



Seventh International Conference and Exhibition on Water Resources and Renewable Energy Development in Asia

organized by

THE INTERNATIONAL JOURNAL ON
**HYDROPOWER
& DAMS**

will take place at the
**Ariyana Convention Centre (ACC) and
Furama Resort, Danang, Vietnam**

13-15 March 2018



Asia continues to be the continent with the greatest amount of water resources and renewable energy development under way. Some of the world's most impressive multipurpose dams of all types are in operation or under construction, and major programmes continue for the development of more hydropower and other renewable energy schemes such as solar and wind power. These intermittent sources increase the attractiveness of pumped-storage development.

Asia is a region with much past experience to share, on everything from large storage schemes, and transboundary run-of-river hydro plants, to small and micro schemes which are playing a major role in rural socio-economic development.

ASIA 2018 will provide a platform for international experts from around 50 countries to focus on issues of direct relevance to Asia: helping advance projects, which will exploit the remaining renewable energy potential; exploring investment opportunities and strategies; addressing major challenges such as climate resilience, and the management of floods and earthquakes; encouraging best practice in project implementation; and, reviewing advances in technology for both new and refurbishment schemes.

Conference supporting organizations include:



For regular updates, please visit: www.hydropower-dams.com



Conference Sessions

The preliminary programme set out below lists the papers which have been accepted by the Steering Committee and Organizers, based on the Call for Papers. Additional speakers and panellists are now being invited for several sessions, and the programme will be updated periodically on the website: www.hydropower-dams.com

TUESDAY 13 MARCH

Opening Plenary Session

- ▶ Welcome to ASIA 2018 and session preview – *A. Bartle, Aqua-Media International Ltd, UK*

Opening addresses from:

- ▶ *Officers of EVN and MARD, Vietnam*
- ▶ *Prof Anton Schleiss, President, International Commission on Large Dams*
- ▶ *Felix Reinders, President International Commission on Irrigation and Drainage*
- ▶ *Niels Nielsen, Joint Secretary, IEA-Hydro, International Energy Agency*
- ▶ *Prof Pham Hong Giang, President, VNCOLD*
- ▶ *David Molden, Director General, International Centre for Integrated Mountain Development*

Keynote messages from:

- ▶ *Prof Dr A.K. Biswas, Senior Research Fellow, Institute of Water Policy, Lee Kuan Yew School of Water Policy, University of Singapore*
- ▶ *Ousmane Dione, Country Director for Vietnam, The World Bank*
- ▶ *Lakhdeep Babra, Environment, Senior Manager of Environment, Social and Governance Department in Asia Pacific, International Finance Corporation – Launch of the new IFC 'Hydropower Toolkit'*
- ▶ *Amb. Tariq A Karim (TBC), Former Ambassador for Bangladesh to India – Cross-border cooperation to promote hydropower development*

National overviews: development activities and plans

- ▶ *Contributions from China, Lao PDR, Malaysia, Bhutan, Nepal,*

Finance and risk

Chair: Dr Judith Plummer-Braeckman, University of Cambridge, UK

- ▶ Credit enhancement strategies for major hydro in emerging markets – *Kelly Malone, King & Spalding (Singapore) LLP*
- ▶ Hydropower risk: How the parties perceive it: A Lender's perspective – *A. Noble, WSP Australia Pty Ltd., Australia*
- ▶ The Scheme Freeze design stage in small hydropower: How to avoid a design thaw – *A. Noble, WSP Australia Pty Ltd, Australia*
- ▶ Development of bankable hydropower projects in South-East Asia using Monte Carlo Simulation – *F-P. Nagel and M. Fuentes, ILF Consulting Engineers (Asia) Ltd, Thailand*

Panel discussion:

Panellists will include Dr. Judith Plummer (University of Cambridge, UK) and Oliver Behrend (International Finance Corporation, Vietnam)

Contractual and legal aspects

Chair: Peter Rae, Peter J. Rae Consulting, Canada

- ▶ Contractual and legal framework including power purchase agreement for hydropower development in Nepal – *G.P. Kayastha, Chilime Engineering & Services Company Limited, Nepal*
- ▶ Considerations for the acquisition of power projects in key Asian emerging markets – *W. Heiser, DFDL Legal & Tax, Thailand*
- ▶ Electrifying Myanmar: Pathway cleared for power project approvals – *W.D. Greenlee and D. Seibert, DFDL, Myanmar*

