# HYDRO 2018

Progress through Partnerships

## GDANSK, POLAND

**AMBEREXPO**

**15-17 October 2018**

organized by

THE INTERNATIONAL JOURNAL ON HYDROPOWER & DAMS

# PROGRAMME AND REGISTRATION DETAILS

**Supporting organizations include:**

CIGB ICOLD · IEA HYDRO · Energa · Towarzystwo Elektrowni Wodnych · TRMEW · IMP PAN GDANSK

**Regular updates will be posted on our website, and published in *Hydropower & Dams***

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# HYDRO 2018 MISSION AND SCOPE

HYDRO 2018 will be the 25th in Aqua-Media's series of international events hosted in Europe, and will once again be the most significant conference and exhibition of the year for the global hydropower community. The annual conferences have become renowned as the most international gatherings in the profession, with delegations representing all countries with major hydro development programmes underway. An exchange of experience is encouraged on practical and topical issues, and an international steering committee works with the Aqua-Media team to ensure the high quality of papers accepted.

The event will bring together delegations from around 75-80 nations, sharing the common interest of advancing hydro development in all parts of the world. Lessons from past experience will be reviewed, achievements will be showcased, and new challenges will be tackled. The conference sub-title 'Progress through Partnerships' highlights the underlying theme of international collaboration which will be the basis for discussions. The location aims to facilitate participation from more countries in the Central Asian and eastern European region.

Emphasis will be on helping the less developed countries to unlock their hydro potential to advance socio-economic development, on cross-border collaboration and regional projects, and on maximizing the potential to increase hydro capacity in the industrialized countries. Timely maintenance of existing hydro assets is another key theme, along with designing for the sustainability of greenfield projects.

## WHO SHOULD ATTEND?

All who are involved in researching, planning, designing, financing, constructing, supplying, operating and maintaining hydro plants and associated civil structures worldwide should not miss the opportunity to join this international forum. HYDRO 2018 will be the most international gathering of the year specifically for the hydropower profession.

Key participants will be specialists on environmental and social issues, climate, energy economics, managing financial risk, the changing role of hydropower, safety and dealing with natural hazards, cyber security, and broader aspects of water storage and renewable energy.

## PROGRAMME HIGHLIGHTS

Professional associations such as ICOLD and the International Energy Agency will lead some of the technical sessions.

Itaipu Binacional will be holding its third 'Roundtable for Large Hydropower Plant Operators' meeting, giving operators of major powerplants in the world such as Itaipu and Three Gorges an opportunity to exchange experience on operational issues and maintenance. This will be by invitation, but the organizers welcome expressions of interest. Please contact Aqua~Media if you are interested in attending:

hydro2018@hydropower-dams.com

Another pre-Conference Workshop 'Design a small hydropower project in one day' will be held prior to HYDRO 2018. It will be the fifth in a series of extremely successful and practical workshops on this subject.

# POLAND WELCOMES HYDRO 2018

The local utility Energa, the Polish Hydropower Association and the Polish Association for Small Hydropower enthusiastically welcome the international hydropower community to Poland. While hydropower plays a modest role in the country's energy mix, new run-of-river schemes could now be developed alongside major inland waterway projects which are planned.

A significant portion of the country's large hydro capacity is pumped storage. There are six pumped-storage plants, of which the largest is Zarnowiec (716 MW).

Poland has around 994 MW of small hydropower, with more under development.

Energa is currently planning a cascade development on the Lower Vistula.

## HYDRO 2018 HOST CITY

Gdansk, on Poland's Baltic coast, is one of the country's most elegant and fascinating cities. It has played a significant role in Polish history. Notably in 1980, it was the birthplace of the Solidarity movement, which had a profound influence not only on Poland, but on the entire eastern European region. Our HYDRO 2018 Welcome Reception will take place in the 'European Solidarity Centre', and there will be a short talk by the Director on Poland's history in recent decades.

The centre of the old town is characterized by colourful facades, for example in the Long Market, which is full of small shops and gourmet restaurants. Nearby is the Neptune Fountain, a 17th century symbol of the city, topped by a bronze statue of the sea god. The 14th century Town Hall houses the city's historical museum. Other places to be explored include: the 16th century Oliwa cathedral, featuring baroque and rococo architecture, and Artus Court, a former meeting place of merchants.

