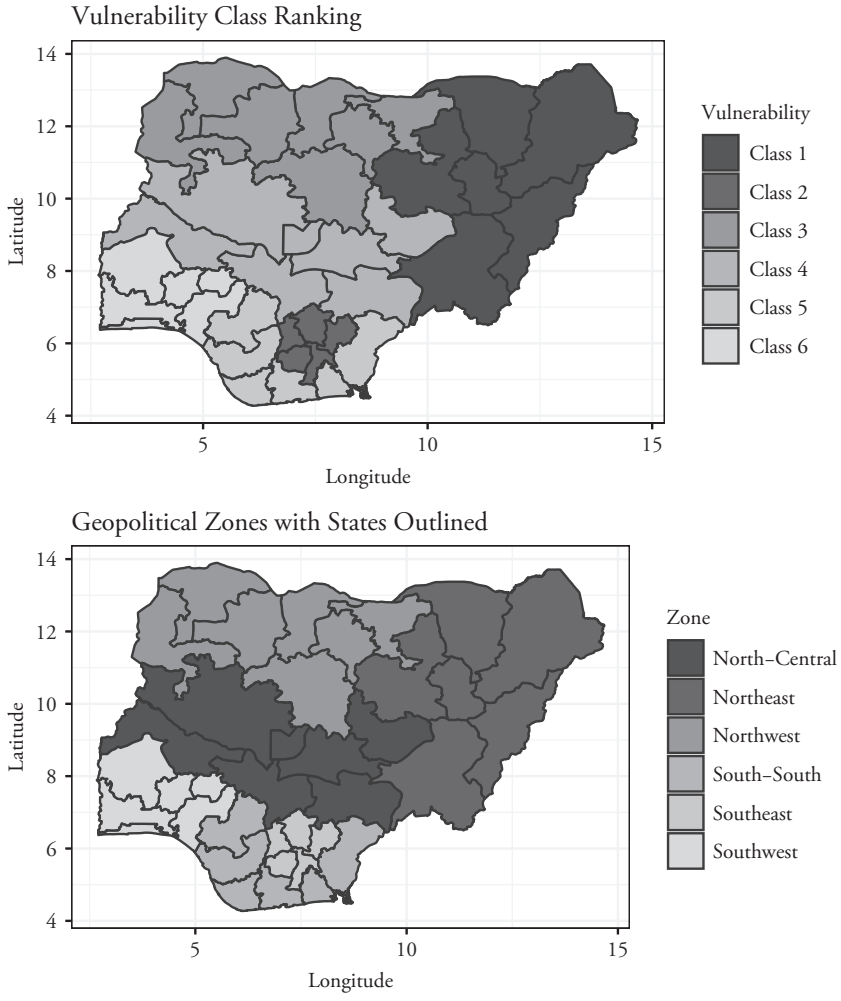
Using the usual formulation in the literature, the model identifies three drivers of vulnerability, namely *adaptive capacity*, *sensitivity*, and *exposure*. *Adaptive capacity* refers to the ability of households, firms, and communities to develop resilience and adjust to climate shocks. This is captured by proxies for income, infrastructure, and access to technology. *Sensitivity* refers to how readily a system

2. See the Notre Dame Global Adaptation Initiative (ND-GAIN) data set: https://gain.nd.edu/our-work/country-index/rankings/

responds (positively or negatively) to external shocks associated with climate change. For an agricultural system, this could involve shocks such as droughts, floods, and so forth. *Exposure* refers to the contact between a given system and the external climate shocks. It captures the extent to which the presence of individuals, communities, or infrastructure in a given location could be adversely affected by a climate hazard.

Figure 6.1 presents the composite vulnerability picture for Nigeria. The northern parts of the country tend to have higher vulnerability scores, reflecting the north–south rainfall gradient and higher levels of economic development in

Figure 6.1. Vulnerability scores across Nigeria's geopolitical zones



Source: Federal Ministry of Environment (2014).

the southern parts of the country. Within the south, the western regions also tend to have lower vulnerability scores than their relatively poorer neighbors in the eastern regions of the country. The southeast zone in particular has relatively high vulnerability scores with frequent floods and environmental damage from oil and gas production as well.

