The pace of hydropower development worldwide is continuing to accelerate; recent progress has been substantial, and prospects are promising for the coming years. Hence, the theme of HYDRO 2014: Building on Recent Development Progress. The event will bring together planners, developers, owners, financiers, consultants and suppliers to discuss planned developments, the remaining challenges ahead, innovations in technology and the need to sustain momentum in hydropower implementation.

PROGRAMME AND REGISTRATION DETAILS
THE AQUA-MEDIA HYDRO EVENTS

The annual events organized by Hydropower & Dams have become the world’s most important gatherings held in Europe for the hydropower profession. HYDRO 2013, which took place in Innsbruck, Austria, last year, was the largest and most international event for the hydro profession in 2013, with more than 1450 participants representing 85 countries.

The main emphasis each year is on encouraging the advancement of carefully planned hydropower plants in the less developed countries of Africa and Asia, where there is vast unexploited potential, and the greatest need for new capacity.

The Technical Exhibitions provide a platform for powerplant owners, consultants and manufacturers to showcase the state-of-the-art of hydropower technology, research and consultancy services. The events are supported by authorities in the host country, and by the major international and national energy and water-related professional associations, such as ICOLD, IEA, ICID, IWRA, ESHA and BHA, as well as the World Bank, African Development Bank, European Investment Bank, the Asian Development Bank and others.

Past events in this series have taken place in:
- Budapest, Hungary (1994); Barcelona, Spain (1995); Lausanne, Switzerland (1996); Portoroz, Slovenia (1997); Aix en Provence, France (1998); Gmunden, Austria (1999); Bern, Switzerland (2000); Riva del Garda, Italy (2001); Kiris, Turkey (2002); Dubrovnik, Croatia (2003); Porto, Portugal (2004); Villach, Austria (2005); Porto Carras, Greece (2006); Granada, Spain (2007); Ljubljana, Slovenia (2008); Lyon, France (2009); Lisbon, Portugal (2010); Prague, Czech Republic (2011); Bilbao, Spain (2012) and Innsbruck, Austria (2013).

HYDRO 2014 MISSION

Policy makers are today taking a much more positive and balanced view of the role and benefits of hydropower. The IEA predicts a doubling of hydropower capacity and production by 2030, and current trends indicate that this is achievable. Vast regional projects (such as Inga) are taking off in Africa, and large-scale schemes continue in Asia. HYDRO 2014 will build on the tremendous progress which has been made in the planning and implementation of large and small hydro schemes, pumped-storage projects, and marine energy systems over the past few years.

INTERNATIONAL EXCHANGE OF EXPERIENCE

We look forward to welcoming delegates from about 90 countries, as well as high level representatives of the financial community, and officers of the water- and energy-related professional associations, all of whom will play an active role in discussions.

As in previous years, leading countries of the world for hydro development, such as China, India, Bhutan, Russia, Iran, Vietnam, Malaysia, Brazil, Canada, Ethiopia and many others, will be well represented, and will share their experience with others embarking on new development programmes.

All those active in advancing world hydropower (large or small), through research, planning, project financing, design and construction, operation and maintenance, upgrading and refurbishment should plan to attend.

THE VENUE

The Hydropower & Dams team is delighted to be bringing HYDRO 2014 to a unique venue, beside Lake Como, in the northern Italian province of Lombardy. On the border with Switzerland, and just 40 km (about 30 minutes by road) from the two international airports of Milan (Malpensa and Linate), the Como/Cernobbio region will be easily accessible for delegates from all parts of the world.

Celebrated since ancient times for its splendid natural location, Lake Como is considered to be the most dramatic and picturesque of the three Italian great lakes. Shaped like an inverted ‘Y’, the lake has three branches, of which the Ramo di Como (western branch) is the most scenic, the shores being studded with villas, gardens and small harbours and villages.

Cernobbio is a small commune in the province of Como, on the western side of the lake. One of the region’s splendid villas, built in the 19th century, is Villa Erba, which has today been transformed, with the addition of a new wing, into a modern congress centre. This is where the HYDRO 2014 Conference and Exhibition will take place.

Villa Erba has been owned in the past by the world-famous Italian film director, Luchino Visconti, and the villa and grounds have provided the setting for several films. Besides the traditional villa (Villa Antica), where some small meetings and the speakers’ and chairmen’s reception will take place, the main Conference and Exhibition centre has a modern design, influenced by the antique greenhouses which were built alongside the villas.

It is a single-storey building, enabling all meetings and the exhibition to take place in adjacent areas.
## HYDRO 2014 OVERVIEW

<table>
<thead>
<tr>
<th>Sunday 12 October</th>
<th>Monday 13 October</th>
<th>Tuesday 14 October</th>
<th>Wednesday 15 October</th>
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<tr>
<td><strong>From 09.00 hrs:</strong>&lt;br&gt;Conference Registration and Exhibition Set-up**&lt;br&gt;(access to stands from 09.00 hrs)**</td>
<td>08.30 hrs:&lt;br&gt;<strong>Opening Plenary Session:</strong>&lt;br&gt;Welcome addresses&lt;br&gt;Keynote addresses</td>
<td>08.30 hrs:&lt;br&gt;<strong>Parallel Sessions:</strong>&lt;br&gt;11 - Social aspects&lt;br&gt;12 - Maximizing the benefits of hydro&lt;br&gt;13a - Pumped storage - case studies&lt;br&gt;14 - Small hydro - I</td>
<td>08.30 hrs:&lt;br&gt;<strong>Parallel Sessions:</strong>&lt;br&gt;24 - Sedimentation management&lt;br&gt;25 - Electrical engineering&lt;br&gt;26 - Operation and maintenance&lt;br&gt;27 - Hydrology and flood management</td>
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<td><strong>11.30 hrs:</strong>&lt;br&gt;Excursion departs&lt;br&gt;Cruise on Lake Como&lt;br&gt;with lunch in Bellagio</td>
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<td><strong>19.00 hrs:</strong>&lt;br&gt;Chairmen’s Meeting&lt;br&gt;followed by&lt;br&gt;19.45 hrs:&lt;br&gt;Speakers’ Briefing&lt;br&gt;Villa Erba Congress Centre</td>
<td><strong>Parallel Sessions:</strong>&lt;br&gt;1 - Policies, Developments, Priorities - Africa&lt;br&gt;2 - Structuring of projects in developing countries&lt;br&gt;3 - Civil works: Materials and design&lt;br&gt;4 - Hydraulic machinery - I&lt;br&gt;Lunch</td>
<td><strong>Parallel Sessions:</strong>&lt;br&gt;13b - Pumped storage - Integration with RE&lt;br&gt;15 - Environmental aspects&lt;br&gt;16 - Challenging sites and tunnels&lt;br&gt;17 - Small hydro - II&lt;br&gt;<strong>Coffee</strong>&lt;br&gt;<strong>Parallel Sessions:</strong>&lt;br&gt;6 - Perception and management of risk (contd)&lt;br&gt;8 - Hydraulic machinery - II (contd)&lt;br&gt;9 - Policies, Developments, Priorities - Asia&lt;br&gt;10 - Flood discharge works&lt;br&gt;20.00 hrs: Welcome Reception&lt;br&gt;Villa Gastel&lt;br&gt;<strong>Coffee</strong>&lt;br&gt;<strong>Parallel Sessions:</strong>&lt;br&gt;13d - Pumped storage - Equipment&lt;br&gt;21 - Hydro expertise: legacy for the next generation&lt;br&gt;22 - Project implementation - contractual aspects&lt;br&gt;23 - IEA Workshop: Rehabilitation&lt;br&gt;17.30 hrs: Networking party&lt;br&gt;Refreshments in the Exhibition Halls&lt;br&gt;(Evening free for private parties)&lt;br&gt;<strong>Coffee</strong>&lt;br&gt;<strong>Closing Plenary Session:</strong>&lt;br&gt;Summary and outcomes&lt;br&gt;Welcome to AFRIA 2015 and HYDRO 2015&lt;br&gt;20.00 hrs: Conference Dinner&lt;br&gt;Villa Erba</td>
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<td><strong>20.15 hrs:</strong>&lt;br&gt;Speakers’ and Chairmen’s Reception&lt;br&gt;Villa Antica (within the grounds of Villa Erba)</td>
<td><strong>Parallel Sessions:</strong>&lt;br&gt;5 - Policies, Developments, Priorities - Europe&lt;br&gt;6 - Perception and management of risk&lt;br&gt;7 - Civil Works: Monitoring and rehabilitation&lt;br&gt;8 - Hydraulic machinery - II&lt;br&gt;Lunch</td>
<td><strong>Parallel Sessions:</strong>&lt;br&gt;13c - Pumped storage - Panel&lt;br&gt;18 - IEA Workshop: Hydropower and fish&lt;br&gt;19 - Dam safety&lt;br&gt;20 - Hydro plant rehabilitation</td>
<td><strong>Parallel Sessions:</strong>&lt;br&gt;24 - Sedimentation management (contd)&lt;br&gt;26 - Operation and maintenance (contd)&lt;br&gt;28 - Hydro plant rehabilitation&lt;br&gt;29 - Penstocks - ensuring safety&lt;br&gt;<strong>Lunch</strong>&lt;br&gt;<strong>Parallel Sessions:</strong>&lt;br&gt;30 - Hydro and cultural heritage&lt;br&gt;31 - Design and safety of hydraulic gates&lt;br&gt;32 - IEA Workshop: Valuing hydropower services&lt;br&gt;33 - Turbine flow measurement&lt;br&gt;<strong>Coffee</strong>&lt;br&gt;<strong>Closing Plenary Session:</strong>&lt;br&gt;Summary and outcomes&lt;br&gt;Welcome to AFRIA 2015 and HYDRO 2015&lt;br&gt;20.00 hrs: Conference Dinner&lt;br&gt;Villa Erba</td>
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### AMI HYDROPOWER FOUNDATION

The AMI Hydropower Foundation (to which a portion of revenue from each annual conference is transferred) was created to assist the participation of delegates from the less developed countries. This is an independent charitable foundation, governed by a board of international trustees. If you or your company would like to co-sponsor participants from one of the less developed countries, you can find more details about the Foundation on our website: [www.hydropower-dams.com](http://www.hydropower-dams.com)

Those wishing to apply for financial assistance to attend, should download the application details from the website, and submit the application at least 8 weeks before the start of the event, to ensure adequate time for processing of the application by the Trustees.

