

# HYDRO 2016



Achievements, opportunities and challenges

**International Conference and Exhibition  
2m2c Convention Centre, Montreux, Switzerland  
10 - 12 October 2016**

The beautiful town of Montreux, overlooking Lake Geneva, will provide a perfect setting for the world hydro community, policy-makers and practitioners, to meet in October to discuss topical aspects of global hydropower development.

Details of the technical and social programmes, and accommodation, and tours, can be found at:  
[www.hydropower-dams.com](http://www.hydropower-dams.com)

Organized by:

THE INTERNATIONAL JOURNAL ON  
**HYDROPOWER  
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Schweizerischer Wasserwirtschaftsverband  
Association suisse pour l'aménagement des eaux  
Associazione svizzera di economia delle acque



# HYDRO 2016 AND SWITZERLAND AS HOST COUNTRY



It is also one of the continent's original major hydropower developers, having based much of its industrial development on exploitation of its hydro resources during the 1950s. Today hydropower produces about 60 per cent of Swiss electricity.

Western Switzerland is a major centre of activity today, with schemes such as the major Nant de Drance, FMHL+ and Linthal 2015 pumped-storage schemes under way (two of which can be visited on post-Conference study tours).

The Swiss Government (through the Federal Office of Energy) is promoting the future use of hydropower through a variety of measures, as part of its 'Renewable energy action plan'. As well as new developments, existing plants are being renovated and expanded, taking related ecological requirements into account. There is a target to increase production by at least 2000 GWh/year through these measures.

Swiss utilities, academic institutes, professional associations and industrial companies have expressed strong support for HYDRO 2016, and are waiting to welcome the international hydropower community, and to share their long-term experience of hydro development.

## THE ANNUAL HYDRO CONFERENCES

The annual conferences in this series are the most international gatherings for the hydropower profession, bringing together experts in the various inter-related disciplines in the field of hydropower development. Emphasis is on encouraging the advancement of carefully planned hydro schemes in the less developed countries, and equally, maximizing the benefits of existing hydro installations, by maintenance and timely upgrading.

Three main tracks of sessions cover technical, economic/financial and environmental issues, with much emphasis on emerging topics, such as climate resilience, cyber security and capacity building/succession planning.

The events also provide a bridge between policy-makers and practitioners, highlighting topical issues and encouraging balanced debate.

Past events have taken place in Budapest (1994); Barcelona (1995); Lausanne (1996); Portorož (1997); Aix en Provence (1998); Gmunden (1999); Bern (2000); Riva del Garda (2001); Kiris (2002); Dubrovnik (2003); Porto (2004); Villach (2005); Porto Carras (2006); Granada (2007); Ljubljana (2008); Lyon (2009); Lisbon (2010); Prague (2011); Bilbao (2012); Innsbruck (2013); Cernobbio (2014); and Bordeaux (2015).

Today the conferences attract around 1500-1600 participants, representing more than 80 countries. The main water- and energy-related professional associations, such as ICOLD and the International Energy Agency, play a major role in sessions and often host side events.

## SWITZERLAND AS HOST OF HYDRO 2016

With 33 hydro and pumped-storage schemes under construction (at both new and major upgrade projects), which will provide more than 2100 MW of new capacity, Switzerland is one of Europe's most active countries for hydro development at present.

## MONTREUX AND THE RIVIERA

As a result of its mild micro-climate, the Montreux-Vevey region has become known as the Montreux Riviera. HYDRO 2016 will take place against a background of stunning scenery, including vineyards, mountains, and medieval buildings.

The conference and exhibition will take place in the modern and spacious 2m2c Congress Centre, overlooking Lake Geneva, which is also home to the world famous Montreux Jazz Festival each summer. The centre, with a total area of 18 000 m<sup>2</sup> and equipped with state-of-the-art technology, has a flexible layout and a total of 23 modular meeting rooms, all offering panoramic views of the lake and the Alps.

## ACCESS AND REGIONAL TRANSPORT

The nearest airport to Montreux is Geneva, which has direct flights from 120 cities. From Geneva, the journey takes approximately one hour by train, coach or car, with much of the route offering spectacular views of the lake.

Zurich airport, with direct flights from 150 cities, is 2.5 hours from Montreux by train. All HYDRO 2016 registered participants will receive a complimentary 'Montreux Riviera Card' allowing free use of all local public transportation in the area.

Discounts are also available for some train journeys from neighbouring countries.



### WHO SHOULD ATTEND:

- All those active in advancing world hydropower development, whether through research, planning, project financing, design and construction, operation and maintenance, refurbishment or equipment supply.
- Others advising on specific aspects such as environmental protection, social aspects, safety enhancement, legal and contractual issues, climate science, etc.
- University lecturers and students, who together will ensure that expertise in the field of hydro and water resources development is sustainable. The conferences include sessions of special interest and relevance to students.



# HYDRO 2016 OVERVIEW

Sunday 9 October	Monday 10 October	Tuesday 11 October	Wednesday 12 October
<p>From 09.00 hrs: Conference Registration opens Exhibition set-up for custom stands only</p> <p>09.00 hrs: Small Hydro Seminar begins</p> <p>10.45 hrs: Excursion departs for Lunch Cruise on Lake Geneva and visit to Chateau de Chillon</p> <p>14.00 hrs: Access to stands for exhibitors</p> <p>19.00 hrs: Chairmen's Meeting followed by 19.30 hrs: Speakers' Briefing at the 2m2c Convention Centre</p> <p>20.00 hrs: Speakers' and Chairmen's Reception at Fairmont Montreux Palace hotel</p>	<p>08.30 hrs: Opening Plenary Session: Welcome addresses Keynote addresses</p> <p>Coffee</p> <p>Parallel Sessions: 1 - Global development opportunities 2 - Risk management and insurance 3 - Climate issues 4 - Hydraulic machinery - I</p> <p>Lunch</p> <p>Parallel Sessions: 5 - Swiss hydropower expertise and activity 6 - Finance and investment 7 - Flood protection and hydrology 8 - Hydraulic machinery - II</p> <p>Coffee</p> <p>Parallel Sessions: 5 - Swiss hydropower expertise (contd) 8 - Hydraulic machinery - II (contd) 9 - Contractual issues 10 - Gates and spillways</p> <p>20.00 hrs: Welcome Reception Petit Palais Hotel Fairmont Montreux Palace</p>	<p>08.30 hrs: Parallel Sessions: 11 - Hydro in Africa (national overviews) 12 - Civil works: Design and construction 13 - Pumped storage (a) 14 - Social issues</p> <p>Coffee</p> <p>Parallel Sessions: 11 - Hydro development in Africa (case studies) 15 - Civil works: Materials 13 - Pumped storage (b) 16 - Solutions for fish (IEA session)</p> <p>Lunch</p> <p>Parallel Sessions: 17 - Decision making for renewals (IEA session) 18 - Natural hazards and risks 13 - Pumped storage (c) 19 - Environmental issue: Fish protection</p> <p>Coffee</p> <p>Parallel Sessions: 20 - Capacity building and training 21 - Dam safety 13 - Pumped storage (d) 22 - Environmental issues</p> <p>17.30 hrs: Networking party Refreshments in the Exhibition Halls (Evening free for private parties)</p>	<p>09.00 hrs: Parallel Sessions: 23 - Operation and maintenance 24 - Powerplant safety 25 - Small hydro: R&amp;D 26 - Sedimentation management</p> <p>Coffee</p> <p>Parallel Sessions: 24 - Powerplant safety (contd) 26 - Sedimentation management (contd) 27 - Refurbishment and upgrading 28 - Small hydro: case studies</p> <p>Lunch</p> <p>Parallel Sessions: 29 - Tunnels and underground works 30 - Grid issues 31 - Marine energy development 32 - Electrical engineering</p> <p>Coffee</p> <p>Closing Plenary Session: Summary and outcomes Welcome to AFRICA 2017, Marrakech and HYDRO 2017</p> <p>20.00 hrs: Conference Dinner Stravinsky Hall 2m2c Convention Centre</p>



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# PRE-CONFERENCE SMALL HYDRO WORKSHOP

## Design a small hydropower project in one day (Sunday 9 October)

Many factors are considered in the design and construction of the optimum hydropower project. All parts of a scheme are interrelated and interdependent. Change one component and all others are affected.

This workshop, following the successful one held at ASIA 2016 in Vientiane, Laos, is aimed at people who are, or will be, involved in hydropower development as part of rural electrification programmes. It will cover run-of-river hydro projects in the 'pico' to 'mini' range: approximately 1 kW to 1 MW capacity.



As this is a diverse form of energy production, there are always areas which are unfamiliar to people, despite many individual specialisms. This workshop aims to fill in the gaps, and help people to gain a good basic grounding in the topic.

All relevant aspects will be covered, from rainfall to energy evaluation, including:

- Analysis of scheme location and definition of potential catchments
- Turning rainfall into an available flow range from a catchment and development of a flow duration curve
- Power and energy generated calculation
- Intake structures, channel and/or pipeline routes and sizing
- Powerhouse design and equipment
- Turbine selection
- Generator, controls and switchgear options
- Grids, national and local

This will be a 'hands-on' workshop, which will involve the participants, working in groups, in developing an actual hydropower project during the day. After presentations on the individual scheme aspects, the groups will put together the components of the project.



This will follow through to the completed design. Feedback from the workshop in Laos included the comment: "Extremely useful and informative – hands on approach is best!"



Co-sponsored by: **GILKES**

## PRE-CONFERENCE EXCURSION

### Swiss Riviera, Lunch cruise on the lake, and Chillon Castle (Sunday 9 October)

Departing from the 2M2C Convention Centre at 10.45 hrs, the tour will begin with a coach journey along by the lake experiencing the Swiss Riviera as well as views



of the famous Lavaux terrace vineyards. On arrival at the picturesque port of Ouchy in Lausanne, the group will board one of the region's traditional paddle steamers for a cruise on the lake. During the cruise, a three-course lunch will be served while delegates take in the beautiful scenery surrounding Montreux. After lunch, the boat will moor at the spectacular Chillon Castle for the group to disembark. Set in the rocky peninsular, this classic medieval fortress was immortalized in Byron's poem, 'The Prisoner of Chillon'. Today it is one of the region's most popular landmarks, housing period furniture and interesting artefacts.

Following a guided tour of the castle, the group will travel back to Montreux, arriving at around 14.45 hrs.