The Green Gate is another attraction, located on the water front between Long Market and the River Motlawa. The magnificent four-arched gatehouse was built between1568 and 1571, and reflects the Flemish architectural influence in Gdansk.

Gdansk, named as one of the Best European Destinations in 2017, is also a centre for the world's amber trade. There is a museum dedicated to amber craftsmanship, as well as a number of small workshops around the town.

The river Motlawa and a number of small canals in the old part of the city provide a perfect setting for an evening stroll.

Plenty of restaurants offer gourmet specialities of Polish, including Kashubian, cuisine.

# HYDRO 2018 TIMETABLE

| Sunday 14 October | Monday 15 October | Tuesday 16 October | Wednesday 17 October |
|---|---|---|---|
| From 09.00 hrs:<br>Conference Registration opens<br>Exhibition set-up for custom stands only | 08.30 hrs:<br>*Opening Plenary Session:*<br>Welcome addresses<br>Keynote addresses | 08.30 hrs:<br>*Parallel Sessions:*<br>11 - Valuing hydro and pumped storage services (IEA)<br>12 - Civil engineering: Safety - I<br>13 - Innovative technology<br>14 - Environment: fish protection | 08.30 hrs:<br>*Parallel Sessions:*<br>25 - Hydro plant safety and cyber security<br>26 - Upgrading and refurbishment - I<br>27 - Small hydro - I<br>28 - Gateworks and penstocks |
| 09.30 hrs:<br>Small Hydro Seminar begins | *Coffee* | *Coffee* | *Coffee* |
| 10.45 hrs:<br>Excursion departs for<br>Tour of city landmarks and monuments<br>(including lunch) | *Parallel Sessions:*<br>1 - Project structuring and financing<br>2a - Development opportunities - I<br>3 - Hydraulic machinery: Research<br>4 - Civil works: Design and construction - I | *Parallel Sessions:*<br>11 - Valuing hydro and pumped storage services (contd)<br>15 - Civil engineering: Safety - II<br>16 - Transboundary projects<br>17 - Hydro and the environment | *Parallel Sessions:*<br>29 - Capacity building and training<br>30 - Upgrading and refurbishment - II<br>31 - Small hydro - II<br>32 - Sedimentation management |
| | *Lunch* | *Lunch* | *Lunch* |
| 14.00 hrs:<br>Access to stands for exhibitors | *Parallel Sessions:*<br>5 - Contracts and procurement<br>2b - Development opportunities - II<br>6a - Hydraulic machinery - I<br>7 - Civil works: Design and construction - II | *Parallel Sessions:*<br>18(a) - Pumped storage - I<br>19 - Civil engineering: Materials<br>20 - Multipurpose schemes<br>21 - Social aspects | *Parallel Sessions:*<br>33 - The 'Must' RE student programme<br>34 - Hidden Hydro (IEA session)<br>35 - Operation and maintenance<br>36 - Electrical engineering |
| | *Coffee* | *Coffee* | *Coffee* |
| 19.00 hrs:<br>Chairmen's Meeting<br>followed by<br>19.30 hrs:<br>Speakers' Briefing at the<br>AMBEREXPO Congress Centre | *Parallel Sessions:*<br>8 - Changing role of hydro: commercial implications<br>9 - Potential, plans and project implementation<br>6b - Hydraulic machinery - II<br>10 - Hydrology, climate and flood management | *Parallel Sessions:*<br>18b - Pumped storage - II<br>22 - Spillways<br>23 - Reservoir operation<br>24 - E&S insights from NT2, after 10 years | *Closing Plenary Session:*<br>Summary and outcomes<br>Welcome to AFRICA 2019, Windhoek, Namibia<br>and HYDRO 2019, Porto, Portugal |
| 20.00 hrs:<br>Speakers' and Chairmen's Reception<br>Hilton hotel (transport will be provided) | 19.30 hrs: Welcome Reception<br>European Solidarity Centre<br>Gdansk | 17.30 hrs: Networking party<br>Refreshments in the Exhibition Halls<br>(Evening free for private parties) | 19.00 hrs: Conference Dinner<br>(preceded by a short concert)<br>Baltic Philharmonic Hall, Gdansk |

## THE INTERNATIONAL STEERING COMMITTEE INCLUDES:

D. Aelbrecht, France
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O. Westberg, Norway
D.A. Williams, UK
Xu Zeping, China
G. Zenz, Austria

# PRE-CONFERENCE SMALL HYDRO WORKSHOP

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 will be affected.