- ▶ Puah hydropower scheme: Electrical and mechanical works issues of additional works/costs – *C.F. Kun, SNC-Lavalin Power (M) Sdn Bhd, Malaysia; A.Y. Othman, Tenaga Nasional Berhad, Malaysia*
- ▶ Development concept for the Nam Ou river basin cascade in Lao PDR – *Shen Yuming, Power China Resources Ltd, China*

Flood protection and hydrology

Prof L. Berga, Hon. President of ICOLD, Spain

- ▶ Hydrological-hydraulic modelling for enhanced design, construction and operation: The case of the Nam Theun 1 hydropower project – *P. Stanzel, H. Kling and M. Fuchs, Pöyry Energy GmbH, Austria; S. Martin, Pöyry Energy Ltd, Thailand*
- ▶ Flood detention dams in developing community environments: Special challenges – *J. Grimston, D. Knappstein and P. McCallum, Tonkin & Taylor, New Zealand*
- ▶ Integrated systems analysis of cascading hydropower and flood control facilities – *R.C. Patev, US Army Corps of Engineers, USA; A. Komey and G.B. Baecher, University of Maryland, USA*
- ▶ Hydrometeorological monitoring and forecasting system at the Xayaburi hydro plant – *B. Graff, CNR Engineering, France; S. Puangpatcharakul, CK Power PCL, Thailand*
- ▶ Development of a system operation model for the Mahaweli river basin, Sri Lanka – *J. Mödinger, B. Dibrani and B. Freeman, Lahmeyer International GmbH, Germany*
- ▶ The diversion works for the Cua Dat CFRD in Vietnam – *M. Ho Ta Khanh, Pham Hong Giang and M. Dinh Sy Quat, VNCOLD, Vietnam*
- ▶ The role of hydropower plant reservoir system in flood control: A new approach towards the Vu Gia Thu Bon river catchment, Vietnam – *Ngoc Duan Vo and Thanh Hao Nguyen, The University of Danang, Vietnam; P. Gourbesville, University of Nice, France*

Climate issues

Chair: Pravin Karki, Global Lead, Hydropower and Dams, The World Bank

- ▶ Understanding and mitigating the climate risk in hydropower generation – *L. Canale, Senior Hydropower Specialist, The World Bank*
- ▶ New trends in structuring hydrologic risk mitigation instruments in emerging countries – *H. Ibarra, Global Parametrics, UK*
- ▶ Planning and designing the Tha Htay hydroelectric project for sustainability and climate resilience – *U Min Khaing, Ministry of Electricity & Energy, Myanmar; R. Wood and D.A. Wright, Multiconsult, Norway; O.E. Kjærstad, Norconsult, Norway*
- ▶ Hydrology forecast and upstream detention to avoid flood and drought: Study of Rugam reservoir, Eastern dry zone of Sri Lanka – *B.G.T. Lasantha, Department of Irrigation, Sri Lanka*

Civil design and construction

Chair: (to be announced)

- ▶ A review of Lao electric power technical design standards (LEPTS) – *S. Boutsakitirath, Ministry of Energy and Mines, Lao PDR; P.C. Jose, Entura Hydro Tasmania, India; C. Grant, Multiconsult UK Ltd, UK*
- ▶ Design improvements implemented at the Xayaburi hydro scheme – *P. Diggelmann and R. Schmidiger, Pöyry Switzerland Ltd; K. Sierotzki, Pöyry Energy Ltd, Thailand; Dr M. Raeder, Xayaburi Power Co Ltd, Thailand*

Conference Sessions

- ▶ Design of an ACSC for the Upper Kon Tum hydro plant – *T.E. Røse, A. Koksæter, K. Dalviken, O. Skuncke and B. Børresen, Multiconsult Norge AS, Norway; K. Vereide, NTNU, Norway*
- ▶ Headworks for the Mtkvari hydro plant: main features and layout solutions – *M. Levytskyi, Ukrhydroproject PJSC, Ukraine*
- ▶ New high CFRD in Lao PDR for the Nam Ngum 3 hydro plant – *X. Dacos, M. Monkachi and Q. Bercher, Artelia Eau et Environnement, France; Komonchanh Phet, Electricité du Laos, Lao PDR*
- ▶ The application of BIM 5D during the construction of the powerhouse of the Golen Gol hydropower plant in Pakistan for monitoring purposes – *C. Siemer, Fichtner GmbH & Co KG, Germany*