### International Steering Committee

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# CONFERENCE SESSIONS

Any final updates to the programme will be posted on our website ([www.hydropower-dams.com](http://www.hydropower-dams.com))

## Monday 10 October

### Opening plenary session

- Introduction to the HYDRO 2016 programme – Alison Bartle, Aqua~Media International Ltd
- Roman Mayer, Swiss Federal Office of Energy (on Swiss Energy Strategy 2050)
- Prof Anton Schleiss, President, International Commission on Large Dams
- Laurent Mouvet, Chairman, Swiss National Committee on Dams
- Luciano Canale, The World Bank
- Prof. F. Avellan, EPFL-LMH (on the EU research project HYPERBOLE)
- Dr Jeff Opperman, The Nature Conservancy (on a systems approach to planning)
- Alessandro Palmieri (on the global need for multipurpose storage schemes)
- Zhou Jianping, Power Construction Corporation of China

(The detailed programme for the Opening will be distributed at the Conference)

### Parallel sessions

#### Session 1 – Global hydropower development opportunities

**Chairman: L. Mouvet, Hydro Operation International SA, Switzerland**

- Initiatives for the Future of Large Rivers (IFGR): the role of large rivers in the energy transition and climate change – J.-L. Mathurin and B. Porquet, Compagnie Nationale du Rhône, France
- Hydropower: the new focus for the development of Uganda's economy – L. Muwumuza and P. Mwesigwa, Ministry of Energy and Mineral Development, Uganda
- Enhancing renewable energy in national and regional power grids beyond 2016: the contribution of hydropower in hybrid powerplants – F. Makhanu and P. Mukeyu, KenGen, Kenya
- Developing hydropower on the Orinoco river – A. Marcano, Almarca Group International, Panama
- Bolivia's hydro development: 2015 to 2020 – E. Paz and J.M. Romay, Ende Corporacion, Bolivia
- Hydropower potential and its development in Pakistan – I. Ul Haq, WAPDA, Pakistan
- Investigation of unexploited hydro potential in Georgia – B. Quigley and C. Thevenaz, Stucky Ltd, Switzerland; G. Matcharadze, Stucky Caucasus Ltd, Georgia; J. Todua and O. Babilodze, JST Georgian Energy Development Fund, Georgia

#### Session 2 – Risk management and insurance

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

- Insurance during construction – V. Victorsson, SwissRe, Switzerland
- Managing financial risks for hydrology-dominated energy systems: the case of Uruguay – L. Canale and H. Ibarra Panda, The World Bank
- Guangdong Meiyuan hydropower precipitation index – Yuanyong Long, Weather & Energy, Corporate Solutions, SwissRe, Switzerland
- Insurance of wind farms, solar installations and small hydro – K. Schreiber, Gothaer Insurance, Germany
- Risk mitigation approach to project preparation: Lightning never strikes twice – K.I. Candee, Aqua Energie LLC, USA

#### Session 3 – Climate issues

**Chairman: P. Mason, MWH Global, UK**

- Climate change: challenges to balance efficiency and reliability of power supply – Dr G. Annandale, George W. Annandale Inc, USA
- Climate change resilience and disaster risk management in the hydropower sector in high mountain environments – Prof J.M. Reynolds, Reynolds International Ltd, UK
- The Paris Climate Agreement: what does this mean for hydropower? – A. Yager and W. Greene, Multiconsult, Norway
- Assessment of reservoir performance under uncertainty in hydrological impacts of climate change – U Min Khaing, Ministry of Electricity and Energy, Myanmar
- Paris agreement, the key outcome of COP21: Impression for the energy sector specifically hydropower – A. Gupta, NTC Ltd, India; G. Kapur, SJVN Ltd, India; T. Joshi, Government of Himachal Pradesh, India; S. Bansal, Manav Rachna International University, India
- Potential impact of climate change on river inflows to the Batang Ai hydro plant – M. Hussain and S. Nadya, Sarawak Energy Berhad, Malaysia; K.B.W. Yusof and M.R.U. Mustafa, Petronas University, Malaysia
- Key design criteria should be very different from those prevailing ten years ago – F. Lemprière, Hydrocoop, France

#### Session 4 – Hydraulic machinery: Research and modelling

**Chairman: Prof F. Avellan, EPFL-LMH, Switzerland**

- Increasing the operating range of Francis turbines by considering dynamic phenomena at partial load – J. Brammer, F. Duparchy, P.-Y. Lowy, M. Thibaud and T. De Colombel, GE Renewable Energy, France

- Lysebotn II: a challenging development in an extreme high head Francis project – E. Oberbichler, W. Artner and D. Mack, Andritz Hydro GmbH, Austria
- Development of support tools to evaluate the performance and cavitation condition proximity for a hydraulic turbine – J.M.C. Proença, and N.M. da Silva Rocha, EDP Gestão da Produção de Energia S.A., Portugal
- Simulation of damage caused by cavitation in non-rotating components of a Kaplan turbine – H. Benigni, B. Montenari, H. Jaber and J. Schiffer, University of Technology, Austria; A. Gehrler and F. Grunder, Andritz AG, Austria; E. Döltelmayer, Verbund Hydro Power GmbH, Austria
- Are horizontal axis Pelton units more challenging concerning vibration? Some special cases analysed – P. Caretti, Hydro Mechanical Specialist Support (HMSS), Italy; T. Lora-Ronco, EDF, France
- Hölleforsen project: experiences and challenges using the new efficiency scale up formula – S. Videhult, GE Renewable Energy, Norway; C. Desrats and F. Pascal, GE Renewable Energy, France; U. Andersson, GE Renewable Energy, Sweden; A. Skagerstrand, Vattenfall Vattenkraft AB, Sweden
- Overflow leakage model in Archimedes screw turbines – K. Songin and W. Lubitz, University of Guelph, Canada

#### Session 5 – Swiss hydropower expertise

**Co-Chairmen: Prof A. Schleiss, President, ICOLD and LCH-ENAC, EPFL, R. Derungs, Schweizerische Wasserwirtschaftsverband, Switzerland**

- Energy strategy and research on electricity supply by hydropower in Switzerland – P. Manso and Prof A. Schleiss, LCH-ENAC, EPFL, Switzerland
- A central role for the hydro sector in Switzerland's energy transition – P. Jacquod and L. Pagnier, University of Applied Sciences of Western Switzerland, Switzerland
- Ancillary services: new challenges in the optimization of hydro equipment and plant operation – G. Judtmann and A. Schürmann, Pöyry Switzerland Ltd, Switzerland
- Setting trends for the operation and maintenance of hydropower stations – E. Kaempfen and A. Bircher, Hydro Exploitation, Switzerland
- Performance-based maintenance to protect the profitability of hydropower assets during difficult market conditions – N. Rouge and B. Valluy, Alpiq, Switzerland; A. Bircher, Hydro Exploitation SA, Switzerland; O. Bernard and B. Géhant, Oxand, Switzerland
- Spatialization of precipitation data for flood forecasting applied to the Upper Rhône river basin – A. Fohel, G. De Cesare and A.J. Schleiss, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; J.G. Hernández, Centre de Recherche sur l'Environnement Alpin (CREALP), Switzerland; B. Schaeffli, Institut des Dynamiques de la Surface Terrestre, Switzerland
- Impulse waves in reservoirs: recent research at VAW – H. Fuchs, F.M. Eners, and R.M. Boes, Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie (VAW), ETH, Switzerland
- Optimization of the emergency plan in case of flood: application to Contra arch dam – F. Amberg and S.M. Sayah, Lombardi Engineering Ltd, Switzerland
- FMHL+: Power extension of the existing Hongrin-Léman powerplant: From the first idea to the first kWh – G. Micoulet, A. Jaccard, N. Rouge, Alpiq Suisse SA, Switzerland
- Hongrin-Léman pumped-storage plant, Veytaux II powerhouse: engineering, erection and commissioning of a new generation of multistage storage pumps – C. Bello, M. Garing and L. Meier, Voith Hydro GmbH & Co KG, Germany
- Lessons learned from detailed design and construction of the Nant de Drance powerhouse – P. Heck and N. Nilipour, BG Ingénieurs Conseils SA, Switzerland; G. Seingre, Nant de Drance SA, Switzerland
- The Tierfehd pumped-storage plant: Design, construction and operating experience of an unusual pumped-storage facility – T. Gaal and F. Nickel, Axpo Power AG, Switzerland; M. Haas, Andritz Hydro AG, Switzerland
- Commissioning and operation of the first variable speed units in the 1000 MW pumped-storage plant Linthal 2015 – T. Kunz, A. Schwery and G. Sari, GE Renewable Energy, Switzerland; J.-M. Henry and R. Guillaume, GE Renewable Energy, France
- Hydropeaking mitigation measures: Planning, realization and operation of the first Swiss hydropeaking compensation basin in Innertkirchen – M. Müller, Y. Keller and P. Billeter, IUB Engineering Ltd, Switzerland; R. Kaderli and M. Gehri, BKW Energy Ltd, Switzerland; M. Kost, Kraftwerke Oberhasli AG, Switzerland
- The Mutsee dam, Switzerland: Highest dam location in the Alps – B. Otto, Axpo Ltd, Switzerland; M. Balissat, Stucky Ltd, Switzerland; A. Ricciardi, Lombardi Engineering Ltd, Switzerland

#### Session 6 – Finance and investment

**Chairman: P. Rae, P.J. Rae Consulting, Canada**

- Developing hydropower at the regional scale: Opportunities and challenges – J.-M. Devernay, Consultant, France
- Enhancing foreign direct investments by de-risking renewable energy projects in developing countries – P. Horka, Technologiefonds, Switzerland
- Hydropower LTA for the South African renewable energy programme – M. Tindale, Arup, UK; A. Basson, J. Hampton and J. Wimbrush, Arup, South Africa
- Private investment in small hydropower development to ensure power to water supply in DRC – A. Wetzel, Fichtner GmbH & Co KG, Germany
- A new deal to unlock Africa's hydropower potential: how internationally financed tariff top-ups can be the key to realizing Africa's hydro potential – R. Anderson, J. Arntsen and I. Flatlandsmo, Multiconsult, Norway
- Lenders and developers: a consultant's view – K.E. Norén, Multiconsult UK Ltd, UK

# CONFERENCE SESSIONS

## Session 7 - Flood protection and hydrology

Chairman: Prof L. Berga, Hon President, ICOLD

- Hydrological forecasting on glacier systems: Temperature forecasting corrections – K. Cros and A.J. Schleiss, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland ; G. Artigue and F. Jordan, e-dric.ch, Switzerland
- Smart flood management DSS – M. Diaz, M. del Mar Gallardo, P. Merino, L. Panizo and E. Soler, University of Malaga, Spain; S. Romero, Software for Critical Systems S.L., Spain
- Weir control for optimal peak discharge capping of floods – E. Lüke, D.F. Vetsch and R.M. Boes, ETH Zurich, Laboratory of Hydraulics, Hydrology and Glaciology (VAW), Switzerland
- On the prospect of a North Wales tidal energy and coastal protection project, UK – J.M. Reynolds, Reynolds International Ltd, UK
- Flood forecasting and reservoir operation in the East-Telemark hydropower system – Å. Killingtveit, K. Alfredeen, D. Maharjan and L. Addo, NTNU, Norway; T. Rinde, NTNU / Norconsult AS, Norway
- Evaluating the benefits of flood mitigation from the Pwalugu multipurpose dam – S. Jobard, A. Lecocq and L. Aljounaidi, Tractebel, France; C. Addo and A. Thompson, Volta Riva Authority, Ghana
- Physical and mathematical modelling to support overspill redesign – E. Škařupová, P. Nowak, M. Králík, M. Zúkal and L. Satrapa, Czech Technical University, Czech Republic