This workshop, following successful ones held in Vientiane, Montreux, Marrakech, Seville and Danang, 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 (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, to develop 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.

# LARGE PLANT OPERATORS' ROUNDTABLE

The Third Roundtable on Large Hydroelectric Powerplant operation will be held on 14 October. Organised by Itaipu Binacional, Brazil/Paraguay, this full-day event will be an informal, exclusive, high-level forum to exchange knowledge about real-time operational challenges and experiences at some of the world's major hydro plants.

The mission is to allow for discussion among senior professionals responsible for the daily operation of the plants. Participants will be invited to play an active role in the discussion. Interventions will be welcome on best practice, or on challenging issues where the opinions of other operators could be helpful in resolving problems.

After invited presentations, a facilitated discussion will take place. Specific topics will be agreed in advance. Examples could include:

- Human factors in real-time operation
- SCADA systems and associated apps
- Operational inspections
- Shift work challenges and practices
- Emergency action plans
- Operational risk analysis
- Dealing with flood forecasting
- Training and communication
- Quality control

Places are limited for the Roundtable; to express interest in securing a place, please email:

hydro2018@hydropower-dams.com

as soon as possible, giving details of your organisation, role and responsibilities, and the powerplant you would discuss during the Roundtable.

# PRE-CONFERENCE EXCURSION

A local cultural excursion is planned for participants and accompanying persons on the day of registration (Sunday 14 October). This will begin mid-morning (allowing for time to register beforehand), and will include lunch in a local restaurant, in a scenic part of town.

This will provide an opportunity to get to know the old city of Gdansk, with its picturesque marina, its stunning architecture, and some key landmarks such as the Neptune Fountain, the 14th century Town Hall houses, the Green Gate, the Long Market and the Artus court.

There will also be an opportunity to visit the Maritime Museum, Granary, and famous Old Crane building.

Gdansk was named as one of the Best European Destinations in 2017, and is well worth exploring. The tour on 14th October is designed to give HYDRO 2018 delegates a first taste of the sights the city has to offer.

# AMI HYDROPOWER FOUNDATION

This is an independent charitable foundation, governed by an international board of trustees, set up in 2007 with the principal aim of facilitating the participation at the annual Hydro Conferences of delegates from the less developed and developing countries, and others with current economic difficulties.

AMI HYDROPOWER FOUNDATION

Details of the application process for funding can be found on the dedicated web page, at:

**www.hydropower-dams.com**

Fully completed applications, with supporting references, must be received by the organizers at least 10 weeks prior to the date of the conference, to allow sufficient time for processing by the trustees.

Successful applicants will normally be granted assistance to cover the conference registration fees, and in some cases accommodation. Travel expenses will generally not be covered, although in some exceptional cases, contributions towards travel costs may be granted.

If you or your company would like to make a donation to the Foundation, you will have the opportunity to do so at the time of registration.

# CONFERENCE SESSIONS

**The following pages present the status of the HYDRO 2018 programme in August. Some additional invited papers are still to be confirmed and will be announced shortly. Please visit our website for regular updates.**

## Monday 15 October - Morning

### Session 1: Project structuring and financing

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

- Public Private Partnership (PPP) in hydropower development in Lao PDR – *A. Vongsay, Ministry of Energy and Mines, Lao PDR*
- The Azambi hydro plant: A private hydropower development in Africa – *J. Steele, Randgold Resources, Kilabi Gold Mine, DRC; R. Greyling, Knight Piésold Consulting, South Africa; E. Scherman, Knight Piésold Consulting, Canada*
- Kaléta and Souapiti hydropower schemes: A success story in public private partnerships – *L. Aljounaidi, M. H. Chevet and F. Dordé, Tractebel Engineering SA, France; C.T. Sylla, Guinean Government, Guinea; Wang Ning, China International Water & Electric Corp., China; M. Condé, Government of Guinea; M. Kaba, Souapiti Management Co, Guinea*
- Do Chinese developers build better hydropower at home than abroad? – *Dr J. Plummer Braeckman, University of Cambridge, UK; J. Kirchherr, McKinsey & Company, UK*
- Greenfield development - brownfield acquisition: The unmasking of hidden risks and value – *K.I. Candee, Aqua Energie LLC, USA, L. Nahmias-Léonard, Virunga Power, Kenya*

