



## **SOUTH ASIAN ENERGY EXECUTIVES ASSESS THE FUTURE ROLE OF HYDRO ELECTRIC POWER USEA EXECUTIVE EXCHANGE TO HYDRO VISION INTERNATIONAL 2011**

**Under the South Asia Regional Initiative for Energy (SARI/Energy) Energy Partnership Program, funded by the U.S. Agency for International Development (USAID), the U.S. Energy Association supported the attendance of 10 energy professionals from Afghanistan, Bhutan, India, Nepal and Sri Lanka at HydroVision International 2011 held in Sacramento, California.**



*Folsom Dam*

HydroVision International, recognized as the premier hydro power event worldwide, was held on July 19 – 22, 2011. More than 3,000 delegates attended the event from not only North America and the SARI/E countries but from Australia, Brazil, Germany, Japan, Norway and others. The conference focused on discussing the advances in technologies and practices as well as highlighting environmental, social, financial, and operational solutions to changing problems in the industry.

An exhibition of more than 300 companies representing the hydro industry was held in conjunction with the event. The exhibition not only allowed the participants to view current technology, products, and software, but was the focal area for many of the networking functions scheduled throughout the event. The event was an unprecedented opportunity to interact with leading professionals and decision makers as well as with major developers and producers.

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## EXECUTIVE EXCHANGE HIGHLIGHTS

During the conference and exhibition, the delegates attended several multi-track conference sessions arranged in the broad areas of:

- Asset Management
- Civil Works & Dam Safety
- New Development
- Ocean/Tidal/Stream Power
- Operations and Maintenance
- Policies and Regulations
- Water Resources

Many countries attending are relying solely on hydro power for their future energy needs. Attending this event allowed them to get the perspective from industry leaders on how to incorporate financing, regulation, incentives, technology, and other elements into the development of new and existing hydro facilities.



*Above: SARI/E delegates attending HydroVision International- From Left to Right: Pema Namgay, Bhutan; Bharat Yonzon, Bhutan; and Pradeep Gangol, Nepal.*

### TECHNICAL TOUR OF OROVILLE AND FOLSOM DAMS

Prior to the keynote panel session on July 19th, there were two technical tours conducted to hydro facilities in the area. The first tour was held at Oroville Hydro Electric Project located in nearby Butte County. The tour began with an instructional video on the Feather River fish hatchery followed by a presentation and tour of the dam. The Oroville Dam is the largest earth-filled dam in the U.S. Situated below the dam is the Edward Hyatt power plant with a generating capacity of 760 MW.

The following day the participants had a tour of Folsom Dam located approximately 25 minutes from downtown Sacramento. The 340 foot tall dam and adjoining lake provide flood control, hydropower, irrigation and drinking water to parts of northern California. Currently one of the three turbines was being repaired which allowed the tour members to get a closer than normal view of hydropower plant turbine.

### KEYNOTE PANEL CALLS FOR MAJOR EXPANSION OF HYDRO POWER

HydroVision 2011 International officially opening with opening remarks from representatives of the National Hydropower Association (NHA), the Northwest Hydroelectric Association (NEHA), and the International Hydropower Association (IHA). Currently, only 1/5 of the hydro potential has been developed, so there is definite potential for expansion. Several comments made by the Associations included:

- **National Hydropower Association:** With the right policies, the U. S. could add 60,000 MWs of hydropower without constructing new dams". In addition to the right policies, the industry would also need smarter and more effective regulation, economic incentives, and greater involvement from the industry.
- **Northwest Hydropower Association:** The majority of the hydro in the U.S. is located in three states – Washington, Oregon, and California – with Idaho and Montana taking a lead in hydro production. It was stated that adequate planning will be key especially in regards to grid scale energy storage, mainly pumped storage.

- **International Hydropower Association:** Reporting on the Hydropower Sustainability Protocol Congress recently held in June, the representative stated the key areas that were identified during the meetings. The areas included greenhouse emission in regards to hydro, climate change and the need for more practical data by the industry and changing models, and communication within the industry by doing outreach to change the perception and thinking of the environmental impacts of hydro.

## THE BUSINESS OF HYDROPOWER

The Executive Roundtable to discuss the current trends and transition of hydropower in the West was manned by:

- Russell Ray, *Hydro Review* (Moderator)
- Mark Cowin, California Department of Water Resources
- James Tracy, Sacramento Municipal Utility District
- Randy Livingston, PG&E, and
- Joerg Pohlman, SGL Automotive Carbon Fibers GmbH & Co.

