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Senior executives from the electric utilities, energy ministries, regulatory authorities and private sector of the East African Community participated in a workshop focused on strategies for clean energy deployment in the region. Delegates identified best practices for deploying clean energy technologies given financial constraints.

The Workshop on Clean Energy Development Strategies in East Africa is part of the ongoing Energy Utility Partnership Program (EUPP) through a Cooperative Agreement between the U.S. Agency for International Development (USAID) and the U.S. Energy Association (USEA). The EUPP is intended to assist developing countries with implementing environmentally sustainable power generation resources, improving operational efficiency, and enhancing financial viability of utilities and related institutions. As part of the workshop, 34 delegates from Burundi, Kenya, Rwanda, Tanzania and Uganda met with clean energy experts from around the world, including electric utilities, consulting firms, government agencies and financial institutions.

This workshop was organized and conducted in cooperation with the East African Community by the U.S. Energy Association (USEA) on behalf of USAID.

EXECUTIVE EXCHANGE HIGHLIGHTS

Producing energy in a sustainable, efficient, affordable and clean manner has emerged as one of the greatest challenges in developing countries around the world. With steadily rising energy demand, developing countries have an opportunity to take advantage of clean energy technologies that underpin economically and environmentally sustainable development.

Clean energy development opportunities are particularly abundant in East Africa. All five countries in the East African Community possess significant renewable energy resources, including small hydro, solar, wind, geothermal and biomass. Still, the majority of the populations of these countries do not have access to electricity. Supplying sustainable energy is a crucial challenge in the economic development of this resource-rich region.

MOVING TOWARDS A LOW EMISSION POWER SECTOR

Dr. S.P. Gon Chaudhuri, Chairman of India's Arka-IGNOU Community College, addressed global energy consumption trends and emphasized the need to transition to a clean, renewable energy sources. In light of rising fossil fuel costs, environmental concerns and fuel supply shortages, developing and countries will need to plan a transition to increased renewable power generation. Dr. Gon Chaudhuri emphasized the importance of this transition as the International Energy Agency (IEA) projects that world energy demand will double between now and 2030.

Dr. Gon Chaudhuri also identified encouraging signs for clean energy development. The steady reduction in cost of renewable energy generation means that these sources have become economically viable when compared to uncertain fossil fuel prices. Solar photovoltaic production is an excellent example of the cost reductions in renewable generation. Since 1975, the average global cost of photovoltaic production has dropped from \$99.61 per watt to \$3.84 per watt. As these trends continue, clean and renewable energy sources will become even more appealing in the developed and developing world. In East Africa, the region's vast renewable resources provide an excellent platform for clean energy development.

FINANCING STRATEGIES AND CLEAN ENERGY INCENTIVE PROGRAMS

Despite cost reductions for renewable energy and the abundant resources in East Africa,

financing clean energy development remains a barrier to deployment in the region. During the panel discussion on financing strategies, Denise Kutsch provided an overview of the Overseas Private Investment Corporation's (OPIC) lending programs. OPIC's programs in sub-Saharan Africa include biomass, geothermal and agricultural efforts. In June 2012, OPIC announced the launch of the U.S. – Africa Clean Energy Initiative (US-ACE) in collaboration with the U.S. Department of State and the U.S. Trade and Development Agency. The Initiative consists of \$20 million in available funding for environmental impact assessments, finalization of power purchase agreements (PPA), preparation of feasibility studies and other project development. She identified key factors for attracting investment, including an established renewable energy framework, creditworthy offtaker with a strong PPA, and a stable regulatory, political and economic environment.

Junhui Wu provided information on the World Bank's lending for clean technologies. The World Bank offers Clean Technology Funds with a total envelope of \$4.5 billion. These funds were used to leverage over \$37 billion of additional investment. The funds can be used for energy efficiency programs, develop renewable energy installations, and other clean technology initiatives. Clean Technology Funds have been deployed in Colombia, Egypt, Indonesia, Kazakhstan, Mexico, Morocco, Nigeria, Philippines, South Africa, Thailand, Turkey, Ukraine, Vietnam and a regional program in North Africa.

UTILITY ENERGY EFFICIENCY PROGRAMS

One of the most valuable energy sources is actually energy efficiency. By reducing energy consumption through efficiency programs, utilities effectively increase available energy supply. When a utility's revenue is linked to volume of energy sales, however, there is no incentive for the utility to encourage efficiency. In fact, energy efficiency means lower profits in many cases. Fouad Dagher, Manager of Power and Energy Products and Services for National Grid, explained the revenue decoupling process undergone by National Grid and other utilities. Through decoupling, revenue is no longer directly tied to volume of energy sold. This makes utility efficiency programs economically viable and can help to reduce wasteful energy consumption.