### Session 2a: Development opportunities - I

**Chair: L. Mouvet, Hydro Operation International, Switzerland**

- Screening of potential hydropower sites in a large region using GIS and global data resources – *P. Thapa, P. Schäfer and S. Palt, Fichtner GmbH & Co. KG, Germany*
- Development potential in Afghanistan – *(Author to be announced)*
- Development of water storage projects in Iraq to secure food, drought threats and clean energy Iraq – *H.A. Hawramany, Ministry of Electricity, Iraq*
- Bornean hydro potential under changing climate: An assessment on existing large hydro plants – *M. Hussain, S. Nadya, J. Janggu, and A. Syamsul, Sarawak Energy Berhad, Malaysia*
- Opportunities and challenges in Myanmar – *Wunna Htun, DHI, Ministry of Electricity, Myanmar*
- Status quo and future trend of FDI along B&R by Chinese companies – *Y.M. Sheng and G.L. Zhang, PowerChina Resources Ltd, China*

### Session 3: Hydro machinery – R&D

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

- Use of compact laser Doppler velocimetry in reduced scale model testing of hydraulic machines – *M. Sakamoto, A. Müller and K. Yamaishi, Nippon Koei Co., Ltd, Japan; L. Andolfatto, V. Berruex and F. Avellan, EPFL Laboratory for Hydraulic Machines, Switzerland*
- Investigation of different ways of the axial thrust reducing on Francis turbine – *Y. Kuznetsov, E Spiridonov and I Kuznetsov, Power Machines PJSC/LMZ, Russia*
- On the use of pressure pulsations in draft tube to determine the cam curve on Kaplan turbines – *M. Sendelius and A.Pettersson, Sweco Energuide AB, Sweden; M. Cervantes, Luleå University of Technology, Sweden*
- Erosion resistance of structural materials used in hydropower installations: assessment by means of the fractional approach – *J. Steller, Polish Academy of Sciences, Poland*
- Model testing beyond the scope of international standards: An outlook – *L. Andolfatto and F. Avellan, EPFL Laboratory for Hydraulic Machines, Switzerland*
- Numerical analysis and laboratory test of a high speed Francis hydraulic turbine – *M. Kaniecki, ZRE Gdansk S.A., Poland; A. Krzemianowski, Polish Academy of Sciences, Poland*

### Session 4: Civil engineering: Design and construction I

**Chair: Dr A. Hughes, Dams and Reservoirs, UK**

- Design and operation of Gibe III power waterways – *A. Pietrangeli, A. Cagiano de Azevedo, G. Pittalis and C. Rossini, Studio Ing. G. Pietrangeli Srl, Italy; E. Zoppis, Salini Impregilo SpA, Italy*
- Intake structure designs of entirely steel-lined pressure conduits crossing an RCC dam – *R. Arnold, A. Lais and R.M. Boes, Swiss Federal University of Technology (ETH) Zurich, Switzerland; A. Bezzi, Studio Ing. G. Pietrangeli S.r.l., Italy*
- Design of the Muzizi hydropower project, Uganda – *G. Krieger, C. Auel, R. Frizer, J. Thene and A. Richmond, ILF Consulting Engineers Austria GmbH, Austria; M. Mwozega, UEGCL, Uganda*
- Physical hydraulic model study of complex hydropower structures: A case study on Upper Yeywa hydropower project, Myanmar ar – *Aung Lwin,Ministry of Electricity and Energy, Myanmar; J.P. Matos and M.L. Ribeiro, Stucky Ltd, Switzerland*
- Determining the optimum scheme layout for the Sombwe hydropower project – *E. Lillie and R. Greyling, Knight Piésold Consulting, South Africa*

## Monday 15 October - Afternoon

### Session 5: Contracts and procurement

**Chair: Dr J. Plummer Braeckman, University of Cambridge, UK**

- EPC contracting in Hydro: risk or opportunity? – *V. Peloutier, EDF-CIH, France*
- Trivialities with a major impact on a successful project execution: 'Small details' of a hydropower plant construction and erection contract – *B. Geisseler, Geisseler Law, Germany*
- Split contracting approach to hydropower procurement to increase competitiveness – *M. Lacey, Westglen Consult, UK*
- Utilizing Building Information Modelling (BIM) methods to mitigate project risk for all stakeholders in dam and hydropower projects – *C. Hicks, Simem SpA, Italy*
- Power utility asset inspection and evaluation – *M. Parameshwaran, J. Dymond and D. Partridge, Multiconsult, UK*