The government's climate models predict marked changes in temperature and precipitation patterns across the country by 2050 (FME, 2021a). Under a medium emissions scenario, temperature increases could range from 1.95 degrees Celsius to 2.31 degrees Celsius above a historical baseline (1960–1990), with the greatest changes in northern parts of the country. Similarly, precipitation is predicted to decrease across all agro-ecological zones of the country. The overall implications of these changes could be severe: The government and external researchers estimate that GDP could contract by about 4.5 percent by 2050; agricultural productivity could decline by 10 to 25 percent; yields of rice and root crops (such as cassava and sweet potato) could decline markedly by 2050; and extreme weather events, particularly dry spells, are projected to reduce the availability of water resources and pasture and to impact livestock production (FME, 2021a; World Bank, 2021).

Low Human Development Indicators

Nigeria's climate vulnerability exists against a backdrop of low human development outcomes, including the incidence of poverty. The World Bank (2022a) estimates that prior to the COVID-19 pandemic, about 40 percent of the population (approximately 83 million Nigerians) lived below the national poverty line of U.S. $1.93 per person per day. Low real GDP growth during the COVID-19 crisis worsened poverty levels, increasing the poverty rate by about 2 percentage points, with an additional 7 million people falling below the poverty line by 2022 (World Bank, 2022a). There is also a geographical dimension of poverty in Nigeria—between rural and urban areas and between the northern and southern parts of the country. The majority of the poor (about 84 percent) lived in rural areas and were predominantly in agricultural households (about 57 percent). The poverty rate in the north (combining the north central, northeast, and northwest geopolitical zones) was also 58 percent, compared with 20 percent for the south (comprised of the southwest, southeast, and south central geopolitical zones).

The spatial dimension of poverty is important as it broadly correlates with the climate vulnerability discussed in the previous section. Indeed, the links between the incidence of climate-related shocks and poverty are already being observed in Nigeria's household survey data. Using the 2018/2019 Nigeria Living Standards

Survey (NLSS), the World Bank (2022a) examined households that had experienced at least one climatic shock—such as poor rains, flooding, or pest invasion—in the past three years. Climate shocks were more prevalent for the poor (about 28 percent) compared to the nonpoor (about 14 percent), reflecting the dependence of the poor on agricultural and pastoral livelihoods. In the absence of strong social protection measures, more frequent climate shocks could worsen the incidence of poverty across the country.

Low Energy Access

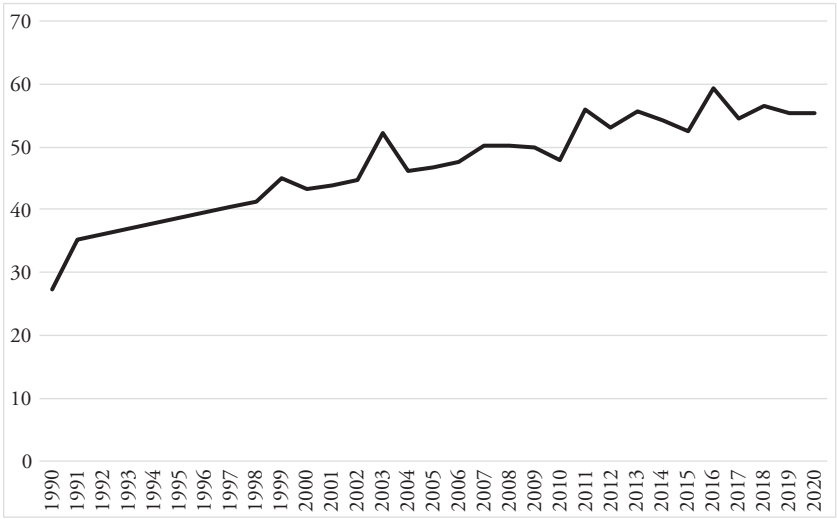
A green transition in Nigeria will require tackling the country's significant energy challenges, especially the lack of energy access faced by the majority of the population. The global community has increasingly emphasized the importance of energy for poverty alleviation and sustainable development. For example, the 2011 launch of the United Nations (UN) *Sustainable Energy for All Initiative* and the 2015 global agreement to include "access to affordable, reliable, sustainable and modern energy for all" as one of the 17 UN Sustainable Development Goals (SDGs) all underscored the access to energy as a centerpiece of sustainable development (Nano, 2022; Roche et al., 2020).