Even with utility buy-in to efficiency programs, the programs cannot be effective without educating the end user. Linda Dethman, Vice President of Program and Marketing Analysis for The Cadmus Group, identified behavioral change as one of the most significant barriers to efficient energy usage. Efficiency programs can be accelerated through public education efforts, labeling practices, codes and standards. These programs have the potential to reduce U.S. annual non-transportation energy consumption by 23% by 2020, eliminating more than \$1.2 trillion in wasted energy, according to a 2012 McKinsey report. In the developing world, efficiency programs can increase access to and reliability of electricity for all.

RURAL ELECTRIFICATION AND RENEWABLE ENERGY INTEGRATION

The panel on rural electrification and renewable energy integration examined different methods of bringing electricity to rural populations, including grid-connected and off-grid solutions. Grid-connected energy development allows utilities to extend more reliable, traditional power to rural populations. Building transmission and distribution networks to these widely dispersed villages is often too expensive to justify in developing countries. When this is the case, off-grid renewable energy generation can be an effective means of bringing power to the most rural populations. Still, this is not a perfect solution. The intermittency of many renewable energy resources means that significant modeling and planning must be completed to accurately assess the resources of an area. Crescent Mushwana, Chief Engineer of Grid Planning for Eskom gave an overview of South Africa's experience in modeling for grid-connected renewable energy generation. This included wind and solar resource assessments

for target areas.

TANZANIA DOMESTIC BIOGAS PROGRAMME

On the final day of the workshop, participants visited several biogas plants installed by the Tanzania Domestic Biogas Programme (TDBP). TDBP provides financing assistance to low-income Tanzanian farmers who wish to electrify their homes and have the capacity to support a biogas plant. Through an anaerobic process, cow manure and urine are stored in an underground digester and separated into methane gas and fertile slurry. The gas can be used to produce a small amount of electricity or for stove cooking. The slurry can then be used as a fertilizer for the farms, producing healthier, faster-growing plants organically. With gas cooking available, the farmers and their families no longer have to spend hours every day collecting firewood for cooking. The gas stoves also significantly reduce the harmful smoke inhaled by mostly women and children while preparing and cooking food. TDBP has been highly successful to date and expects to install 12,000 plants by 2013.

RESULTS

The participants had the opportunity to conduct detailed discussions with recognized international experts in clean energy development. They also were able to share their own experiences with clean energy development and identify best practices in clean energy development. The information shared at the workshop will be valuable to the participants as they return to their home countries and formulate plans for energy sector development.

Additional specific outcomes of the exchange are as follows:

- Workshop participants received detailed information on criteria for acquiring international financing for clean energy programs and were introduced to the U.S. – Africa Clean Energy Initiative funding program.
- Participants in Tanzania identified the need for energy efficiency programs, including CFL lightbulb deployment programs.
- Participants learned the strengths and weaknesses of the rural electrification models of India, Laos, Cambodia and South Africa. In particular, the Indian model of off-grid renewable energy generation fits well with the resources available in East Africa.
- Participants highlighted the need for increased training programs and public outreach to accelerate behavior change and accelerate energy efficiency deployment.
- Several participants plan to push for enhanced labeling programs and efficiency standards.

EXECUTIVE EXCHANGE PROGRAM PARTICIPANTS

BURUNDI

- Mr. Nolasque Ndayihaye, Director of Planning and Electric Project Studies, Ministry of Energy and Mines
- Mr. Pascal Ndayishimiye, Director General, REGIDESO

KENYA

- Ms. Esther Wangombe, Assistant Director, Renewable Energy, Ministry of Energy
- Eng. Joseph Nganga, Director, Electricity, Energy Regulatory Commission
- Mr. John Ihuthia, Chief Planning Officer, Kenya Power & Lighting
- Ms. Elizabeth Njenga, Capital Planning and Strategy Manager, Kenya Electricity Generating Company
- Ms. Njeri W. Nthiga, Graduate Trainee Electrical Engineer, Kenya Electricity Transmission Company

RWANDA

- Mr. Alexis Mutware, Head of Electricity Section, Rwanda Utilities Regulatory Authority
- Mr. Claver Gakwavu, Head of Planning, Energy, Water and Sanitation Authority

TANZANIA

- Mr. Robert Dulle Charles, Ministry of Energy and Minerals
- Mr. Ng'anzi Jumaa Kiboko, Principal Commercial Officer- Electricity, Energy and Water Utilities Regulatory Authority
- Mr. Thabit Salum Khamis, Zanzibar Electricity Company (ZECO)

UGANDA

- Mr. Emmanuel Nsubuga, Energy Officer, Ministry of Energy and Mineral Development
- Mr. Peter Kityo, Environmental Officer, Electricity Regulatory Authority
- Mr. Gerald Muganga, Manager of Planning and Investments, Uganda Electricity Transmission Company

Energy Category:

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