

The potential of small and medium enterprises: Off-grid solutions to corruption in Nigeria's electricity sector

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Credit: Joel William, Electric Pole, flickr 2008

Key messages

- The Nigerian electricity sector is constrained by a combination of interdependent issues, chiefly, legacy corruption, problematic contract design that leads to the selection of politically connected players, transmission inefficiency, and financial illiquidity due to critically low supply from the grid.
- With high unfulfilled demand and consistently low supply there are strong perverse incentives for corruption in the sector.
- Small and medium enterprises (SMEs) appear most vulnerable to supply constraints and currently face extra costs to self-generate that pushes many towards corrupt practices.
- A national grid-based solution looks unlikely in the short to medium term, therefore solutions are needed that are disaggregated from the grid and embedded in an existing productive SME cluster using feedstock like compressed natural gas.

What is ACE?

The Anti-Corruption Evidence (ACE) research consortium takes an innovative approach to anti-corruption policy and practice. Working with a multi-country coalition of 12 partners over five years, ACE is responding to the serious challenges facing people and economies affected by corruption by generating evidence that makes anti-corruption real and using those findings to help policymakers, business and civil society adopt new, feasible, high-impact strategies to tackle corruption.

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Introduction

This briefing outlines the complex story of corruption and inefficiencies that straddles the entire electricity value chain – generation, transmission and distribution – in Nigeria. It puts forward a disaggregated and embedded solution as a means to improve productive outcomes by increasing the number of organisations that will demand enforcement in their own interest.

Most entrepreneurs in the country get less than five hours of electricity supply from the national grid and therefore face extra costs to self-generate. This forces small and medium enterprises (SMEs) into corruption, for instance buying diesel from the black market or paying engineers from distribution companies to informally provide their power supply.

Corruption and inefficiencies in the main grid mean that off-grid solutions are imperative. While recent policy changes that allow consumers to bypass the grid can help, the incentives created so far in the sector have been hugely distortionary. Our solution aims to break this network of collusive interests by giving productive stakeholders in the sector a sense of ownership of the policy solution. In Nigeria's electricity supply industry, such an alignment of interests has to involve SMEs that are potentially productive and are likely to play a critical role in sustaining growth and employment in Nigeria. This is especially important now in the wake of COVID-19, given the slump in the domestic economy due to the collapse of oil demand internationally as well as the domestic economic shock due to lockdowns.

Drawing on research conducted among functioning SME clusters in Aba, Nnewi and Onitsha, we recommend an anti-corruption solution of disaggregated and embedded generation that is less expensive than the costs currently incurred to source electricity informally, while providing adequate electricity supply. The likelihood of insider support should also ensure that the policy is self-sustaining and therefore self-enforcing.

The Immediate power crisis in Nigeria and how it came to be

Nigeria's power sector faces liquidity scarcity as a result of interdependent historical and structural issues. When privatisation took place in 2013, a fresh infusion of cash was expected for the necessary upgrading of infrastructure. However, this did not happen.

When the sector was wholly privatised, the country was only producing about 4,000 megawatts (MW) of electricity when it had been recommended that electricity supply should be at least 18,000 MW so that there would be a real market to sell in. To compound matters, most of the firms who bid were not technically competent in electricity generation – they were owned by politically connected investors whose political networks would shield them from regulatory enforcement in the sector. The lack of investment to upgrade and increase capacity in turn meant that distribution companies were not able to raise enough revenues due to low tariffs.

As distribution companies are meant to remit incomes to other parts of the grid, their low revenue collections were insufficient to be able to pay invoices to other parts of the grid. The sector as a whole accumulated debt – estimates from 2018 put the monthly losses in the sector at N40 billion (SDN, 2018). While generating capacity has actually moved up to about 8,000 MW since privatisation, only an average of 4,000 MW can be distributed due to Nigeria's poor transmission infrastructure. This is in part due to the inadequate infrastructure for gas supplies, poor maintenance of the transmission system run by the state-owned Transmission Corporation of Nigeria, and grossly inadequate collection of user tariffs by distribution companies. Furthermore, private residential consumers do not want to pay for a poor-quality electricity supply and often do not pay bills. Consequently, the sector has moved into a low-level equilibrium where incentives to invest and upgrade are simply not present.