### HYDRO 2014 INDUSTRY SPONSORS

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PRE-CONFERENCE EXCURSION

A half-day trip, cruising on Lake Como, will be offered for all participants on Sunday 12 October, the day preceding the conference. This is intended to be an orientation trip, giving HYDRO 2014 delegates a first taste of the spectacular landscape around the Lake.

There will be time to register for the conference before the trip departs at around 11.30. During the cruise, there will be a chance to view the most beautiful and important villas around the lake, including those belonging to well known celebrities (George Clooney, Richard Branson, etc).

A highlight of the day will be a visit to the picturesque lakeside village of Bellagio. The village is located at the intersection of the ‘branches’ of the Y-shaped lake, which means there are spectacular views in all directions. It is known as the ‘pearl of the lake’. Lunch will be served in Bellagio, and there will be time for sightseeing and shopping, before the return to Cernobbio (by around 16.30 hrs).

The trip will depart from, and return to, the Villa Erba Congress Centre.

Places for this excursion should be booked at the time of registration, so that the organizers can assess numbers accurately in advance of the Conference.

SOCIAL PROGRAMME

Chairmen and speakers are invited to a Reception following their briefing meeting on the evening of 12 October, at Villa Antica (adjacent to Villa Erba).

The welcome reception will take place on the evening of 13 October, at the elegant Villa Gastel, beside Lake Como. A buffet supper will be served.

An informal networking reception will be arranged in the exhibition halls, after the sessions on 14 October. Refreshments will be served up to 19.00 hrs, after which the evening will be free for private parties, or to explore the region and have dinner by the lake.

On 15 October, the Farewell Gala Dinner, with a variety of musical entertainment, will provide a memorable end to HYDRO 2014. It will take place at Villa Erba.

ACCOMMODATION

A wide range of accommodation has been reserved for delegates in the Lake Como region, in 4* and 3* categories, with prices to suit a wide range of budgets.

Many hotels offer views over the lake.

Three hotels are available in the village of Cernobbio, within walking distance of the Villa Erba Congress Centre. For other HYDRO 2014 hotels, in Como, between Como and Cernobbio, or in nearby Maltrasi (booked via our registration system), a shuttle bus to and from the conference will be provided each day.

Details of the prices and locations are given on the registration form, and fuller descriptions of the various hotels are available with the on-line registration form available via our website.

We recommend booking early, to ensure that you can obtain your first choice of hotel.
Monday 13 October ~ Morning

Opening plenary session

Welcome and introduction to the themes of HYDRO 2014: Alison Bartle, Aqua-Media International Ltd, UK
- Welcome addresses on behalf of ENEL, ITFOLD, and others
- Opening addresses by officers of the principal supporting organizations
- Keynote addresses on behalf of World Bank and others
- Musical interlude

Session 1: Policies, developments and priorities - Africa
Co-Chairs: Adam Nombre, President, ICOLD; Azeb Asnake, EEPCo, Ethiopia
- Update on hydropower development and plans in Ethiopia – A. Asnake, EEPCo, Ethiopia
- Studies performed for development of the North bank power station project – D. Chirinda, J.R. Motafo, A. Mahajna and I. Tembe, Hidroelektrica de Cahora Bassa S.A., Mozambique
- (Additional contributions to be announced, reviewing progress with hydropower development programmes in various African countries)

Session 2: The structuring of hydropower projects in developing countries
Chairman: C.R. Head, Consultant, UK
- Joint public and private investments in hydropower projects - Peruvian experience – B. Zdravkovic, Sinesa, Peru
- Financing of hydropower projects in India - Challenges and innovation in financing – V. Jeyakumar, Power Finance Corporation, India
- Developing large scale hydro through public private partnerships – S. Joshi, G. Davies, Investment Board of Nepal
- Achieving a national and local consensus on hydropower breaking decades of deadlock: a case study of Nepal – S. Tamot, and G. Davies, Investment Board of Nepal

Panel discussion:
Most of the world’s untapped hydro resources are located in developing countries where public funds are strictly limited and private investors are hesitant. The panelists will examine alternative financing and ownership models, to see how the public and private sectors can best combine their resources to develop hydropower projects successfully in such situations.

Session 3: Civil works - Materials and design
Chairman: Dr Malcolm Dunstan, Malcolm Dunstan & Associates, UK
- KEYNOTE: World developments in RCC dams – Dr M.R.H. Dunstan, MD&A, UK
- Design of RCC mixed head concrete in fine inorganic filler – F. Surrio, and F. Longhi, Magip SpA, Italy; P. Bianciardi, Sini Impregilo SpA, Italy
- An assessment of the effectiveness of artificial fill under the plinth of a concrete faced sand-gravel dam – M. Uyel and M. Erizık, Energisa Enerji Uretim AS, Turkey
- Physical and numerical modelling of Cerro Del Aguila dam – S.M. Sayah, Lombardi Engineering Ltd, Switzerland; S. Bonanni, Astaldi SpA, Italy; A. Amini, e dric, Switzerland; M. Volpato, Protecno Srl, Italy
- Non-linear structural analysis in the early design process of an arch dam – F. Rueda, Esteyco, Spain; A.M. Gill and M.A. Fernández, IDOM, Spain

Session 4: Hydraulic machinery – Part I
Chairman: Prof Hermod Brekke, Emeritus Professor, NTNU, Norway
- Design of Pelton turbines with a brief comparison of Francis turbines – H. Brekke, Prof. Emeritus, NTNU, Norway
- Semi-homologous model tests for uprating water turbines – A. Skoták, L. Motyčák, and J. Obrovský, CKD Blansko Engineering a.s., Czech Republic
- Experience in optimization design of turbine water passages shapes – I.M. Pulyv, V.Š. Riegli, V. Jin, and A.V. Semenova, LMZ, OICE Power Machines, Russia
- V.A. Skorospelov, D.V. Chirkov, and A. Astrakova, Russian Academy of Sciences, Russia
- Turbine runner replacement projects for wide head ranges – I. Ochiali and K. Hiroto, J. Power, Japan; H. Kawagüri, Toshiba Corporation Power System Company, Japan
- ODF methods for prediction of the characteristics of hydraulic turbines – A. Pospol, CKD Blansko, Czech Rep; A. Zharkovsky, St. Petersburg State Polytechnic University, Russia

Monday 13 October ~ Afternoon

Session 5: Policies, developments and priorities - Europe
Chairman: José Freitas, EDP, Portugal
- KEYNOTE: Hydropower’s role in a regional perspective – Bvind Johansen, Ministry of Petroleum and Energy, Norway
- Most future investments for European hydropower may be offshore – E Lemprière, Hydro Co-op, France
- An economic approach in sharing water resources: Durance valley example – I. Raïf and D. Roux, EDF, France
- Case study at five hydro plants – G. Prinsensticker, V. Cavedon and D. Thainier, SEL Plc., Italy
- (Additional contributions to be announced)

Session 6: The perception and management of risk
Co-Chairs: Dr Judith Plummer, University of Cambridge, UK; Peter J. Rao, Independent Consultant, Canada
- The allocation and documentation of hydrological risk – A. Blomfield, King and Spalding, UK; J. Plummer, University of Cambridge, UK
- Geotechnical risk – looking at geotechnical risk registers and optimal design for risk reduction – M. McWilliams, Matt MacDonald, UK
- Social and environmental risk – S. Sparkes, Tankstafs A.S., Norway
- Climate resilient hydropower infrastructure – J. Dumhan, C. Foley and P.C. Lumb, Matt MacDonald, UK
- Probability approaches to risk management – P. Rao, Independent Consultant, Canada
- Three initial risk management steps to estimate potential time delay and cost increase in hydropower construction – C. Oxan and K. Hänisch, Fichtner GmbH & Co. KG, Germany
- Risk management tools: the identification, quantification, mitigation and allocation of project risks – K.I. Canedo and S. Larson, Aqua Energie LLC, USA

