





NEPAL LOOKS TO VIETNAM FOR BEST PRACTICES IN HYDROPOWER DEVELOPMENT

Through funding from the U.S. Agency for International Development (USAID) South Asia Regional Initiative for Energy Integration (SARI/EI) project, USEA organized a five-day executive exchange for Nepal members of parliament residing in provinces with planned large hydro facilities, and executives from the Investment Board Nepal, which is the lead organization in large hydropower development. Vietnam shared their experiences in the planning, appraisal, financing, development, risk mitigation, structuring, and operations involved in large hydropower production.



The delegation visited two hydropower sites during their visit. The first was to the recently completed Trung Sơn hydropower project, owned by the Trung Sơn Hydropower Company Limited (TSHPCo) (under EVN) and largely financed by the World Bank. The powerhouse has four generating units with a total capacity of 260 MW and an annual output of 1,018.61 GWh – a significant addition to the national grid. In addition to learning about the project's planning and finance, the delegates were exposed to the details of the resettlement and risk, social and environmental impact mitigation. Thanh Son Hydropower was the second site the delegation visited. Thanh Son is under construction by a private developer, with a planned capacity of 30 MW. The delegation briefly visited the site to learn the salient features of the plant and view the construction efforts.

The primary topics covered in the course of this executive exchange were:

- Overview of the Vietnam hydropower and its impacts on the economy
- The current role and future of hydropower in Vietnam and the region
- Major issues and challenges for the development of hydropower in Vietnam, including local community issues, environment and social mitigation measures, and benefit sharing mechanisms around the hydropower plants
- Financing of hydropower projects by multilateral agencies in Vietnam
- Power trade agreement (PTA), power purchase agreement (PPA), transmission and regulatory regimes
- Cross-border transmission issues

About South Asia Regional Initiative for Energy Integration

Over the last two decades, South Asia has been one of the fastest growing regions in the world, with an average annual growth rate of 6% as measured by GDP per capita. Yet despite this impressive macroeconomic growth, the energy sector in the region has not been able to keep pace and continues to experience chronic problems of supply

shortage and poor quality of service. South Asia's energy security dilemma is one of the single energy development challenges of the 21st century critical to the economic future of almost 1.5 billion people. Given this dilemma, the only long-term solution is the sustained increase in regional energy cooperation among the South Asian countries.

USAID's South Asia Regional Initiative for Energy's (SARI/E) role over the past decade in advocating energy cooperation in South Asia has transitioned to the next phase of advancing regional energy integration and cross-border energy trade (CBET) in eight South Asian countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka).

This current phase titled South Asia Regional Initiative for Energy Integration (SARI/EI) is designed to build upon USAID SARI/Energy's successful implementation in the past decade to move South Asian countries towards increased regional energy security. The program addresses policy, legal, and regulatory issues related to energy in the region; promotes transmission interconnections; and works towards establishing a regional market exchange for electricity.

Background

Nepal has 918 MW installed hydropower capacity and over 80,000 MW of hydropower potential. Currently, there are 139 hydropower projects under construction, totaling 3,785.38 MW. Due to the country's obvious reliance on hydropower, it is essential that Nepal implement the best practices



Map of Nepal hydropower projects under various stages of development. Nepal has 3785.38 MW under construction. (Source: Government of Nepal, National Planning Commission.)

in hydropower planning, financing, development, and social and environmental risk mitigation.

Executive Exchange Highlights Electricity Vietnam (EVN)

The delegation met with Electricity Vietnam (EVN) – the vertically integrated utility responsible for the majority of electricity generation, transmission and distribution in the country. EVN shared their experiences in hydropower development, including key stakeholders' roles, project classification, financing of hydropower projects by multilateral agencies in Vietnam, power trade agreement (PTA),



Mr. Nguyen Cuong Lam, Vice President for Hydropower and Renewable Energy Investment, EVN welcomed the Nepalese delegation. Mr. Nguyen highlighted the Vietnam hydropower and its impacts on the Vietnam economy.