Although Nigeria's access to electricity has improved over the years, as shown in figure 6.2, 45 percent of the population still lacked access to functional electricity as of 2020 (World Bank, 2022b). In fact, Nigeria accounted for around 10 percent of the world's population without access to electricity as of the same year (Nano, 2022). These gaps are faced by both households and firms and further draw attention to the need for energy access at important public infrastructure such as schools and health facilities (Archibong, Modi, & Sherpa, 2015).

Nigeria also has relatively low levels of electricity consumption per capita compared to African peers. at 146 kWh over 2010–2014. This is less than half the corresponding level of 336 kWh in Ghana, still lower than 232 kWh in Cote d'Ivoire, and far below the sub-Saharan African average of 494 kWh (Nano, 2022). Again, there are significant rural–urban disparities within the country. As of 2020, average access in urban areas was as high as 83.9 percent, while access in rural areas was as low as 24.6 percent (World Bank, 2022b).

The picture looks even more dismal when we consider access to functional electricity, that is, electricity that is stable and reliable. Archibong, Modi, and Sherpa (2015) review a survey of more than 68,000 primary schools representing over 80 percent of Nigerian public primary schools in 2012. They find that 78 percent of schools reported having no access to functional electricity, meaning access to functional power from the national grid, a generator, or a solar energy system.

Figure 6.2. Electricity access in Nigeria (% of population), 1990–2020



Source: World Bank (2022b).

There are also significant regional disparities in access to electricity across Nigeria's six geopolitical zones. The spatial distribution of nonfunctionality was very clustered. In northern Nigeria, between 86 percent (in the northwest zone) and 91 percent (in the northeast zone) of schools reported having no functional electricity. In southern Nigeria, 62 percent (in the southwest), 73 percent (in the south central), and 75 percent (in the southeast) of schools reported having no access to functional electricity (Archibong et al., 2015). These data are of concern given recent evidence on the importance of electricity for school enrollment, educational attainment, and performance outcomes for children (Park et al., 2020; Nano, 2022). Lack of electricity has direct and detrimental impacts on the educational development of Nigeria's young people.

Data from a 2012 survey of health facilities reveal similar trends (Abubakar et al., 2022). Of more than 24,000 public health facilities surveyed, 41 percent had no access to functional power from the national grid. The vast majority of these facilities (75 percent), which are often the first and only point of health care access for many communities, report having to use private generators for power. As with schools, access to electricity among health facilities is much more physically widespread in southern Nigeria, especially in the southwest, compared to the north.

High Cost of Energy Systems

The majority of Nigeria's electricity production is sourced from gas, around 85 percent as of 2018 (Roche et al., 2020). Hydropower makes up the majority of the remainder. While most of the population relies on the national grid for electricity (around 86 percent by General Household Survey estimates over 2010–2016), roughly 80 percent of those with grid access use costly diesel and petrol-fueled back-up generators due to the country's unreliable electricity supply (Roche et al., 2020). The lack of stable, functional electricity means that households and small and medium size enterprises (SME) reportedly spend two to three times more on kerosene, diesel, and petrol than they spend on power from the grid (Roche et al., 2020). Government data provides suggestive evidence that the cost of self-generating electricity makes Nigerian products around 33 percent more costly than imported goods (Roche et al., 2020).

Households and firms are also highly sensitive to energy prices. They rely heavily on oil and gas for transportation and cooking activities, so relevant price hikes can have significant overall negative effects on household and firm budgets. Increased transportation costs and pass-through effects on food costs can lead to declines in real incomes. Moreover, the intensity of oil and gas use in energy production also produces air and water pollution detrimental to health and human capital development (Toledano & Archibong, 2016; Bruederle & Hodler, 2019). In this context, transitioning to renewable energy sources can provide Nigeria with many significant benefits: improving energy access; lowering costs for households and firms, which will, in turn, improve the economic circumstances of individuals; and reducing the pollution that reduces health, life expectancy, and associated education and earnings across the country.

