

TANZANIAN REPRESENTATIVES TRAVEL TO BRAZIL ON AN EXECUTIVE EXCHANGE TO EXAMINE REVERSE POWER AUCTIONS

DELEGATES FROM THE TANZANIA ELECTRIC SUPPLY COMPANY LTD, ENERGY AND WATER UTILITIES REGULATORY AUTHORITY, AND THE STATE MINING CORPORATION PARTICIPATE IN AN EXECUTIVE EXCHANGE TO BRAZIL TO MEET WITH STAKEHOLDERS TO DISCUSS REVERSE POWER AUCTIONS.

BRAZIL - Supported by the U.S. Agency for International Development (USAID), participants representing the various Tanzanian agencies and companies charged with developing and regulating electricity generation, transmission, and distribution took part in a ten day executive exchange to Brazil. They discussed Reverse Power Auctions, Power Purchase Agreements, project finance, national energy planning and procurement, competitive bidding processes and prequalification. Delegates included lawyers, procurement specialists, project managers, and engineers from Tanzania's Electric Supply Company Ltd (TANESCO), Energy and Water Utilities Regulatory Authority (EWURA), and the State Mining Corporation (STAMICO). The executive exchange was conducted by the U.S. Energy Association (USEA) as part of the Power Africa initiative.



Participants meet with the Ministry of Mines and Energy in Brasilia, Brazil



Participants visit the Fonte dos Ventos Hybrid Solar and Wind Farm in Tacaratu, Brazil hosted by Enel Green Power.

BACKGROUND: THE U.S. – TANZANIA PARTNERSHIP PROGRAM

Tanzania is one of the six initial focus countries of Power Africa, a multi-partner initiative launched in the summer of 2013, which aims at increasing electricity access in sub-Saharan Africa by 30,000 MW. Three important factors that currently influence the direction of electricity policy development in Tanzania include: a) the Government of Tanzania’s (GOT) aim to increase generation capacity up to 10,000 MW by 2025; b) the unbundling of the public utility, Tanzania Electric Supply Company Ltd. (TANESCO), by 2021; and, c) the increase of the supply of natural gas-fired generation to meet base-load demand.

TANZANIA’S ELECTRICITY MARKET

Tanzania has a vast potential of energy sources from natural gas deposits to hydropower, geothermal, biomass, coal, solar, and wind. Currently, Tanzania has 1,591 MW of installed grid generation capacity and approximately 76 MW in mini-grid systems to serve its population of over 51 million people. And while these numbers are continuously increasing, electricity production meets less than 15 percent of the demand per year and only 30 percent of the population is connected to the grid.

PRIMARY EXCHANGE OBJECTIVES

Within this energy context, the goal of the executive exchange was to build upon a Reverse Power Auctions Workshop, held in 2016, and augment the knowledge of the key stakeholders in Tanzania responsible for power sector reform, specifically regarding competitive bidding and reverse

power auction processes. The executive exchange was designed to allow the Tanzanian executives to meet with the principal stakeholders, government entities, and private sector companies involved in Brazil’s reverse power auctions. Over the course of ten days, the exchange:

- Discussed with Empresa de Pesquisa Energetica (EPE), the Energy Research Company, short- and long-term energy policy planning, the Brazilian governmental structure and roles, the technical requirements for bidders, as well as how EPE determines cap price.
- Met with BNDES, the Brazilian Development Bank to discuss financing policy, and local content requirements.
- Met with the various governmental branches that deal with the policy, regulation, and operation of electricity generation in Brazil, namely, the Ministry of Mines and Energy (MME), the National Grid Operator (ONS), and Brazil’s regulator the Agência Nacional de Energia Elétrica (ANEEL).
- Met with two law firms, Veirano Advogados and Demarest Advogados, to discuss the legal aspects of the Power Purchase Agreements, the due diligence of the reverse power auction bidders, procurement, and contract management.
- Discussed wind and solar development in Brazil with ABEEólica (Brazil’s wind power association), ABSOLAR (Brazil’s solar power association), and Enel Green Power.
- Participated in a half-day reverse power auction simulation by Câmara de Comercialização de Energia Elétrica (CCEE), Brazil’s commercial electric market operator.
- Visited a hybrid wind and solar PV farm in Pernambuco, Brazil that was built as a result of reverse power auctions with Enel Green Power as the winning bidder, as well as a site visit to the Paulo Afonso Hydroelectric Dam IV run by CHESF.