Civil engineering: Materials for dams

Chair: Dr Malcolm Dunstan, MD&A, UK (to be confirmed)

- ▶ 3D BIM used to model the construction infrastructure at the Changuinola 1 project in Panama: A contributory factor for the efficient placement of the RCC – *Dr M. Dunstan, MD&A, UK; C. Hicks, Krow LLC, USA*
- ▶ Quantity and quality aspects of the Nam Ngiep 1 hydropower project main RCC dam construction in Lao PDR – *Y. Aasaka, B. Egailat, J. Cockcroft, T. Seoka, A. Mitsuzumi and H. Iota, Nam Ngiep Power Company, Lao PDR*
- ▶ How better knowledge of RCC tensile strength may help improve the design of RCC dams – *A.M. Giovagnoli and P. Mastrofini, Salini-Impregilo SpA, Italy; R. Saccone, Mapei SpA, Italy; E. Schrader, Consultant, USA*
- ▶ Geomembranes to prevent and stop leakage: Recent dam projects in South East Asia – *A. Scervo, G. Vaschetti and J. Cowland, Carpi Tech SA, Switzerland*
- ▶ Design and construction of composite geomembrane face rockfill dam of Nam Ou 6 hydropower station – *Sheng Yuming, Zhang Gulou and Bai Cunzhong, Power China Resources Ltd, China; Tang Cunjun, Nam Ou Power Company Ltd, China*
- ▶ The role of local concrete raw materials in the sustainable construction of concrete dams – *R. Saccone, F. Surico and D. Sforza, Mapei SpA, Italy*

WEDNESDAY 14 MARCH

Hydropower machinery

Chair: Daniel Paschini, EDF, France

Hydraulic machinery

- ▶ Son La and Lai Chau: Successful project execution for two of Vietnam's most important hydropower plants – *Xuejun Gao, GE Renewable Energy, China*
- ▶ New challenges for bulb turbines – *T. Eiper and D. Sitz, Andritz Hydro GmbH, Austria*
- ▶ Recent developments in axial turbines: Jinsha and Don Sahong case studies – *H.T. Phan and A. Cuvillier, GE Renewable Energy, France*
- ▶ Digital twins embedded in GE APM edge analytics to improve hydro turbine flexibility – *D. Auger-Habel, V. Bouillet, F. André and H. Mollet, GE Renewable Energy, Switzerland*

Electrical machinery

- ▶ SSFR test case studies and parameters identification of large hydro generators – *U. Bhatt, S. Kamarsu and S. Yerukonda, GE Renewable Energy, India*
- ▶ Using an air gap monitoring system – *A. Tétéault, Vibrosystm Inc, Canada*

Refurbishment/O&M

- ▶ Effects of guidevane erosion on runner of low specific speed Francis turbines – *B.S. Thapa and B. Thapa, Kathmandu University, Nepal; O.G. Dahlhaug, NTNU, Norway*

- ▶ Preparing the Shardarinskaya plant for the future: A recent rehabilitation project in Kazakhstan – *M. Collins, Andritz Hydro GmbH, Austria; J. Sattler, Andritz Hydro GmbH, Germany*
- ▶ Da Nhim hydropower plant expansion project in full progress – *Nguyen Dinh Chien, Ham Thuan-Da Mi Hydropower JSC/EVN; T. Okamura, Nippon Koei Co, Ltd, Japan*
- ▶ Scrap and build initiative: Setoyama hydroelectric power project – *M. Nakai, H. Weihao, K. Ono and S. Nakamura, Voith Fuji Hydro KK, Japan*

