FINAL AGENDA

A SUCCESSFUL CROSS BORDER POWER PROJECT: THE BHUTAN – INDIA EXPERIENCE

EXECUTIVE PEER EXCHANGE TO BHUTAN

October 29 – November 3, 2007

Conducted by the
U.S. ENERGY ASSOCIATION
Under the
SOUTH ASIA REGIONAL INITIATIVE FOR ENERGY (SARI/ENERGY)
Funded by the
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

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AGENDA FOR EXECUTIVE PEER EXCHANGE

October 29 – November 3, 2007 – Bhutan

GOAL: The Tala Hydroelectric project in Bhutan is the largest successful cross border electricity exchange project in South Asia. The 1020 mw project generates 4865 million kWh/yr and is a large portion of the revenue stream from cross border sale of electricity to India which makes up approximately 30% of Bhutan's export earnings. This percentage is likely to soar because both countries recently agreed to allow India to import almost 5,000 MW of hydel power from this country by 2020. Tala was funded by India and is executed by the Tala Hydroelectric Project Authority. The executive exchange will examine the intergovernmental process and agreements leading up to the joint venture, the financing and contracting that supported the project, along with the management and operations, including the load dispatch center in Bhutan that controls the power flow to India.

By examining the Bhutan – India cross border exchange of electricity, South Asian executives will gain a better understanding of the mechanisms and policies necessary for a successful exchange of electricity in South Asia. After learning in depth about the organization, operation and development impacts of the individual players in the Bhutan – India exchange, the delegates will have the opportunity to identify potential actions and practices that might be applicable to the power sectors of their own South Asian countries.

Objectives:

To learn approaches and techniques for:

- Enhancing energy security through cross border trade
- Investment & contracting of cross border electricity projects
- Managing cross border electricity exchange

Anticipated Outcomes:

Knowledge & documentation on:

- Financing strategies for cross border electricity projects
- Contracting mechanisms for cross border electricity projects
- Policies, procedures, organizational structure and practices potentially applicable to other parts of South Asia

Executive Peer Exchange Participants

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Bhutan

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Ms. Mercy Thomas
Regional Project Management Assistant
USAID/India

PA Consulting
Ms. Vinita Kathuria
Outreach and Events Coordinator

October 26 through October 28, 2007

Delegates arrive in Paro airport and travel to Thimphu (approximately 1 ½ hours drive)

Lodging in Thimphu: Hotel Pedling (meals in the hotel)

Transportation: Provided by Pem Dorji, Bhutan Himalayan Tourism (BHT), Mobile: 975 - 1711 3551

DAY 1: Monday, October 29, 2007 – Thimphu

7:00 – 9:00 am Breakfast (Hotel Pedling)

9:00 am **Registration and Tea/Coffee** – Meeting hall (level 1) at Pedling Hotel

9:30 am **Arrival of Chief Guest**

9:35 am **Welcome Address by Mr. K.B. Wakhley, Offtg. MD, Bhutan Power Corporation**

9:45 am **Keynote Address by Dasho Sonam Tshering, Honorable Secretary, Ministry of Economic Affairs**

10:00 am **Address by Mr. Srinivasan Padmanabhan, Director, SARI/Energy, USAID/India**

10:25 am **Vote of Thanks by Ms. Sarah Blanford, Senior Program Coordinator, SARI/Energy, U.S. Energy Association**

10:30 am **Group photo**

10:35 am **Tea/Coffee break**

10:50 am **Introductions of Executive Exchange Participants & USAID/SARI/Energy**

11:00 am **Presentation by the Ministry of Trade & Industry – Department of Energy**

Speaker: Mr. Bharat Tamang, Offtg. Director General, Department of Energy

The Department of Energy within the Ministry of Trade & Industry was formed during the restructuring process of the erstwhile Department of Power in July 2002. DOE is responsible for the formulation of energy and power sector policy, plans, programs and guidelines/regulations, feasibility studies related to hydropower development, and Detailed Project Reports (DPRs) for sustainable development of hydropower projects. DOE also performs the function of RGoB/donor/lender fund coordination related to energy/power sector projects. DOE also has the mandate to issue techno-economic clearances and technical sanctions for all capital works in the energy/power sector. DOE currently has four divisions with nearly 200 employees. DOE is headed by a Director General.

12:50 pm **Questions & Answers**

1:15 pm **Lunch** (Hotel Pedling)

2:15 pm **Presentation by the Bhutan Power Corporation**

Speaker: Mr. K.B. Wakhley, Offtg. MD, Bhutan Power Corporation

Formed on July 1, 2002, Bhutan Power Corporation was separated from the former Department of Power with a mandate to not only ensure that electricity is available to all Bhutan citizens but to also make sure that it is reliable, adequate and above all within the means of all consumers. For economic growth to take place, sufficient supply of electricity is an important prerequisite and BPC's mandate provides a direct link to achieving the national goal of Gross National Happiness

3:20 pm **Questions & Answers**

3:50 pm **Tea/Coffee & Adjournment**

6:30 pm **Group Welcome Dinner Hosted by the Bhutan Power Corporation**
(location Hotel Jumolhari)

Lodging in Thimphu: Hotel Pedling

DAY 2: Tuesday, October 30 – Gedu

7:00 – 9:00 am Breakfast (Hotel Pedling)

9:00 am **Check out of hotel & Travel to THPA Dam** (dam located approximately 3 – 3 ½ hours from Thimphu)

Lunch **Hotel Dam View near THPA Dam**

2:00 pm **Site Visit to Drive to THPA Dam**

3:30 pm **Depart THPA Dam and drive to Gedu** (1 – 1 ½ hours drive)

