

Session 5: Grid Intensification, Innovation and Cost



Wednesday, June 10, 2009

Population growth rates in peri-urban areas in SSA increase much faster due to rural-urban migration placing a strain on utilities to provide services to these areas. Utility companies will therefore need to rollout new technologies and innovative systems that would intensify grid expansion at a lower cost within their existing networks. However, given the fact that these areas are so congested, the right of way becomes an issue. It is important to note that high rate of losses due to the use of substandard conductors and power theft through illegal connections poses a greater challenge to utility companies.

The workshop received practitioners who presented various models on grid intensification using technical and managerial innovations for grid expansion, with special focus on peri-urban electrification. The workshop also discussed the type of technical solutions, innovations and business models that can be deployed to make access expansion more affordable and sustainable for users and utilities alike.

Grid intensification in peri-urban areas needs more innovative ideas to cope with the numerous challenges in grid expansion. Utility companies have to devise smarter ways of recovering the cost of their investments. Customers within these settlements are often low income earners, and as such, are unable to afford the initial service connection. In Kenya, where the largest slum in Africa is found, the Kenya Power and Lighting Company (KPLC) customers are highly subsidized as a motivation for increase access.

Losses both technical and non-technical coupled with low revenue collection are outstanding features of utilities operating in urban and peri-urban areas in developing countries. The workshop presented models such as remote metering, prepayment metering and smart grids as innovations and techniques to minimize non-technical losses which are basically through power theft and meter tempering. This problem can be tackled by involving the communities in power distribution which will create trust between consumers and the utility companies.

Grid intensification models presented at the workshop varied from country to country depending on their experience, level of technology and management of the electricity network. Models are customized to match the type of challenges peculiar to the country or peri-urban settlement. In some countries, while their biggest challenge to grid intensification is the reliable supply of electricity, for others is right of way to expand grid infrastructure.

Theft and loss management techniques are costly and could benefit from cost-effective mechanisms to make them work sustainably in peri-urban areas. There are pros and cons of single-phase systems (MALT/SWER) as a low cost approach used for peri-urban areas. There is a conflict between low cost and limitations for economic development of these areas, and political interference or regulatory rejection in some countries can severely limit their productive uses.

Barriers to grid expansion in general include lack of electricity supply for grid expansion, lack of acceptance and even reversals of single-phase systems, old neighborhood with old networks leads to high cost of providing service and this should be recognized by regulators and donors. Grid expansion is a moving target as urban and peri-urban areas keep expanding faster than electrification can be expanded.

Prepaid systems are quite prevalent, used in different ways (urban vs. rural or middle class or low income depending on the reason for using them.) The experience of EDM Mozambique with pre-paid systems shows improvements in the collection ratio and the quality of service (more transparency and reduction of complaints) and reduction of the administrative losses compared to the postpaid systems. In addition, the pre-paid systems facilitate the debt recovery.

Some older systems lack the best features of prepay (e.g., reducing theft, providing instant read-out on usage for customer control purposes, communication systems to allow company easy tally of kWh sold vs. delivered, etc.). Obtaining these features may mean total replacement of the management system and possibly the meters too). Failure to provide an accurate rate and the utility life of the equipment is also a problem, particularly for older systems.

Smart grid technologies (AMR, two way communication) are probably inappropriate for use in grid expansion. There may also be barriers related to integration with existing prepayment systems and protocols.

Presentations:

Ahmed Ounalli: Overview of Low Cost Grid Electrification Methods.

Maboe Maphaka, Senior Manager, Distribution Energy Trading, ESKOM & Connie Smyser, Independent Consultant, World Bank: Slum Electrification: What Technologies Can and Cannot Do.

Shahid Mohammad, Kenya Power Lighting Company (KPLC), Peri-urban Electrification: The Success Story of Group Scheme and Challenges of Kibera, the Largest Slum in Africa.

Masengo Kealotswe, Botswana Power Corporation: Botswana Intensification: Involving Women.

Antoine Graillet, Technoambiental (TTA), Spain: Smart Grid Technologies for Africa.