Pumped-storage technology and development

Chair: Eric Guillemot, Mott MacDonald, USA

- ▶ Commissioning experience on recent pumped-storage plants – *J. Koutnik, M. Giese and M. Bruns, Voith Hydro Holding GmbH & Co. KG, Germany*
- ▶ Hydraulic application aspects on speed variable pump-turbines – *R. Schrepler, T. Schöner and T. Aschenbrenner, Voith Hydro, Germany*
- ▶ Battery versus pumped storage: A comparison of raw material costs and CO₂-footprints – *K. Krüger, Voith Hydro Holding, Germany; P. Mann, N. Van Bracht and A. Moser, IAEW, Germany*
- ▶ Pain and gain of utilizing pumped-storage powerplants for fast grid support – *M. Bruns and J. Koutnik, Voith Hydro Holding GmbH & Co KG, Germany*
- ▶ Development planning of pumped-storage power stations – *Yao Chenchen, Yang Lifeng and Zhang Yannan, Power China Huadong Engineering Corporation Ltd, China*
- ▶ Theoretical prediction of performance curves of pump turbines at a low specific speed – *Nho Thi Nguyen, Thuyloi University, Vietnam; Vu Van Truong and Anh Viet Truong, Hanoi University of Science and Technology, Vietnam*
- ▶ Some improvement in design of a pump turbine at a low specific speed – *Nguyen Thi Nho, Thuyloi University, Vietnam; Anh Viet Truong, Hanoi University of Science and Technology, Vietnam*
- ▶ Challenges for new installation of additional units at the existing Lamtakhong pump-storage powerplant – *K. Adler, AF-Consult Ltd, Switzerland; R. Rangsilakunpum, Electricity Generating Authority of Thailand*

Synergy in renewable energy sources

Chair: Dr Kamal Laksiri, Ceylon Electricity Board, Sri Lanka

- ▶ Adding renewable to hydro: Practical benefits in Southeast Asia – *Y. Paquot, Tractebel Engie, Thailand; M. Beraud, Tractebel Engineering, France*
- ▶ The comprehensive development model of hydropower, wind power and photovoltaic to promote the development of new energy – *Lu Di, Zhao Yan and Shao Yinlong, Huadong Engineering Corporation Ltd, China*
- ▶ Hydro-solar: A storage solution for solar energy with competitive cost – *H. Meurisse, Ciel & Terre, France; S. Amazzal, LJ Hydro Consultancy, Vietnam; B. Peltié, ISL Ingénierie, France*
- ▶ Optimization of hydropower plant operation with solar and wind energy plants – *A. Kumar, A. Gupta, D. Kumar Khatod and S. Kumar Singal, Indian Institute of Technology Roorkee, India*
- ▶ From assessment of hydropower resources to strategies for sustainable hydropower development and electricity supply in Bhutan – *H. Hildebrand, Fichtner GmbH & Co KG, Germany; M. Gyeltshen, Ministry of Economic Affairs, Bhutan*
- ▶ Optimal planning of an off-grid hybrid energy system using HOMER Pro in Ladakh, India – *K. Ishey, Jammu & Kashmir Power Development Department, India; D. Das, Indian Institute of Technology Roorkee, India*

Conference Sessions

- ▶ Synergy of hydro and renewables: Installation of floating solar systems on existing hydropower plants – *Y. Nochovkin, V. Dragomyretskyi and I. Zhdanov, Ukrhydroenergo PRJSC, Ukraine*

Sustainable hydropower development and transboundary cooperation in the Mekong river basin

Chair: (Mekong River Commission officer, to be confirmed)

- ▶ Updated preliminary design guidance and guidelines for hydropower impact mitigation and risk management in the Lower Mekong mainstream and tributaries – *P. Chanbanyong and Voradeth Phonekeo, Mekong River Commission, Lao PDR*
- ▶ Updated Sustainable Hydropower Development Strategy and study on Sustainable Management and Development of the Mekong, including impacts of mainstream hydro projects – *(MRC speaker TBC)*
- ▶ RSAT: Multi-stakeholder dialogue for a basin-wide perspective on hydro development in the Mekong region – *(MRC speaker TBC)*
- ▶ Joint Environmental Monitoring (JEM) programme – *(MRC speaker TBC)*
- ▶ Mekong Integrated Water Resources Management Project: Showcase 2S (Sesan-Srepok) – *(MRC speaker to be confirmed)*

Cross-border projects and international collaboration

Chair: Chhewang Rinzin, Druk Green Power Corp, Bhutan (tbc)