## Session 8 - Hydraulic machinery

Chairman: J.H. Gummer, Hydro-Consult Pty Ltd, Australia

- Flow induced vibration problems in a Francis runner caused by tailwater elevation changes – A. Suarez Carrio, Iberdrola Generación, Spain
- Investigation on sediment erosion in Francis turbine runners at a plant in India – J.H. Masoodi, G.A. Harmain, National Institute of Technology, India
- Resonance of Francis turbine guide vanes caused by painting – D. Dolenc, B. Rihtaršič, J. Gale and Š. Jelenko, Litostroj Power d.o.o., Slovenia; A. Skotak, ČKD Blansko Engineering, Czech Republic
- Reshaping Francis runners to enhance performance at partial loads: The case of Aldeadávila I – P.P.G. Segura, Iberdrola Generation, Spain
- A discussion on dynamic problems in Francis turbines – H. Brekke, Professor Emeritus Consult, Norway
- Successful elimination of self-excited vibrations in a Francis turbine without dismantling the power unit – W. Weber, J. Koutnik, Voith Hydro Holding GmbH & Co KG, Germany; H. Gissoni, Voith Hydro Ltda., Brazil
- High reliability of a 61 MW Kaplan turbine by applying water lubricant to the runner bushing – K. Shimokawa, M. Nakai, S. Nakamura and T. Tsukamoto, Voith Fuji, Japan
- Influence of blade tip clearances on Kaplan turbine characteristics – I. Kuznetsov, Y. Kuznetsov, M. Romanova and R.S. Akulaev, Power Machines, Russia
- Online residual life assessment of power unit components – W. Drefs, J. Loefflad, A. Greck, A. Kratsch and J. Koutnik, Voith Hydro, Germany
- Water film stiffness and damping analysis of water lubricated bearings with multiple axial grooves for hydro turbines – G. Ren and G. Auger, Thordon Bearings Inc, Canada
- Development of a low-friction multi-layer bearing for water turbine application – M. Kugo, Oiles America Corporation, USA; K. Kato and S. Takekawa, Oiles Corporation, Japan; T. Watakabe, Shanghai Oiles Bearings Inc, China; M. Hirayama, Oiles Deutschland GmbH, Germany
- Design and replacement of fatigue cracked hubs to reduce outage time in service to customers – D. Lee, L. Kunz, Li Chen, Voith Hydro Inc, USA

## Session 9 – Contractual aspects

Chairman: H. I. Aker, Dolsar Engineering, Turkey

- A defence of EPC contracts for hydropower projects – P.J. Rae, Independent Consultant, Canada
- Contractual aspects of hydropower projects: The division of responsibilities and risk allocation between employers and contractors – B. Geisseler, Geisseler Law, Germany
- Site supervision by the employer's representative in FIDIC EPC turnkey contracts – S. Camilletti, Tractebel Engie, France
- Legal and commercial aspects of the procurement of hydraulic steelworks for hydro projects: a case study in contracting for project-financed hydro – A. Blomfield, UK
- Are FIDIC the ideal contracts for a hydro project? How to allocate the main risks between employers and contractors under FIDIC conditions of contract – S. Giraud, Egis Eau, France

## Session 10 – Gates and spillways

Chairman: P. Erbisti, Consultant, Brazil

- Pont-et-Massène dam: An innovating spillway design to maximize dam safety – O. Lapeyre and S. Mevel, ISL Ingénierie, France; F. Del Rey, Hydroplus, France
- Spillway gate drive systems: How safe is safe? – K. Grubb, B. Imisson, P. Jones and D. Cave, Kgal Consulting Engineers, UK
- Optimized design method for hydraulic steel gates based on BIM (3 dimension modelling) – K.S. Lee and M.C. Gu, K-water, Korea; J.S. Jun, CMER Inc, Korea; Y.H. Kim, Keum Jeon Industrial Co. Ltd, Korea
- Design and operation of lifting beams – P.C.F. Erbisti, Independent Consultant, Brazil
- Pressurized retractable water seal: Adaptable to 30 mm of gate deformation – Wu Xiaoyun, China Three Gorges Corporation, China; Liao Lekang, Changjiang Institute of Survey Planning Design and Research, China

Tuesday 11 October

## Session 11 – Hydropower development in Africa

Co-Chairmen: M. de Vivo, Secretary-General, ICOLD; Adama Nombre, Hon President, ICOLD

- Review of hydropower in Sub-Saharan Africa – L. Canale and N. Sans, The World Bank
- Challenges and solutions in the construction of Karuma, the largest hydro plant in Uganda – O. Voborny and J. Brommumdt, AF-Consult Switzerland Ltd, Switzerland; A.M. Byaruhanga and H. Mutikanga, Uganda Electricity Generation Company Ltd, Uganda
- Hydropower site screening in Nigeria: Adding value in the early phases of project planning – G. Barker, N. Tomczak, O. Amogu, E. Lacroix and P. Pichavant, Tractebel Engie, France
- Potential of large and small hydropower in Algeria: Assessment and socio-economic benefits – A. Laouari, University of Boumerdes, Algeria; A. Ghenaïet, University of Science and Technology Houari Boumedienne, Algeria
- Hydropower development in Benin: The Beterou hydro scheme – S. Le Clerc, C. Aubert and X. Ducos, Artelia Eau et Environnement, France
- Development of the Shire river, Republic of Malawi – I. Vuckovic and S. Palt, Fichtner GmbH & Co Kg, Germany
- Conjunctive operations for the Cahora Bassa and Mphanda Nkuwa projects, Zambezi river basin, Mozambique – R.J. Gualé and J.R. Matola, Hidroelectricva de Cahora Bassa, SA, Mozambique
- Laúca hydropower project: the future backbone of the electricity grid in Angola – J. Horn, Lahmeyer International GmbH, Germany; E.D. Estevão, Gamek, Angola
- Rehabilitation of the Mount Coffee hydro plant in Liberia: A substantial increase in capacity and a number of challenges – B.T. Brunes and O. Skuncke, Multiconsult ASA, Norway; W.D. Hakin, Manitoba Hydro International, Canada; A. Trišković, Fichtner GmbH, Germany
- Development of the Lufubu river basin hydropower cascade project – A. Brasca, S. Galantino and F. Vulpiani, Studio Ing. G. Pietrangeli Srl, Italy; A.S. Nyirenda, LPC–Lufubu Power Company, Zambia

## Session 12 – Civil works: Design and construction

Chairman: M. Rogers, MWH Global, USA

- Budhi Gandaki hydropower project, Nepal: a 260 m high arch gravity dam and a 1200 MW powerplant to resolve Nepal energy crisis – P. Cazalis de Fondouce and M. L'Hostis, Engie, France; P. Aryal, Jade Consult Pvt. Ltd, Nepal; G. Basnet, Budhi Gandaki Hydropower Project Development Committee, Nepal
- Reduction of arch dam displacements thanks to adapted heating/watering system: EDF feedback from several years experience – C. Pralong and P. Meunier, EDF, France
- Ingula pumped-storage scheme: Design, construction, instrumentation and monitoring of the Ingula power caverns – G.J. Keyter, Braamhoek Consultants Joint Venture, South Africa
- New design for a high gravity dam with a concrete apron and asphalt-concrete junction component – O. Vaynberg and I. Landau, Ukhidroproject, Ukraine
- Optimization study of staged construction of Gibe 3 dam – A. Masciotta and F. Mattei, Studio Masciotta, Italy; A. Cagiano de Azevedo, Studio Pietrangeli, Italy
- Construction of the New Assiut barrage and hydropower plant: major challenges during the dewatering operations – D. Jaubertie, D. Grenier and P. Chalivat, Engie Tractebel France; A. Roussin and X. Dumont, Vinci Construction Grand Projects, France
- BIM as a support tools for resolution of clashes of the draft tube area - powerhouse construction: case study of Muskrat Falls project, Canada – R.M. Rocci and V. Mattei, Astaldi S.p.A., Canada; F. Eccel, SWS Engineering, Canada
- Use of 3D/BIM models for the design and construction of a major Norwegian hydropower plant – H.B. Smith, Multiconsult, Norway; E.R. Dahl-Mortensen, Zenith Survey AS, Norway
- Design implications and construction challenges of a cellular cofferdam for the Oxeck II hydro project, Guatemala – H. Ghassemi, Hatch, Canada; H. Assa, Solel Boneh, Guatemala; J. Gonzalez, Energy Resources Capital, Guatemala

## Session 13a – On-going pumped-storage projects in Europe

Co-Chairmen: B. Trouille, Mott MacDonald, USA; D. Surla, EDF, France

- Back-to-back start of a reversible pump-turbine: the case study of Robie – M. Regolatti, Officine Idroelettriche della Maggia SA, Switzerland; T. Klein and L. Ebner, GE Renewable Energy, Switzerland
- New surge tank commissioning at the Hongrin-Léman pumped-storage plant by real time simulation monitoring – C. Nicolet and A. Béguin, Power Vision Engineering Sarl, Switzerland; J-D. Dayer and G. Micoulet, Alpiq Suisse SA, Switzerland
- Highlights of the initial project stages of the Koralm pumped-storage plant in Austria – R. Fritzer, K. Blank and J. Dunn, ILF Consulting Engineers, Austria; R. Grunder and C. Pedretti, AF-Consult Switzerland Ltd, Switzerland; T. Stelzl, PSKW Koralm GmbH, Austria
- Tailwater system of the new FMHL+ pumped-storage plant – M. Wickenhäuser and J-M. Burnier, Stucky Ltd, Switzerland; G. Micoulet, Alpiq Suisse SA, Switzerland
- Refurbishment of a straight flow valve at the Ffestiniog pumped-storage plant – A. Taglieber and D. Christ, Voith Hydro GmbH & Co KG, Germany
- Nant de Drance: a 900 MW variable speed pumped-storage plant: transient and equipment challenges – S. Kolb and K. Adler, AF-Consult Switzerland Ltd, Switzerland; S. Vogel, Nant de Drance SA, Switzerland

# CONFERENCE SESSIONS

## Session 13b – On-going pumped-storage projects worldwide

**Co-Chairs: B. Trouille, Mott MacDonald, USA; Dr A. Negede, ECDC, Ethiopia**

- Exploring the possibility of constructing pumped-storage projects in areas of the Greek mainland – J.P. Stefanakos, National Technical University of Athens, Greece
- The Ingula pumped-storage scheme: Project development outline and commercial operation and performance of the scheme – C. F. Logan, Gibb engineering and Science, South Africa; D. Johnson and J. Diamond, Eskom, South Africa
- Design challenges for the main structures at the Kaniv pumped-storage plant – V. Galat and V. Galat, Hydrotechproject Ltd, Ukraine
- Overview of the upgrading process at the 325 MW Dlouhé Stráné pumped-storage plant – A. Skotak, L. Stegner, M. Feilhauer, Z. Cepa, J. Mikulasek, CKD Blansko Engineering, a.s., Czech Republic
- Small pumped storage to support increasing oil production at Cepu Block, Indonesia – T. Hartanto, Ministry of Public Works and Housing, Indonesia; P.Hastowo, Exxon Mobil Cepu Ltd, Indonesia

