

Session 1: Grid Extension



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electricity extension.

Undoubtedly, access to modern forms of energy plays an important role in stimulating economic development and poverty reduction in the rural areas of Sub Saharan Africa and other developing countries. Unfortunately, to date there has been little progress in extending grid electricity to rural areas in Africa. There are several reasons for this. Rural settlements in many Sub Saharan Africa countries are sparsely populated as compared to their urban counterparts. The low population densities in rural areas result in high capital and operational costs for electricity companies. Because of low incomes and high levels of poverty in the rural areas, customers' electricity consumption rates are also low leading to low cost recovery. Although this poses a difficult task for utilities in Africa, there are some good examples of countries that have successfully faced these problems and have programs that have been successful. In this session a comparative overview of the most successful programs in the developing world was followed by a detailed overview of programs in Cote d'Ivoire and Tunisia.

An institutional overview of the challenge of rural electrification indicates that despite the problems rural electrification programs can be successful in most if not all countries. There is reason for optimism, even among countries about to embark on electrifying their poorest populations. But rural electrification is a dynamic, problem-solving process. Countries must discover solutions consistent with their geography and natural resources; demographics; and socioeconomic, cultural, and political realities. Problems change as programs evolve, but a worldwide review of developing country programs indicates that there are a set of underlying principles that guide successful programs. They include:

- Sustained government commitment. National commitment must be reflected in effective institutional structures that exhibit a high degree of operating autonomy and accountability, strong management, and dynamic leadership with the capacity to motivate and train staff.
- Effective prioritization and planning. Clear criteria based on market research are required for prioritizing areas to obtain a supply. Key factors include capital investment costs, level of local contributions, numbers and density of consumers, institutional capacities, and likely demand; for off-grid systems, it is important to identify markets that can benefit most for grid

- Reducing construction and operating costs. Careful attention to system design and sizing systems to meet actual energy demand can reduce construction costs up to 20–30 percent for grid systems and lower the cost of renewable-energy systems, thereby accelerating a program's pace and widening its scope.
- Sustainable financing. When cost recovery is pursued, most other program elements fall into place.
- Customer focus. To be effective, distribution companies must lower the barriers to obtaining a supply and involve local communities in promoting electricity use; this is true for both grid and off-grid systems.

Côte d'Ivoire is a leader in both electricity sales and purchases in the ECOWAS area of Africa. The objectives of the Société d'Opération Ivoirienne d'Électricité (SOPIE) an electrical company in Côte d'Ivoire are to build electrical systems that are of high quality, competitive, meet existing demand for electricity and ensure the transparency of investment operations. SOPIE plans the expansion of electricity systems, oversees the distribution of electricity and implements public investments rural electrification.

Cote d'Ivoire's population has grown significantly over the last 20 years. The achievements of electricity companies in Cote d'Ivoire to serve this population have been remarkable compared to other African countries. The population with electricity has grown from less than 1 million in 1960 to over 11 million in 2008 and the localities provided with electricity have grown from virtually none to over 2,500. In 2008, national coverage rates were 31.6 % of localities or 2686 total communities. The tariff for electricity is 0.072 \$ US/kWh with 80 kWh per month average consumption. The electricity companies have paid attention to keeping cost low through the use of distribution techniques such as single phase and single wire earth return to lower costs.

The impacts of the program have been that for households with electricity there is better lighting, more access to information, better space condition including refrigeration, greater schooling and improved health care. Many new activities have resulted from rural electrification including more household activity during the evening hours, the conservation and processing of agricultural products and the modernization of homes. The government's objectives are to further the development of small village businesses and commercial establishments and to create new employment through informal businesses that may located in the home.

Despite the successes of the program, there is still a need to for continued progress. This can be achieved by the development of a plan for rural electrification, the provision of a subsidy to lower the cost of service for new customers, consideration of the adoption of prepaid meters, and the possibility for villages to consider rural electrification as a part of their integrated development programs . There also is a need to stress the greater use of electricity for both income diversification and for agricultural processing. If these outcomes are achieved, electrification can have a significant impact on rural economic development.

In Tunisia, when the rural electrification program was launched in earnest in the mid 1970s, only 30,000 (or 6%) of rural households were electrified, even though half of the Tunisian population lived in rural areas. At that time, rural electrification became the third pillar of an integrated rural development drive that also emphasized education and basic health (especially family planning, in support of women's social equality). The Government of Tunisia has given top priority to rural electrification in the country's social and economic development plans, as evidenced by the significant level of investments amounting between 1977 and 2000, of which the majority was provided by the national government. By 2000, 88% of rural households (and 95% of all households) had been electrified, and as of today 99% of all households have access to electricity.

Rural electrification has been implemented primarily by a public utility, the Societe Tunisienne de l'Electricite et Gas (STEG). STEG is known as a "model enterprise" in the country, with a high level of human and technical competence. STEG introduced into the rural electrification program at an early stage efficient commercial, computerization and technological innovations such as the MALT. MALT is a three-phase/single-phase distribution system that reduced costs dramatically, enabling greater investments in distribution and thus repeated overshooting of targets for connections. Overall system losses of 13.4% (3.1% non-technical) compared favorably with loss levels of utilities in developed countries.

A unique feature of Tunisian rural electrification has been its balancing of an essentially business-oriented utility operation, with substantial state finance and explicit support for rural development. Close coordination of rural development zones and infrastructure provision by regional governments ensured that electrification would be provided at the same time as investments in schools, clinics, roads and public lighting. Tariff policies, negotiated with the Ministry of Industry, have not diverged greatly from STEG's long term marginal costs. In addition, low consumption consumers and agricultural electricity users benefited from tariffs that involved cross subsidies.

As saturation of the Tunisian market approaches, the question arises of how the considerable technical expertise built up in STEG and its external contractors and suppliers can be maintained and used, perhaps through technical assistance to other rural electrification programs in Africa. The STEG experience in Tunisia owed its success to a number of factors - the strong government policy and financial commitment to rural electrification, gender and social equity, the institutional "esprit de corps," the high level of technical innovation, and uniquely enabling political and economic conditions - that may not be replicated in other African countries where such conditions do not exist. Nonetheless, the STEG experience can provide useful lessons even in unpromising situations through its emphasis on adaptive technology, robust finances and an open and transparent system for selecting villages for electrification.

Presentations:

The Challenge of Grid Rural Electrification: Experience of Successful Programs: Douglas Barnes (World Bank Consultant) and Voravate Tuntivate (World Bank Consultant)

Rural Electrification and the Political Approach in Cote d'Ivoire. Eugène Botto, Chef de service Distribution, Société d'Opération Ivoirienne d'Électricité (SOPIE)

Institutional and Financial Aspects of a Rural Electrification Experience: The Case of TUNISIA. Ahmed Ounalli ADB Consultant.