
What is the true scale of unmet electricity demand in Sub-Saharan Africa?

The electricity access deficit is more pronounced in sub-Saharan Africa than in any other region globally, where despite recent progress in transmission and distribution capacities, around 580 million people still lacked access to electricity in 2019.¹ And those that do have access are often burdened with poor reliability.

As of April 2022, a survey found that 43% of Africans reported having access to a reliable supply of electricity, up by only three percentage points since 2015, and about 28% of connected households have power half the time, occasionally, or never.² The latest World Bank Enterprise Surveys data suggests that customers across sub-Saharan Africa experienced an average of nine outages per month, each lasting an average of 5.7 hours.³ Yet, understanding the exact scale of energy poverty in the region remains elusive.

Assessing the ‘unmet’ electricity demand

A recent study by Garg, et al. lays out a framework to provide insight into the true scale and impacts of unreliable electricity service provision.⁴ The study introduces a novel approach for quantifying the difference between electricity supply and demand, accounting for both met and unmet demand in Sub-Saharan Africa (SSA) excluding South Africa.

Many firms in the African region identify no or poor electricity supply as a major restraint on their operations, subsequently forcing firms to adopt alternatives such as diesel generators, which have detrimental effects on firm economic efficiency (not to mention local environmental and health impacts). The methodology controls for reduced productivity due to poor electricity reliability and the price elasticity of demand due to high tariffs. Findings are consistent with the regional reality, where the aggregate electricity access deficit is staggering, though there are some utilities that are able to meet electricity demand for their customers.

To determine the unmet demand, generator use, reduced grid utilization due to unreliable electricity service, unrealized demand from unelectrified households, and the effect of tariff reductions are considered.

- **Reduced Utilization Cost** – The costs for firms from reduced utilization rate caused by disruptions to the on-grid power sector.
- **Generator Cost** – The additional costs for firms from the investments and operation costs of generators because of power outages.

The unmet demand is determined by using the net electricity supply and the total electricity demand, which requires three calculations.

- To gauge the **unmet on-grid electricity demand**, the study calculates the cost for the firm from reduced utilization due to unreliable electricity supply.
- **Unmet off-grid demand** is calculated in two parts: First the generator cost for businesses is divided by electricity intensity to gauge off-grid demand from the firms, and second, a household proxy is constructed by multiplying the current household

consumption by the unelectrified household population to get the total off-grid electricity demand.

- Finally, to account for the effect of reduced prices, we repeat the process for on-grid and off-grid unmet demand with **lower electricity tariffs** which provides the total unmet electricity demand in SSA.

The paper estimates that at 2018 electricity prices, SSA (excluding South Africa) on-grid power networks had annual unmet demand of 8.83 TWh for on-grid users and 42.9 TWh with the inclusion of the off-grid sector and un-electrified households. With a 50% reduction in tariff by country, the on-grid power sector would face 21.46 TWh of unmet demand in the region, rising to 55.53 TWh with the inclusion of off-grid. As one might expect, on-grid electricity supply in North Africa and South Africa is more reliable as these regions have a surplus of electricity supply compared to consumption. Algeria, Egypt, and South Africa have the highest volumes of electricity surplus in the African region. Countries without sufficient on-grid electricity supply are heavily concentrated in the SSA region as shown in Table 1.

TABLE 1: Unmet Electricity Demand (in GWh), by Region, Sub-Saharan Africa (excluding South Africa)

Region	On-Grid Unmet Demand	On-Grid + Off-Grid Unmet Demand	Price Elastic Unmet On-Grid Demand	Price Elastic Unmet On-Grid + Off-Grid Demand
Central Africa	68.73	6,246.69	114.26	6,292.23
Eastern Africa	-2,665.82	7,100.30	1,196.22	10,962.34
Southern Africa	3,867.96	9,853.79	3,867.96	9,853.79
Western Africa	7,554.60	19,699.77	16,280.45	28,425.62
Total Unmet Demand	8,825.47	42,900.56	21,458.90	55,533.98

Note – A negative value denotes a supply surplus

Reliability of Electricity Supply and Policy Implications

In many SSA countries, due to poor grid reliability, there is a lack of public trust in the capability of the electric utility to supply consistent power, in turn leading many households and industries to invest in off-grid systems for backup power generation. These unmet demand findings and country-level totals have implications for the policymaking narrative around achieving Sustainable Development Goal 7 in Africa, designing integrated electrification planning models, and targeting investment in a capital-efficient way into Africa’s electricity sector. The efforts in SSA should be accompanied by policy measures to spur uptake and consumption in areas already covered by the grid and those off the grid. Improving estimation techniques for predicting the unmet demand will help policymakers address issues beyond the supply-side market, spurring new wealth creation opportunities for firms and businesses in SSA.

Endnotes

1. International Energy Agency. 2020. "SDG7: Data and Projections."
2. Afrobarometer. 2022. [Still lacking reliable electricity from the grid, many Africans turn to other sources.](#)
3. [World Bank Enterprise Surveys](#)
4. Garg, Sankalp, Benjamin Attia, Brad Handler, and Morgan Bazilian. 2022. "Demand in the Dark: Estimating the true scale of unmet electricity demand in Sub-Saharan Africa." The Electricity Journal 35 (8). doi:<https://doi.org/10.1016/j.tej.2022.107189>.