## Session 13c – New ideas in pumped-storage development

**Co-Chairmen: B. Trouille, Mott MacDonald, USA; J. Baztan, Gas Natural Fenosa idg, Spain**

- The new strategy for pumped-storage in Norway: Medium sized projects at existing power schemes – L. Lia and L.F. Strypet, NTNU, Norway; B. Kvaal, TrønderEnergi, Norway; K. Vereide, Sira-Kvina Power Company, Norway
  - Small hydro pumped storage: unexploited potential at existing infrastructure – K. Deželak and J. Pihler, University of Maribor, Slovenia; A. Rajh, HSE Invest d.o.o., Slovenia; L. Belak, Elektro Slovenija d.o.o., Slovenia
  - Local pumped-storage plants connected to the distribution grid: case studies from medium head (150 m) to high head (800 m) in France – L. Smati and V. Denis, Mhylab, Switzerland
  - Optimization of pumped-storage plants reservoir configuration for challenging market requirements – S. Cramer, F. Klomps and M. Schmidmeister, AF-Consult Switzerland Ltd, Switzerland
- Panel discussion

## Session 13d – Improvements in pumped-storage equipment technologies

**Co-Chairmen: B. Trouille, Mott MacDonald, USA; P. Magauer, Andritz Hydro GmbH, Germany**

- Simulation and measurement of unstable pump characteristics: comparison with PIV – C. Widmer, R. Neubauer, A. Gehrler and M. Sallaberger, Andritz Hydro, Switzerland; H. Jaberg, M. Guggenberger and F. Senn, Graz University of Technology, Austria
- Adaptive vibration protection depending on load and head on reversible pump-turbines – L. Fromaigeat, Meggit S.A., Switzerland; E. Peixoto and F. Duarte, EDP – Gestão da Produção de Energia, S.A., Portugal
- Development of a high head reversible pump-turbine with a splitter blade runner – Y. Enomoto, Toshiba Corporation, Japan; R. Du and Q. Wang, Toshiba Hydro Power Hangzhou Co. Ltd, Japan; Z. Wang, China Southern Power Grid Power Generation Company, China; Hongyu Chen, CSG Power Generation Co, China

## Session 14 – Social aspects

**Chairman: Dr S. Sparkes, Statkraft, Norway**

- Revisiting the 3Rs principle, 12 years after Porto – A. Palmieri, Dam Specialist, Italy
- Addressing gaps between legal requirements and sustainable development – S. Sparkes, Statkraft A.S, Norway
- Improving community relations during ESIA and project development phases through comprehensive stakeholder engagement – A. Niesslein and T. Streater, Mott MacDonald, UK
- Resettlement experience at the Upper Kotmale hydropower project Sri Lanka – R.S.W. Wagarachchi, CEB, Sri Lanka

## Session 15 – Civil works: materials

**Co-Chairmen: Dr R. Charlwood, Consultant, USA; Dr M.R.H. Dunstan, Malcolm Dunstan & Associates, UK**

- Global developments in RCC dam construction – Dr M.R.H. Dunstan, MD&A, UK
- New materials and techniques for the repair of dams without affecting the operation – A. Gonzalo, HCC S.A., Spain
- AAR risk reduction in new dams and hydro project – I. Sims, RSK Group Plc, UK; Dr Robin Charlwood, Robin Charlwood & Associates, USA
- The characteristic strength of hardfill for dams – N. I. Moutafis, National Technical University of Athens, Greece
- Geomembrane to stop leakage at the Saint Martin de Vésubie reservoir – A. Scuro, G. Vaschetti and J. Machado do Vale, Carpi Tech, Switzerland
- Construction intelligent control packaged technology and its application for a large hydropower project – Fan Qixiang, Zhou Shaowu and Yang Ning, China Three Gorges Corporation, China; Lin Peng, Tsinghua University, China

- Stability of concrete and masonry gravity dams, determination of mechanical properties: Creation of a database on the tensile strength of the concrete-to-rock interface – G. Coubar, EDF CIH, France; G. Deveze, EDF-TEGG, France
- Ingula pumped-storage scheme: Assessment of deterioration of concrete tunnel linings – C. Logan and J. du Plessis, Braamhoek Consultants Joint Venture, South Africa; M. Alexander, University of Cape Town, South Africa; M. Otieno, University of the Witwatersrand, South Africa
- Lining dams with dense asphaltic concrete: how to store millions of tonnes of water safely and economically – D. Wilson, Walo UK Ltd, UK; C. Torkuhl, Walo Bertschinger AG, Switzerland

## Session 16 – Hydropower and fish (IEA session)

**Chairman: N.M. Nielsen, IEA Hydro, Australia**

Understanding the impacts of hydropower development on fish populations and societies is gaining increasing importance, as new developments seek to meet sustainability targets. The IEA Hydro Annex on 'Hydropower and Fish' is developing a Roadmap to collect a full range of information on this subject. Significant gaps in knowledge will be identified and studies undertaken to address them, with the purpose of helping to develop best practice in the management of this issue.

The session will cover both the basis of the Roadmap, and examples of good practice already in place. This will be an interactive session, with input from the audience. Presentations will include:

- IEA's Hydro Roadmap on hydropower and fish – H-P. Fjeldstad, Sintef, Norway
- Safe downstream migration of Atlantic salmon past hydropower intakes: New research and technologies – H-P Fjeldstad, Sintef Energy, Norway; K. Ø. Gjelland, A.T. Silva, I. Uglem, T. Forseth and F. Økland, Norwegian Institute for Nature Research, Norway; H. Baktoft, Technical University of Denmark
- Holistic and adaptive environmental management in regulated rivers using LIDAR technology – M. Stickler, Statkraft, Norway
- Acoustic telemetry development for fish passage at hydropower dams – Z. D. Deng, Huidong Li, Jun Lu, Jie Xiao, J. Martinez, T. Carlson, M. Weiland, R. Brown and S. Cartmell, Pacific Northwest National Laboratory, USA
- Fish migration in rivers in Finland and Sweden with multiple hydro dams – M. Savolainen, Fortum, Finland
- Lower Fiskumfoss, Norway: upgrading, expansion or new plant as salmon premises (increasing production by 42 per cent) – T.J. Flåm and B. Hogaas, NTE, Norway; T. Gjermundsen and G. Braend, SWECO, Norway
- The Three Gorges reservoir: Ecological operating practices to sustain the natural reproduction of the four Chinese major carp downstream – Wei Jiang, Lei Chen and Yong Gao, Institute of Chinese Sturgeon, China
- Brush-baffle fish pass: a continuous migration corridor for fish – S. Kucukali, Cankaya University, Turkey; R. Hassinger, Kassel University, Germany

## Session 17 – Decision making for hydro plant renewals (IEA session)

**Chairman: N.M. Nielsen, Joint Secretary, IEA Hydro**

As hydro plants age, requirements for renewals and the opportunity for upgrades are based on risk reviews and asset assessments. A key component of the process is decision-making relating to scope, timing and duration. The IEA Hydro group has initiated an Annex covering best practices in optimal decision making, which will complement the recently completed study on technical aspects. The session will share experiences from IEA Hydro members and conference participants will be invited to join the discussion. Presentations will include:

- Introduction to Annex XV: Maintenance works and decision-making for hydro facilities – Y. Mizuhashi, Electric Power Development Co. Ltd, Japan
- Case history of decision-making for upgrading hydro plants – M. Takahashi, Japan Electric Power Information Department Inc, Japan
- Risk-based decision making approaches for hydropower asset refurbishment – T. Ang, Hydro Tasmania, Australia; N. Nielsen, IEA, Australia
- Risk: It's embedded in your assets – B. Neijens, Copperleaf Technologies Inc, Canada
- John Hart generating station replacement project: the use of revit for BIM from design to construction – A.V. Maiorov, R.S. Greig and S. Majid, SNC Lavalin Inc, Canada

## Session 18 – Hazard and risk

**Co-Chairmen: Dr J. Reynolds, Reynolds International Ltd, UK; Dr M. Wieland, Pöry, Switzerland**

- Seismic hazards of large storage dams – Dr M. Wieland, Pöry, Switzerland
- Seismic safety assessment framework for large arch-gravity dams according to Swiss guidelines compared with international practice: similarities, limitations and possible integrations – S-P. Teodori and M. Conrad, AF-Consult Switzerland Ltd, Switzerland
- Seismic vulnerability analysis of a super high arch dam in China – Guo Shengshan and Endi Zhai, China Three Gorges Corporation, China; Chen Houqun, China Institute of Water Resources and Hydropower Research, China
- Gravity dam safety evaluation under seismic action using simplified methods – B. Tardieu, Bernard Tardieu Expertises et Conseils, France; A. Sichaib and P. Lignier, Tractebel Engineering S.A., France

# CONFERENCE SESSIONS

- Safety assessment of Beni-Haroun dam regarding complex site conditions – M.K. Abidi, COB El Djazair, Algeria; B. Tardieu, Bernard Tardieu Expertises et Conseils, France; A. Si-Chaib and P. Lignier, Tractebel Engineering S.A., France
- The importance of access roads to the development of hydro projects: a case study from the Devoll hydro plant, Albania – A.R. Drake and M.D. Gill, Mott MacDonald, UK
- Mosul dam project: definition and hazards – H.A.H. Hawamany, Ministry of Electricity Kurdistan, Iraq

## Session 19 – Environment: Fish protection

**Chairman: Dr M. Raeder, Xayaburi Power Company Ltd., Lao PDR**

- Design development of the fishpassing facilities of the Xayaburi hydro plant from a developer's perspective – M. Raeder, XPCL, Lao PDR; P. Saritanon, CK Power Plc, Lao PDR; P. Nantasen, XPCL, Lao PDR
- Upstream fish passage facilities of Xayaburi hydropower plant – an explanation of the design concept – G. Morier-Genoud, Pöyry Switzerland Ltd, Switzerland; T.S. Coe, Fishtek Consulting Ltd, UK; M. Raeder and T. Poomchaivej, XPCL, Lao PDR
- Restoration of fish migration: An operator's and engineering provider's view – C.R. Kriewitz, S. Zingg, W. Gabl and D. Marbacher, BKW Group, Switzerland
- The Romaine complex: Large hydro development and Atlantic salmon. Is it possible? – J-C Guay, Hydro-Québec, Canada
- Influence of the construction of the Wudongde hydro station on protecting fish and the corresponding countermeasures – Liu Liwen, Gu. Gongkai Mi. Chuang and Shang Guodong, China Three Gorges Corporation, China