Session 7: Civil works - monitoring and rehabilitation
Chairman: Dr Andy Hughes, Atkins, UK
- First steps for an automatic data acquisition and analysis system at Cahora Bassa dam – E.F. Corvalho and B.T. Matsuhi, Hidroelecctrica Cahora Bassa, Mozambique
- 223 dams to be rehabilitated in India: which organization? – S. Giraud, EGIS-Eau, France
- Underwater repair of three failing joints with an external geomembrane waterstop at Olai gravity dam in Italy – D. Deidda, Abbnanoa, Italy; S. Sinu, Studio di Ingegneria Sinu, Italy; A. Savero and G. Vascetti, Carpeh, Switzerland
- Rehabilitation of the Eables dam – G. Dutout, Tractebel Engineering S.A., France
- Replacing protective coating systems which contain asbestos as a component – M. Pachec, EDP Gestão da Produção de Energia, Portugal

Session 8: Hydraulic machinery – Part II
Chairman: John Gunner, Hydro-Consult Pty Ltd, Australia
- Local penstock resonance resulting from turbine operation – J.H. Gunner, Hydro-Consult Pty Ltd, Australia; P. Gautam, Genesis Energy, New Zealand; J. Pott, Hydropower Engineering, New Zealand
- Living with partiration – A. Wedmark, Rainpower Norway AS, Norway
- Innovations in Francis turbines upgrade design to fit new grid requirements – D. Robert, J. Virenne, M. Bouschon, Y. Straub and G. Billoette, Alstom, France
- Cost of operation of Francis runners – A. Coutu and J. Chamberlain-Louzou, Andritz Hydro Ltee, Canada
- Design of all free Kaplan runners – E. Wurm and A. Rammler, Andritz Hydro GmbH, Austria; H. Lindöy, Andritz Hydro AB, Sweden; M. Lapanen, Andritz Hydro Oy, Finland
- The hooped Pelton runner: from innovative design to mature technology – G. Billoette, P.Y. Lowys and J. Virenne, Alstom Hydro, France; N. Baket, Alstom Hydro, India; P. Claverolé, EDF, France
- Alstom study shows PEAK coated bearing pads reduce power losses by up to 30 percent – P. Pajączowski and A. Schulberg, Alstom, Switzerland
- Lubrication of Kaplan runners – J. Moe, Consultant, Norway
- Numerical investigation of low frequency pressure pulsations in hydraulic turbines for high head power development – D.A. Doktery, A.V. Minakov, D.V. Platonov and A.V. Sentjabov, Siberian Federal University, Russia
- Tidal and wave power engineering with use of caisson method of construction and new orthogonal turbines – Y.B. Shpolyanskiy, B.L. Istorik, V.Y. Sobolev and I.N. Usachev, JSC Nizh, Russia
Session 9: Policies, developments and priorities - Asia
Chairman: Dr Kamal Lakshmi, Ceylon Electricity Board, Sri Lanka
- KEYNOTE: Natural disaster preparedness for hydropower projects in high mountain environments — Prof. J. Reynolds, Reynolds International Ltd, UK
- Hydropower development in Nepal - A review focused to prioritize the appropriate scale of generation — R.P. Singh and H.P. Nischmke, University of Natural Resources and Applied Life Sciences, Austria
- Challenges and achievements in China’s hydropower development — Yuanye Xing, Ministry of Water Resources, China
- Future prospects and opportunities for the development of hydropower in India — T. Sharma, Council of Power Utilities, India
- (Additional contributions to be announced)

Session 10: Flood discharge works
Chairman: F. Lempièriére, Hydro Coop, France
- 1:40 large scale model study of the 120 m-high stepped spillway design for Murum hydroelectric project in Sarawak, Malaysia — J. Wong Kwei Ji, Thian Kah Khiun and Ngu Sang Hing, Sarawak Energy Berhad, Malaysia
- Getting an existing spillway to enhance powerplant profitability — C. Andrade and C. Palminti, AF-Consult Switzerland Ltd, Switzerland
- Aeration chamber in the spillway chute at Koldam: A case study — S. Das, J.L. Penda and V.K. Gupta, NTPC, India
- A challenging solution for Zarema May Day dam spillway design and model tests — M. Scarrella, SC Sembembeni Consulting, Italy; S. Pagliara, University of Pisa, Italy
- Model investigation of energy dissipation for low Froude number spillways in the lower Thjorsa river in Iceland — A. Gunnarsson and H. Johannisson, Landsvirkjun, Iceland; S.M. Gardarsson and G. Tomasson, University of Iceland

Tuesday 14 October – Morning

Session 11: Social aspects
Chair: Prof. María A. Gómez Balandra, IMTA, Mexico
- Benefit sharing an update — B. Trembath, Consultant, Australia; C. Cinatte, The World Bank, DFID, UK
- Developing and testing tools for improving communications and grievance processes to better coordinate hydropower development projects in Laos — M. Jones, Independent Consultant, Lao PDR; H. Srivithaya, and V. Lathavong, Village Focus International, Lao PDR
- Hydroelectric plant of Huuza in Peru — S. Bonanni, Astaldi SpA, Italy; G. Orsatti, Astaldi, Peru
- Critical view of free, prior and informed consent (FPIC) — S. Sparkes, Statkraft AS, Norway
- Determination of the acceptable risk to life by assessing the demographic effect from the construction of a hydropower project — R. Maliszderski, Hydropower Ltd, Ukraine

Session 12: Maximizing the benefits of hydropower
Co-Chairmen: Michel de Vivo, Secretary-General, ICOLD
A. Palmieri, Consultant, Italy
- KEYNOTE: The benefits and challenges of multipurpose storage — A. Palmieri, Consultant, Italy
- Multipurpose water uses of hydropower reservoirs: success stories as good examples — E. Briche, EDF France
- Regional development partnerships: opportunities and challenges for hydropower plants and other energy projects — R. Sousa, E. Verduzco Chavez, B. Contreras Rodriguez, H. Sergio, C. Rivera Aldebaran, P. Guajardo and C. Noi, Guadalajara University, Mexico
- (Additional contributions to be announced)

Session 13a: Pumped storage - Case studies
Co-Chairmen: Bruno Trouille, MWH, USA;
F. Baztán Moreno, GNF Engineering, Spain
- Seawater pumped hydrop plant with a variable speed reversible pump-turbine: a case study for the Italian Islands — J. Altecre, A. Danelli and M. Meghella, RSE SpA, Italy; A. Stoppato and G. Cavazzini, Padua University, Italy
- The Shumariwim variable speed type power station: reverse running pumped turbine using mass-produced inverters — H. Kimura, A. Tanaka and S. Yamato, Voith Fuji Hydro k.k., Japan
- Upper reservoir at the Kaniv PSP in Ukraine — I. Yudina and I. Makaruk, UKrHydroproject PSPC, Ukraine
- The Moment Sa pumped storage scheme: further pumped-storage development in Africa — C. Logan, Gibb Pty Ltd, South Africa
- Relais III pumped-storage plant: optimizing of hydraulic structures using fluid dynamics — E.J. Baztán Moreno and A.M. Thomas, Gas Natural Fenosa Engineering, Spain
- Feasibility of a pumped storage scheme development on a dormant tailings storage facility — S. J. van Eeden and M. Rust, Jones and Wagener, South Africa; E. Rust and S.W. Jacobsz, University of Pretoria, South Africa

Session 13b: Pumped storage - Integration of storage and renewable energy technologies
Co-Chairmen: Bruno Trouille, MWH, USA;
C. Nicolet, Power Vision Engineering sàrl, Switzerland
- Wind powered pumped storage in the Faroe Islands — B. Thomson, Earth and Energy Directorate, Faroe Islands
- Variable speed pumped storage with converter-fed synchronous machines (CFSM) - a high value in grids with large penetration of wind and solar generation — S. Aubert, S. Under, P.K. Steimer and C. Hilkberg, ABB Switzerland Ltd, Switzerland
- Assessment of hydrop unit grid code compliance by numerical simulations — C. Nicolet, Power Vision Engineering sàrl, Switzerland; B. Kawakabani, Electrical Machinery Group EPFL, Switzerland; J.L. Dromm and P. Grillot, EDF-CH, France
- The use of balanced scorecard methodologies in the management of hydropower projects - the case of Venda Nova III — M.A. Oliveira and T. Marques, EDProdução, Portugal
- The Obervermutwerk II pumped storage plant of Vorarlberger Illwerke AG: a tailor-made, customized, conception for a changing energy market — G. Gökller, Vorarlberger Illwerke, Austria
- The value of pumped storage in providing operating reserves in the Western United States — V. Korkhtarov, Argonne National Laboratory, USA; T. Goos, Energy Exemplar, USA; E. Ela, National Renewable Energy Laboratory, USA; B. Trouille, MWH, USA
- J. Fellers, Siemens Power Technologies International, USA; M. Reed and C. Clark, US Department of Energy, USA
- Pumped storage: a life saving solution for the Indian power system — R. Varma, NTPC Ltd, India; Y. Prasad, Former NHPC, India; R.P. Dahya and Sushil, Indian Institute of Technology, India