SUMMARY OF KEY ISSUES/DISCUSSIONS

The following are the key topics addressed during the executive exchange:

1. Structure of the Brazilian Power Sector

Angela Livino of Empresa de Pesquisa Energetica (EPE) explained that the structure of the Brazilian power sector is defined in the different roles that each independent agency plays in the generation, transmission, and distribution of electricity. The electricity market itself is divided between the “Regulated Market” which accounts for 76% of the market and the “Free Market” at 24%. Brazil currently has more than hundred times the installed capacity as Tanzania at 143 GW. However, 65% of Brazil’s electricity generation comes from hydropower which has faced significant decline due to a drought that has lasted 2 years. This has prompted Brazil to diversify their electricity mix.

Accordingly, EPE was created in 2005 in order to produce the various energy planning studies for the long-term and short-term. EPE determines how current supply can meet future demand and makes recommendations to the Ministry of Mines and Energy (MME) if there needs to be new energy added. Speaker Jeferson Soares of EPE went into greater detail with explaining electricity load forecasting and the various models, like the Generation Expansion Model (GEM), that are used to depict different scenarios depending on changes in globalization, conflict, environmental, economic, and political variables. This helps determine what type of new energy supply should be added to the generation mix and if the project will be auctioned through a reverse power auction.

2. Reverse Power Auctions and Reserve Power Auctions

A reverse power auction is a bidding process for developers to propose new energy projects at the lowest bid cost. The winner of the auction with the lowest bid is awarded a Power Purchase Agreement for an average of 20-30 years. Within Brazil, “Energy Nova” or New Energy will have a reverse auction 3 to 5 years before the project is targeted to go online. A reserve power auction falls under the umbrella of the reverse power auction system, but it is only for renewable energy projects that are meant to support and secure the electricity supply within Brazil. It originated after significant shortages of electricity spurred the government to absorb the cost of adding more generation kept in reserve in order to prevent future shortages. These auctions are regulated by ANEEL in the “regulated market” and the electricity is sold to captive consumers, like DISCOs, who consume between 0.5MW< 3MW.

Gabriel Doyle at ANEEL clearly explained the flowchart process by which a reverse power auction is initiated in Brazil. According to Doyle, EPE conducts a market expansion planning study and makes recommendation to MME with starting bid price → MME then defines the guidelines for conducting the Tender for a Reverse Power Auction → ANEEL drafts the required documents for the accomplishment of the Tender (Tender Notice and Contracts) → DISCOs inform MME of their market projections → ANEEL informs CCEE to set up the auction and CCEE operates the electronic bidding platform → ANEEL executes the phases after the auction such as the issuance of bid award and documentation.

According to Alexandre Viana of CCEE it took 2 years to prepare for the first auction in 2009 for a wind project and Rodrigo Sauaia of ABSOLAR stated that the first large-scale solar PV auction occurred in 2013. Now, CCEE holds 6 to 7 auctions a year, taking only 6 months prepare. According to EPE, there have been a total of 36 auctions: 21 new energy auctions, 9 reserve auctions, 3 alternative sources auctions, and 3 special auctions. Paulo Pedrosa, Executive



Participants discussing the technical features of the solar PV panels with Enel Green Power representative.

Secretary of MME, stated that in 2017 they will start holding auctions for projects to go online in 2020-2024. The first batch of PPAs that were issued in 2003 will start to expire in 10-15 years, around 2023-2033.

The Tanzanian delegation was able to see the process of a reverse power auction firsthand during a half-day simulation at CCEE hosted by Alexandre Viana and Ana Paula Ferme. Here they asked questions about how to set an appropriate starting bid price, how to prevent collusion, how do you accurately define the technical requirements of the project, and how to control the auction if the DISCOs have been the traditional procurement entity?

3. Financing Power Projects

In Rio de Janeiro, the delegation met with the Brazilian National Development Bank (BNDES) which provides financing for power projects throughout the country. According to Alexandre Esposito of BNDES, developers can either get direct financing from BNDES or they can go through 70 different accredited banks in order to indirectly get BNDES financing. One key question the Tanzanian delegation had for BNDES was the regulation on local content requirements. The Government of Brazil set forth that BNDES cannot finance projects that are primarily imported. Accordingly, the local content requirement states that projects with >60% local content are eligible for financing by BNDES. Projects that cost more than 20 million Brazilian Reals are eligible for direct financing, when those less than 20 million Brazilian Reals must be indirectly financed. This is meant to be an incentive to support Brazilian businesses and to consolidate the supply chain. For example, a PV solar module has to be assembled in Brazil, but the rest of the material to build a PV solar farm can be imported. This was an important topic for many of the Tanzanians who are considering the best way to attract foreign investment, yet also expand their economy through domestic production and supply of equipment.