The sector was already characterised by high levels of political corruption in the era of government ownership, but this has been compounded by

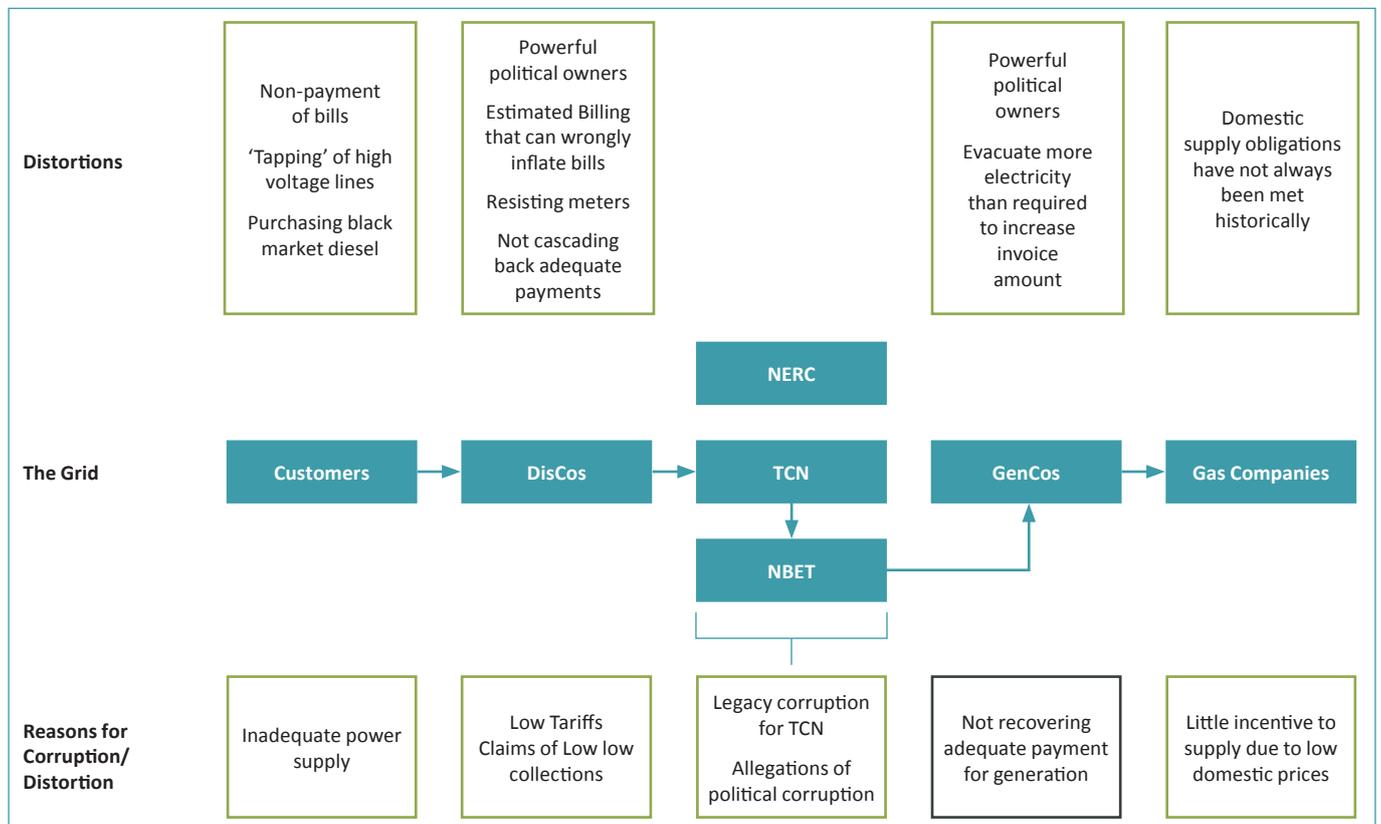
interdependent processes of corruption since privatisation. Privatisation didn't succeed because the inefficiencies of the state-run companies were transferred to private-sector firms who lacked technical capabilities.

- Despite a 'domestic supply obligation', gas companies have little incentive to supply extra gas to the domestic sector as export prices are higher.
- Both distribution and generating companies are owned by the politically powerful – including a former military head of state, a former provincial military administrator and a former commissioner of the telecoms regulatory agency.
- Generating companies often evacuate more electricity than required to increase the amount they can bill to the state-owned Nigerian Bulk Electricity Trader, which has so far failed to act as an institutional 'backstop' in the sector and provide credible commitment (Roy et al., 2020).