One upshot of these challenges is that Nigeria's "just transition" should focus not only on expanding electricity generation, especially from cleaner energy sources, but raising energy access in the least resourced parts of the country, especially in the north, where high levels of poverty and climate vulnerability pose severe development challenges. Herein lies the dual development and climate investment opportunity. Investing in renewable energy in Nigeria could simultaneously improve energy access, spur development, and support the country's climate aspirations.

Nigeria's Greenhouse Gas Emissions and Recent Government Policies

How large are Nigeria's current greenhouse gas emissions, and what are the government's proposed policies to reach net zero emissions? As of 2018, Nigeria's annual emissions were estimated at 347 Mt carbon dioxide equivalent (CO_2e)

(FME, 2021a). Energy and agriculture, forestry, and other land use (AFOLU) sectors account for the bulk of the total, with a breakdown as follows:

- *Energy sector:* 209 Mt CO_2e or ~60 percent of total emissions (FME, 2021a). This includes fugitive emissions from the oil and gas sector and emissions from transport, electricity generation, and residential and industrial consumption.
- *AFOLU:* 87 Mt CO_2e or ~25 percent of total emissions (FME, 2021a).
- *Waste:* 31 Mt CO_2e or ~9 percent of total emissions (FME, 2021a).
- *Industrial processes and other product use (IPPU):* 17 Mt or ~5 percent of total emissions (FME, 2021a).

Nigeria is the fourth largest emitter in Africa, after South Africa, Egypt, and Algeria (Ayompe et al., 2021). However, Nigeria's average per capita emissions are ~1.7 tCO_2e per annum, significantly lower than the 4.5 tCO_2e average for Africa and far lower than the 10 tCO_2e average for OECD countries (Ayompe et al., 2021).

Government Policies and Commitments

What is the outlook for Nigeria's GHG emissions for the next decade, and how will public commitments be achieved? The government's projections indicate that total emissions will grow to 453 $MtCO_2e$ by 2030 (FME, 2021a). The top shares of emissions are projected to shift slightly, with energy decreasing to 51 percent and AFOLU climbing to 33 percent. By 2030, Nigeria's nationally determined contribution (NDC) targets an unconditional 20 percent emission reduction below the business-as-usual scenario and, conditional on adequate international support, a 47 percent reduction (FME, 2021a). A majority of these conditional reductions are expected to come from the electricity sector. A green transition scenario would involve meeting these plans, with the electricity composition diversifying away from fossil fuel–based self-generation as well.

In the past decade, the federal government of Nigeria has announced various adaptation and mitigation measures and passed several policies and legislation to support its climate-related activities (see, for example, FME 2014, 2020, 2021a, 2022). In the following discussion, we focus on measures proposed for the energy and agriculture sectors as the dominant sources of GHG emissions. We also briefly consider efforts to promote renewables and discuss the 2021 Climate Change Act, which provides an institutional framework for delivering Nigeria's decarbonization objectives.

Energy Sector. A central component of Nigeria's decarbonization strategy is presented in the Nigeria Energy Transition Plan (ETP). Launched in 2022, the

ETP proposes a path for Nigeria to achieve carbon neutrality by 2060. It focuses on a just transition by managing any potential job losses from reduced global demand for fossil fuels and improving access to modern energy services for the Nigerian population. The country also set a goal of 90 percent electrification by 2030 and universal electrification by 2040. While including a focus on renewable energy, the ETP also makes a strong case for the use of natural gas as a "transition fuel" to support Nigeria's long-term net-zero aspirations. It focuses on emission reduction in areas such as power generation, residential and commercial buildings, transportation, oil and gas, and industry. Box 6.1 provides examples of investment projects highlighted in the Nigeria Energy Transition Plan.

Agriculture, Forestry, and Other Land Use (AFOLU) Sector

The federal government has identified high-level adaptation strategies for crop and livestock production, water resources, fisheries, and related elements of the AFOLU sector (BNRCC, 2011; FME 2014, 2021a, 2021b). In a few instances, these include specific measures and targets, such as the following:

- Climate-smart agriculture (CSA) measures to tackle the two objectives of increasing agricultural productivity and tackling climate change. One specific goal is to halve the fraction of crop residues that are burnt by 2030.
- Forestry and other land use measures aiming to
  - Improve management of 128,528 ha of natural forests in southern Nigeria.
  - Restore 115,584 ha of degraded forests in southern Nigeria.
  - Tackle fuelwood harvesting by reducing the area of forest land used for fuelwood harvesting by 19,346 ha.
  - Protect and restore 13,012 ha of mangrove ecosystems in Nigeria's coastal regions.