United States Energy Association, 1300 Pennsylvania Avenue, NW Suite 550, Washington, DC 20004-3022 USA +1-202-312-1230, <u>www.usea.org</u> power purchase agreement (PPA), transmission and other cross-border transmission.

Site Visit to Trung Son Hydropower Project

The (Dự Án Nhà máy Thủy điện Trung Sơn) is a hydroelectric power station recently completed on the Ma River in northwestern Vietnam. Located in the Trung Sơn commune, Quan Hóa District, Thanh Hóa Province, it is approximately 95 kilometres (59 mi) southwest of Hòa Bình city, and 195 kilometres (121 mi) northwest of Thanh Hóa city. The dam has a reservoir that covers a large area of the Mường Lát and Quan Hóa Districts in the Thanh Hoa province as well as part of the Mộc Châu District in Sơn La Province. It is approximately 9.5 kilometres (5.9 mi) from the Vietnam–Laos border.

The Trung Sơn hydropower project is owned by Trung Sơn Hydropower Company Limited (TSHPCo), the entity established by Vietnam Electricity (EVN) in 2011. TSHPCo is responsible for the management, construction and operation of the Trung Sơn hydropower project.

The project provides both power generation and flood control. The powerhouse is designed to contain four generating units with a total capacity of 260 MW and an annual output of 1,018.61 GWh – a significant addition to the national grid. The flood control storage of 112 million cubic metres (4.0×109 cu ft) will help prevent floods downstream.

The project cost a total of VND 7,775,146 million (equivalent to US \$410.68 million). This includes US \$330 million from a World Bank loan, which was signed by the Socialist Republic of Vietnam and the World Bank on June 28, 2011. Additionally, the project was given slightly over US \$80 million from the counterpart fund of EVN.



Left: The delegation visits Resettlement site #1 for the Trung Son Hydropower Project.

Right: Head of delegation Honorable Mr. Bhim Bahadur Rawal, MP & former Home Minister, Achham presents a token of thanks to Mr. Vu Huu Phuc, Director of Trung Son Hydropower Company Limited (TSHPCo).

The project has created the Resettlement, Livelihoods and Ethnic Minorities Development Program (RLDP), which is a social, environmental and community relation program to mitigate anticipated and unanticipated issues with populations either directly or indirectly impacted. These populations consist of approximately 10,600 people (2,327 households), of which 7,012 (1,516 households) were directly impacted in the main project area, resulting in a total of 533 households having to be resettled. The RLDP includes a Resettlement Plan (RP), a Community Livelihoods Improvement Plan (CLIP) and an Ethnic Minorities Development Plan (EMDP).

In addition, management has prepared a Supplementary Environmental and Social Impact Assessment (SESIA) with Environmental Management Plan (EMP) for the project. This plan included principles, approaches, procedures and methods to be used to control and minimize environmental impacts of all project-related construction and operation activities. Compared with fossil-fuel based energy plants of the same size, the dam produces far less greenhouse gas emissions (GHGs). TSHPCo maintains a website at www.trungsonhp.vn where public information is routinely updated.

Site Visit to Thanh Sơn Hydropower Project

Thanh Son Hydropower Project is also located on the Ma River. The plant and auxiliary structures of Thanh Son Hydropower Project are expected to be constructed in Chieng Yen Village (Thanh Son Commune) and Tang Village (Trung Thanh Commune) of Thanh Hoa Province. The reservoir area is along the Ma River located in Trung Thanh and Thanh Son communes, Quan Hoa District. The Thanh Son Hydropower Plant (Thanh Son HPP) is located on the Ma River section between two hydropower cascades of Hoi Xuan and Trung Son. The project is considered to be a low head hydropower plant, with a planned installed capacity of about 30 MW, average output from 122.3 to 115.7 million kWh in order to take advantage of the remaining water balance between Trung Son Hydropower Plant and Hoi Xuan Hydropower Plant. Use of the flow has been regulated through the reservoir of Trung Son hydropower to generate electricity.