- And distribution companies who pay less than half the amount they owe to other players in the value chain are also reported to be misusing the policy of 'estimated billing' to pass their commercial losses on to customers (Adeniyi, 2019).

Distribution companies are perhaps the most important link as they are supposed to collect payments from the end consumer and pass them back up the chain. This also makes them the only player with access to liquidity through payments from customers. Given this critical position, the privatisation process had been designed for oversight of distribution companies by allowing the Federal Government of Nigeria (FGN) to retain a 40% stake. However, it is clear that the FGN has not used this oversight function – the distribution companies are technically bankrupt so payments are not escalated back up the value chain and the sector has been left accumulating debts with every unit of electricity produced (Roy et al., 2020).

Figure 1: Distortions in the power sector and underlying drivers



Note: The blue arrow denotes payments made up the chain.

Source: Roy et al. (2020)

Economic and social costs

Some estimates suggest that corruption-related practices in the electricity sector cost the country N11 trillion between 1999 and 2017 (SERAP, 2017). Nigeria also has one of the largest shares of power 'self-generation' in the developing world, with electricity produced by private means through generators and inverters, etc. Akanou (2019) estimates that Nigeria's generation capacity from small petrol and diesel is at nearly 14 gigawatts (GW), while over 80% of SMEs own or use a generator in Nigeria (Scott et al., 2014). This has also been borne out by our research conducted in the three manufacturing clusters of Aba in Abia state and Nnewi and Onitsha in Anambra state in South East Nigeria, as well as in Abuja, the country's capital.

A recent article in *Nature Sustainability* calculates that the 'mean net cost of electricity' from diesel generators in Nigeria is US\$1.6 billion per year (Farquharson et al., 2018). The diesel used in generators can also be linked to sustaining the ongoing humanitarian and security crisis in the Niger Delta, as it is one of the most produced items in illegal artisanal refineries in the region. Some of the diesel makes its way to the domestic black market for generator fuel and this demand adds to the ongoing violence and insecurity in the region. Hence, once the environmental and security impact of diesel generators is considered too, the full social costs of this informal market are much higher.

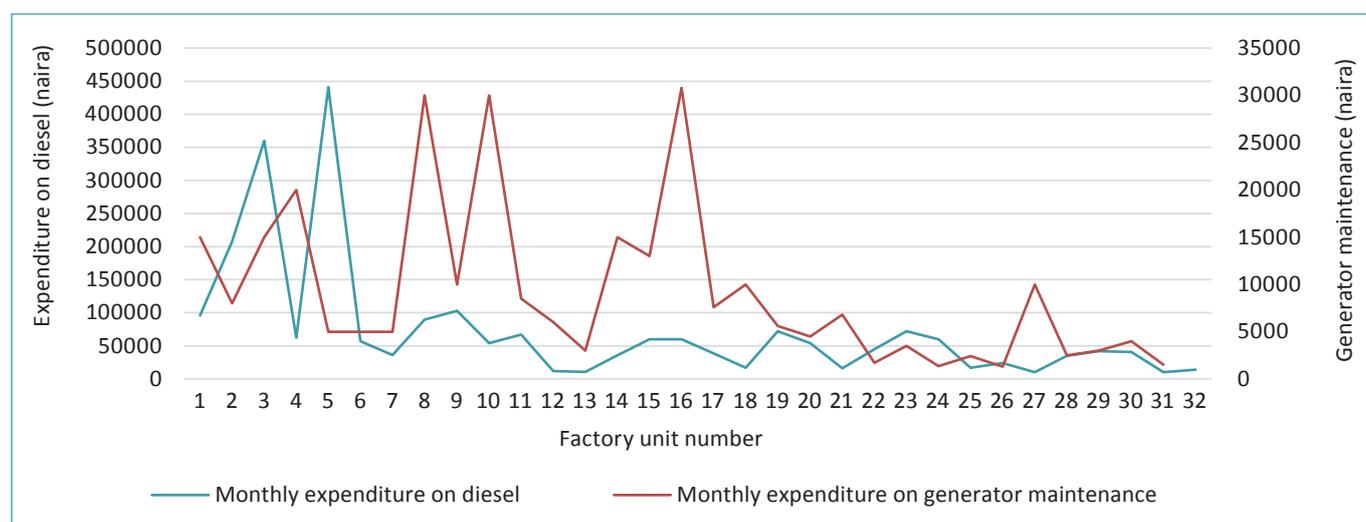
The evidence

Our research suggests that micro-, small and medium enterprises (MSMEs) are most vulnerable to the capacity constraints in the electricity sector. SMEs account for 96% of businesses in Nigeria (PwC, 2016) and therefore are the most vulnerable to losses from lack of supply.