On Renewables

As of 2019, Nigeria's stated objective was to achieve 30 GW of installed on-grid capacity by 2030, of which 13.8 GW would be from grid-connected renewables—around 45 percent of total capacity and 30 percent of generation, respectively (Roche et al., 2020).

Box 6.1. Nigeria Energy Transition Plan

The Nigeria Energy Transition Plan was launched in August 2022 and summarizes the country's emission reduction plans in the energy sector. It aims for Nigeria to reach net-zero GHG emissions by 2060. The ETP focuses on emissions reduction in five sectors—namely power, transport, oil and gas, cooking, and industry—which account for about 65 percent of total emissions in Nigeria. Examples of investment projects targeted are as follows:

- **Renewable energy generation:** Working with private sector partners to deploy 5 million solar home systems and mini-grids across Nigeria to electrify 5 million homes and SMEs by 2023. Anticipated impacts include reducing carbon emissions by about 25,000 metric tons, providing power for about 200,000 SMEs, and creating 250,000 new jobs.
- **Nigeria Gas Flare Commercialization Program:** Achieve gas flare out by 2030, by commercializing and offering flared gas for sale to private sector off takers. Anticipated impacts include reducing carbon emissions by about 13 million tons CO_2e per year, generating about U.S. $1 billion per annum in revenues, and creating 300,000 direct and indirect jobs.
- **Clean cooking:** Switching about 30 million homes from the use of dirty fuels (kerosene, charcoal, and diesel) to LPG for cooking, biogas with personal home biogas digesters, community biogas digesters, electric alternatives, and so on. Anticipated impacts include reducing carbon emissions by about 120 million tons CO_2e and generating about 1 million jobs.
- **Health care:** Providing solar power for about 10,000 functional health care centers across Nigeria with 50 MW of solar power capacity. Anticipated impacts include providing renewable energy to health centers serving about 100 million people across Nigeria.

Source: Federal Government of Nigeria (2022), Investing in Nigeria's Energy Transition Opportunity, Abuja: Federal Government of Nigeria.

In a transition scenario from Roche and colleagues (2020), the share of renewables in the energy composition could increase enough, excluding large hydropower, to meet the Nigerian government's target of 15 percent by 2030. Potential off-grid and on-grid solutions would include standalone solar photovoltaic (PV), hybrid mini-grids, an increase of large hydropower, and the introduction of solar PV/non-hydro renewables-based generation in the on-grid sector. Financing these options will be key to meeting these targets by 2030, but there is a clear path for further investment in renewable energy, and particularly solar, for electricity generation going forward.

Climate Change Act

The Climate Change Act was signed into law by President Buhari in 2021 and provides the legal and institutional backing for Nigeria's climate-related programs and activities. The act establishes a National Council on Climate Change comprising the president, vice president, several ministers, and representatives from the private sector and civil society. The council is responsible for setting targets and mitigation measures for Nigeria's GHG emissions, developing a carbon budget for Nigeria, and developing a process for carbon tax and emissions trading. An important innovation of the act is the establishment of a Climate Change Fund financed jointly by appropriations from the National Assembly, funds obtained from international sources, and receipts from carbon taxes and emissions trading. The Climate Change Act provides a useful framework for coordinating Nigeria's climate-related activities.

However, as we argue subsequently, greater international support is needed to finance Nigeria's emission reduction efforts and also to drive implementation at the subnational levels.

Obstacles to Be Overcome

To implement a green transition, Nigeria will need to tackle three main types of obstacles: inadequate financing, fiscal and job consequences of a just transition, and imperfect project implementation capacities. We discuss each of these challenges briefly in the following sections.

