AES: From Backup to Backbone: Community Microgrids to boost National Grid Reliability

Africa has made significant progress expanding electricity access, yet a growing challenge is emerging: reliability. Millions of households and businesses remain connected to national grids that experience frequent outages, disrupting economic activity, education, healthcare, and daily life. In response, many consumers rely on costly and fragmented backup solutions such as diesel generators, batteries, and standalone solar systems.

This paper presents a community microgrid model for urban and peri-urban communities connected to unreliable national grids. Rather than replacing the utility grid, the model leverages shared solar and battery infrastructure to improve reliability, reduce costs, and strengthen local energy resilience. Communities begin by monitoring electricity consumption and outage patterns, then progressively deploy distributed energy resources (DERs) that evolve from backup systems into primary community energy infrastructure.

Drawing on lessons from a pilot deployment in Uganda, the paper examines the technical, economic, governance, and regulatory considerations required to implement community-owned microgrids at scale. Particular attention is given to cooperative ownership, affordability, grid integration, and digital platforms for managing DERs. The paper further explores how community microgrids can reduce peak demand on local transformers and substations, improving network performance and reliability for both participating and neighboring customers.

The paper argues that community microgrids can complement national electrification efforts while supporting utility networks. It also examines policy and regulatory frameworks that could enable wider deployment of community-scale microgrids and unlock private and community investment in local energy infrastructure.

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