- ▶ Optimize and minimize: Why hydropower companies should consider cumulative impacts – *K. Lazarus, International Finance Corporation*
- ▶ A brief analysis of the integrated benefits by water resources development in the Lancang-Mekong region – *Lui Wenkun, China Power Kunming Engineering Corporation Ltd, China*
- ▶ How transboundary hydro project development models used in South America could be applied to Asian cross-border projects: Case study of the bi-national stretch of the Uruguay river between Brazil and Argentina – *G. dos Santos Cruz Rocha and F. Ladeira Luchesi, Worley Parsons, Brazil*
- ▶ Additional talks focusing on the Indian Sub-Continent to be announced

Project planning

Co-Chairs: H. Irfan Aker, Dolsar Engineering, Turkey;

- ▶ PEACH, a tool for hydropower plant planning and development – *B. Peltié and N. Van Hecke, ISL Ingénierie, France*
- ▶ Lao coordination and monitoring center (CMC): Concept and principles – *B. Graff, CNR Engineering, Lao PDR; Daovong Phonekeo and Chansaveng Nounngong, Ministry of Energy and Mines, Lao PDR*
- ▶ Enhancing sustainability in the hydropower development of Nepal – *U. Khatiwada, NRN Investment Ltd, Nepal*
- ▶ Application of Chinese technical innovation in international hydropower projects – *Wang Ruihua, Sinohydro Corporation Ltd, China*

Asset management

Chair: Niels Nielsen, Joint Secretary, IEA Hydro

- ▶ Capacity building for dams and hydro plants: Enhancing hydro asset management – *P. Droz and S. Mützenber, Stucky SA, Switzerland; F. Ferranti, Stucky Asia, Thailand*
- ▶ (Additional speakers being arranged by IEA)

Hazard and risk

Chair: Prof John Reynolds, Reynolds International, UK

- ▶ The role of disaster risk management strategies in managing natural hazards – *J. Reynolds, Reynolds International Ltd, UK*

- ▶ Countermeasures against large-scale behaviour on a mudstone slope at the Rajamandala hydropower project – *M. Asakawa, M. Mizuguchi and M. Terakawa, KEPCo, Japan*
- ▶ Impacts of the recent M7.3 magnitude earthquake on the Derbendikhan dam, Kurdistan, Iraq – *H.A. Hawramany, Ministry of Electricity, Iraq*
- ▶ Seismic risk in relation to water infrastructure – *Dr Jia Jinsheng, IWHR, China*
- ▶ Contribution on earthquakes and dams from Japan (to be confirmed)

Challenging sites

Chair: (to be announced)

- ▶ Engineering design of Longhaikou hydro project – *Ye Jian-qun, Zheng Peng-xiang and Tu Cheng-yi, Hydrochina Huadong Engineering Corporation, China*
- ▶ Nam Lik 1 hydropower project: Construction in Lao PDR of a run-of-river scheme in adverse conditions – *E. Mine, Tractebel, Lao PDR*
- ▶ Geological difficulties in the main dam foundation at the Nam Ngiep 1 hydropower project, Laos – *T. Tabuchi, Y. Murakami, Y. Higuchi, T. Seoka and H. Ueda, Nam Ngiep Power Company, Lao PDR*
- ▶ Study on deformation failure mechanism and control measure of bending and topping slope – *Zheng Huifeng, Wu Guanye, Zheng Quanchun, Huang Tairen and Chen Liang, Huadong Engineering Corporation under PowerChina, China*
- ▶ The design of the upper reservoir at Kaniv pumped-storage plant in difficult engineering-geological conditions – *V. Ryzhyi and V. Galat, Ukrhydroproject PRJSC, Ukraine; A. Riabenko, National University of Water and Environmental Engineering, Ukraine*
- ▶ Suitability of underground geological conditions as a critical decisive factor at a hydropower project site: Case study of the Masang II hydropower plant project, West Sumatera, Indonesia – *D. Claudia and N. Suryakomara, PT. PLN (Persero), Indonesia; S. Visona, AF Consult, Switzerland; J.P. Basuki, PT. Kwarsa Hexagon, Indonesia*
- ▶ Geological and geotechnical challenges faced during excavation of the underground powerhouse and headrace tunnel for the 720 MW Mangdechhu project, Bhutan – *A.K. Mishra, R.K. Chaudhary, P. Punetha and I. Ahmed, Mangdechhu Hydroelectric Project Authority, Bhutan*