## Session 20 – Capacity building and training

**Co-Chairmen: Prof D. Williams, DAW Hydro, UK; Dr A. Hughes, Atkins, UK**

- Summary of the pre-conference training workshop – D. Williams, Hydro Trainer, UK
- Perspective on good governance, capacity and institutions development in Guinea energy sector – A.M.T. Conde, EDG/Electricité de Guinée, Republic of Guinea
- Capacity building for dams and hydro plants: enhancing hydro asset management – P. Droz, Stucky Ltd, Switzerland
- Where will you be in four years? – R. Stearnes, Foundation for Water and Energy Education, USA
- Solving the knowledge to practice gap for hydropower – C.T. Ferrari, Voith Hydro, Canada
- Study of the Atemo Falls hydropower plant, Kenya – J.F. Eldegard, S. Fosshem and C.L. Gaasrud, (Summer Interns), Multiconsult ASA, Norway  
Panel discussion

## Session 21 – Dam safety and monitoring

**Chairman: Dr H. Kreuzer, Consultant, Switzerland**

- Laouzas dam: Behaviour of a thin concrete arch dam located in a wide valley and foundation stability improvement – E. Robbe, F. Morel and E. Bourdarot, EDF, France
- A new concept of bearing devices for arch dams reinforcement – A. Lochu, EDF-ClH, France
- Hongrin dam, Switzerland: The long-term serviceability of the right bank – R. Leroy, Alpiq, Switzerland; T. Bussard, Norbert SA, Switzerland; A. Wohnlich, Stucky SA, Switzerland
- Stability analysis of Angat rockfill dam and dykes – S. Ehlers and Dr. M. Wieland, Pöyry Switzerland Ltd, Switzerland; Y.S. Park and G.J. Han, Angat Hydropower Corporation, Philippines; H. Fallah and H. Roshanomid, Pöyry Switzerland Ltd, Iran
- Kariba dam: Instrumentation appraisal – K. Gurukumba, Zambezi River Authority, Zimbabwe
- Probabilistic approach to the design supervision of the Miguillas EPC hydroelectric project in Bolivia – P.H. Perazzo and H. Ayala, Ende Corporacion, Bolivia; A. Dematteis, A. Lavagno and G. Russo, Geodata Engineering SpA, Italy
- Monitoring dams with distributed fiberoptic sensing – D. Inaudi and R. Blin, Smartec SA, Switzerland
- The Adjustable Factor of Safety to consider uncertainties in dam safety assessment: Practical use and applications – P. Léger, École Polytechnique de Montréal, Canada; H. Kreuzer, Consultant, Dam Expert, Switzerland

## Session 22 – Environment

**Chairman: M. Aufleger, University of Innsbruck, Austria**

- Innovative and ecological approach for dam restoration (INADAR) – B. Brinkmeyer and M. Aufleger, University of Innsbruck, Austria; R. Klocke, Bayerische Elektrizitätswerke, Germany; S. Blass and C. Gyffka, Katholische Universität Eichstätt-Ingolstadt, Germany; R. Stiegele and N. Vogt, TU München, Germany
- A holistic, system-focused approach to environmental flow regime investigations and design of mitigation – D. Hetherington and I. Lertzatz, Arup, UK
- Intervention strategies to mitigate hydropeaking – M. Bieri, B. Zünd and M. Gasser, Pöyry Switzerland Ltd, Switzerland; A.J. Schleiss, EPFL, Switzerland
- Hydropeaking mitigation measures: Performance of a complex compensation basin considering future system extensions – P. Meier, Eawag, Switzerland; M. Bieri, P. Manso and A.J. Schleiss, École Polytechnique Fédérale de Lausanne, Switzerland; S. Schweizer, A.U. Fankhauser and B. Schwegler, Kraftwerke Oberhasli AG, Switzerland
- Cumulative impact assessment of hydropower projects on the ecosystem – Vaishali and A. Kumar, Indian Institute of Technology Roorkee, India

**Early evening: Option to visit EPFL-LMH or EPFL LCH laboratories (see details on line)**

## Wednesday 12 October

### Session 23 – Operation and maintenance

**Chairman: J. Freitas, EDP, Portugal**

- Preventive maintenance and optimization of hydro plant equipment – S. Viennet, Hydreole Consulting, France
- How to leverage expert knowledge with data-driven models and smart data – V. Bouillet and V. Allarousse, GE Renewable Energy, France
- From e-Maintenance during operation to a digital service – J-F. Taloud and O. Demaya, EDF-ClH, France; F. Hebrard and M. Baloyan, GE Renewable Energy, France
- Integral monitoring system for hydropower equipment – R. Münch and F. Flemming, Voith Hydro Holding GmbH & Co KG, Germany
- Mechanical fitness-for-purpose analysis: Benefits for risk assessment – A. Jordan, M. Genoud and B. Golaz, Hydro Exploitation SA, Switzerland
- Legacy governor support: a cost-saving case study – R. Clarke-Johnson, American Governor Company, USA

### Session 24 – Powerplant safety

**Chairman: O.A. Westberg, Sivilingeniør Ole A. Westberg AS, Norway**

- Guidelines for the application of the machinery directive for hydropower equipment – B. Barresen, Multiconsult ASA, Norway; H. Bjarndal, Norconsult, Norway; J.R. Davidsen, Statkraft, Norway; V.G. Pedersen, Norwegian University of Science and Technology, NTNU, Norway; P. Teppan, Andritz Hydro, Norway
- Inertisation of transformer rooms as protection against oil mist secondary explosions – E. Elnan, Hypoxic Technologies AS, Norway
- Integrating safety features to hydraulic steel structures winches – P-Y. Launay and M. Pasquier, CMD Gears, France
- Measures to improve the reliability of the electrical parts at existing Ukrainian hydro and pumped-storage plants – E. Ryzhaya, Hydrotechproject Ltd, Ukraine
- Developing a sustainable cyber security policy for power plants – M. Antoine, ABB Power Generation, Switzerland
- Surge tank throttles for safe and flexible operation of storage plants – N.J. Adam, G. De Cesare and Prof A.J. Schleiss, EPFL-LCH, Switzerland
- New Matre Haugsdal powerplant, Norway; one of the most secure underground powerplants to be built – I. Kjode, BKK, Norway and O.A. Westberg, Safety Consultant, Norway

### Session 25 – Small and low head hydro Innovative design and development

**Chairman: V. Denis, Mhlyab, Switzerland**

- Design optimization of a very low head powerplant: Plenty of hydraulic common sense and a bit of CFD – D. Cazzago, L.L. Papetti and G. Negrinelli, Frosio S.r.l, Italy
- Performance measurements on the duoturbo microturbine for drinking water systems – V. Hasmatuchi, D. Biner and C. Münch-Alligné, HES-SO VS, Switzerland; F. Avellan, EPFL-LMH, Switzerland
- Design of a low-head plug-flow helical turbine for power generation in Kenya – C. Maiko, KenGen, Kenya; T. Thoruwa, Pwani University of Science and Technology, Kenya; J. Githiri, Jomo Kenyatta University of Agriculture and Technology, Kenya
- Developments in diagonal turbines for flexible medium head small hydro plants – C. Cottin and V. Denis, Mhlyab, Switzerland
- New development technology for small hydro plants – K. Watabe and Y. Ogino, Nippon Koei Co, Ltd, Japan
- Developing the residual hydropower potential on a medium sloped river stretch by standardized in-flow plants: Italian experience – G. Frosio, F. Frosio and L. Papetti, Studio Frosio S.r.l., Italy
- Archimedean screw and intake head losses: design optimization under variable flows, with or without inverter – N. Fergnani and P. Silva, Milan Polytechnic, Italy; D. Bavera, Consorzi di Bonifica Est Ticino Villosesi, Italy

### Session 26 – Sedimentation management

**Co-chairmen: G. Annandale, Consultant, USA; S. Alam, Consultant, France**

- Trans-border cooperation for better sedimentary management on the upper Rhône river – T. Pollin, S. Reynaud, M. Jacober, F. Abadie, F. Pressiat and C. Peteuil, Compagnie Nationale du Rhône, France; S. Diouf, Services Industriels de Genève, Switzerland
- Reservoir sedimentation management: practical guidelines for the implementation of mitigation measurements – M. Launay, M. Leite Ribeiro, Stucky SA, Switzerland; C. Juez, M. J. Franca and A. J. Schleiss, EPFL, Switzerland
- Active sediment management: 60 years of experience in Switzerland and worldwide – F. Pomi and U. Brauen, Swiss Sedimentation Technologies Ltd, Switzerland
- Space based monitoring of the sediment balance and water quality in reservoirs – T. Heege and P. Klinger, EOMAP GmbH & Co KG, Germany



# CONFERENCE SESSIONS

- The importance of venting turbidity currents on the sustainable use of reservoirs – S. Chamoun, G. De Cesare and A.J. Schleiss, EPFL, Switzerland
- Handling sediment management in practice – M. Detering and L. Bolsenkötter, DB Sediments, Germany; C. Jokiel, Cologne Technical University, Germany
- Applications of the Sedicon system at Coca Codo Sinclair, Ecuador and Banja dam, Albania – T. Jacobsen and J.Z. Montoya, Sedicon, Norway
- Patind project, Pakistan: Physical model studies to optimize the sediment management concept – C. Beck, N. Lutz, A. Lais, D. Vetsch and R.M. Boes, ETH Zurich, Switzerland
- Multi-method monitoring of suspended sediment concentration on the Rhône river during a sediment management operation – R. Le Boursicaud, G. Pierrefeu, D. Bonhomme and N. Corannel, Compagnie Nationale du Rhône, France
- Pressurized flushing of Verbois reservoir: A first experience of environment-friendly sediment flushing – E. Bollaert, AquaVision Engineering Ltd, Switzerland; S. Diouf, Services Industriels de Genève, Switzerland; J. Barras, Société des Forces Motrices de Chancy-Pougny, Switzerland
- Suspended sediment concentrations and turbine wear during the drawdown of two Alpine reservoirs – J.N. Fernandes, R.M. Boes, VAW/ETH Zürich, Switzerland; M. Titzschkau, KWO, Switzerland; A. Hammer and M. Schletterer, TIWAG, Austria; S. Haun, University of Stuttgart, Germany

