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CAPACITY BUILDING WORKSHOP IN TANZANIA ASSISTS UTILITIES

USEA WORKSHOP ON DEMAND SIDE MANAGEMENT AND ADVANCED METERING



Participants of the Workshop on Demand Side Management (Energy Efficiency and Demand Response) and Advanced Metering held in Dar es Salaam, Tanzania.

Under the Energy Utility Partnership Program (EUPP) funded by the U.S. Agency for International Development (USAID), the U.S. Energy Association (USEA) conducted a workshop in Dar es Salaam, Tanzania on Demand Side Management (Energy Efficiency) and Advanced Metering. The workshop was held on May 22 – 25, 2013 and included representatives from the Tanzania Electric Supply Company Limited (TANESCO), Zanzibar Electricity Corporation (ZECO), the Energy and Water Utilities Regulatory Authority (EWURA), and the Ministry of Energy & Mineral Resources.

USEA is providing capacity building support to the two utilities in Tanzania through the development of a utility partnership program. The partnership involves executive exchanges, workshops and short-term technical assistance to learn about utility best practices from their counterparts in the U.S. This initial workshop focused on energy efficiency and advanced metering.

TANZANIA ENERGY SECTOR

Currently, the energy sector in Tanzania is facing difficulties. Although they may have several energy sources such as wind, hydro, gas, geothermal, and solar, the country continues to rely heavily on biomass. This reliance has greatly contributed to deforestation in the country. With access to electricity in the country hovering around 18%, there is a need to extend the grid to many other areas in the country, which is economically challenging. For many years, the main source

of power in the country was hydroelectric plants, but the reduced rainfall and subsequent drought have forced many to use very expensive diesel fuel for power. The cost of this diesel fuel is a significant detriment to the growth of Tanzania's energy sector.

Zanzibar Electricity Corporation (ZECO) supplies power to the two islands of Ungula and Pemba mainly through a submarine cable from the mainland. A second interconnector cable began functioning this year, supplying power from Dar es Salaam to Zanzibar. ZECO is faced with challenges of their own as they address an aging distribution system with high capital costs and meeting the energy demand.

Tanzania, like other countries in East Africa, is looking at ways in which energy efficiency and demand response programs will help to reduce the load on their system and increase the reliability of the power grid. A key step in addressing this issue was the recent introduction of an AMI metering system by TANESCO. The system was developed to help improve revenue collection and reduce the theft of energy. Prior to the program, energy losses for TANESCO were estimated to be 26% from transmission/distribution losses and non-technical losses. A pilot project was instituted to convert all of TANESCO's large power customers to AMR. The goal of the program is to phase in the remaining large and medium size customers by the end of 2013 should the pilot be a success. By the end of 2012 with the introduction of the AMRs, revenue collection has improved as non-paying customers can now be disconnected and attempts of tampering with the meters can be detected quickly. Since the introduction of the AMR losses have dropped from 26% to 20% with plans to convert additional customers to AMR meters in the future. ZECO is also looking to incorporate AMR into their system as they begin the process of finding a vendor for the meters.



Although both TANESCO and ZECO are the main participants in this program; other representatives from the Ministry and EWURA also attended. As the regulator and entity responsible for the regulation and policies of the electricity, petroleum, natural gas and water sectors; the participation of both EWURA and the Ministry is crucial to the success of energy sector development in Tanzania.

DEMAND SIDE MANAGEMENT AND DEMAND RESPONSE

At most utilities in the U.S., demand side management (DSM) programs enable the end consumer to modify their energy use with the goal of using less electricity during peak hours. TANESCO has the added challenge of a generation shortfall, so the implementation of DSM programs is critical to reduce both load and costs.

As presented by the U.S. utilities, DSM programs have been in use for many years as part of the company commitment to their customer's needs, sustainability, corporate and state goals, and part of their larger Integrated Resource Planning.

DSM plays a key role in energy by:

- Meeting society's goals for efficient use of resources,
- Decreasing emissions of gases that lead to climate change, and
- Reducing manufacturers' costs thereby making them more competitive.

