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## **SOUTH ASIAN ENERGY EXECUTIVES ASSESS REGIONAL CROSS-BORDER ELECTRICITY TRADE**

**WORKSHOP WITH SOUTH ASIA REGIONAL INITIATIVE FOR ENERGY INTEGRATION (SARI/EI)**

**COLOMBO, SRI LANKA - The United States Energy Association, under the South Asia Regional Initiative for Energy Integration (SARI/EI), with funding from the United States Agency for International Development, organized a South Asia Regional Workshop on Competitive Electricity Markets that took place March 18 – 20, 2014 in Colombo, Sri Lanka. The first two days of the workshop included technical presentations by power pool experts, updates on cross-border electricity trade (CBET) from each of the participating countries, and open discussions on the development of a regional grid and electricity market in South Asia. On the final day of the workshop, participants visited generating stations in the Puttalam area.**



*Above: Participants in the South Asia Regional Workshop on Competitive Electricity Markets in Colombo, Sri Lanka*

The participating utility and government executives discussed the benefits of a regional power pool and the steps necessary to form a South Asian energy market. By examining the evolution of various power pools around the world, the participants were exposed to the challenges faced in different political and regulatory environments, as well as the universal benefits achieved by implementing regional electricity markets. By interconnecting grids, utilities can achieve economies of scale that provide increased grid reliability, lower energy production cost through centralized dispatch, a decreased need for infrastructure investment, and the provision of ancillary grid services.

## Power Pool Presentations

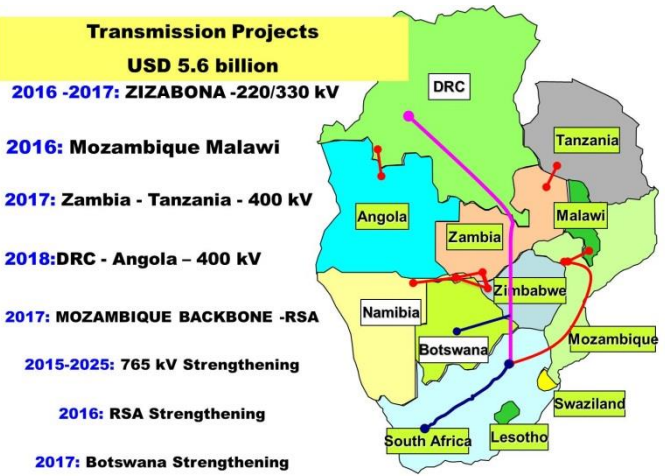
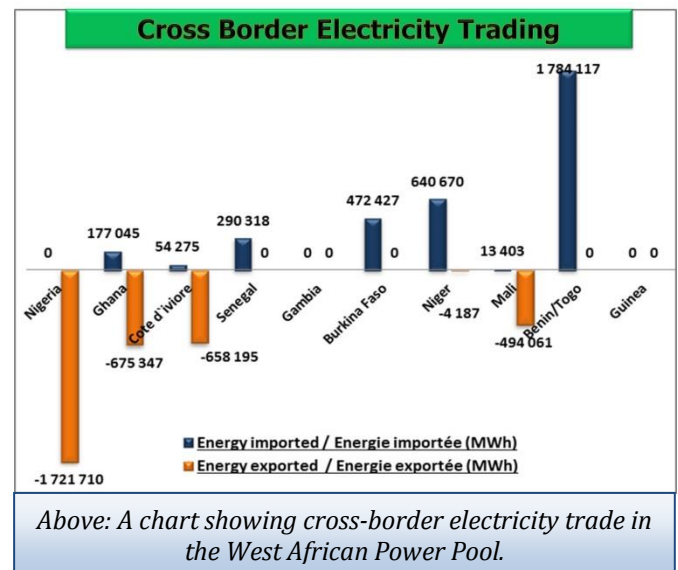
The workshop’s first day featured speakers from four existing power pools: PJM in North America, the West African Power Pool (WAPP), the Southern African Power Pool (SAPP), and the Indian Energy Exchange (IEX). Each presenter provided an overview of their operations. They also discussed notable challenges and solutions found in their respective regions.

## PJM Interconnection

Craig Glazer of PJM highlighted solutions for congestion and the connection of a new generator into the grid. At PJM, new energy generators must pay for interconnection with the grid and any upgrades to the grid that would be required for that interconnection. As a result, existing generators do not pay for congestion resulting from a new generator interconnection. PJM advised that physical and financial rights of generators on a grid need to be clarified in a cross-border network situation. To be most efficient, the grid operator should be concerned only with keeping the grid stable. Rights issues should be settled ahead of time, not during real-time operation, otherwise operator disputes might arise.

## West African Power Pool

Established in 2006, the West African Power Pool (WAPP) connects 14 of the 15 countries within the Economic Community of West African States (ECOWAS). WAPP Coordination Center Director Babatunde Adeyemo highlighted the variety of energy resources distributed throughout different countries. By creating a regional grid and promoting electricity trade, WAPP countries can share the benefits of these resources and reduce the cost of electricity. In addition, a regional grid allows countries with low generation and high demand, like Benin, to import electricity from electricity exporters like Nigeria. Still, supply constraints are a major challenge for the region, with an average supply shortage of 46% of total demand. WAPP aims to address these shortages by increasing new generation and improving regional transmission networks to facilitate electricity trade.



