

An integrated regulatory–financial proposal for universal electrification in Uganda beyond the Umeme concession

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Abstract-

Achieving universal electricity access in Uganda requires rethinking the institutional, regulatory, and financial structure of the distribution segment following the end of the Umeme concession. This paper develops and applies an integrated framework that links least-cost electrification planning with cost-reflective revenue requirements, blended capital flows, and internal cross-subsidies. A computational model has been built that simulates the full financial architecture of the power distribution segment, generating annual income statements, balance sheets, and cash flows for each actor. The approach introduces two entities: Service-Co, a publicly supervised and privately operated distribution service company, and Finance-Co, a dedicated vehicle that pools public and private funds including grants, concessional loans, commercial debt, and equity to finance investments across grid and off-grid technologies. Results based on Uganda's National Electrification Strategy show that universal access is achievable without permanent subsidies. Extending the rollout to 2040 reduces annual distribution investment needs by two-thirds and significantly increases returns to both public and private investors. The framework captures the dynamic interaction between tariffs, investment timing, and financing terms, offering a practical tool to design financially robust electrification pathways. This work provides policymakers with a replicable methodology to align access targets with sector solvency. It shows that, when planned and financed as a single system – integrating all electrification modes in a unique technical, regulatory, and financial plan – universal electrification can become a viable long-term investment.

Index Terms- Universal electrification; Uganda; Regulation; Public private partnership; Blended financing; Financial model; Sub-Saharan Africa

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