Linda Brethitt, Kentucky Public Service Commissioner, stated that most regulators in the U.S. have endorsed the need for utilities to have DSM programs available to their customers. It was clear from the discussions that TANESCO is interested in improving the relationship with their customers. Due to the unreliability of power in the country many customers do not look favorably upon the utility. One of the challenges stated by TANESCO which hinders them in managing their DSM programs is the limited staff available. They do not have the necessary resources to effectively oversee such programs. However, it was stressed by SMUD that there are some changes that can be made for little cost and limited resources. The identity of a company is very much tied to their branding as it represents their goal and vision. A change of a corporate brand usually sends a signal to consumers that the company is also undergoing a change, as evidenced by SMUD when they changed their logo a few years ago.



U.S. presenters (from left to right): Fouad Dagher, National Grid; Elisabeth Brinton, Sacramento Municipal Utility District, and Linda Brethitt, Kentucky Public Service Commission.

The idea of consumer education was also stressed by National Grid. Throughout Tanzania there are huge corporate billboards in which various companies advertise their services. It was noted by one of the presenters that TANESCO did not have a single billboard sign presenting the company to their customers. It was suggested that TANESCO needs to educate the consumer on what they do as a company. It can include not just the use of the billboard but other resources such as schools, electricity bills, and the employees themselves. The idea of forming community partnerships has worked within the SMUD service territory and recommended to TANESCO for consideration as well.

ADVANCED METERING

An Advanced Metering Infrastructure (AMI) is used for automated, two-way communication between a smart meter a utility company and the customer.

The goal of an AMI is to provide utilities with real-time data information about the consumption patterns of their customers and to enable the customer to decide about their usage based on the price at the time of use. The inclusion of AMR into TANESCO's distribution system has proven to reduce theft and increase revenue through accurate billing. AMR is only one aspect of the overall AMI and Smart Grid development; however TANESCO is moving forward with ZECO soon implementing one as well.

BEST PRACTICES PRESENTED

Throughout the three days of the workshop, the U.S. speakers presented ideas and programs that their individual companies have implemented in the various topics areas. Some practices presented included:

Energy Efficiency

- How U.S. utilities determine the most cost-effective strategies for program implementation is that all options should be considered.
- Since most utility energy efficiency programs are funded by the rate payers, it is important to identify key goals and incentives and ensure that spending limits do not exceed budgeted amounts.
- Clear energy efficiency standards need to be established for construction, commercial building retrofits, lighting, appliances, industrial equipment, etc. This would shape the market and help solve the demand crisis.

Demand Response

- A utility Integrated Resource Plan should include DSM programs.
- Load management plans and programs are effective utility tools to avoid or minimize blackouts.

Advanced Metering

- An added element of advanced metering to reduce theft should include employee and public awareness of the impacts of power theft to both safety and revenue.
- Utilities must have in place billing and recovery options that allow delinquent customers a clear way to repay the utility for any revenue loss due to power theft.
- Installing advanced meters on large customers is a cost effective way to reduce losses and improve service to key customers.

Key Results

A daily part of the workshop was the Action Plan development. At the conclusion of each workshop day, time was spent with the participants identifying key elements they felt should be implemented based on the presentations given earlier in the day. It was clear that everyone recognized the need to have a better and clearer defined relationship with their customers, both commercial and residential. The idea of key accounts and categorizing customers by their energy use was well received. Better utilization of the data collected by the AMR was also discussed as it can be used for more than just revenue collection and theft. It gives a more realistic and up-to-date use of the system that can help in planning future energy efficiency and demand response programs.

The items below were those identified by the participants as those to be considered for implementation:

- Increased customer education and stakeholder engagement for energy efficiency and demand response programs.
- An improved regulatory infrastructure.
- Better peak load management and capacity planning for system optimization.
- Introduction of time of use tariffs for some customers.
- Addressing ways to construct micro grids to increase access in rural areas to control/monitor energy use.
- Increasing the penetration of AMI/AMR infrastructure to include two-way communication



Picture of TANESCO's Ubungu II Gas Power Plant located in Dar es Salaam.

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