Session 14: Small hydro - Innovation in development and rehabilitation
Chairman: Marko Gospodinči, President, ESHA
- Promoting investment in small hydropower developments by mitigating against major development risks — D. Tulloch, Petroleum Corporation, Jamaica
- Five small hydropower plants in the Argentina catchment, Italy — E. Carcano, Soan srl, Switzerland
- Smart solutions for small hydropower with Archimedean screws: a panel of case studies — C. Anghileri, Enresa srl, Italy; G. Giudici, Politecnico di Milano, Italy; A. Solomon, Gess s.e.c., Czech Republic
- Steamturbine utilizing new hydropower potential — J. Lochschmidt, Vath Hydrop Holding GmbH & Co. KG, Germany
- Design and control of a new hydro test rig for small turbo machines — V. Hasmatuci, S. Gabatulhuler and C. Münch, HES-So Valais/Wallis Engineering School, Switzerland; E. Botero, EAFIT University, Colombia
- Restor hydro project - first outcomes from Italy: Rehabilitation of ancient mills and old industrial sites: bridge building between past and future — C. Boggiano Pico, assorinnovabilità, Italy
- Community finance and small hydropower cooperatives — M. Steinkusz, ESHA, Belgium

Session 15: Environmental aspects
Chairman: Prof Markus Aufleger, University of Innsbruck, Austria
- Reconstruction of the Jatiluhur powerhouse in Indonesia: new air circulation system to adapt to environmental impact — H. Idrus and A. Mardiyono, Jasa Tirta II Public Corporation, Indonesia
- Delimiting a flow through trial reguliation: the example of the Soldalskålen river in Norway — V. Petersen, Statkraft Energi AS, Norway
- Increasing the dissolved oxygen (DO) in water flowing through the Fridøa turbine — H. Oså, A. Peres, A. Ferreira da Silva and M. Ines Lacerda, EDP, Portugal
- Environment and power generation: Positive measures to be applied in powerplant design — A. Lugaresi and P. Chiodi, ELC Electroconsult S.p.A., Italy
**CONFERENCE SESSIONS**

**Session 16: Civil works - Challenging sites and tunnels**

**Chairman: Dr Yannis Thanopoulos, Consultant, Greece**

- Hydropower plant in Artic area in Greenland — K.M. Sugaarsson and R. Johannsson, Verkís, Iceland; G. Godmundsson, Istaq, Iceland
- The foundation of the Arkun powerhouse under challenging site conditions — R. Hoeldestein, E. Korte, R. Pannuk and V. Ceri, Björnram Consulting Engineers, Germany
- Alpine experience of shaft construction and grouting — P. Stakno, Marti Shaft Sinking, Switzerland; A. Hiezmann, Marti Geotechnik GmbH, Germany; M. Zmölnig, Östu-Stettin GmbH, Austria; H. Wannenmacher, Marti Holding Ltd, Switzerland
- Design and construction of an unlined pressurized tunnel: the case study of Cambiasi headrace tunnel — H. H. Balei and M. Eroz, ENERGI Enerji Yetim A.S., Turkey

**Session 17: Small hydro - Civil works and retrofitting**

**Chairman: Prof Bernhard Pelikan, Vice President, ESHA**

- Numerical modelling of a run-of-river tailrace channel — V. Hosmatschi and C. Münch, HES – SO Valais/Wallis Engineering School, Switzerland; F. Avellan, EPFL, France
- Tunnels and shafts in small hydropower projects — W. Stefanou, SWECO AS, Norway
- Customer benefits of optimizing small hydropower plants and layout concept — T. Aschenbrenner, S. Karihal, Växjö Hydro Holding GmbH & Co. KG, Germany
- The development of conduit hydropower in a city’s water distribution system: case study of the City of Eghvane - Annlin reservoir — A. Kunt, Eghvane Metropolitan Municipality, South Africa; M. van Diik, I. Loots and S.J. Van Vuuren, Pretoria University, South Africa
- Mini hydropower plants exploiting ecological flow. Ready to go — G. Frosio, F. Frosio and L. Papetti, Studio Frosio, Italy
- Lessons learned from small hydropower development at irrigation dams for renewable energy in Thailand — W. Pengpattaphum, EGAT, Thailand
- Hydropower plant in a new irrigation canal — M. Zare Baharei, Tooss AB, Iran

**Tuesday 14 October ~ Afternoon**

**13c: Pumped storage - Panel Discussion**

**Co-Chairmen: Bruno Trouille, MWH, USA; Gaudenz Koeppel, Axpo, Switzerland**

The panel will focus on topics related to emerging trends in current pumped storage operation to maximize revenues and better respond to increasing needs for ancillary services and integration of renewable energies, including potential capacity markets. Proposed changes in European electricity markets and regulatory environments will be discussed.

**13d: Pumped storage - Latest developments in equipment performance and O&M**

**Co-Chairmen: Bruno Trouille, MWH, USA; Sergio Griegloti, Enel Green Power, Italy**

- The planned Grimsel 1E pumped-storage plant with a 150 MW full-size converter — H. Schlaegger and C. Müller, Oberhasli Hydroelectric Power Company, Switzerland
- Approaches to develop pumped storage plants from an electro-mechanical equipment manufacturer’s perspective — J-M. Henry and G. Billotey, Alstom, France; A. Buscarini, Alstom, Switzerland
- Pumped storage refurbishment: major performance improvement for the Revin pump turbines — J.-B. Houdelle, S. Anthoineau, F. Dupont and N. Joulie, Alstom, France; G. Duc, P. Maruzewski and P. Lauzier, EDF, France
- Improved peace of mind with modern bearing materials: study of Mingyang PSP retrofit — L. Melet, D. Havard and R. Dameone, Alstom Hydro, France; C.-H. Chien, Taiwan Power Company, Taiwan
- Fluid structure interaction analysis for resonance investigation of pump turbine runner — S. Narawongs and A. Shinohara, Toshiba Corporation, Japan; Lingyan He, China Agricultural University, China
- Commissioning of a refurbished pump storage synchronous motor by sustained reverse rotation with excitation — Y. Michiel, Y. Pannatier and D. Reymond, Hydro Exploitation S.A., Switzerland
- Numerical analysis on the hydrodynamic characteristic of model pump turbine — D.M. Liu and Y.Z. Zhao, Dongfang Electric Machinery Co., Ltd., China

**Session 18: Hydropower and fish (IEA Workshop)**

**Chairman: Niels Nielsen, IEA Hydro, Australia**

This workshop will present and discuss the work on hydropower and fish being undertaken by member countries of the IEA Hydropower Agreement.

- KEYNOTE: Monitoring technologies related to fish and hydropower — Z. Daniel Deng, PHWE, USA
- Annex Summary: IEA Hydro’s Annex on Hydropower and Fish — H-P Fjeldstad, Norway
- Applicability of Fish-Friendly turbines for hydropower plants in the Lower Mekong basin — N. Sugurðnsson, Iceland
- Est protective power plant management: experiences from the Weser river basin in Germany — M. Barn, Norway
- Poutès dam and salmon issues: an innovative approach for sustainable hydropower — C. Avella, France
- Weir removal and habitat restoration for Atlantic salmon — H-P Fjeldstad, Norway
- Three dimensional hydraulic modelling of fish way attraction flow in tailraces of hydropower stations — Dr Markku Laiti, Finland

Discussion with selected panelists.

**Session 19: Dam and powerplant safety**

**Chairman: Dr Harald Kreuzer, Consultant, Switzerland**

- KEYNOTE: The traditional factor of safety: a factor of safety against what? — Dr Harald Kreuzer, Consultant, Switzerland
- Rehabilitation of earth dams - design measures for increase of safety — R. Goumon and A. Trilkovic, Fichtner GmbH & Co. KG, Germany
- Dam break analysis for Serra Ceppi Ulivi dam — L. Canato, Stucky Ltd., Switzerland; D. Wöthrich, EPFL, Switzerland
- Non-stationary thermal regime and cracking in arch dams — M. Kalaabegishvili, Georgian Technical University, Georgia
- Effect of rockfill modelling on the behaviour of tail concrete faced rockfill dams during impoundment — E. Stavrethodorau and P. Dakoulas, Thessaly University, Greece
- Safety of Emosson dam during construction of the Nant de Drance pumped-storage plant, Switzerland — J. Brommendt, H. Stahl and T. Ilty, AF-Consult, Switzerland
- Risk assessment studies in underground powerplants — O.A. Westberg, Sivilingeniør Ole A. Westberg AS, Norway; F. Chilli, Gecon, Italy