Inadequate Financing

While Nigeria's overall green transition is not costed, Nigeria's Energy Transition Plan (ETP) provides a preliminary estimate of the transition costs for the energy sector, which is a major component of Nigeria's broader green transition. About U.S. $410 billion in incremental funding is needed to finance Nigeria's Energy Transition Plan between 2021 and 2060. The required expenditures imply additional average annual investments of U.S. $10 billion above business-as-usual spending, with roughly equal contributions from the public and private sectors. The expenditures need to be targeted at the power sector infrastructure (electricity generation, transmission, and distribution), transport sector, oil and gas, and industry. Specific projects would include harnessing natural gas resources to support power generation and liquified petroleum gas (LPG) for clean cooking and investments in renewable (solar) energy.

How large is this financing requirement relative to Nigeria's current government budgets? To provide context, in 2018, the federal government had an annual

budget of about U.S. $30 billion, with a capital investment budget of about U.S. $9.5 billion (FGN, 2019).[3] The financing requirement would therefore be equal to a doubling of the federal government's capital investment budgets over the next decade. Financing from domestic sources has so far been inadequate: Since 2017, the government has mobilized only N26 billion (or about U.S. $75 million) through two issuances, in 2017 and 2019, of green sovereign bonds from domestic capital markets. Additional, external financial support would clearly be needed to bridge the financing gap.

Fiscal and Job Consequences of a Just Transition

A second obstacle relates to the costs of a just transition. Following a global transition away from fossil fuels, Nigeria could be impacted in two ways: loss of petroleum export revenues to the national treasury and job losses, especially in the petroleum sector (Osinbanjo, 2022a; FME, 2022).

Since petroleum revenues account for 80 percent of government revenues, in the short term, these revenues would clearly be needed to support Nigeria's green transition investments (Archibong, 2022). Additional investments in Nigeria's petroleum industry would be needed to provide revenues that can improve energy access across Nigeria, both for households and firms that can drive the country's industrialization.

On the employment front, preliminary estimates from the ETP suggest that about 150,000–200,000 jobs could be at risk by 2050 (Federal Ministry of Environment, FME, 2022). These jobs are mainly in the oil and gas sectors and often involve vulnerable, low-skilled workers. However, at the same time, Nigeria's green transition could generate 400,000 new jobs by 2030 and about 1 million new jobs by 2050, implying a clear possibility for positive net job creation. The new jobs are projected to arise from the deployment and distribution of renewable energy systems and clean cooking stoves. Nonetheless, regional equity issues need to be addressed. Job losses would be concentrated in the Niger Delta region, compared with new jobs—for example, from deployment of solar energy systems—which could be spread across the country and concentrated in northern parts of the country.

Project Implementation Capacities

Third, besides the financing constraints, there are often challenges with design and execution of infrastructure projects across Nigeria, especially for subnational governments. Nigeria is a federal republic—with 36 states, a federal capital

3. Although the capital budget is often not fully implemented.

territory, and 774 local government areas—and the subnational governments have significant fiscal autonomy in the design and implementation of their public programs. Any meaningful progress on delivering green transition projects—from deploying decentralized solar energy systems to implementing climate-smart agricultural practices—would require active participation by states and local governments. However, project implementation capacity can be a limiting factor at the subnational level, hindering delivery of Nigeria's green transition projects. As we will discuss further in the next section, targeted programs (e.g., matching block grants) could provide financial incentives which nudge subnational governments to find ways to implement green growth projects.

How to Make Progress

In spite of the previously mentioned challenges, we remain optimistic about the climate investment opportunity for Nigeria. Nigeria's size and importance in Africa—as the continent's largest economy and most populous nation—also implies that a successful green transition story from Nigeria could serve as a useful example for other African countries. Conversely, an adverse climate outcome could create significant dislocations within Nigeria and the surrounding West Africa region. Nigerian policymakers and the international community must deliver on Nigeria's green transition.

Examining previous episodes of successful policy reform in Nigeria can help inform strategies to support the country's green transition. We discuss three opportunities for progress: improving project implementation, increasing public awareness, and attracting international financing.

Improving Project Implementation

How can implementation capacity and project delivery be improved at the subnational level? Nigeria's ability to achieve its green transition goals will require significant improvements in the design and execution of government projects at both the federal and subnational levels. The establishment of a National Council on Climate Change is a useful start to improve coordination across federal government institutions. However, several activities in Nigeria's NDC (e.g., climate-smart agricultural practices and rural electrification projects) will require implementation by state and local governments, which have lower financing and implementation capacity compared to the federal government.