Above: Planned transmission projects in the Southern African Power Pool.

## Southern African Power Pool

The 12-country Southern African Power Pool (SAPP) connects the region’s northern hydropower resources with its southern thermal resources. Like many South Asian countries, SAPP currently faces a generation shortfall. Mziyanda Mbuseli outlined SAPP’s efforts to reduce supply gaps through demand-side management (DSM) initiatives and new generation projects. SAPP’s master plan calls for generation shortfalls to be resolved by 2017. SAPP is also implementing over \$5 billion of transmission projects between 2015 and 2025 to relieve congestion.

Operationally, SAPP currently administers several forms of electricity trade, including bilateral contracts, a Day-Ahead Market (DAM), an Energy Imbalance Settlement, and a Post Day-Ahead Market. Beginning in 2014/15, SAPP plans to implement an Ancillary Services Market, a Balancing Market, and Financial Markets.

## Indian Energy Exchange

The Indian Energy Exchange (IEX) is India's oldest and largest electricity market. Currently, about 9% of the electricity sold in India is traded through IEX. This amounts to an average daily trade of 80,000 MWh. Rajesh Mediratta, Director of IEX, provided an overview of IEX's history and operations. IEX administers three markets – a Day-Ahead Market, a Term-Ahead Market, and a Renewable Energy Certificate (REC) Market. Mr. Mediratta also outlined planned regional integration through the South Asia Association for Regional Cooperation (SAARC). Through SAARC, the region will evolve from long-term bilateral PPA-based trade to short-term power exchange markets. Proposed features for the SAARC single energy market include the creation of a separate market operator and transmission system operator (TSO), congestion management through market splitting, and common exchange bids. Scheduling would be managed by the TSO, while financial settlement would be the responsibility of the market operator, TSO and utility.

## Participant Country Presentations

Each of the seven countries represented at the SARI/EI workshop presented on the current state of their cross-border electricity connections.

Mr. Mizanur Rahman of the Bangladesh Power Development Board updated the delegates on the status of Bangladesh's 400 kV interconnection with India at Bheramara. The line was energized in August 2013 and began commercial operation in October 2013. He also provided projections of possible locations of future interconnections with India.

Representatives from National Transmission & Despatch Company Limited (NTDCL) Pakistan presented the latest developments in their cross-border electricity trade. The Pakistan–India interconnection is moving ahead under joint working groups to address issues with importing 500MW of power from India.

Delegates from Afghanistan described the CASA-1000 project with Pakistan, Afghanistan, Tajikistan, and Kyrgyzstan that will transport surplus power (1300MW) during five summer months from Kyrgyz Republic and Tajikistan to Afghanistan (300MW) and Pakistan (1000MW). Under the current timeline, the major development banks will reach financial closure on the loan negotiations by October 2014. Construction will begin by the end of the year and the first supply of energy will occur in May 2018.

Sri Lanka's Ceylon Electricity Board presented the latest developments of the proposed undersea HVDC cable connecting the island at Thalai Mannar to the Indian mainland at Panaikulam. This cable would be the only feasible connection for Sri Lanka into a South Asian electricity market, mainly to import power. The planning process began with a pre-feasibility study in 2002. Sri Lanka is currently awaiting Indian approval in order to move ahead with the revised undersea cable route.

Representatives from the Nepal Electricity Authority showcased Nepal's existing 33 kV and 132 kV interconnections with India, as well as plans to increase future electricity trade. Nepal has a large seasonal fluctuation of hydropower generation, which makes cross-border trade ideal to make up seasonal supply shortages. Currently, a 400 kV DC line is under construction from Dhalkebar (Nepal) to Muzaffarpur (India). NEA is also considering three additional 400 kV interconnections with India.



*Above: Craig Glazer gives an overview of the role of PJM Interconnection as a Regional Transmission Operator (RTO).*

Bhutan Power Corporation officials discussed Bhutan’s historic cross-border trade with India and the plans to further develop Bhutan’s hydropower resources for power export. Bhutan has a National Transmission Grid Master Plan (NTGMP) for 2020 and 2030, which identifies multiple potential 400 kV and 220 kV interconnections with India.

### Site Visit to Puttalam Wind Farm

On the final day of the workshop, participants travelled to Puttalam to visit the 20 MW Puttalam wind farm. The Puttalam wind farm is a combination of two 10MW facilities that are owned and operated by WindForce Ltd., an independent power producer. Participants were interested to learn more about how wind power was integrated into CEB’s electric grid. Under a standard national PPA for wind electricity, CEB purchases all energy produced by the facility. In 2013, the total energy delivered by the wind farm was 30,023,736 kWh.



*Above: Participants visit the 20 MW wind farm in Puttalam operated by WindForce, Ltd.*

### Results

By assessing various energy markets from around the globe, South Asian energy executives gained a better understanding of the positive impacts that transparent energy markets and cross border electricity trade can have on attracting additional investments and meeting energy needs.