**Session 20: Hydro plant rehabilitation and refurbishment**

**Chairman: H. Obermoser, AF-Consult Ltd, Switzerland**

- Superhydro - a major refurbishment programme managed by EDF integrated hydro engineering — R. Courtial and J. Michalewski, EDF, France
- Building new power plants under continuous exploitation of neighbouring hydropower schemes - planning and construction challenges of the tandem expansion project in the Central Alps of Switzerland — M. Müller, M. Zahno, Y. Koller and P. Billetet, IUB Engineering Ltd., Switzerland
- Santa Giustina - a complete Francis unit modernization with unusual vibration problems — P. Caretti and G. Daccò, Voith Hydro, Italy; A. Fumagalli, Edison, Italy; F. Fausto Muciaccia, Water Energy System and Tests, Italy
- Improved performance of a propeller turbine after 45 years of operation — R. Suzuki, S. Couison, S. Nakamura and T. Tsukamoto, Vaithi Fuji k.k., Japan
- Extension of the Spilje hydropower plant in Macedonia — T. Mohinger and I. Vuckovic, Fichtner GmbH & Co. KG, Germany
- Refurbishment of semi-regulated Kaplan turbines and customized hydraulic development by CFD — H. Benigni and J. Schiller, Graz University of Technology, Austria; N. Bock, Wien Energie GmbH, Austria; M. Viertler, EFG Turbinen- und Kraftwerksanlagenbau, Austria
- Upgrading of the Matka hydro plant — L. Tanchiev and J. Shulevski, Sv Lyulin and Methodius University, Macedonia

**Session 21: Hydro expertise - Ensuring a legacy for the next generation**

**Chairman: Philippe de Félix, Tractebel Engineering, France**

- Improving performance with scientific training — A. Buvamama, ONNE, Morocco
- Introduction to hydropower for European students under the Athens program — A. Källingreit, NTNU, Norway
- A lens to the future — S. Usher, International Journal on Hydropower and Dams, UK
Conference Sessions

Session 22: Project implementation and contractual aspects

Chairman: H. Irfan Aker, Dolsar Engineering, Turkey

- Risk allocation provisions in the EPC contract documents for the Vidyaphud Pipalkoti hydropower project in India – B. Trembath, Consultant, Australia; R. K. Vihol, THDC India Ltd., India Ltd.
- FIDIC and hydropower - what are the essential issues – C. Siemer, Fichtner GmbH, Germany
- How to choose the right colour of FIDIC contract for a hydropower project: red, yellow or silver? – S. Giraud, EGUS-Eas, France
- Implementation of the Jinnah hydropower project on EPC/turnkey basis-lessons learnt – M.S. Iqbal and Z.H. Butt, WAPDA, Pakistan
- The IIA contractual framework checklist for subsurface construction contracts – A. Hodgkinson, SoKks GmbH, Switzerland; A. Wilson, GHD, Australia

Session 23: Hydro plant rehabilitation and refurbishment (IEA Workshop)

Chairman: Dr Boualem Hadjerioua, Oak Ridge National Laboratory, USA

- Keynote Address: United States hydropower fleet current and future potential upgrade programs – B. Hadjerioua ORNL, USA
- Annex Summary: IEA hydro’s Annex on renewal and upgrade of hydropower plants – T. Akiyama, NED, Japan
- Case Study: upgrading of the sedimentation counter-measure after extraordinary heavy rain – R. Hamamoto, NED, Japan
- Case Study: Extension of Lysbathin hydro power plant; the decision making process – B. Hamnungsby, Lyse Produksjon AS
- Rehabilitation of Gressoney and Nas hydropower plants, M. Bianchi, E. Chinotto, M. Magioncalda and A. De Mari, Water Power, Italy
- The rehabilitation of the Perucica hydropower plant, Montenegro – C. Grass and V. Zoric, Lahnemyer International, Germany; B. Bozovic, Elektroprivreda Crne Gore, Montenegro
- Upgrading of Andekalakota hydro power plant – J. Oliver, Tractebel Engineering S.A., France; A. Ramantshahala and A. Ravelnoama, Jirama, Madagascar

Wednesday 15 October – Morning

Session 24: Sediment management

Chairman: Sultan Alam, Consultant, France

- Major savings by tunnel sand traps at the Shukhkevi hydro plant in Georgia – T. Jacobson, Sedicon AS, Norway; L. Pedersen, Clean Energy Investment AS, Norway
- Sedicon sluices to remove 6 million tons of sand per year at 1500 MW Coca Codo Sinclair project in Ecuador – T. Jacobson, Sedicon AS, Norway; G.A. Luzuriaga, Coca Codo Sinclair EP, Spain
- Development and optimization of a hydropower conversion system based on vortex induced vibration – N. Dellingher and P. Francois, ENGIE-ICUBE, France
- Methodologies adopted in the sediment management study of Tarbela reservoir – J.H. Meldrum, Mott MacDonald Ltd., UK
- Sediment management study of reservoir PB Soedirman in Central Java, Indonesia – N. Efthyvou and H. Hildebrand, Fichtner GmbH & Co. KG, Germany; N. Ruther, MTNUs, Norway; H. Soekono, PT. Indonesia Power, Indonesia
- Tarbela dam reservoir sedimentation towards a sustainable future – A. Agha, ACE Pvt Ltd., Pakistan
- Integrated sediment management plan of the cascade of reservoirs on the river Rioni, Georgia – G. Matcharadze, Stucky Caucesus Ltd., Georgia; B. Quigley, Stucky Ltd, Switzerland

Session 25: Electrical engineering

Chairman: Ralf Bucher, Lahmeyer International, Germany

- Challenges for hydropower generators caused by frequent start-stop operation – W. Lodstatter, F. Neumayer and F. Ramsauer, Andritz Hydro GmbH, Austria
- Fatigue assessment in hydro generator pole fixation – H. Hennings, D. Ludwig and M. Hagemeyer, Voith Hydro Holding GmbH & Co. KG, Germany; T. Hildinger, Voith Hydro Ltd, Brazil
- Specific SH requirements for generators and their role for grid stability – D. Hoffmann, Voith Hydro Holding GmbH & Co. KG, Germany
- Grid frequency response - contribution of hydropower for grid stabilization – J. Hell, M. Egerterburger and A. Lechner, Andritz Hydro, Austria
- Shaft current and voltage protection relay – A. Elez, I. Poljak and J. Polak, Koncar Electrical Engineering Institute Inc., Croatia; J. Studar, Koncar Generators and Motors, Croatia; M. Dujnic, HEP Production, Croatia
- Finding a concept for electrical equipment taking account of economical and efficiency aspects: Case of the Rellwerk hydro plant – A. Roks, Vorarbeiter Ilaverke AG, Austria

Session 26: Operation and maintenance

Co-Chairmen: F. Coelhia da Rocha e Silva, Portugal/Mozambique; D. Caldaro, Enel Green Power, Italy

- New developments for an integrated automation solution for hydropower plants – C. Mann, Andritz Hydro, Austria
- Alqueva II and Salamanda II: a new approach for extending turbine operating range – P.Y. Lowes, R. Guillaume, F. Andre and F. Dupuchy, Alstom, France; J.C. Ferrreira, A. Ferreira da Silva and F. Duarte, EDP, Portugal
- Innovations in the after sales service market – L.G. Garrido, IMHP, Spain; J.F. Bok, Afiraventures BV, Switzerland/Ghana
- Experience with comprehensive surveying of the condition of large hydraulic turbine components – S.N. Matyushechkin, S.V. Fotin, JSC Nizhe, Russia
- On-line condition monitoring and fault diagnostics for hydropower units as a core of an industrial product service system for hydropower plants – L. Selak, A. Sluga and B. Butula, University of Ljubljana, Slovenia; B. Riharšič and D. Husejnojad, Litrostroj Power, Slovenia
- Implementation of a SCADA system for Enel’s hydroelectric power generation in Italy according to critical infrastructure security criteria – F. Bellino, Enel Produzione SpA, Italy; G.L. Pugini, Enel Servizii S.r.l., Italy
- Case study for vibration problem at the Ham Theun 2 hydropower plant, Laos PDR – S. Hamumpala and P. Wannakorn, EGAT, Thailand
- Optimization tools for operation of hydropower plants in a market context – A. Poggi, Enel Produzione SpA, Italy; C. Bruno and E. Isella, CESI S.p.A., Italy
- The role of concept and maintenance synergies on new hydropower project development, assembly and commissioning – A.F.N. Alves da Silva, EDP Gestão da Produção de Energia, Portugal
- Knowledge management for hydropower maintenance – B. Barrenes, Energy Norway; Norway; T.M. Welte, SINTF Energy Research, Norway; D.F. Edvardsen, CATENDA, Norway; E. Kraggseth, Statkraft, Norway

Session 27: Hydrology and flood management

Chairman: Prof Luis Berga, UPC Barcelona, Spain

- The role of Cahora Bassa dam on attenuation of floods downstream – J.R. Matola, Hidroeléctrica de Cahora Bassa SA, Mozambique
- Floods in the lower Piéria, Iceland – Ö. R. Karadóttir, Verkis Consulting Engineers, Iceland; H. Johannesson, Landsvirkjun, Iceland
- Extreme flood mitigation and management – M. Lino, Ecole des Ponts et Chaussées, France; S. Chevalier, Ecole Nationale Supérieure d’Hydraulique, France; M. Dayraut, Ecole Nationale Supérieure d’Electrotechnique, France; V. Mouy, Ecole Centrale de Paris, France
- Global flood study of Ottawa river, statistical approach – M.K. Nezhad, Hydro Quebec, Canada
- Other projects – L.G. Garrido, IMHP, Spain; M. Dayraut, Ecole Centrale de Paris, France; V. Mouy, Ecole Centrale de Paris, France; A. Ferreira da Silva, EDP Produção SA, Portugal