We sampled 35 MSMEs through focus group discussions (FGDs) in Abuja, Nnewi, Aba and Onitsha over three months between April and May 2018 and followed these up with intensive semi-structured interviews with six respondents. Of our respondents in the South East, all (100%) felt power was the chief constraint to business. The figure is a little lower at 80% if we add the sample from Abuja. All respondents had alternative (non-grid) sources of supply – over 50% reported that power constituted about 35% of their costs (based on our research compared with between 20–25% among MSMEs in India) and 20% reported that pollution from diesel was dangerous for their workers. Many MSMEs face high costs to secure an adequate power supply and have been forced into corrupt violations since compliance will affect their bottom-line. This has then affected growth in the sector.

In the data collected from the FGDs and interviews in the South East, the highest expenditure on diesel was N441,000 and on generator maintenance was N30,800. Although generator maintenance is often not computed as a significant contributor to costs, we see from Figure 2 that this is not the case.

Figure 2: Expenditure on diesel and generator maintenance



Source: Roy et al. (2020: Figure 9)

A report by the International Finance Corporation (IFC, 2019) conservatively estimates operation and maintenance costs to be 10% to 20% of fuel costs, and this is significant. SMEs are likely to face high power costs not just because they buy more diesel, but because they have poor-quality generators and high maintenance costs.

While having to use diesel is expensive and these cost inefficiencies need to be dealt with, the 'costs' of corruption are high too for SMEs. For instance, buying diesel on the black market as fuel for captive generators is a huge corruption externality, as is 'tapping' illegally into high voltage lines to draw power. We know therefore that there is a market for power but SME's are paying high costs for it as a result of technical inefficiencies and corruption throughout the electricity value chain.

Figure 3 shows an inverse (negative) relationship between the ratio of outlay over sales, and the ratio of grid over outlay for large firms with sales above N100,000. Power outlay comprises all expenditures related to non-grid power such as weekly expenditures on diesel, generator purchase and maintenance. And grid expenditure denotes weekly expenditure through a formal electricity bill. The trend implies that an increase in the use of formal grid-based power by SMEs (holding other variables constant) will result in a decline in expenditure on power as a share of outlay. It means that relying on diesel is very expensive and substituting diesel with

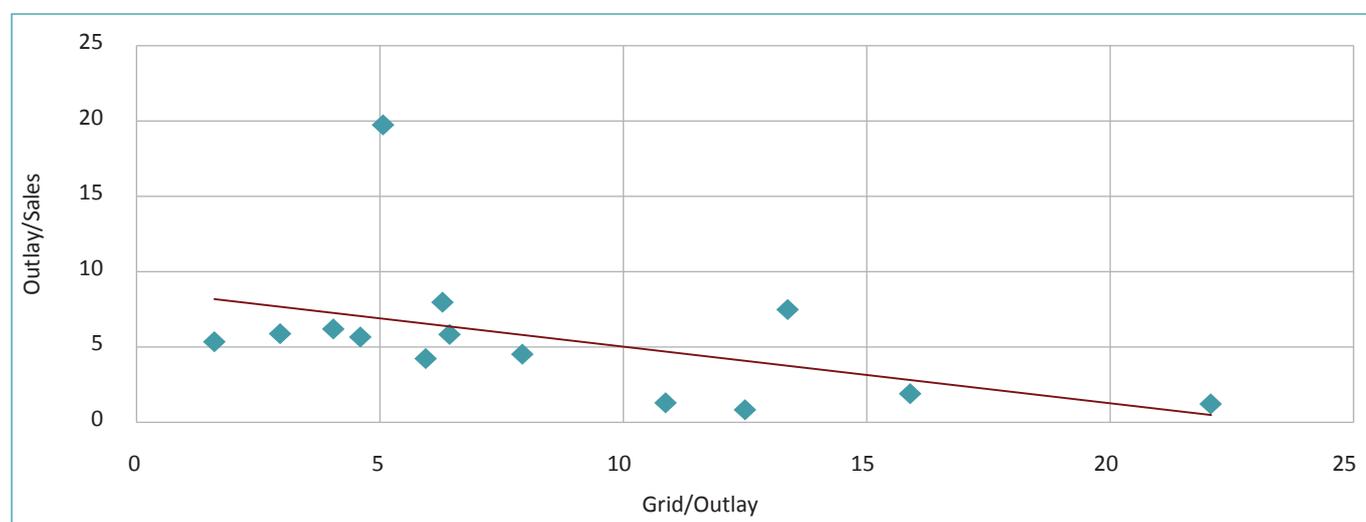
even a small amount of poor-quality grid supply results in lower total expenditure on power as a percentage of sales.