Presentation by Tala Hydroelectric Project Authority – location THPA, Gedu

In the early eighties, the 1020 MW Tala Hydroelectric Project Authority (THPA) (along with the 500 MW Chukha II) project was identified as a downstream hydroelectricity project of Chukha. The THPA, a run-of-river scheme immediately downstream of the Chukha project on Wangchu river generates approximately 3962 Million units of power in an average year. This project is the largest high-head (860m) power plant being constructed in the region. The THPA has an installed capacity of 1,020 MW. It is a run-of-the-river project on the Wangchu river, downstream of Chukha Hydroelectric project. It comprises a 92-meters high dam, a 22.25 kilometre long head race tunnel, an underground power house complex at Tala village to house 6 units of 170 MW generators and three 440 KV single-circuit transmission lines to reach the Ind0- Bhutan border.

5:00 pm **Overview of Tala Hydroelectric Project**

- History
- Operating guidelines
- Implementing policies
- Financing
- Technical issues

6:00 pm **Adjourn**

7:00 pm onwards **Dinner in THPA Guesthouse**

Lodging at THPA Guest Houses/Field Hostels

DAY 3: Wednesday, October 31, 2007 – Gedu & Phuentsholing

7:00 am onwards **Breakfast in THPA Guesthouse**

10:00 am **Check out of Guest House & Travel to THPA Site Visits**

Morning **Site Visits to Tala Powerhouse & Surge Shaft**

1:00 pm **Field lunch at Tala Power House after site visit**

Afternoon **Drive to Phuentsholing** (2 hours drive)
Lunch enroute to Phuentsholing

5:00 pm **Approximate arrival time to Phuentsholing**

Lodging **Phuentsholing –** Hotel Sinchula and Hotel Namgay (dinner in own hotels)

DAY 4: Thursday, November 1, 2007 – Phuentsholing

7:00 am onwards **Breakfast (in own hotels)**

9:30 am **Depart hotel**

Site visit of Malbase 400/200 kV substation
The 400/220 kV sub-station at Malbase, which interconnects the Chhukha and Tala systems, was constructed by THPA and is now being operated by Bhutan Power Corporation Limited (BPC) as of July 1, 2007. The substation, which is responsible for both the distribution to India as well as the domestic consumption by Bhutan, demonstrates the feasibility of distributed generation for home country and foreign purchase.

Lunch **Phuentsholing** (at respective hotels where participants overnight)

Afternoon **Executive time**

7:00 pm **Group Dinner in Phuentsholing** (casual) at Druk Hotel

Lodging **Phuentsholing –** Hotel Sinchula and Hotel Namgay

DAY 5: Friday, November 2, 2007 – Phuentsholing & Gedu

7:00 am onwards **Breakfast** (in own hotels)

10:30 am **Check out of hotel & travel for Gedu (2 hours drive)**

12:30 pm **Lunch (Enroute to Gedu Tala Guesthouse)**

Meeting with Tala Hydroelectric Project Authority – location THPA, Gedu

In the early eighties, the 1020 MW Tala Hydroelectric Project Authority (THPA) (along with the 500 MW Chukha II) project was identified as a downstream hydroelectricity project of Chukha. The THPA, a run-of-river scheme immediately downstream of the Chukha project on Wangchu river generates approximately 3962 Million units of power in an average year. This project is the largest high-head (860m) power plant being constructed in the region. The THPA has an installed capacity of 1,020 MW. It is a run-of-the-river project on the Wangchu river, downstream of Chukha Hydroelectric project. It comprises a 92-meters high dam, a 22.25 kilometre long head race tunnel, an underground power house complex at Tala village to house 6 units of 170 MW generators and three 440 KV single-circuit transmission lines to reach the Ind0- Bhutan border.

1:30 pm **Overview of Interconnection for the Tala Hydroelectric Project for Connection Between India and Bhutan**

- Drawing of Tala power for domestic consumption
- Overview of the Loop In Loop Out arrangements for domestic and cross border exchange
- Arrangements for oversight shift from THPA to BPC

4:30 pm **Adjourn**

Lodging at THPA Guest Houses/Field Hostels

7:00 pm **Dinner in Tala Guesthouse**

Saturday, November 3, 2007 – Chhukha & Paro

7:00 am onwards **Breakfast at Tala Guesthouse**

9:00 am **Check out of THPA Guest Houses & Drive to Chhukha** (1 ½ hours drive)

Meeting with Chhukha Hydro Power Corporation Limited

CHEP, a 336 MW project, located on Wangchu River in Chhukha district was built by India on a turnkey basis at a remarkably low cost of Rs 2470 million. The project has earned precious revenue for Bhutan through export of electricity to India and has a significant share in the internal revenue generation of the RGoB. In 2001, it exported electricity worth Rs1650 million to India, which went up to Rs1980 million in 2002. The Chhukha Hydropower Corporation now runs the project.

10:30 am **Overview & Site Visit of Chhukha Hydroelectric Project**

- History
- Operating guidelines

- Implementing policies
- Financing
- Technical issues

1:00 pm **Depart Chukkha & Drive to Paro** (2 hours drive)
Lunch at Bunakha Restaurant enroute.

5:00 pm **Arrive in Paro**

Lodging **Paro** – Sonam Trophel, Samden Norzen and Holiday Inn

Dinner

Sunday, November 4, 2007 – Delegates depart for home

6:30 am onwards **Breakfast in own hotels**

Morning **Delegates depart for home**