Session 28: Hydro plant management

Co-Chairmen: M. Lauro, ENEL Produzione SpA, Italy and Oivind Johansen, Ministry of Petroleum and Energy, Norway

- Promoting global networking at EDP with SKIPPER – G. Ribeiro, C. Cerqueira and M. Patos, EDP Gestão da Produção de Energia, Portugal
- Proper project progress records - paying the piper – M.C. Ramey, Project Advisors International LLC, USA; R. Isiridou, PAI, UAE
- Asset planning and decision optimization – B. Neijens, Copperleaf, USA
- Project management interfaces of control and creativity – M. Gill, Mott MacDonald, UK
- STE-neral: Maximizing energy production at run-of-river power stations – M. Arquilla and F. Pasut, STE Energy SpA, Italy
Session 29: Ensuring the safety of penstocks
Chairman: Bryan Leyland, Consultant, New Zealand

- Key parameters for safe steel construction for the new penstock at the Kaunertal high head hydropower plant — A. Hammer and R. Maldest, TWAG-Trailier Wasserwerk AG, Austria
- Refurbishing of a high head penstock in the French Pyrenees: case study of the Nantilla hydroelectric plant — E. Bouchard-Claisse, HydroSys Consultants Inc., Canada
- Earthquake pipe burst protection of a penstock using a VAG pipe burst safety valve with an integrated earthquake sensor — A. Riemmiller, VAG Armaturen GmbH, Germany; E. Veronese, VAG Valvole Italia srl., Italy
- ODSET Division 3: 2014 - A code for construction of penstocks — A. Di Rienzo, SNCI, France; P. Bryha, EDF — DPH, France; P. Claveireol, EDF — CIH, France

Wednesday 15 October — Afternoon

Session 30: Hydropower and cultural heritage
Chairman: David Fleetwood, Historic Scotland, UK

- Tracing our hydro heritage, what we have learned so far — D. Fleetwood, Historic Scotland, UK
- 1944, the big bang of the Portuguese electrical grid — P. Vassanços, A. Moreira, C. Rosário and M. Alvés, EDP, Portugal
- Development progress through looking at the past: understanding and using the heritage of hydro — D. Williams, Hon. Chairman, British Hydropower Association, UK
- Norwegian hydrop nominated as world heritage - industrial fairy tales and global history — P.M. Ekervold, Hordaland Kylkeskomminne, Norway
- Restor hydro - community finance and small hydropower cooperatives — J. Gray, ESHE, Belgium
- Energy and excellence - hydropower and tourism in Hardanger — R. Bartvedt; Energy and Excellence, Norway

Session 31: The design and safety of hydraulic gates
Chairman: Paulo Erbisti, Consultant, Brazil

- The safety of spillway gates — B. Leyland, Consultant, New Zealand
- Technical approach for changing spillway gates maintaining the water level in the reservoir — L. Mochin and D. Hermida, ITK Ingeniería S.A., Spain; I. Reviriego and E. Gutierrez, E.ON, Spain
- Navigelli waterway, Fiso — M. Hirschler, Federal Mogul Deva, Italy
- A discrete optimization process for the design of horizontal grids of a rising sector gate using PIANO — K.S. Lee and M.C. Gu, K-Water, Korea; V.D. Kwon, Kyungpook National University, Korea
- Numerical investigation on flows under high head gates — M. Renna, A. Guerini and P. Zenocchini, ATB Riva Calzoni Spa, Italy; A. Pagano and U. Fratini, Diacethe, Italy
- FDC system development for opening and closing of hydraulic cylinder and wire rope method gates — Heo Gwanglee and Kim Chunggul, Konyang University, Korea; No Hyun Park, Kumsung Engineering, Korea

Session 32: Valuing hydropower services
(IEA Workshop)
Chair: Karin Seelos, Statkraft, Norway

- Valuing power and non-power services provided by multipurpose hydropower schemes beyond electricity generation — K. Seelos, Statkraft, Norway
- Worldwide perspective of multipurpose hydropower dams — recent statistical analysis of ICOLD’s database and recommendations for allocation efforts - T.H. Bakken, Centre for Environmental Design of Renewable Energy (CEDREN)
- Modelling and analysis of the role and value of pumped storage hydropower services and contributions to the power system - V. Kortiarov, Argonne National Laboratory (ANL)
- Energy management services provided by hydropower in Europe - Large-scale balancing and storage - current situation and trends for the future — A. Killingtei, The Norwegian University of Science and Technology (NTNU), Norway
- Multipurpose hydropower reservoir economical benefits in the United States - B. Haderjoua, Oak Ridge National Laboratory (ORNL), USA
- Recent test cases for multipurpose water uses of hydropower reservoirs in France: methodological approaches, challenges, and outcomes - E. Branche, Electricité de France (EDF), France

Session 33: Turbine flow measurement
Chairman: P. Gruber, HSLU Lucerne, Switzerland

- Measurement of disturbed velocity profiles and their correction: a surrogate model for acoustic flow meters with clamp-on or insertion sensors — J. Skripalle, HydroVision GmbH, Germany; T. Hies, HydroVision Asia, Singapore
- Water condition monitoring capabilities with ultrasonic measurements — P. Gruber, P. Odermatt and F. Deschwendan, HSLU Lucerne, Switzerland; G. Storti, ETH Zurich, Switzerland; M. Farhat; EPFL, Switzerland
- Implementation of a new acoustic flow measuring system in an old powerhouse — H. Obermoser, AF Consult, Switzerland; Ch. Busenhart, EWZ, Switzerland
- Multiphase clamp-on meter performance investigation — S. Maroshchenko, University of Applied Science and Arts, Lucerne, Switzerland
- Approach for acoustic transit time flow measurement in irregular sections — S. Maroshchenko, P. Gruber and T. Staubli, Lucerne University, Switzerland

INTERNATIONAL STEERING COMMITTEE

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A package of three excursions has been planned for accompanying persons during the days of the Conference, to provide an opportunity to travel through beautiful landscapes to historical towns, and to experience the best of Italian food, wine and culture.

Accompanying persons are also warmly welcomed to the HYDRO 2014 evening social events (the Welcome Reception at Villa Gastel and the Gala Dinner at Villa Erba).

**Monday 13 October: Franciacorta and Bergamo**

The first trip will take participants to one of the most famous wine regions of Italy, Franciacorta. The country’s best sparkling wine, which has been compared to French champagne, is produced there.

The tour will start with a visit to the famous Il Mosnel cellar, established in 1836, where there will be a guided tour and a chance to taste some of the best produce, along with lunch.

On the way back to Cernobbio there will be a stop in Bergamo, considered to be one of the most romantic cities of northern Italy. There will be a guided tour of the city, including a walk in the Upper Town, which is the historical centre, surrounded by Venetian walls built in the 17th century.

Some of the most important monuments will be visited, including: the Piazza Vecchia (old square), the Basilica of the large Romanesque church of Santa Maria Maggiore (renowned for its history of the teaching of music), the S. Alessandro Cathedral and the Fortress. The medieval Fortress was refurbished by the Viscontis, and then by the Republic of Venice in the mid-15th century.

The return will be in good time for the Welcome Reception in the evening.

**Tuesday 14 October: Lake Maggiore**

A full-day trip will be devoted to visiting a second stunning Italian lake: Lake Maggiore, which is quite different in character to Lake Como. After a drive of approximately 90 minutes from Cernobbio, the group will arrive at the small, elegant town of Stresa, a commune of about 5000 inhabitants in the Piedmont region, on the shore of the lake. There will be a short visit to the historical centre of Stresa, followed by a motorboat cruise around Isola Madre, Isola Bella and Isola dei Pescatori, with a chance to view their lush gardens and elegant villas.

Lunch will be on the beautiful Isola dei Pescatori (Fisherman’s Island). It is the most northerly of the Borromean islands, and is just 375 m long by 100 m wide. A narrow street running along the centre is joined by cobbled streets, which lead down to the promenade encircling the island.

The tour will arrive back in Cernobbio in the late afternoon.

**Wednesday 15 October: Milan City Tour**

The final excursion will be to the elegant city of Milan, known as the “fashion and design capital” of Italy. The trip will include a visit to the famous Duomo, which is the fifth largest cathedral in the world, and the Galleria Vittorio Emanuele, one of the world’s oldest shopping malls, housed within a four-storey glass-vaulted double arcade.

There will also be a visit to the world renowned La Scala opera house, inaugurated in 1778, and the Sforzesco castle. The castle was built in the 15th century, by Francesco Sforza, Duke of Milan, on the remains of a 14th century fortification. It was renovated during the 16th and 17th centuries, and now houses some of the city’s museums and art collections.

A lunch of Milanese specialities will be served in town.

During the trip there will be a chance, on a first come first served ticket basis, to view the famous masterpiece of Leonardo da Vinci, ‘The Last Supper’, in the Convent of Santa Maria delle Grazie. The Convent’s walls are lined with a number of paintings by da Vinci, and it is classified as a UNESCO World Heritage Site. The return to Cernobbio will be in the mid-afternoon, allowing some time for relaxation, shopping or local sightseeing in Como before the Conference Gala Dinner.