Comments made included:

### Potential:

- Mark Cowin stated that, “with the extra snow in the Sierra Nevada and ample water supply this year, California has had a good year in terms of hydro”
- The role of hydro is vital to ancillary services
- The industry needs to look more closely at pump storage and how it will compete in the long term (erosion issues)
- Hydro needs to be part of an integrated, diverse system with older facilities being retrofitted



Above: SARI/E delegates from Sri Lanka at the Exhibition during HydroVision International- From Left to Right: **Cotte Gunasekara** and **Wilarachige Perera**.

### Sustainability:

- There must be a balance between sustainability and cost. If this does not happen, then projects will not be built.
- There should be more interest in sustainable power directed to a broad array of customers

### Competition:

- The long process to get a hydro project approved and built has to be offset with the fact that it’s a long-life asset so that developers do not get discouraged.
- The hydro industry has set a policy by mandates however if the industry gets to a cap and trade carbon market, then the mandates would be in the background.

### Challenges/Obstacles:

- It will be necessary for developers to start early in the licensing process and to develop relationships with stakeholders
- It will be necessary to learn from the experience of others and be open to collaborating with other companies
- A clear defined playing field will be necessary to drive investment

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## CALL FOR NEW POLICIES AND REGULATION TO RECOGNIZE HYDRO

A common thread running throughout many of the panel sessions and also mentioned during the keynote panel discussion was the need for “smarter and more effective regulation”. A panel session was held to address the issues regarding the need for regulation. The panel consisted of representatives from the International Hydropower Association, National Hydro Association, Canadian Hydropower Association, Pacific Gas and Electric, and Manitoba Hydro.

Policies in the U.S. should include a clean energy standard goal of 80% of energy from clean and renewable sources. There needs to be economic incentives, national standards and more R & D (demonstration programs, pump storage, assessments) in order for the industry to continue to grow.

Some of the panelist felt that there needs to be a real recognition of the value of hydro and the promotion of new and existing hydro worldwide. The industry needs to show support for the Hydropower Improvement Act legislation submitted this year that provides for the development of hydropower by increasing support for research and development; calling for better coordination on regulation and permitting processes; and establishing a grant program for hydropower projects.

There also needs to be discussions with the Federal Energy Regulatory Commission (FERC) to determine whether the minimum two-year licensing process can be reduced, as currently this long process has deterred many from proposing new projects.

Canada is facing many of the same challenges mentioned above as well, although their projects tend to differ due to remote siting and green fields. There is new regulation in place however it is patchwork and something better needs to be defined.



*Turbine at Folsom Power Plant*

## FINANCING

The discussion of financing of hydro projects was meant to give the attendees a realistic view of the very lengthy and complex process from the point of view of those who have actual experience.

The process includes many steps and they were summarized in the order of planning, soliciting interest, establishing stakeholders, navigating due diligence, securing commitments, negotiating documents, closing and disbursements, and finally monitoring and reporting. For large projects you should also allocate risk to those parties that are most able to bear it.

The first step, planning, should entail building a comprehensive model using reasonable assumptions for debt/equity ratio and reserves as well as a financial marketing plan. The U.S. and EU based companies spoke on their new developments and an incentive program being used in the U.K. One of the U.S. based companies spoke on a new 1300 MW closed loop pumped storage project being developed that used a reclaimed brown field mine site. For the financing, they needed to obtain a fully permitted site, as well as interconnection and off-take agreements.

The U.K. based company was a water utility which spoke on how currently the U.K. favors small schemes in emerging technologies and at times a water utility can be a host for hydro. As an incentive for suppliers to use

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renewable energy, there are Renewables Obligation Certificates (ROCs) are issued for each MWh of renewable electricity generated and are tradable. These ROCs can be purchased from a generator or bought at a buy-out price and used as a way of establishing a market value for renewable energy generation. However, it was cautioned that these ROCs were not ideal for funding especially for small scale projects.

## **SARI/E DELEGATE JOINS INTERNATIONAL HYDRO POWER PANEL**

In the U.S. and Europe, 60% of the hydro has already been developed while in other countries only 30% has been developed. Much of the new development of hydro will therefore be overseas with a large concentration in Asia. The panel presented a general outlook on where new development in hydro is taking place. One of the SARI/E delegates, Mr. Pradeep Gangol of the Independent Power Producers Association, participated on this panel and gave an overview of hydro development in Nepal.