One recommendation would be to create peer competition across state governments and provide incentives (e.g., matching grants) to reward high-performing state governments. A useful institutional example is the establishment of

Nigeria's Universal Basic Education Commission (UBEC),[4] which is backed by federal law and governs the implementation of free, compulsory, universal basic education across the country. The UBEC model is informative in many respects: First, it is financed by a first-line statutory charge on all revenues accruing to the national treasury, ensuring a steady inflow of operational funds. Next, the establishment of UBEC at the federal level requires Nigerian states and local governments to set up equivalent institutions, namely *State Universal Basic Education Boards* and *Local Government Education Authorities*. Third, it introduces a matching block grant scheme that provides financial transfers to state governments based on their own financial allocations to basic education and past performance in project delivery.

While the operation of UBEC still has challenges, it provides a useful template for encouraging peer competition and service delivery at the subnational level. A similar financing and institutional arrangement focused on climate change outcomes could encourage Nigeria's states and local governments to prioritize action on Nigeria's climate commitments. Such an institutional arrangement should provide a statutory (ring-fenced) financing for a federal environmental oversight board, require state governments to establish equivalent institutions, and then provide block grants to states which meet pre-agreed targets.

Increasing Public Awareness

Second, institutional change in Nigeria tends to be strong when there is bottom-up pressure from citizens for reform. There is an important role for civil society and advocacy groups to improve grass-roots education and awareness of climate change across the country. In an Afrobarometer opinion poll conducted between 2016 and 2018, about 50 percent of respondents in Nigeria had "heard about climate change" (Selormey et al., 2019). This was comparable to the sub-Saharan African average of 58 percent but lower than 83 percent in Mauritius, 78 percent in Uganda, and 73 percent in Zimbabwe. Yet, the Nigerian public is observing the consequences of variation in rainfall patterns, water stresses on livestock production, threats to food security, and worsening communal conflicts as natural resources (e.g., freshwater) become scarce.

Institutional change in Nigeria tends to be strong when there is bottom-up pressure from citizens for reform. Abah (2012) reviews case studies of institutional reforms in Nigeria, highlighting the example of the drug regulatory agency, the National Agency for Food and Drug Administration and Control

4. See Laws of the Federation of Nigeria (2018), Compulsory, Free Universal Basic Education Act, 2004, Abuja, Nigeria.

(NAFDAC). He argues that, even in weak states such as Nigeria, strong institutions can emerge when citizens are directly adversely impacted and put "pressure" on political leaders for reform. Akunyili (2010) also notes that, for many years, fake and substandard drugs abounded in Nigeria's pharmaceutical markets, with sometimes fatal consequences: Children died from ingesting painkillers produced with toxic chemicals, while elderly patients sometimes unknowingly used fake medications for chronic illnesses. From his reviews, Abah (2012, pp. 266, 277) argues that "citizens expressed their outrage each time a child dies from fake drugs," and "the pressure to tackle fake and substandard drugs was palpable … [so] the government deployed its power to … [support] NAFDAC to achieve atypical performance." There was a marked reduction in unregistered and counterfeited drugs in Nigerian markets, and NAFDAC emerged as one of the most effective public institutions in the country (Transparency International, 2006).

Similarly, the adverse consequences of climate change are likely to become more observable in Nigeria over the coming decade, perhaps through the incidence of extreme weather events, decreased availability of surface water, lost agricultural output, and so forth. A key challenge will be for citizens who experience the adverse impacts of climate change to make these connections to climate change and then to put greater palpable pressure on political leaders and demand appropriate remedial measures.

Mobilizing International Financing

As mentioned previously, Nigeria needs about U.S. $10 billion in incremental funding per year to finance its green transition (FGN, 2022). The federal government's previously mentioned green bond issuances have been usefully targeted at mitigation and adaption projects in rural agriculture, off-grid solar power program, national afforestation efforts, and related priorities, but much larger volumes of financing are required. Reductions in gas flaring could form a key part of a strategy (see Box 6.2). However, further external financial support would be needed to address Nigeria's financing gap.