The ACE solution

Our research has identified distortions in every component of the national grid from gas supply to the end customer, which has a significant bearing on the policy options available. Addressing the distortions in any one component is unlikely to help the electricity sector as bottlenecks and corrupt practices will remain elsewhere in the value chain. And addressing the problems across the entire grid requires levels of investment neither the FGN nor donors will be likely to make, especially now given the public health crisis of COVID-19. The high levels of political connectedness in the sector also means political transaction costs will be considerable in any reform efforts (Roy et al., 2020).

The solution that emerges is two-fold. The first is long-term and needs to address the structural problems faced by generation and transmission infrastructure and to improve revenue collection by distribution companies. But the immediate challenge, and solution, is to increase generation and supply, without running into powerful political interests or requiring extensive investment in infrastructure. Such a solution has always been possible in theory as enabling policies exist in Nigeria (through embedded and disaggregated

Figure 3: Relationship between the ratio of outlay over sales, and the ratio of grid over outlay



Source: Roy et al. (2020: Figure 10)

mini grids and 'Eligible Customer' policies) but the incentive structure that would allow adoption hasn't been followed through.

Our research challenge has been to identify an alignment of incentives among SME entrepreneurs in such a way that supply can be achieved at a low 'cost' of corruption. The evidence set out in greater depth in Roy et al. (2020) should be compelling for policy-makers and indeed some SME owners as we put forward a cheaper alternative to current practices. We also provide reinforcing qualitative evidence for policy-makers that shows there is likely to be strong support for our recommendation of disaggregated and embedded power generation that uses CNG as feedstock. For instance, some manufacturers already have arrangements where they share payments to rent large generators for 'pay-as-you-go power'. While this method of supply is obviously inadequate, it does evidence support for a collectivised solution for power supply among a broadly powerful community who can be mobilised in their self-interest to support alternative policies. It also shows existing demand for extra power and 'willingness to pay'.

These are important factors as designing enforcement mechanisms for power supply to the cluster is as necessary as designing technical solutions. In the case of SMEs, incentives to support external enforcement are clear as the solution takes into account their constraints. This then ensures the policy is self-enforcing and self-sustaining.

Conclusion

A strategy of realigning incentives in a way that makes enforcement self-sustaining will help to reduce corruption in the sector and, by definition, will improve developmental outcomes. But the COVID-19 pandemic is exposing the economic vulnerabilities of developing economies and Nigeria is no exception. Although the demand shock in the oil market will compound Nigeria's economic troubles, the country's abundant natural gas resources should at this point be used to rebalance away from the oil economy. Our policy solution of using CNG is one way of helping the domestic economy through this crisis and beyond, and it will also help lessen the cycle of corruption in the Nigerian electricity sector.

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About the Anti-Corruption Evidence (ACE) Research Consortium:

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ACE is a partnership of highly experienced research and policy institutes based in Bangladesh, Nigeria, Tanzania, the United Kingdom and the USA. The lead institution is SOAS University of London. Other consortium partners are:

- BRAC Institute of Governance and Development (BIGD)
- BRAC James P. Grant School of Public Health (JPGSPH)
- Centre for Democracy and Development (CDD)
- Danish Institute for International Studies (DIIS)
- Economic and Social Research Foundation (ESRF)
- Health Policy Research Group (HPRG), University of Nigeria Nsukka (UNN)
- Ifakara Health Institute (IHI)
- London School of Hygiene and Tropical Medicine (LSHTM)
- Palladium
- REPOA
- Transparency International Bangladesh (TIB)
- University of Birmingham

ACE also has a well established network of leading research collaborators and policy/uptake experts.

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