## Session 27 – Refurbishment and upgrading

**Co-Chairmen:** H. Obermoser, AF Consult, Switzerland;  
F. Coelho da Rocha e Silva, Consultant, Portugal

- Why wait for a retrofit to achieve upgraded performances? – J. Verone, J-M. Henry, D. Robert and S. Broizat-Broman, General Electric, France; T. Kunz, General Electric, Switzerland
- Upgrading of the Keban hydro plant in Turkey – B. Ariöz, Dolsar Engineering Inc Co, Turkey
- Upgrading work on the horizontal Pelton turbines at the Tussa hydro plant, Norway – J.O. Haugen, Rainpower Norge AS, Norway; T. Myklebust, Tussa Energi AS, Norway; J.B. Moe, Hydrocell Consulting AS, Norway
- Refurbishment of a dual frequency hydropower plant – A. Matsui and Y. Ishiguro, Electric Power Development Co. Ltd, Japan
- Runner blade system shape optimization for the Krasnoyarsk hydro station – M.A. Sokolova, V.E. Rigin and A.V. Semenova, Power Machines, Russia
- Batang Ai hydroelectric plant half-life refurbishment and renewal project – W. Wong, E. Lamat, M. Hussain and J. Charles, Sarawak Energy Berhad, Malaysia
- Refurbishment of the Bratsk hydro station in Russia – B. List and F. Ibetsberger, Voith Hydro, Austria; B. Krzyzewski, Voith Hydro Inc, USA; V. Pisarev, Irkutskenergo, Russia
- Rehabilitation and replacement of a bottom outlet under water: the case of Pannecière dam – C. David, S. Lopez ad E. Boidy, Tractebel Engie, France

## Session 28 – Small and low head hydro

**Chairman:** Prof. B. Pelikan, University of Natural Resources and Applied Life Sciences, Austria

- Potential for small hydro development in Africa – J. Kenfack, SolarHydroWatt Sarl, Cameroon; N. Crettenand, BG Ingénieurs Conseils SA, Switzerland
- The Tulila small hydro plant, Tanzania – G-A. Tannò and L. Groschke, AF-Iteco, Switzerland
- Multiple compact hydro: an alternative to large hydro – P. Dufflon, R. Shahsavari, M. Bertrand and M. Mirshams, Andritz Hydro Canada Inc, Canada; F. Henon, Andritz Hydro SAS, France
- Challenges of construction of a small plant, in particular site conditions – P. Heck, and N. Nilipour, BG Ingénieurs Conseils SA, Switzerland; H. Moukhliiss, Romande Energie, Switzerland
- Rehabilitation of the Fully hydropower scheme: a cascade of small plants integrated in a municipal water transfer system – P. Manso, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland; J. Filliez, Stucky SA, Switzerland; B. Mösching, SEIC-Teledis, Switzerland
- Dafnozonara-Sanidi small hydro project on the river Acheloos: Environmental parameters and experience from the satisfactory performance of the fusegate system – J.P. Stefanakos, National Technical University of Athens, Greece; P.I. Tsiknakou, Tema Energy SA, Greece
- Flexible-pin planetary gearboxes for hydro plant applications – J. Vosátka, Wikov Industry a.s., Czech Republic; V. Roško, Czech Orbital2 s.r.o., Czech Republic

## Session 29 – Tunnels and underground works

**Chairman:** Y. Thanopoulos, Consultant, Greece

- New hydraulic gallery to improve operating conditions at the Emossion hydro scheme – N. Nilipour and M. van Mark, BG Consulting Engineers Ltd, Switzerland; P. Monnay, Emossion Ltd, Switzerland
- Air accumulation in hydropower tunnels – M. Skoglund, Multiconsult, Norway; L. Lia, NTNU, Norway; T.M. Bjertnes, Statkraft Energi, Norway; J. Jerkø, Troms Kraft, Norway
- Yusufeli dam and hydro project water intake structure: Opening of the gate and energy shafts by the raise boring method – D. Aydoğan and M.O. Ünal, General Directorate of DSİ, Turkey
- Inga 1 and 2 hydropower scheme: Increasing headrace canal capacity to reach full power – O. Cazaillat, B. Delaruelle, P-E. Loisel, J-T. Mechin and F. Brousset, Artelia Eau & Environnement, France
- Challenges overcome during the design and construction of the underground works at the Kariba South extension project – J. Basson, Hatch, South Africa

- Geological and geotechnical engineering aspects of the 600 MW Karuma hydro project in Uganda – J.E. Ongodia and H.E. Mutikanga, Uganda Electricity Generation Company Ltd, Uganda; D. Kalumba, University of Cape Town, South Africa; B.K. Ojha, Energy Infratech Pvt. Ltd, Uganda
- Owner's design check during construction of the underground powerhouse caverns for the Wudongde hydro project – Endi Zhai, Fan Qixiang, Guo Shengshan and Xu Haibin, China Three Gorges Corporation, China
- Water ingress and reduction measures in the headrace tunnel at the Uma Oya multipurpose project – H. Wannenmacher, Gaia Ground engineering, Switzerland; A.H. Hosseini, A. Rahbar and Z. Shahrokhi, Farab Energy & Water Projects, Iran; D. Wenner, Amberg, Switzerland
- Headrace channel slope stabilization by soil nailing at Dagachhu hydropower project – L.M. Dhungyel, Druk Green Power Corporation Ltd, Bhutan; T. Dorji, Bhutan Hydropower Services Ltd, Bhutan

## Session 30 – Grid issues

**Chairman:** Ø. Johansen, Ministry of Petroleum and Energy, Norway

- Interconnecting hydropower; opportunities and progress in Europe – Ø. Johansen, Ministry of Petroleum and Energy, Norway
- A novel concept to increase the flexibility at powerplants with outlets to the river – P-T. Storli, NTNU, Norway
- Increasing existing hydropower plants' flexibility to respond grid new challenges – M.C.M. Pacheco and J.E. Sequeira Correia, EDP Gestão da Produção de Energia, SA, Portugal
- Hydrology and electricity price correlations in the Iberian market – V.T. Mendes, A.F. Moura, R.F. Silva, M.J. Tavares, A.C. Nunes, J.E. Costa and J.C. Sousa, EDP Gestão de Produção de Energia, S.A, Portugal

## Session 31 – Marine energy potential and development

**Chairman:** F. Lempérière, Hydro Co-op, France

- What future for tidal energy? Updates on ongoing activities in France – D. Aelbrecht, EDF-DPIH, France
- Progress with marine energy developments in Russia – Dr E. Bellendir, VNIIG Institute, Russia
- The challenges of developing tidal range projects in the UK – E. Sidgwick and N. Macrae, Mott MacDonald, UK
- Opportunities and challenges for exploring tidal stream energy in China – Zhang Tianfang, Zhang Jisheng, Lu Zhongmin and Bai Yong, China Three Gorges Corporation, China

## Session 32 – Electrical engineering

**Chairman:** Prof J.J. Simond, EPFL, Switzerland

- High cycle fatigue on generators: An emerging concern – S. Déplanque, H. Walser and N. Dabagh, GE Renewable Energy, Switzerland; B. Courmoyer and O. Morin, GE Renewable Energy, Canada
- A comparison of wave, lap and diamond core windings in modern hydro generators – A. Frank and L. Ködding, Voith Hydro Holding GmbH & Co. KG, Germany; T. Hildinger, Voith Hydro Ltda, Brazil
- Optimization and rehabilitation of a fully water-cooled 352 MVA hydro generator – S. Schofer and G. Traxler-Samek, Andritz Hydro Switzerland
- Partial discharge measurement: Yes or no? – C. Matzhold, G. Albert and G. Lemesch, Andritz Hydro GmbH, Austria
- Digital substations for hydro powerplants – G. Schett, ABB Technology Ltd, Switzerland
- Overhaul of the generators at the Sayano-Shushenskaya hydro plant, Russia (2010 – 2014) – V. Shkolnik V. Novozhilov and S. Tiles, Power Machines, Russia
- A smart energy harvesting device for AC machines – A. Elez, Končar Electrical Engineering Institute Inc, Croatia; J. Študir, Končar Generators and Motors, Croatia; and T. Pintarić, HEP Generation, Croatia

## Closing plenary session

- Session summaries and key outcomes
- Welcome to AFRICA 2017, Marrakech, Morocco; and HYDRO 2017, Seville, Spain



# ACCOMPANYING PERSON'S PROGRAMME

## Monday 10 October: Local heritage



Departing from the 2m2c Convention Centre after breakfast, the group will have a short journey by coach to Vevey, home to Charlie Chaplin for the final 25 years of the legendary artist's life. The visit to 'Chaplin's World' includes exploring the beautiful manor where Chaplin lived, filled with furnishings and personal belongings. In addition, the newly opened studio brings Chaplin's cinematic journey to life, including interactive exhibits and replica sets from his most well known films spanning several Hollywood eras.

The tour will continue into the mountains to Gruyères, world-renowned for its cheese. With its quaint, perfectly preserved main square, the village retains the charm of its legendary past. Following a traditional three-course lunch, there will be a guided tour to allow participants to explore the picturesque town.

The afternoon coach journey back to Montreux will take around 45 minutes, arriving around 16.15 hrs.



## Tuesday 11 October: Mountain life



One of the best ways to travel through the mountains is by train; an infrastructure developed over a century ago. Participants will experience travel as it would have been in that era, aboard a 'Belle Epoque' style train. The group will depart from Montreux, in a first class carriage for a journey to the famous ski resort of Gstaad, favoured by celebrities. There will be time to see the picturesque promenade lined with boutiques and art galleries.

The journey through the mountains will continue by coach to Leysin. A short ride on a cable car will take the group to Berneuse, at an altitude of 2048 m. There will be time to take in the spectacular views across the snow-capped Alps, while enjoying a three-course lunch at the panoramic Kuklos restaurant.

The return will be by cable car to Leysin, where a cheese making demonstration will take place. A coach journey (around 45 minutes) will take participants back to Montreux, arriving around 15.30 hrs.



## Wednesday 12 October: Swiss Gastronomy



Participants will be divided into two groups for the morning and afternoon visits, but will meet for lunch.

Group 1 will begin with a chocolate-making workshop, at the Läderach Chocolaterie in Vevey, one of the finest chocolate producers in the region. After learning about the art of chocolate making, participants will have a chance to make a bar of chocolate to take away.

Group 2 will start the day with a tour of the Lavaux vineyards, where there will be a briefing on how the different soils and micro climates in the region account for the wide variations in flavour. There will be an opportunity to sample the produce.

The two groups will have a three-course lunch at the Relais de la Poste. Its terrace offers a wonderful view across the UNESCO-protected terraced vineyards.

After lunch, Group 1 will continue for a vineyard tour, and Group 2 will proceed to the Läderach Chocolaterie. The return to Montreux will be around 16.15 hrs.



# SOCIAL PROGRAMME

## Monday 10 October

The HYDRO 2016 Welcome Reception will take place at the Petit Palais, within the elegant Fairmont Montreux Palace hotel. With its Belle-Epoque architecture, this is one of the most prestigious hotels in Switzerland. The upper floor of the Petit Palais has a terrace overlooking Lake Geneva.

Cocktails and a buffet supper will be served, and the evening will provide a chance to catch up with news of friends and colleagues in the international hydropower community.



## Tuesday 11 October

The Exhibition Halls will remain open after the day's sessions have ended, to provide an opportunity for extra networking between registered participants and the international exhibitors. Light refreshments will be served.