Recent policy options discussed in the literature include debt-for-climate swaps, sustainability-linked bonds, and climate-linked debt (AfDB, 2022). Debt-for-climate swaps are structured to provide debt relief, provided savings from debt repayments are channeled into specified climate adaptation or mitigation projects. Nigeria's Vice President Osinbajo has also advocated for debt-for-climate swaps to support developing countries, noting that it would provide the "fiscal space necessary for climate investments for the debtor countries" (Osinbanjo, 2022b).

In the case of Nigeria, a useful template is the landmark debt relief program negotiated with Paris Club creditors during the second Obasanjo administration (2003–2007). This U.S. $30 billion debt relief program released approximately U.S. $1 billion in annual debt servicing costs, which the Obasanjo administration committed to channeling into Millennium Development Goal (MDG)–related health and education projects (IMF, 2005, 2007). Following the COVID-19 pandemic and recent global macroeconomic challenges, Nigeria and many emerging economies face challenges in accessing international capital markets and in attracting foreign direct investments. An ambitious economic package is needed which provides concessional financing and debt relief to create fiscal space for developing countries. In the case of Nigeria, such concessional financing could be provided in exchange for commitments toward development milestones, such as the SDGs and other international climate commitments. It should recognize that development goals and climate action are inherently linked—and "if we fail on one, we fail on the other" (Lankes, Soubeyran, & Stern, 2022).

Box 6.2. The Opportunity in Reducing Gas Flaring

One big opportunity for Nigeria to promote green transitions while addressing fiscal challenges is embedded in gas flaring, whereby natural gas associated with oil production is burned, releasing excess carbon dioxide and methane into the atmosphere. As of 2018, Nigeria had the world's seventh-highest volume of gas flared, according to the International Energy Agency (PwC, 2019). Associated gas burned in flaring can be a byproduct of routine oil production, inadequate gas extraction, and other elements of the supply chain. Nigeria has significantly reduced flaring, from 53 percent of gas produced in 2002 to 10 percent in 2018, but the lost revenue that might have been raised from using the gas flared was still estimated at more than U.S. $762 million in 2018 (PwC, 2019).

The World Bank's Global Gas Flaring Reduction (GGFR) partnership is a public–private initiative made up of oil companies, national governments, and international organizations, with the goal of reducing gas flaring to zero by 2030. At 2018 prices, all else being equal, reaching the zero flaring objective could help Nigeria achieve cumulative direct revenue gains of over U.S. $6 billion by 2030 (PwC, 2019). This is before factoring in indirect citizen benefits from improved health, education, labor market, and employment outcomes. Repurposing flared gas can also be used to improve electricity supply and generation and provide liquefied natural gas for transport.

As described by Toledano and Archibong (2016), the Nigerian Gas Policy and the Nigerian Gas Flare Commercialization Programme are key policy frameworks for addressing flaring. Implementation hinges on collaboration between the Nigerian National Petroleum Corporation and other domestic entities, including the Federal Ministry of Petroleum Resources, the Nigerian National Petroleum Corporation, and the Federal Ministry of Environment. Recent gains suggest ongoing progress is possible, but institutional coordination will remain important in order to seize the opportunity.

Conclusions

This chapter has focused on Nigeria and the challenges of delivering on its decarbonization agenda. Post-COVID economic recovery plans provide a unique opportunity for developing countries such as Nigeria to pursue growth plans which combine their development aspirations with their climate commitments. Nigeria has a generational opportunity to reset its development trajectory. We are optimistic that by improving project delivery across all tiers of the Nigerian government, increasing public awareness to demand action, and attracting international financing, Nigeria can make progress in meeting its dual development and decarbonization aspirations.

Nigeria's policymakers, businesses, civil society groups, and the international community have a role to play. Nigeria's policymakers—in federal, state, and local governments—must recognize that Nigeria's development and green transition objectives are interlinked and must be jointly tackled. For businesses, it would be important to view the decarbonization agenda as an investment opportunity and to seize new opportunities in the green economy, such as in renewable energy, green manufacturing, and climate-smart agriculture. Civil society groups can support in increasing public education and awareness of the potential adverse impacts of climate change. The international community can help, too, by providing financial support, which can create the fiscal space for Nigeria to invest in its emission-reduction activities.

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