**PRACTICAL INFORMATION:**

Prices of the tours are given on the registration form, and they include:
- all coach and boat transfers (as applicable)
- English-speaking guides throughout the days
- entrance fees and guided tours of the places of interest
- a three-course lunch each day with wine, water and coffee

All the trips will depart from and return to the Villa Erba Congress Centre in Cernobbio. They will return to Cernobbio by the late afternoon, so that there will be some free time before the evening social events on Monday and Wednesday.
Four study tours are being organized, in collaboration with ENEL. Prices are given on the registration form. The programme below may be subject to minor changes.

A. 16 October (one day): Lombardy - Paderno and Trezzo historical powerplants

The journey by coach to Paderno will take about 75 minutes. There will be a stop on a railway bridge to have a panoramic view of the weir and powerplant, which was built by Edison in 1898. On arrival, there will be a briefing and tour at the plant, followed by lunch at a restaurant a few kilometres away.

The next stop will be at the picturesque Trezzo powerplant, on the Adda river, about 15 km away. This plant, at the foot of Visconti’s castle (see photo above right), dates back to the early 20th century. Operated by ENEL Green Power, it has an installed capacity of 10 MW. Originally constructed to power a cotton mill, the Trezzo plant represents one of the finest examples of industrial architecture.

B. 16 October (one day): Lake Maggiore - Roncavalgrande pumped storage

The group will travel by bus to the 1016 MW Roncavalgrande pumped-storage plant, beside lake Maggiore, about 3 km north of Maccagno in the Province of Varese. There will be a stop en route for coffee and a snack.

Delegates will take a boat ride across the lake, from Laverno to Luino, and then the group will proceed by bus to the powerplant, which is operated by Enel GEM. The underground powerplant is equipped with eight four-stage Pelton units. After the visit to the powerplant, there will be a chance to go on to visit the upper reservoir, Lake Delio, about 30 minutes ride away. The head available between Delio and Maggiore is 736 m. Lake Delio has a storage capacity of $10 \times 10^6$ m$^3$.

C. 16+17 October (two days) Valtellina region - Lanzada, Alpe Gera and Edolo

Valtellina is a valley within the Lombardy region of Italy, bordering Switzerland. The group will travel via the Sondrio region through a valley which is the only west-east longitudinal valley in Italy.

The group will continue to the 188 MW Lanzada powerplant. After the technical tour, a light lunch will be served in a nearby restaurant, before the final technical visit of the day, to the 174 m-high Alpe Gera gravity dam and 35 MW powerplant. This is Italy’s highest dam. The concrete placement methods used resembled those used for subsequent RCC dams.

Valtellina is a famous wine-growing region; the overnight stay will be in Sondrio.

Next day the tour will continue to the Edolo pumped-storage plant, with a coffee stop on the way. There will be a technical visit to the 1000 MW plant followed by lunch, before the return journey to Como.

D. 16, 17+18 October (three days) Sicily - Anapo powerplant, Ancipa dam and cultural visits

This three-day trip will begin with a flight from Milan to Catania, followed by the first technical visit to the Troina powerplant. After that, the group will continue to the historic city of Siracusa, where there will be some time at leisure before dinner and an overnight stay. The city is listed as a UNESCO World Heritage Site, and is noted for its architecture and amphitheatres. It is the birthplace of Archimedes.

The second day will include a visit to Enel SpA’s Ancipa dam, originally constructed in the 1950s, and upgraded between 2002 and 2005 to repair cracks and enhance the structural integrity. The Anapo pumped-storage plant will also be visited.

Lunch will be in the town of Noto, and will be followed by a guided sightseeing tour.

On the third day, there will be a trip to Modica, with opportunities for a guided tour and sightseeing, a visit to a famous chocolate factory, and viewing of some baroque gems. Modica is referred to as “a pearl of Sicilian baroque”. There are records of the town dating back to the 3rd century BC, when it was a thriving agricultural centre under Arab rule.

After lunch, the group will transfer to Catania airport, where the tour will end.

**ITALIAN HYDROPOWER**

Hydro was one of the main sources of power in Italy until the 1960s, with much of the major water infrastructure having been built in the late 1950s. Today, the share of hydropower in the energy mix has decreased, but Italy is still the world’s 14th largest producer of hydro. The major hydro and pumped-storage schemes are: Entracque (1317 MW); Roncavalgrande (1016 MW); Presenzano (1000 MW); and, Edolo (1000 MW).

Today Italy’s hydro capacity is 17 800 MW, contributing around 15 per cent of national electricity, about 50 000 GWh/year. The HYDRO 2014 post-Conference study tours described above have been designed to show a variety of large dams, as well as conventional hydro and pumped-storage plants. Detailed itineraries will be sent to those booking the tours.
Exhibition space is sold in minimum units of 6 m². Multiple units can be booked to form pavilions. The stand space sold includes the standard booth with white panelling, a table and two chairs, a name sign, spotlights and an electricity supply. Prices include one full delegate registration per 6 m², plus discounted rates for two additional colleagues. All exhibitor registrations include the full technical and social programmes (including valuable evening networking opportunities) and lunches each day.

All lunches and refreshments will be served in the exhibition halls, and there will be extended opening of the exhibition, with drinks and snacks, on 14 October.

The layout of Villa Erba is exceptionally favourable: the halls are on the same level, facilitating access to all areas by conference participants.

To receive further details of the exhibition and/or sponsorship opportunities, please contact:
Mr Lukas Port, Mrs Maria Loredo or Miss Melanie Ganz - Tel: +44 20 8773 7250/7251/7252 • Email: sales@hydropower-dams.com

3 x 2 m (6 m²) = €2975  ▪  = Sold  ▪  = Catering  ▪  = Fixed seating  ▪  = Internet
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Website</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABB</td>
<td><a href="http://www.abbch">www.abbch</a></td>
<td>312</td>
</tr>
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<td>Adams Schweiz AG, Switzerland</td>
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<td>Andrzej Hydro GmbH, Austria</td>
<td><a href="http://www.andritz.com">www.andritz.com</a></td>
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</tr>
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<td><a href="http://www.billinger.at">www.billinger.at</a></td>
<td>231</td>
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<td>Bross Marxhnhoflhr, Austria</td>
<td><a href="http://www.bross.at">www.bross.at</a></td>
<td>222</td>
</tr>
<tr>
<td>British Power Association, UK</td>
<td><a href="http://www.british-hydro.org">www.british-hydro.org</a></td>
<td>148</td>
</tr>
<tr>
<td>Brodrene Dahl, Norway (Norwegian Pavilion)</td>
<td><a href="http://www.dahl.no">www.dahl.no</a></td>
<td>389</td>
</tr>
<tr>
<td>Bruel &amp; Kjaer, Austria</td>
<td><a href="http://www.bk.com">www.bk.com</a></td>
<td>200</td>
</tr>
<tr>
<td>Cammas Industridenttica SpA, Italy</td>
<td><a href="http://www.cammasa.com">www.cammasa.com</a></td>
<td>213</td>
</tr>
<tr>
<td>Carpi, Italy</td>
<td><a href="http://www.carpi.com">www.carpi.com</a></td>
<td>140</td>
</tr>
<tr>
<td>Carpi Tech, Italy</td>
<td><a href="http://www.carpetech.com">www.carpetech.com</a></td>
<td>381</td>
</tr>
<tr>
<td>CEEM SpA, Italy</td>
<td><a href="http://www.ceem.com">www.ceem.com</a></td>
<td>354</td>
</tr>
<tr>
<td>CG Electric Systems, Hungary</td>
<td><a href="http://www.cgglobal.com">www.cgglobal.com</a></td>
<td></td>
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<tr>
<td>China Valves Technology Inc., China</td>
<td><a href="http://www.china-valves.com">www.china-valves.com</a></td>
<td>386</td>
</tr>
<tr>
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<td><a href="http://www.blanka.com">www.blanka.com</a></td>
<td></td>
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<td><a href="http://www.cleanairpower.com">www.cleanairpower.com</a></td>
<td>101</td>
</tr>
<tr>
<td>CMC Tvar s.r.o., Czech Republic</td>
<td><a href="http://www.cmc-ch.com">www.cmc-ch.com</a></td>
<td>258</td>
</tr>
<tr>
<td>Copperhead, Canada</td>
<td><a href="http://www.copperhead.com">www.copperhead.com</a></td>
<td>361</td>
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<td>DECC Energy Valves, France</td>
<td><a href="http://www.decc.com">www.decc.com</a></td>
<td>362</td>
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<tr>
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<td><a href="http://www.delphin.de">www.delphin.de</a></td>
<td>128</td>
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<tr>
<td>Dettol, Italy</td>
<td><a href="http://www.dettol.it">www.dettol.it</a></td>
<td>374</td>
</tr>
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<td>DHB - Ruhrpott, Poland</td>
<td><a href="http://www.dtb.com">www.dtb.com</a></td>
<td>238</td>
</tr>
<tr>
<td>Dynavox, Norway (Norwegian Pavilion)</td>
<td><a href="http://www.dynavox.com">www.dynavox.com</a></td>
<td>177</td>
</tr>
<tr>
<td>Dyndiff Ltd, UK</td>
<td><a href="http://www.dyndiff.de">www.dyndiff.de</a></td>
<td>145</td>
</tr>
<tr>
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<td><a href="http://www.eisenbeiss.com">www.eisenbeiss.com</a></td>
<td>363</td>
</tr>
<tr>
<td>ECC Electroconsult S.p.A.</td>
<td><a href="http://www.ecc-electroconsult.com">www.ecc-electroconsult.com</a></td>
<td>112</td>
</tr>
<tr>
<td>Emec, Italy</td>
<td><a href="http://www.emec.com">www.emec.com</a></td>
<td>153</td>
</tr>
<tr>
<td>Emerson, Europe</td>
<td><a href="http://www.emerson.com">www.emerson.com</a></td>
<td>203</td>
</tr>
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<td>e.on-Anlagenserivice GmbH, Germany</td>
<td>230</td>
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<td><a href="http://www.epfl.ch">www.epfl.ch</a></td>
<td>367</td>
</tr>
<tr>
<td>Ergonomics Energy Casino Hydro, Italy</td>
<td><a href="http://www.ergonomics-energy.com">www.ergonomics-energy.com</a></td>
<td>137</td>
</tr>
<tr>
<td>European Small Hydro Association</td>
<td><a href="http://www.evhs.eu">www.evhs.eu</a></td>
<td>361</td>
</tr>
<tr>
<td>Federal Mogul Deva GmbH, Austria</td>
<td><a href="http://www.devade.com">www.devade.com</a></td>
<td>303</td>
</tr>
<tr>
<td>Ferry Captain, France</td>
<td><a href="http://www.ferrycaptain.fr">www.ferrycaptain.fr</a></td>
<td>338</td>
</tr>
<tr>
<td>FGTI, Italy</td>
<td><a href="http://www.fgti.it">www.fgti.it</a></td>
<td>163</td>
</tr>
<tr>
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<td><a href="http://www.flumespray.com">www.flumespray.com</a></td>
<td>168</td>
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<td>167</td>
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<td>205</td>
</tr>
<tr>
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<td><a href="http://www.hc.vc.com">www.hc.vc.com</a></td>
<td>256</td>
</tr>
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<td><a href="http://www.imir.ch">www.imir.ch</a></td>
<td>376</td>
</tr>
<tr>
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<td><a href="http://www.indar.net">www.indar.net</a></td>
<td>208</td>
</tr>
<tr>
<td>International Commission on Large Dams</td>
<td><a href="http://www.iccd.com">www.iccd.com</a></td>
<td>263</td>
</tr>
<tr>
<td>IHTP (Norwegian Pavilion), Norway</td>
<td><a href="http://www.ihtp.no">www.ihtp.no</a></td>
<td>177</td>
</tr>
<tr>
<td>IROR, Ireland</td>
<td><a href="http://www.iror.com">www.iror.com</a></td>
<td>170</td>
</tr>
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<td></td>
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<td>138</td>
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<td>237</td>
</tr>
<tr>
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<td><a href="http://www.jacaindustrial.com">www.jacaindustrial.com</a></td>
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<td>146</td>
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<td><a href="http://www.kxal.com">www.kxal.com</a></td>
<td>129</td>
</tr>
</tbody>
</table>