There will also be opportunities to visit one of the laboratories of EPFL, either LMH (Hydraulic Machinery) or LCH (Hydraulic Constructions). There will be informal guided tours, and refreshments will be available. These tours must be pre-booked at the time of registration.



## Wednesday 12 October

The HYDRO 2016 Farewell Gala Dinner will take place this year in the Stravinsky Hall, home to the world famous annual Montreux Jazz Festival, and offering spectacular views over Lake Geneva.

This will be a chance to relax with friends, following three days of intense discussions.

In view of the venue, there will naturally be no shortage of music and other entertainment, so the evening will provide a memorable end to the HYDRO 2016 Conference and Exhibition.



# POST-CONFERENCE STUDY TOURS

## TOUR A (2 days)

### Nant de Drance pumped storage and Emosson dam; Martigny; Les Toules dam

#### Day One - Thursday 13 October

Departing from Montreux on Thursday morning, the group will travel to the 900 MW Nant de Drance pumped-storage plant, under construction in the municipality of Finhaut. The main element of the scheme is an underground power cavern, between the existing Emosson and Vieux Emosson reservoirs. The group will split into two groups, one group going first through a 6 km-long tunnel to the power cavern site to see work in progress and to have a briefing. The other group will meanwhile visit the 180 m-high Emosson arch dam (weather permitting).

After lunch together in the canteen at the site, the groups will swap over, with the first group going to the dam, and the second into the power cavern. Because of the limits on access to the power cavern (16 persons at a time), the number of participants on Tour A is strictly limited to 32.

*[Anyone who could suffer from claustrophobia may wish to avoid the trip involving a journey through such a long tunnel!]*

After the technical visits, the trip will continue to join participants from Tour B for an evening meal and overnight stay in the small town of Martigny, famous for its cultural and historical heritage.



#### Day Two - Friday 14 October

After breakfast, there will be a visit to the famous Gianadda Foundation Museum, with plenty to see, including a special exhibition of some of the works of Picasso. The group will then proceed towards Les Toules dam in the region of Bourg St-Pierre, with a stop en route for lunch.

In the afternoon there will be a technical visit and briefing at Les Toules, an 86 m-high double curvature thin arch dam, completed in 1964 as a heightening of an older structure. A project was carried out between 2008 and 2011 to strengthen the dam, to enhance its seismic safety.

The return to Montreux will be in the late afternoon, where the tour will end.

## TOUR B (3 days)

### FMHL+ pumped storage; Hongrin and Moiry dams; Martigny; Bieudron; Zermatt

#### Day One - Thursday 13 October

The group will depart from Montreux to the nearby FMHL+ scheme, which is under construction to



increase the capacity of the Veytaux pumped-storage plant from 240 to 480 MW. Two new units are being installed in a new underground cavern. The scheme is nearing completion, and will generate 1 TWh/year of peak energy.

There will then be a visit to the Hongrin arch dam, and the lake which has a surface area of 1.6 km<sup>2</sup>. The dam, in the form of two arches (Hongrin Nord and Hongrin Sud) was completed in 1969. Lunch will be at Col des Mosses.

In the afternoon the tour will continue on to Martigny, for a visit to the Gianadda Foundation Museum (see description in Tour A above), before joining participants from tour A for an evening meal at the hotel.

#### Day Two - Friday 14 October

After breakfast on Friday, the group will visit the 1269 MW Bieudron powerplant, part of the Cleuson-Dixence development, and fed by water from the Grande Dixence reservoir. The plant set new records when complete in 1998, for the highest head hydro installation, and the most powerful Pelton unit in operation (3 x 423 MW).

Lunch will be in Sion, after which the tour will proceed to view the 148 m-high Moiry arch dam, at the head of the Grimetz valley. The dam is in a very scenic area, popular for walking and climbing. The reservoir serves three hydro plants in the region.

Later in the afternoon, the group will arrive at the mountain village of Täsch for an overnight stay in a chalet-style hotel.

#### Day Three - Saturday 15 October

In the morning there will be a guided tour and lunch in neighbouring Zermatt, a world-famous ski resort set below the spectacular Matterhorn peak. After lunch in a local restaurant, the tour will depart for Geneva, its final destination, with a coffee stop en route.

## TOUR C (2 days)

### Schiffenen arch dam; Hagneck and Ruppoldingen run-of-river schemes; visit to Bern and on to Zurich

#### Day One - Thursday 13 October

The first visit on Thursday morning will be to the 47 m-high Schiffenen dam, on the Sarine river. It has a hydro plant equipped with two 35 MW Kaplan units, operating under a head of 38–48 m. There will then be a short drive to Morat/Murten, for lunch in a local restaurant.

After lunch, the group will proceed to the Hagneck powerplant on the river Aare. This plant was renovated



between 2011 and 2014. The weir was reconstructed, and two new bulb units were installed. After the visit, the group will continue to Bern, Switzerland's capital city, for dinner and an overnight stay.

#### Day Two - Friday 14 October

In the morning there will be time for a short tour of the beautiful medieval city of Bern, before the final technical visit, to the Ruppoldingen powerplant. This 23 MW run-of-river plant is equipped with two Kaplan units, which are among the largest of their type in Switzerland.

An upgrade scheme which began in 2000 introduced a number of environmental enhancements to the scheme, including landscaping and the creation of wetlands along the river Aare. In 2010 the Swiss Association for Environmentally Sound Energy awarded Ruppoldingen the 'Naturemade' Star Certificate.

Lunch will be taken in Aarburg, and the group will then travel on to Zurich, where the tour will end on Friday evening.

## TOUR D (1 day)

### Mhylab laboratory; visit to a local small hydro plant

#### Thursday 13 October

After breakfast, the group will travel by coach for about 1.5 hours to Montcherand, north of Lausanne, for a tour of the Mhylab laboratory. The laboratory is dedicated exclusively to R&D for small hydro machinery, and develops tailor-made solutions for turbine manufacturers, suppliers, engineering companies, utilities and public communities.

After a briefing and tour of the laboratory, a light lunch will be served. The group will then proceed to the HautePierre small hydro plant, installed within a drinking water system, and then on to see the Forestay small hydro plant at Rivaz, within a UNESCO World Heritage site; there will be briefings and tours at each plant. The group will return to Montreux by around 17.30 hrs.



# EXHIBITION PLAN

10 to 12 October 2016 ~ Montreux, Switzerland



- The Technical Exhibition will be an important part of HYDRO 2016, bringing together experts from the manufacturing industry, consultants, developers and professional associations.
- All lunch and refreshments will be served in the Exhibition Halls. Delegates are encouraged to move around the whole exhibition area over the three days, to have a comprehensive overview of the exhibits on display, and to make new contacts among the international hydropower community.
- A Networking Party will take place in the Exhibition Halls after the conference sessions on Tuesday afternoon. The Exhibition Hall therefore will have extended opening hours on Tuesday.

## Technical Exhibition Pricing:

3 x 2 m (6 m<sup>2</sup>) = € 3085

3 x 3 m (9 m<sup>2</sup>) = € 4625

RESERVED



Height Max: 2.5 m   
 Catering   
 Business Lounge   
 Internet stations   
 Pillar

# HYDRO 2016 TECHNICAL EXHIBITION STANDS BOOKED BY SEPTEMBER

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# BOOKING CONDITIONS

The Conference HYDRO 2016 - Achievements, Opportunities and Challenges, is being organized by The International Journal on Hydropower & Dams with ASK Event Management Ltd.

## On-line Registration

You can register on-line via the Hydropower & Dams website at: [www.hydropower-dams.com](http://www.hydropower-dams.com). This is a secure site. Registrations will be handled by ASK Event Management on behalf of Aqua~Media. You will receive an acknowledgement of registration on completion of this process; however, this is not a confirmation (until payment is received). This year we encourage all delegates to register on line, using the newly upgraded system which provides more information during the registration process. In the unlikely event of any difficulties using this system, please contact ASK Event Management (see contact details below).

## Picking up conference documents and badges

The desk will be open from 09.00 hrs on Sunday 9 October 2016, at the 2m2c Convention Centre. Pre-registration is generally required, by one of the methods mentioned above.

## Payment

Payment for all services (fees, hotels, tours) must be made in Euros (€) and received in advance of the Conference. Payment is possible by the following methods:

- On-line by Visa or Mastercard
- Banker's draft to ASK Event Management (see details on the registration form);

All fees paid by credit card will be charged in Euros (€).

## Accommodation

The Conference organizers have negotiated rates at a wide range of hotels in various price categories in Montreux. Accommodation bookings are being handled by ASK Event Management. Please include your hotel booking at the time of registering (either on-line, or using the Registration Form in the brochure). **Beware of scam accommodation bureaux who are operating this year, falsely claiming to represent HYDRO 2016! We recommend that you do not pass credit card details to them.** We anticipate a high demand for HYDRO 2016 accommodation, and strongly recommend that bookings are made as soon as possible, and at the latest before the end of September. Payment must be made in full at the time of booking.

## Disclaimer

All best endeavours will be made to present the programme as printed. The HYDRO 2016 organizers and their agents reserve the right to alter or cancel, without prior notice, any arrangements, timetable, plans or other items relating directly or indirectly to HYDRO 2016 for any cause beyond its reasonable control. The organizers and agents are not liable for any loss or inconvenience resulting from such alteration. The Conference and Tours are subject to minimum numbers. Tour places are subject to availability on a first-come-first-served basis. Full payment for tours must be received at the time of registration.

## Cancellations

Cancellations must be made in writing to ASK Event Management. Cancellation charges will be payable as shown in the Table below. Substitution of delegates after a reservation has been made is acceptable before the Conference, and no extra fee is payable. Any necessary refunds (see Table below) will be made after the Conference.

## Liability/Insurance

The registration fees do not include the insurance of participants against personal accidents, sickness, cancellations by any party, theft, loss or damage to personal possessions. The organizers accept no responsibility for death, injury, loss or accident, delays arising from any act or default of any person, or any other matter arising in connection with Conference services or transport. The organizers make no warranty in this connection.

All services provided are subject to local laws. Arrangements for the Conference have been made in accordance with UK and Swiss Law.

Delegates, exhibitors and tour participants are strongly advised to take out adequate personal insurance to cover risks associated with travel, accommodation, cancellation and theft or damage to personal belongings.

The organizers reserve the right to amend any part of the Conference programme or arrangements, if necessary. In the very unlikely event that it is necessary to cancel any of the Conference arrangements, an appropriate refund will be made and thereafter the liability of the organizers will cease.

The organizers reserve the right not to accept applications for attendance (for example, but not exclusively, if applicants are not working in the field of hydro, or if there could be a conflict of interest with the mission of the conference, the organizers, or any policy of the host country).