*(Additional presentations to be announced)*

### Session 2b: Development opportunities - II

**Chair: L. Lia, NTNU, Norway (to be confirmed)**

- Hydropower in the East European region: Challenges and opportunities – *J. Steller, Polish Academy of Sciences, Poland; S. Lewandowski, Polish Hydropower Association, Poland; E. Malicka, Polish Association for Small Hydropower Development, Poland; E. Kremere, ICSH, China; B. Popa, University Politehnica of Bucharest, Romania; P. Punys, A. Stulginskis University, Lithuania*
- The construction of a hydroelectric powerplant as a partnerships lever – *A.P. Moreira and A. Soeiro, EDP - Gestão da Produção de Energia SA, Portugal*
- Integration and optimization of hydrokinetic turbines in existing water infrastructure in South Africa – *C. Niebuhr and M. van Dijk, Pretoria University, South Africa; J. Bhagwan, WRC, South Africa*
- Perspectives of hydropower development in Ukraine – *E. Antonova and I. Tugaeva, Hydroproject Ltd, Ukraine*
- Various innovations in the uses of dams – *F. Lempérière, Hydrocoop, France; A. Nombre, BUCOD, Burkina Faso; L. Deroo, ISL Ingénierie, France*
- Resuspension and control of reservoir sediments by surface waves and point absorbers in large dams: A potential joint venture between dam industry and ocean energy makers – *F.J. Arias, University of Catalunya, Spain*

### Session 6: Hydraulic machinery

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

- Comparison of hydraulic losses for bulb, pit and S-type tubular turbines – *D. Jošt, V. Pirnat, P. Filipli, and A. Škerlavaj, Kolektor Turboinštitut d.o.o. Slovenia*
- Leakage flow effect and labyrinth losses impact on Francis turbine efficiency prediction and performance – *S. Dalla Costa and M. Sartori, Tonello Hydro srl, Italy*
- Investigation of unsteady flow inside the draft tube cone of model Francis turbine using bi-directional piezometric probe – *R. Akulaev, A. Kaznacheev, I. Kuznetsov and Y. Kuznetsov, PJSC Power Machines, Russia*
- Reliable prediction of pressure pulsations in the draft tube of a Francis turbine at medium and deep part load: A validation of CFD-results with experimental data – *J. Schiffer, Jaberg & Partner, Austria, H. Benigni and H. Jaberg, TU Graz, Austria; M. Ehrengruber, WWS Wasserkraft, Austria*
- Comparison of high and low pressure systems in hydraulic speed turbine regulation – *H. Botelho Le Grand and T. Kiiso, Bosch Rexroth AG, Germany*
- Water dynamic pressure measurements help with better hydro-turbine-generator operation management – *Mark Snyder and Ryszard Nowicki, Bently Nevada LLC, Poland*
- High loaded PEEK coated bearings: Measurements at hydro powerplant – *P. Neubauer, O. Berchtold, M. Spiridon and A. Schubert, GE Renewable Energy, Switzerland*
- Experience in developing and operating antifriction materials for the blade turning mechanism of ecologically clean Kaplan turbines – *R.N. Shakirov, S.Y. Ilin and O.V. Morkin, PJSC Power Machines, Russia*
- Oil to water lubricated turbine bearing conversions – *J. Thornhill and R. Strickland, Wärtsilä Seals & Bearings, UK; J. Druck, American Hydro, USA*
- Hydro lubricants: Water-based lubricants for hydropower applications – *B. Vengudusamy, E.V. Hoersten, M. Schweigkofler and M. Kuhn, Klüber Lubrication München SE & Co. KG, Germany; W. Litwin, Gdansk University of Technology, Poland*
- Water lubricated main shaft bearings: Modern solution for hydropower industry – *W. Litwin, Gdansk University of Technology, Poland; I. Matsuoka, Kemel Co, Japan; N. Hirata, Mikasa, Japan*
- Noppikoski hydropower plant: Experience from design, assembly and commissioning – *J. Veselý and F. Ambrož, CKD Blansko holding a.s., Czech Rep*
- Spherical valves for the Polish Porabka-Zar pumped-storage plant: Interests and experiences from design, manufacturing, assembly and commissioning – *O. Klusák, M. Krupa and F. Ambrož, CKD Blansko holding a.s., Czech Rep*
- A challenging puzzle to extend the runner lifetime of a 100 MW Francis turbine – *V. Hasmatuchi J. Decaix and C. Münch-Alligné, HES-SO Valais, Switzerland; M. Titzschkau, Kraftwerke Oberhasli AG, Switzerland*
- Technology for increasing power production of a 48 MW Deriaz turbine after 50 years in operation, with only blade replacement – *R. Suzuki, H. Kikuta and M. Nakai, Voith Fuji Hydro K.K., Japan*