Delegates were provided with:

- History & basic frameworks of a power pool’s development
- Organization, governance and enabling polices of participating countries

- Supply, demand and transmission constraints
- Operational and trading guidelines
- Power pricing: bidding/auction procedures and documentation
- Transmission system pricing and open access requirements
- Congestion management procedures
- Contract documentation, settlement system and documentation
- Regulation and monitoring
- Positive impacts of cross border trade such as attracting additional investments and meeting energy needs

Specific results included:

- Participants received updates on all of the existing cross-border connections in South Asia, as well as the planned interconnections in the region.
- Participants were able to candidly discuss the challenges and success stories in the development of the West African Power Pool.
- International speakers explained how various electricity markets function and demonstrated the reductions in electricity price by implementing markets.
- Workshop participants identified common policy and regulatory barriers to cross-border electricity trade and reinforced the need for a “top-down” approach to market implementation.
- West African Power Pool staff agreed to host a follow-on visit for SARI/EI participants to the WAPP Coordination Center in 2014 and engage in ongoing dialogue about regional power pool formation.
- Southern African Power Pool staff agreed to host a SARI/EI executive exchange at ESKOM headquarters in May 2014 to build upon the regional power pool formation discussions.

## **Workshop Participants**

### **Afghanistan**

- Mr. Shekeeb Ahmad Nessar, Chief Operating Officer, Da Afghanistan Breshna Sherkat (DABS)
- Mr. Habib Rahman Rahmat, National Advisor in Energy and Policy, Ministry of Energy & Water

### **Bangladesh**

- Mr. Md. Mizanur Rahman, Chief Engineer (Planning & Design), Bangladesh Power Development Board

### **Bhutan**

- Dasho Yeshi Wangdi, Director General, Department of Hydropower & Power Systems, Ministry of Economic Affairs
- Dasho Bharat Tamang Yonzen, Managing Director, Bhutan Power Corporation

### **India**

- Mr. Anil Kumar Meena, DCDE (CTU Planning), Power Grid Corporation of India Ltd.
- Mr. Rajesh Kumar Mediratta, Director, Business Development, Indian Energy Exchange Ltd.
- Mr. Harish Saran, Executive Director (Marketing), PTC India Ltd.

### **Nepal**

- Mr. Hitendra Dev Shakya, Director of Power Trade Department, Nepal Electricity Authority
- Mr. Sanjeeb Baral, Senior Divisional Engineer, Ministry of Energy

### **Pakistan**

- Mr. Muhammad Waseem Younas, Additional Manager o/o GM, Planning Power, National Transmission & Despatch Company Ltd.

- Mr. Sohail Mumtaz Bajwa, Additional Manager o/o GM, CE (Design), National Transmission & Despatch Company Ltd.

## **Sri Lanka**

### Ceylon Electricity Board

- Mr. Shavindranath Fernando, General Manager
- Ms. Kamani Jayasekera, Deputy General Manager (Transmission and Generation Planning)
- Mr. D.K.B.S. Tilakasena, AGM (Corporate Strategy)
- Mrs. Y.M. Samarasinghe, AGM (Transmission)
- Mr. H.D.S. Thimothies, DGM (System Control)
- Mr. I.S.K. Abeywickrama, DGM (Energy Purchases)
- Mrs. R.A.A.S. Seneviratne, DGM (Energy Marketing)
- Mrs. S.W.A.D.N. Wickramasinghe, EE (Transmission Planning)
- Mr. D.S.R. Alahakoon, CE (System Planning)
- Dr. H.M. Wijekoon, CE (Tr. Planning)
- Mr. A.J. De Z. Wickramatne, CE (Energy Purchases)
- Mr. M.B.S. Samarasekera, CE (Gen. Planning)

### Ministry of Power and Energy

- Mr. Chandana Wijayasinghe, Deputy Director (Power and Energy)
- Mr. Sulakshana Jayawardena, Acting Director (Planning and Development)

### Public Utilities Commission of Sri Lanka

- Mr. Gamini Herath, Deputy Director General
- Mr. Hasanka Kamburugamuwa, Assistant Director (Tariff and Economic Affairs)

## **PJM**

- Mr. Craig Glazer, Vice President – Federal Government Policy, PJM

## **Southern African Power Pool**

- Mr. Mziyanda Mbuseli, Trading Accounts Manager, Southern Africa Energy Unit, Eskom Holdings SOC LTD & Representative, SAPP

## **West African Power Pool**

- Engr. Babatunde Adeyemo, Director of WAPP Information and Coordination, WAPP Secretariat

## **IRADE**

- Mr. VK Kharbanda, Project Director – SARI/EI, IRADe

## **USAID**

- Mr. Paul Richardson, Director for Economic Growth, USAID/Sri Lanka
- Mr. Shanker Khagi, Development Program Specialist, USAID/Nepal

For a list of all workshop presentations, please visit the event page at:

<http://www.usea.org/event/south-asia-regional-workshop-competitive-electricity-markets>

For more information about the South Asia Regional Initiative for Energy Integration, please contact Ms. Sarah Blanford at [sblanford@usea.org](mailto:sblanford@usea.org).