## Passport and Visa Requirements for Switzerland

Switzerland is not a member of the European Union, but is a signatory to the Schengen Agreement. It is the responsibility of all participants to check their own passport and visa requirements. Please contact the Swiss embassy or consulate in your country if in doubt about requirements, or visit: <https://www.ch.ch/en/entry-stay-switzerland/> In some cases, letters of invitation from Aqua~Media in the UK and one of our partner organizations in Switzerland may be necessary, as well as special clearance from the relevant authorities.

The process could take several weeks, so we strongly urge participants requiring visas to start the application process in good time.

## Applying for a letter of invitation

If you require a letter of invitation to facilitate your visa application, please let us know at the time of registering. Please note that letters to assist with obtaining visas can only be provided to registered or invited participants, and these letters do not imply an invitation to the Conference without payment of registration fees. If you need a letter from the host country, as well as the organizers, please notify us as soon as possible and supply your full name, date of birth, passport details, and proposed dates of arrival and departure.

**As soon as a registration is confirmed, a number of expenses are incurred by the organizers; therefore the following cancellation conditions apply:**

Date cancellation received	On or before 19 August 2016	From 20 August to 18 September 2016	On or after 19 September 2016
Registration for the Conference	10% of fee will be forfeited	50% of fee will be forfeited	No refund
Technical Excursions (Study Tours)	10% of fee will be forfeited	No refund unless place can be resold	No refund
Accommodation	10% of fee will be forfeited	No refund unless place can be resold	No refund

NB: Separate booking conditions apply to Exhibition Stands, and these will be notified direct to Exhibitors by our Sales & Marketing Department.

**A reduced registration fee is available for current subscribers to *Hydropower & Dams*.  
See registration form for details.**

## CONTACT DETAILS

For enquiries concerning registration and accommodation, contact:

### ASK Event Management Ltd

Abigail Stevens, Co-Director • [abigail@askeventmanagement.com](mailto:abigail@askeventmanagement.com)  
Keta Hunt, Co-Director • [keta@askeventmanagement.com](mailto:keta@askeventmanagement.com)

Tel: +44 (0)1725 519287

On-line registration via: [www.hydropower-dams.com](http://www.hydropower-dams.com)

For further details of the programme, please contact: Mrs Margaret Bourke at: Hydropower & Dams, PO Box 285, Wallington, Surrey SM6 6AN, UK.

Tel: + 44 (0)20 8773 7244 • Fax: + 44 (0)20 8773 7255 • Email: [hydro2016@hydropower-dams.com](mailto:hydro2016@hydropower-dams.com)

Website: [www.hydropower-dams.com](http://www.hydropower-dams.com)

# BOOKING INFORMATION

The online HYDRO 2016 registration is now open and bookings can be made via [www.hydropower-dam.com](http://www.hydropower-dam.com). The on-line system has been fully upgraded this year, to present more information. The system is simple to use, but in the event of any difficulties, please contact ASK Event Management. Email: [hydro2016@askeventmanagement.com](mailto:hydro2016@askeventmanagement.com) ~ Tel: +44 (0) 7931 613482/3

Prices for each delegate category and conference activity are given below.

<b>FULL DELEGATE FEE:</b> Includes attendance of the Conference and Exhibition; documentation; conference papers on a USB stick; morning and afternoon refreshments; lunches during the Conference; full social programme.	€1065 (until 19 Aug) €1170 (from 20 Aug)
<b>REDUCED DELEGATE FEE:</b> For existing subscribers to <i>Hydropower &amp; Dams</i> .	€1005 (until 19 Aug) €1170 (from 20 Aug)
<b>FEE INCLUDING NEW SUBSCRIPTION TO H&amp;D:</b> (6 issues from No. 5, 2016 + Atlas + Maps) (This represents a saving of more than 40 per cent on the normal H&D subscription rate).	€1165 (until 19 Aug) €1330 (from 20 Aug)
<b>SPEAKER FEE:</b> Includes all facilities described above for Full Delegates, plus an additional reception on Sunday 9 October. NB: This fee applies to <u>one</u> person per paper (main author or presenter).	€610
<b>FIRST EXHIBITOR FEE:</b> (One full participant fee is included with exhibition booking).	€0
<b>SECOND + THIRD EXHIBITOR FEE:</b> (Fee per person for up to two additional exhibitors). (Covers attendance of Conference, Conference papers on USB stick, refreshments, lunches and evening social programme).	€735
<b>SMALL HYDRO TRAINING SEMINAR</b> (Full day on Sunday 9 October - Design a small plant in one day).	€50



**ACCOMPANYING PERSON FEE:** (For family members, partners or friends not colleagues attending the Conference or Exhibition). The fee includes the excursions each day, with lunch, and the evening social events.  
The cost for registering as an accompanying person is €540.

**HALF DAY EXCURSION:** The details of this are presented on a previous page.  
The cost for joining the tour including lunch, is €150 per person.

#### **OPTIONAL DONATION TO THE AMI HYDROPOWER FOUNDATION:**

As in past years, there will be opportunity when registering online to make a donation to the AMI Hydropower Foundation. This is a charitable foundation, set up by Aqua-Media and governed by a board of international trustees. It exists to facilitate the participation of delegates from the less developed countries at the annual Hydro Conferences.

#### **TRANSFERS FROM GENEVA AIRPORT:**

Some coaches have been organized to transfer delegates from Geneva airport, at peak times (see on-line system for times) during the two days prior to the conference. Seats can be reserved via the online system at a cost of €40. (Information is also available about train services from Geneva; the station is adjacent to the airport).

**EPFL LABORATORY VISITS ON TUESDAY AFTERNOON:** Visit to either LMH (Hydraulic Machinery) or LCH (Hydraulic Constructions) €80 per person.

**TECHNICAL TOURS:** Prices include all transportation, meals, guides, entrance fees during sightseeing trips, and accommodation.

Tour A - 2 days: Nant de Drance pumped storage and Emosson dam; Martigny; Les Toules dam	€425 per person, single room; €385 per person sharing double room
Tour B - 3 days: FMHL pumped storage; Hongrin and Moiry dams; Martigny; Bieudron plant; Zermatt	€775 per person, single room; €725 per person sharing double room
Tour C - 2 days: Schiffenen arch dam; Hagneck and Ruppoldingen run-of-river schemes; visit to Bern	€465 per person, single room; €418 per person sharing double room
Tour D - 1 day: Mhyllab laboratory tour; and visit to a local small hydro plant	€70 per person

**DIETARY REQUIREMENTS:** These may be specified on the online registration system (including, for example, vegetarian, vegan, kosher, halal, gluten free, etc).

**VISA REQUIREMENTS:** This year, you will be able to apply for an invitation letter to support your visa application during the on-line registration process.



# HYDRO 2016 HOTELS



The following hotel rooms have been reserved for delegates. As well as the listed range of categories, from 3\* to luxury 5\*, student accommodation can also be arranged on request. Within Montreux, the selected hotels are all within easy walking distance of the 2m2c congress centre. For others nearby, free public transport can be used. Hotel rooms are also available in nearby Vevey, and other villages, which are just a few minutes away by tram or bus (Montreux Riviera Cards will be provided for free travel on this journey).

## Royal Plaza, 5\*

**Montreux, 0.2 km from 2m2c**  
7 Av. Claude Nobs, 1820 Montreux  
www.royalplaza.ch  
Single Occupancy - €228.00  
Double Occupancy - €248.00

## Villa Toscane, 4\*

**Montreux, 0.2 km from 2m2c**  
Rue du Lac 2-8, 1820 Montreux  
www.villatoscane.ch  
Single Occupancy - €170.00  
Double Occupancy - €200.00

## Astra Hotel, 4\*

**Vevey, 6 km from 2m2c**  
Place de la Gare 4, 1800 Vevey  
www.astra-hotel.ch  
Single occupancy - €200.00  
Double occupancy - €232.00

## Grand Hôtel Suisse Majestic, 4\*

**Montreux, 0.6 km from 2m2c**  
Avenue des Alpes 45, 1820 Montreux  
www.suisse-majestic.com  
Single occupancy - €208.00  
Double occupancy - €238.00

## Hotel Eden Palace au Lac, 4\*

**Montreux, 1.2 km from 2m2c**  
Rue du Théâtre 11, 1820 Montreux  
www.edenpalace.ch  
Single occupancy - €168.00  
Double occupancy - €184.00

## Eurotel, 4\*

**Montreux, 0.35 km from 2m2c**  
Grand' Rue 81, 1820 Montreux  
www.eurotel-montreux.ch  
Single occupancy - €228.00  
Double occupancy - €250.00

## Golf Hôtel René Capt, 4\*

**Montreux, 1.9 km from 2m2c**  
Rue du Bon Port 35, 1820 Montreux  
www.golf-hotel-montreux.ch  
Single occupancy - €164.00  
Double occupancy - €184.00

## Hotel Du Grand Lac Excelsior, 4\*

**Montreux, 1.8 km from 2m2c**  
Rue de Bon-Port 27, 1820 Montreux  
www.hotelexcelsiormontreux.com  
Single occupancy - €164.00  
Double occupancy - €184.00

## Hotel Helvetie, 3\* Superior

**Montreux, 1.3 km from 2m2c**  
Avenue du Casino 32, 1820 Montreux  
www.helvetie.ch  
Single occupancy - €128.00  
Double occupancy - €155.00

## Hotel Tralala, 3\*

**Montreux Old Town, 1.3 km from 2m2c**  
Rue du Temple 2, 1820 Montreux  
www.tralalahotel.ch  
Single occupancy - €126.00  
Double occupancy - €194.00

## Hostellerie Bon Rivage, 3\*

**La Tour-de-Peilz, 4.2 km from 2m2c**  
Route de Saint-Maurice 18,  
1814 La Tour-de-Peilz,  
www.bon-rivage.ch  
Single Occupancy - €136.00  
Double Occupancy - €176.00

## Hotel Bon Port, 3\*

**Montreux, 1.5 km from 2m2c**  
Rue du Théâtre 4, 1820 Montreux  
www.hotelbonport.ch  
Single occupancy - €130.00  
Double occupancy - €160.00

## Hotel de Chailly, 3\*

**Chailly, 2.4 km from 2m2c**  
Route des Châtaigniers 1, 1816 Montreux  
www.hdc.ch  
Single occupancy - €140.00  
Double occupancy - €158.00

## Hôtel de la Vieille Tour, 3\*

**La Tour-de-Peilz, 4.5 km from 2m2c**  
Grand-Rue 43, 1814 La Tour-de-Peilz  
www.vieilletour.ch  
Single occupancy - €124.00  
Double occupancy - €172.00

## Hotel du Port, 3\*

**Villeneuve, 5.8 km from 2m2c**  
Rue du Quai 6, 1844 Villeneuve  
www.duport.ch  
Single occupancy - €130.00  
Double occupancy - €165.00

## Hotel Splendid, 3\*

**Montreux, 0.7 km from 2m2c**  
Grand' Rue 52, 1820 Montreux  
www.hotel-splendid.ch  
Single Occupancy - €148.00  
Double Occupancy - €194.00