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HYDRO 2014: BUILDING ON RECENT DEVELOPMENT PROGRESS  
13 to 15 October 2014 ~ Cernobbio (Como), Italy

REGISTRATION FORM  
(Deadline for early booking discount: 16 August 2014. On-line booking is strongly recommended)

This registration form is a self-billing order form, which should be sent to SureFire Events Ltd with payment for all items booked. By completing this form you are agreeing to the Booking Conditions within this brochure. Fees are payable in Euros. Each participant should complete a separate form.

PLEASE COMPLETE THE FORM IN CAPITAL LETTERS, AND EMAIL A PORTRAIT PHOTO (JPEG FORMAT) TO BE USED ON YOUR DELEGATE BADGE

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<th>Until 16 Aug</th>
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<td>Please note this fee does not apply to business associates attending the conference</td>
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HALF DAY EXCURSION: CRUISE ON THE LAKE, WITH LUNCH IN BELLAGIO (Sunday 12 October) I wish to book .......... places at € 95 per person

OPTIONAL DONATION TO THE AMI HYDROPOWER FOUNDATION (we suggest €25, 50, 75 or 100), This is a charitable foundation, set up by Aqua-Media and governed by international trustees. It exists to facilitate the participation of delegates from the less developed countries at the hydro conferences. (More details at: www.hydropower-dams.com)

PLEASE TOTAL THE COSTS ON THIS PAGE AND CARRY THEM OVER TO THE SECOND PAGE Euros (€)
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The two-letter code after the price indicates the locations of the hotels, as follows: CE - Cernobbio (walking distance to conference venue). CC - Between Como and Cernobbio (1.7 km from venue - shuttle provided) CO - Historic centre of Como (8 km south, shuttle provided); MO - Maltravia (5 km north, shuttle provided)

Please consult our website for more details about the hotels and their locations.

Check-in date: ........ October 2014   Check-out date: ........ October 2014   Total number of nights: ...............

Special requests (eg, non-smoking room): ..................................................

Tw in occupancy: Name of partner .......................................................

NB: A nominal contribution is requested, which will be put towards the cost of the Reception and Dinner, so that we may accurately assess numbers for catering.

We require an accurate estimate of who will attend, to avoid food wastage; the small charge is to encourage delegates to make a firm decision on attendance!

Payment is possible by the following methods:

- On-line by Visa or Mastercard. All on-line fees will be taken in EUROS (€).
- Bank transfer to: SureFire Events Ltd, Barclays Bank, Wimborne, UK Sort Code: 20-96-96 • Account number: 76109233
- IBAN: GB53 BARC2096976109233 • SWIFT BIC: BARCGB22

SureFire Events Ltd, Unit 8, Hinton Business Park, Tarrant Hinton, Blandford, DT11 8JF, United Kingdom
Tel: + 44 (0)1258 447040   Fax: +44 (0)700 349 7034   E-mail: hydro2014@surefire-events.com
Online registration at: www.hydropower-dams.com
HYDRO 2014
BUILDING ON RECENT DEVELOPMENT PROGRESS

BOOKING CONDITIONS

The Conference HYDRO 2014 - Building on Recent Development Progress, is being organized by The International Journal on Hydropower & Dams with SureFire Events, UK, for event management.

On-line Registration
You can register on-line at www.surefire-events.com also accessible via the Hydropower & Dams website at: www.hydropower-dams.com. Registrations will be handled by SureFire Events. These are secure server websites. You will receive an acknowledgement of registration on completion of this process; however, this is not a confirmation (until payment is received).

Registration by post or fax
Completed registration forms should be sent, with payment, to the Conference Secretariat. Please complete one registration form per delegate, including any accompanying persons. Please photocopy the form if you need further copies, or download a form: www.hydropower-dams.com or www.surefire-events.com. The total fees for Conference registration, accompanying persons' programme, cultural excursion and/or study tour (if applicable) should be calculated and totalled in the 'Total Euros' column on the second page of the registration form.

Picking up registration documents
The desk will be open from 09.00 hrs on Sunday 12 October 2014, at the Villa Erba Congress 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 SureFire Events (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 or near Cernobbio. Accommodation bookings are being handled by SureFire Events. Pre-registration is generally required, by one of the methods mentioned above.

We anticipate a high demand for HYDRO 2014 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 2014 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 2014 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 SureFire Events. 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 Italian 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).

Passport and Visa Requirements for Italy
Italy is a member of the European Union and 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 Italian embassy or consulate in your country if in doubt about requirements. Please note that in some cases, letters of invitation from Aqua-Media in the UK and one of our partner organizations in Italy 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.

For guidance about visa requirements, visit; http://www.esteri.it/visit/index_eng.asp

Applying for a letter of invitation
If you require a letter of invitation from the organizers 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:

<table>
<thead>
<tr>
<th>Date cancellation received</th>
<th>On or before 16 August 2014</th>
<th>From 17 August 2014</th>
<th>On or after 15 September 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration for the Conference</td>
<td>10% of fee is forfeited</td>
<td>50% of fee is forfeited</td>
<td>No refund</td>
</tr>
<tr>
<td>Technical Excursions (Study Tours)</td>
<td>10% of fee is forfeited</td>
<td>No refund unless place can be resold</td>
<td>No refund</td>
</tr>
<tr>
<td>Accommodation</td>
<td>10% of fee is forfeited</td>
<td>50% of fee is forfeited</td>
<td>No refund</td>
</tr>
</tbody>
</table>

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:
Mr Miles Halton, SureFire Events, Unit 8, Hinton Business Park, Tarrant Hinton, Blandford DT11 8JF, UK
Tel: +44 (0)1258 447040 • Fax: +44 (0)700 349 7034 • Email: hydro2014@surefire-events.com

NB: Registration forms and payment should be sent to SureFire Events Ltd.
On-line registration at: www.surefire-events.com

For further details of the programme, please contact: Mrs Margaret Bourke at:
Hydropower & Dams, PO Box 285, Wellington, Surrey SM6 6AN, UK.
Tel: +44 (0)20 8773 7244 • Fax: +44 (0)20 8773 7255 • Email: hydro2014@hydropower-dams.com
Website: www.hydropower-dams.com