*Mr. Pradeep Gangol of Nepal participating on the "New Development Around the World" panel at HydroVision*

In the case of the U.S., 51% of the hydro facilities are federally owned. Development will mainly be using new technology such as green field, hydrokinetics, ocean current, pumped storage, wave, and tidal. The major obstacles to these types of technology are the long lead time, large up front capital investments, and uncertainty. However these facilities are needed as a major portion of the hydro facilities in the U.S. are aging.

For the international perspective, the IHA discussed that part of the Renewable Energy (REN) Alliance is to work on energy markets and investments. Russia has the highest installed capacity of hydro however they may soon be overtaken by China. In the North America, most of the development is in Canada. With new development comes an increased need for water management and advanced technology for the purpose of improved sustainability and optimizing performance.

Mr. Gangol said that in Nepal, there is currently 698 MW of installed hydro with the potential of 80,000 MW in the country. There are currently 24 hydro projects with a capacity of 344 MW at different stages of implementation with an additional 118 projects awaiting power purchase agreements. There is a real need in Nepal for additional power as the country experiences 14 to 16 hours of daily load shedding during the dry season. To fully optimize the potential for not only hydro but other sources of generation, they must overcome the challenges of security, open access to the Indian market, stability of the Nepal Electricity Authority (NEA), and inadequate transmission network.

## **RESULTS**

The Executive Exchange provided an opportunity for the delegates gain further insight into the strategies, policies, technology, being discussed and developed in the hydro industry worldwide. Not only were the delegates able to meet with representatives from several of the most renowned companies for energy research and development, walking the exhibition floor allowed them to see some innovative and cutting edge technology and software.

Following the conference, the SARI/E participants gave country presentation to other members of the delegation. This was very useful as it gave a better picture of the overall hydro development and potential in the region.

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The comments made by the delegates on the conference and during the country presentations emphasized topics and discussions the delegates found to be most beneficial or essential to the situation in their respective country. Comments



included:

- Consider learning from the U.K. experience in framing feed-in tariffs to encourage other non-conventional renewables development like wind and solar – *Yeshi Wangdi, Bhutan*
- For dam safety, it is important to pay attention to small defects and abnormalities instead of floods or earthquakes – *Yeshi Wangdi, Bhutan*
- Interim dam risk reduction measures need to be carried out while long term measures should be planned carefully – *Yeshi Wangdi, Bhutan*
- When building new hydro plants you must address the concerns of the local inhabitants truthfully – *Wilarachige Perera, Sri Lanka*
- Both preventive and curative methods are necessary to cope with sedimentation problems in river systems – *Pradeep Thike, Nepal*
- The participation of local communities in earlier stages are of need for hydro power development – *Pradeep Thike, Nepal*
- It was noted that major points to development included effective policies development, barriers to small hydro, efficient process to obtain authorization, and consideration to environmental issues. These were applicable to almost all of the SARI/E countries – *Mohammad Sharifi, Afghanistan*

## **SARI/E EXECUTIVE PEER EXCHANGE PARTICIPANTS**

### *AFGHANISTAN*

- Mr. Mohammad Shafi Sharifi, University Professor, Kabul University

### *BHUTAN*

- Dasho Bharat Yonzen, Managing Director, Bhutan Power Corporation
- Mr. Yeshi Wangdi, Director General, Department of Energy
- Mr. Pema Namgay, Regional Reporter, Bhutan Broadcasting Service Corporation

### *INDIA*

- Mr. Sudhir Kumar, Joint Secretary, Ministry of Power
- Mr. Jatinder Kumar Sharma, Director (Projects), NHPC Limited

### *NEPAL*

- Mr. Pradeep Gangol, Executive Manager, Independent Power Producers Association
- Mr. Pradeep Kumar Thike, Assistant Manager, Nepal Electricity Authority

### *SRI LANKA*

- Mr. Cotte Gamage Sarathchandra Gunasekara, Engineer/Chief Engineer, Ceylon Electricity Board
- Mr. Wilarachige Rohan Asanka Perera, Electrical Engineer/Deputy General Manager, Ceylon Electricity Board

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