Dam safety

Co-Chairs: Dr Harald Kreuzer, Consultant, Switzerland; Dr Andy Hughes, Consultant, UK

- ▶ Effect of foundation conditions on stability and stress behaviour at the Nam Theun 1 RCC dam in Laos – *M. Goltz and S. Ceriani, Pöyry Switzerland Ltd, Switzerland; B. Mayer, Pöyry Energy GmbH, Austria; S. Martin, Pöyry Energy, Thailand*
- ▶ Evidence-based decision making for dam rehabilitation in large portfolios of dams in Vietnam – *P. Amos and B. Veale, Damwatch Engineering Ltd, New Zealand; Nguyen Canh Thai, Thy Loi University, Vietnam; K. Berryman, GNS Science, New Zealand*
- ▶ Dam safety and emergency planning in reservoir cascades – *I. Davison and G. Webby, Damwatch Engineering, New Zealand*

The dichotomy in treating the safety of large and small dams

Chair: Dr Harald Kreuzer, Consultant, Switzerland

- ▶ Low hazard small dams – *M. Ho Ta Khanh, VNCOLD, Vietnam/France; F. Lempérière, Hydrocoop, France; A. Nombre, CNBB, Burkina Faso*

Conference Sessions

- ▶ Improving the safety of small embankment dams: from lessons learnt from dam failures to cost-effective methods and solutions to assess safety and reinforce the dams – *J.-R. Courivaud, EDF, France; M. Ho Ta Khanh, Dam Expert, France*
- ▶ Learning from dam incidents and accidents – *A. Hughes, Dam Expert, UK*

Panel discussion:

While there have been advances in the use of risk assessment for large dams, on the other hand, treating the safety of the thousands of small dams is continuously neglected because their individual risk is too insignificant to be seriously considered. This disregards the considerable cumulative damage of thousands of small dams with their higher failure rate as compared with large dams. Panellists will discuss this issue from engineering, social and environmental perspectives.

THURSDAY 15 MARCH

Environmental aspects

Chair: Lakhdeep Babra, IFC Environment, Social and Governance Manager for Asia

- ▶ IFC's environmental, health and safety guidance document for hydropower: A new standard for emerging economies – *G. Gregoire, IFC, USA*
- ▶ Foundations for strategic Lower Mekong hydropower and water resources management – *B. Hadjerioua, Oak Ridge National Laboratory, USA; J.M. Kern, United States Department of Energy, USA*
- ▶ Indirect environmental impacts: Who is responsible? – *P. G. Jensen, Nam Ngiep Power Company, Lao PDR*
- ▶ Environmental compliance and monitoring during the construction period: Lessons learned from Nam Ngiep 1 hydropower project – *P. G. Jensen, P. Phonsavat, K. Xaysomphou, Nam Ngiep Power Company, Lao PDR*
- ▶ EOMAP: Pioneering the field of world water quality – *T. Heege and H. Bernert, EOMAP GmbH & Co KG, Germany*
- ▶ Fish and fishery monitoring at the Nam Ngiep 1 hydropower project – *M.R. Frederik, T. Visser, H. Winastu and N. Wongyai, Nam Ngiep Power Company, Lao PDR*
- ▶ Discussion on 'Advancing sustainability in the hydropower sector'

Social aspects

Chair: Dr Cecilia Tortajada, Institute of Water Policy, Lee Kuan Yew School of Public Policy, University of Singapore

- ▶ Community benefit sharing in the Tina river hydropower project – *E.C. Johnson, World Bank; F. Cimato, Independent Consultant, UK*
- ▶ Benefit sharing practices for sustainable hydropower development in Nepal – *P.P. Shrestha, Policy Entrepreneurs Incorporated (PEI), Nepal*
- ▶ Self-resettlement planning and follow-up at the Nam Ngiep 1 hydropower project – *M.R. Frederik, P. Inphomma, and K. Inthavong, Nam Ngiep Power Company, Lao PDR*
- ▶ People participation in designing the resettlement area and livelihood restoration programme at the Nam Ngiep 1 hydro project – *M.R. Frederik and S. Phommahack, V. Somsoulivong and Y. Yamabayashi, Nam Ngiep Power Company, Lao PDR*

