Living 'Under the Grid' in Nigeria – Methodological Note

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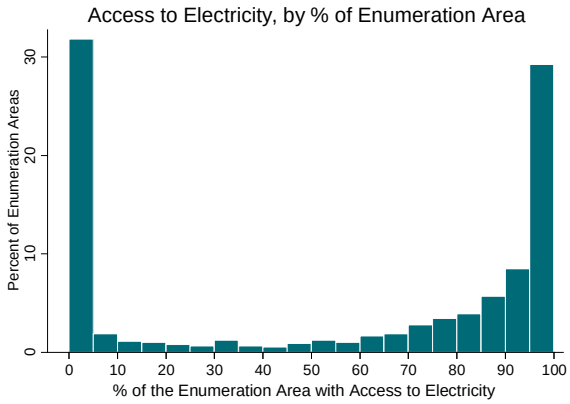
Using the 2013 DHS survey GPS dataset, we identified the percentage of unconnected Nigerians that were living in enumeration areas that included survey respondents *with* electricity and did not own a generator set. This latter qualifier reflects the fact that the DHS questionnaire does not explicitly differentiate whether households receive electricity from the regional power utilities or from a generator set. Importantly, a recent NOI Polls survey finds that a majority of Nigerians (77 percent) with electricity connections also rely on alternative power sources (e.g., generators, windmills, and solar invertors) due to erratic power delivery. Despite these findings, we utilized a highly conservative assumption to ensure that we did not unintentionally include enumeration areas with only households that rely on alternative power sources.

Interestingly, the DHS data suggests that many Nigerian enumeration areas have either universal or no access to the national grid (see histogram below). Specifically, 40 percent of enumeration areas fall into one of these categories (15 percent with universal access and 25 percent without any access). These areas were excluded from our "under the grid" analysis.

Access to Electricity, by % of Enumeration Area



To estimate the total number of "under the grid" Nigerians, we first calculated the percentage of unconnected people living within the aforementioned enumeration areas using the DHS data. We then calculated the total number of "under the grid" Nigerians by multiplying the percentage of the population by DHS weights and the total population of Nigeria. With the DHS data, we were also able to identify key characteristics of the "under the grid" population, like location (urban/rural) and wealth.

Next, we layered the national grid GPS dataset (available from the African Development Bank) onto the 2013 DHS GPS dataset. This enabled us to calculate the distance between "under the grid" households and the nearest high voltage transmission line (132 kilovolts and above). However, this is an imprecise measure since it does not capture the distance between "under the grid" households and lower voltage distribution lines. Currently, there is no publicly available GPS datasets on these distribution lines, which connect villages, towns, and cities to the high voltage power grid. As a result, our distance figures are likely upwardly biased, particularly outside of the South West and South East geopolitical zones. Therefore, these related findings should be interpreted with appropriate caution.

There is one additional methodological consideration beyond those listed above and in the blog post. To protect survey respondent privacy, DHS displaces the GPS coordinates of household observation data by up to 2km for urban areas and up to 5km for rural area. Therefore, this displacement distorts the distance from the transmission line calculations for individual observations. However, this displacement is uniformly distributed, meaning that the error should average to 0. As a result, the average distance figures across the entire sample theoretically should be accurate. However, estimates for subsamples (e.g., households living under the grid) could potentially be systematically biased at the distances specified above.