# CONFERENCE SESSIONS

## Session 7: Civil engineering – Design and construction II

**Chair: Dr K. Laksiri, Ceylon Electricity Board, Sri Lanka**

- Why BIM is the future of civil design and construction of hydropower plants: Examples and methodology from large Norwegian hydropower – *D. Gomsrud, B.Rising Nesje and H.B. Smith, Multiconsult Norge AS, Norway*
- Moglice hydropower project, Albania: Construction design experience – *D. Tirunas, AF-Consult Switzerland; A.B. Victor, Statkraft AS, Norway*
- Engineering design and construction of 112 m-high concrete gravity dam of Mangdechhu hydro electric project, Bhutan – *A.K. Mishra, R.K. Chaudhary and I. Ahmed, Mangdechhu Hydroelectric Project Authority, Bhutan*
- Cutoff wall design and performance for two challenging embankment dam foundations – *X. Ducos and P. Agresti, Artelia Eau & Environnement, France*
- Achieving enhanced resource utilization: Lessons learned from our new 100 MW hydropower plant construction in 2 years – *E. Erlingsson and G.T. Gudmundsson, Landsvirkjun Power, Iceland; A. Kristinsdóttir and D. Georgsson, Landsvirkjun, Iceland*

## Session 8: Commercial implications of the changing role of hydro (Panel discussion)

**Co-Chairs: C.R. Head, Consultant, UK; and M. McWilliams, McWilliams Energy, UK**

As renewables become an increasingly important element in many power systems, the role of hydropower is rapidly changing. The challenge is to reflect this versatility in the commercial arrangements that are needed to induce private investment in optimal developments. This Panel session will be based on the following three short presentations, followed by discussion.

- Can auctions monetise ancillary services? – *M. McWilliams, McWilliams Energy, UK*
- Hydro concessions: Maximizing the national benefit – *B. Leyland, Consultant, New Zealand*
- Financing for project sustainability – *P.J. Rae, P.J. Rae Consulting, Canada*

## Session 9: Potential, plans and project implementation

**Chair: H.I. Aker, Dolsar Engineering, Turkey**

- Yalong river hydropower development and innovations – *Yunhua Chen, Yalong River Hydropower Development Company, Ltd., China*
- The 1870 MW Gibe III scheme: The unique Ethiopian way to develop a major hydropower project from identification to commissioning – *Azeb Asnake, EEP, Ethiopia; V. Boinay, J. Binquet and P. de Barmon, Tractebel Engineering SA, France; P. Ravetta and S. Amodeo, ELC Electroconsult SpA, Italy*
- Baleh hydroelectric project: Planning, challenges and preparation – *Tan Chuan Ngan, C. Teo Ching Shi and Goh Chee Hui, Sarawak Energy Berhad, Malaysia*
- 'Twin dams' could double the use of rivers for energy production – *F. Lempérière, Hydrocoop, France*

## Session 10: Hydrology, climate and flood management

**Chair: Prof A.J. Schleiss, Hon President, ICOLD**

- Sustainable hydropower development 'part of the solution' toward the UN Sustainability Development Goals: An Assessment of Climate Change Action Goal (SDG 13), Affordable and Clean Energy Goal (SDG 7) – *M.I. Aman. B. Giles and M. Hussain, Sarawak Energy Berhad, Malaysia*
- Climate resilience for hydropower in glaciated catchments: Alps and Andes – *C. Pluess, F. Widmer and G. Micoulet, Alpiq AG, Switzerland, Alpiq AG, Switzerland*
- Impacts of climatic variability on reservoir inflows to Kainji hydropower station, Nigeria and implications for hydropower output – *O.A. Fasipe and C.N. Emeribe, Energy Commission of Nigeria; E.S. Isagba, University of Benin, Nigeria*
- Integrating community-based adaptation mechanisms into national response to hydrologically induced disaster management in Nigeria: An assessment of non-state actors involvement – *C.N. Emeribe and O.A. Fasipe, Energy Commission of Nigeria; E.S. Isagba, University of Benin, Nigeria*
- Water level forecasting in a hydropower controlled river catchment using Artificial Neural Network (ANN): A case-study from South of Norway – *G. Yakoub and J. Leal, Agder University, Norway*
- Nam Theun 1 hydropower plant: Flood management during construction of 180 m high dam – *A. Arnason, Pöyry Switzerland Ltd; M.P. Bieri and S. Martin, Pöyry Energy Ltd, Thailand*