Small hydropower

Co-Chairs: Prof David Williams and Gordon Black, Learning Hydro, UK

- ▶ Big challenges in small hydro – *P. Diggelmann, M.P. Bieri and R. Braunshofer, Pöyry Energy Ltd, Thailand*
- ▶ Small hydro: Appropriate turbine choice reduces overall cost – *C. Gentner, GE Renewable Energy, Switzerland*

- ▶ How to use experience from Norwegian small hydro development to build more MW per US\$ in Asia – *J. Arenal Martin, A. Koksæter and M. Kullberg, Multiconsult ASA, Norway; K. Noren, Multiconsult, UK Ltd*
- ▶ Low head small hydro solution for existing dams with minimal civil construction adaptations – *M. Schober, Gugler Water Turbines GmbH, Austria*
- ▶ The small hydropower plant in consideration with environmental protection: Adoption of hybrid servomotor – *T. Suzuki and I. Komuro, Nippon Koei Co, Ltd., Japan*
- ▶ Case study: Small hydropower sector in Laos – *J. Mackay, ReEx Capital Asia, Lao PDR; J. Chen, Mekong 8 Partners, Lao PDR; L. Deroo, ISL Ingénierie, France*
- ▶ Vacuum generator circuit breakers: Innovative switching technology ideal for pumped-storage powerplants – *Hong Urbanek and K.R. Venna, Siemens AG, Germany*
- ▶ Practical case of system redundancy on a small hydro located in an irrigation channel – *I. Labiano, Ingeteam Power Technology SA, Spain*

Gateways and spillways

Chair: Dr Peter Mason, MWH, UK

- ▶ The design and manufacture of the large radial gates for the Xayaburi hydro plant in Lao PDR – *S. Wingrove and D. Griffiths, KGAL Consulting Engineers, UK*
- ▶ The approach of a large water undertaking to assess the condition of gates and valves – *Dr A. Hughes, Consultant, UK*
- ▶ Innovative solutions to increase flow capacity of spillways and maximize dam safety – *B. Peltié and O. Lapeyre, ISL Ingénierie, France*
- ▶ Upgrading of spillways using automatic non electro-mechanical gates to meet higher safety standards – *J. von Holdt, Amanziflow Projects Pty Ltd., South Africa*
- ▶ Innovative spillway refurbishment – *N. Crosby and T. Doyle, KGAL Consulting Engineers, UK*
- ▶ Experimental study of a ski jump spillway at the Nam Ngiep 1 hydro project in Lao PDR – *T. Takahashi, Y. Murakami, A. Asakawa and Y. Aosaka, Nam Ngiep Power Company, Lao PDR*

Sedimentation management

Chair: Prof Anton Schleiss, President, ICOLD; and EPFL-LCH, Switzerland

- ▶ Financing reservoir sediment management for sustainability – *R. Hotchkiss, Brigham Young University, USA*
- ▶ Sediment handling at Indrawati III's Intake, Nepal – *J. Zamora Montoya and T. Jacobsen, Sedicon AS, Norway*
- ▶ Impact of the Koshi barrage and embankment on river morphology and dynamics – *L. Devkota, ILF Consulting Engineers (Asia), Thailand; S. Giri, Deltares, The Netherlands; B. Baral, Queen Mary University of London, UK; A. Crosato, IHE Delft, The Netherlands*
- ▶ Dredging solution for power dam maintenance – *O. P. Marcus, Damen Shipyards Gorinchem, The Netherlands*
- ▶ Study of flushing at the intake and weir of Masang hydropower as structure countermeasures for sedimentation with flow 3D simulation – *B. Pandra, PT. PLN (Persero), Indonesia; S. Visona and H. Salem, AF Consult, Switzerland; P.A. Wardhan, PT. Kwarsa Hexagon, Indonesia*

Closing plenary session

- ▶ Session outcomes and recommendations
- ▶ Summaries of the side events (SHP Workshop; Hydro Developers' Working Group; IFC Workshop on Gender Diversity)
- ▶ Conclusions of ASIA 2018