Nepal delegates examine the construction at Thanh Son Hydropower Project

Thanh Son HPP generates power based on the construction route flow and the difference in the topographic water column. During flood season when the daily flow is more than the designed one, the plant will work with maximum capacity (59 MW); the excess water will flow freely through the dam to the downstream. In normal days, the reservoir shall remain at a high water level to generate power. When the downstream area demands for water discharge from the reservoir, the Ministry of Agriculture and Rural Development has the authority to require a release.

Thanh Son HPP will have a number of positive impacts on environment and socio-economic conditions, including: (1) providing 206.1 million kWh of electricity per year for the country; (2) improving the socio-economic life of local people, contributing to promoting the rural industrialization process (Trung Thanh and Thanh Son), (3) improving the climate in the area when the reservoir is formed and (4) improving the transportation system, supplying electricity to Ban Dai (Que Son commune) when forming the operation route of the plant and the 35KV transmission line for the plant construction.

World Bank

On the final day of the executive exchange, the World Bank provided their perspective on the Vietnam power sector including hydro power, World Bank's parameters to support the Vietnam power sector on soft support (technical assistance, capacity building etc.) and asset financing. They also shared success stories and learnings from hydropower development in the region.

Regulation

The exchange was conducted with assistance from USAID's Nepal Hydropower Development Project (NHDP). Deloitte Consulting, USAID's NHDP implementing partner, provided presentations to the delegation. The first was focused on regulation – the role and function of the regulator, steps for establishing regulatory framework, and international case



World Bank Energy Sector Coordinator for Laos & Vietnam Mr. Franz Gerner shared the World Bank's experiences with hydropower development in Southeast Asia.

United States Energy Association, 1300 Pennsylvania Avenue, NW Suite 550, Washington, DC 20004-3022 USA +1-202-312-1230, <u>www.usea.org</u> studies of electricity regulator.

Next Steps

The Trung Son hydropower project was deemed a model example for the delegation, and Vietnam's experience provided beneficial lessons to the Nepal parliamentarians and Investment Board Nepal executives to apply at home. Additionally, Nepal just recently passed legislation to form an independent regulatory body, so the exchange lent focus on the role of an independent, transparent regulatory body and what steps Nepal will need to take in order to achieve this goal. On the final day of the exchange, the participants provided their feedback on the key lessons that they hope to apply in Nepal. These include:

- Best practices in resettlement and rehabilitation of displaced communities from hydropower development
- The necessity of extensive stakeholder engagement
- Maintaining government ownership of transmission (compared to privatizing distribution and generation) may be a more practical way manage long-term planning for the country

USAID

SARI/EI

Hanoi, Vietnam August 28 - September 1, 2017

EXECUTIVE EXCHANGE ON HYDROPOWER DEVELOP

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Necessity of integrated planning of transmission and generation development

Participating Host Organizations

- World Bank
- Trung Son Hydropower Company Limited
- Electricity Vietnam (EVN)
- Thanh Son Hydropower •

Participants

- I. Mr. Bhim Bahadur Rawal, MP & former Home Minister, Achham (Upper Karnali Hydropower project district)
- 2. Mr. Prakash Jwala, Chairperson, Parliamentary Finance Committee
- 3. Mr. Mohan Prasad Baral, Chairperson, Parliamentary Committee on Agriculture & Water Resources
- 4. Mr. Rabindra Adhikari. Chairperson, Parliamentary **Development Committee**
- 5. Mr. Taraman Gurung, MP &
 - State Minister for Health, Sankhuwasabha (Arun 3 Hydropower Project)
- 6. Mr. Laxmi Prasad Pokharel, MP, Dailekh (Upper Karnali Hydropower project district)
- 7. Mr. Ammar Bahadur Thapa, MP, Dailekh (Upper Karnali Hydropower Project District)
- 8. Mr. Bharat Saud, MP, Achham (Upper Karnali Hydropower Project District)
- 9. Mr. Maha Prasad Adhikari, CEO, Investment Board Nepal (IBN)
- 10. Mr. Madhu Prasad Bhetuwal, Joint Secretary (Technical), IBN
- 11. Mr. Sunil Poudel, Senior Divisional Engineer, IBN
- 12. Mr. Ghanashyam Ojha, Communications Consultant, IBN

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