4. Lessons Learned

Each organization that the delegation visited offered a number of lessons learned that would help the Tanzanians create their own reverse power auction system without falling into the same pitfalls that the Brazilians did.

Some key lessons were:

- Long-term fixed contracts render lower risk premiums, and thus lead to lower bids;
- Auction awards provide project developers with revenue stability and financial ease;
- The introduction of new technologies can radically change the market;
- A culture of competition reduced the regional monopoly in the infrastructure sector; and
- There is no “one-size-fits-all” approach to developing an electricity sector and reverse power auction system.



Participants met with Brazil's energy research company, Empresa de Pesquisa Energetica (EPE) to discuss short-term and long-term national energy planning goals and reverse power auction plans.

Some pitfalls to be aware of:

- Do not wait until last minute to build the transmission line after constructing the power plant. Often transmission lines face greater environmental licensing issues and end up taking more time to come online, meanwhile you are left with a generating power plant that cannot reach the grid.
- Be clear in your contracts with developers on the timeline and due diligence process.
- Fossil fuel power plants have complex contracts regarding generation performance and reimbursement, which is important because the capacity factor differs from actual generation, and thus they will need to pay the difference based on the spot market price.
- Understand what your real demand versus your nominal demand is. There is a significant difference in the demand of customers that can afford to pay for the service of electricity versus the demand of the population that would like electricity, but cannot afford to purchase it. It is important to balance the cost of energy supply and demand.

After this exchange, the participants felt that they had a better understanding of how to evaluate bidders and have advanced their knowledge on reverse power auctions, hybrid auctions, and sealed-bid auctions. 87% of the participants found that the simulation at CCEE and the presentation given by EPE were the most relevant activities during the executive exchange.

The top three recommendations that the participants plan to bring back to their organization are:

- 1) Long- and short-term planning should be independent of the utility, whereas currently it is done by TANESCO. It is important to create an independent institution like EPE to do energy market planning.
- 2) There needs to be clear and standardized preparation of the bidding documentation.
- 3) Reverse auctions can attract investment and aid in procuring more power projects if done properly.



Tanzanian delegation getting a tour of the Paulo Afonso IV Hydroelectric Dam

EXECUTIVE EXCHANGE PROGRAM SPEAKERS AND PARTICIPANTS

1. BRAZILIAN ORGANIZATIONS

ABEEÓLICA
ABSOLAR
AGÊNCIA NACIONAL DE ENERGIA ELÉTRICA (ANEEL)
BRAZILIAN NATIONAL DEVELOPMENT BANK (BNDES)
CÂMARA DE COMERCIALIZAÇÃO DE ENERGIA ELÉTRICA (CCEE)
DEMAREST ADVOGADOS
EMPRESA DE PESQUISA ENERGETICA (EPE)
ENEL GREEN POWER
MINISTRY OF MINES AND ENERGY (MME)
NATIONAL GRID OPERATOR (ONS)
VEIRANO ADVOGADOS

2. TANZANIA ELECTRIC SUPPLY COMPANY LIMITED (TANESCO)

AARON NANYARO	SENIOR RESEARCH MANAGER
FOKAS DANIEL	PRINCIPAL PLANNING ENGINEER
CECILIA MPAMILA	PROCUREMENT MANAGER
ABDALLAH AWADH	PROCUREMENT OFFICER
NORAH MTAU	PROCUREMENT SPECIALIST

3. ENERGY AND WATER UTILITIES REGULATORY AUTHORITY (EWURA)

GODFREY CHIBULUNJE	ACTING DIRECTOR OF ELECTRICITY
EDWIN KIDIFFU	LEGAL MANAGER
KEMILEMBE KAFANABO	FINANCIAL ANALYST

4. STATE MINING CORPORATION (STAMICO)

ISMAEL MWITA	HEAD OF PROCUREMENT MANAGEMENT UNIT
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