# Tuesday 16 October - Morning

## Session 11: Valuing hydropower and pumped-storage services

**Chair: A. Beckitt, Hydro Tasmania, Australia**

Multipurpose hydropower and pumped-storage schemes are significant contributors to electricity system stability, yet their development often triggers a major regulatory process to be met. Furthermore, for both new and existing projects, their role in providing grid stability and flexibility is not generally valued appropriately, nor compensated adequately. This situation is compounded by two key issues affecting the hydropower sector: the substantial increase in grid penetration by variable renewable energy (VRE) sources and the moveable impacts of climate change. The work of IEA Hydro is considering the role of hydropower in supporting VREs, and providing flexible energy services to support electricity systems (hydro balancing), through: Valuing and compensating hydropower and pumped storage for providing grid stability and flexible energy services; and, valuing the role of hydropower in providing climate change adaptation services

- Developing a valuation guidance for pumped storage hydropower – *V. Koritarov, Argonne National Laboratory, USA*
- Review of existing studies on valuing energy services in Japan – *K. Ota, Kansai Electric Power Co, Inc, Japan.*
- Possibilities and challenges for balancing hydropower; Results of the CEDREN Hydrobalance project – *M. Belsnes, SINTEF Energy Research, Norway*
- The value and capabilities of US hydropower – *A. Somani, Pacific Northwest National Laboratory, USA*
- Lessons learned from an assessment of pumped storage schemes in Europe – *M. Takahashi, Kansai Electric Power Co., Inc. Japan; M. Urayama, Japan Electric Power Information Centre, Inc. Japan; N. Nielsen, Kator Research Service, Australia*
- Can Tasmania become a 'battery for the nation' in Australia? – *A. Beckitt, Hydro Tasmania, Australia*
- Climate change adaptation to constrain floods through cascade system expansion and pumped-storage development. a Norwegian river system example – *F. Arnesen and T. Jensen, NVE, Norway*
- Panel discussion: Valuing hydropower and pumped-storage energy services, led by Alex Beckitt (Hydro Tasmania, Australia)

## Session 12: Innovative technology

**Chair: L. Deroo, ISL, France**

- High definition wide angle imaging of underwater civil structures in hydroelectric undertakings – *W.F. Jardim, State University of Campinas, Brazil; L.F. Zara, University of Brasilia, Brazil; B.P. Rocha and M.A. Jardim, Venturo Environmental Consulting, Brazil*
- Development of nanostructured copper-based anti-fouling coatings on stainless steel for freshwater applications – *J. Krasucki and K. Grabowiecki, CIM-mes Projekt Sp.z o.o, Poland; Z. Buczko and E. Osuchowska, Institute of Precision Mechanics, Poland*
- A smart low-cost approach for remote surveillance of small hydro – *F. Tartaro, M. Lupo and S. Iorda, Hydro Energia S.r.l., Italy*
- Hydro-optic UV technology provides non-chemical environmentally friendly approach to biofouling control in hydroelectric facilities – *Y. Rozenberg and Y. Abramovich, Atlantium Technologies, Israel*
- Acoustic monitoring system based on a safe and secure cloud approach – *C. Steinmassl and A. Jung, Voith Hydro Holding GmbH & Co. KG, Germany; P. Eisen, Voith Digital Solutions GmbH, Germany*
- Direct-on-line synchronous permanent magnet generator with a hybrid rotor for small hydropower plants in Finland – *A. Parviainen and Y. Alexandrova, Axco Motors Ltd, Finland; K. Kamiev, The Switch (A Yaskawa Company), Finland; G. Fornasa, Zeco di Zerbaro e Costa e C Srl, Italy*
- Information-Gap Decision Theory (IGDT): A new promising method for management of uncertainties in hydropower projects: Case Study – *F. Oberrauch, Pöyry Switzerland Ltd, Switzerland; A. Schleiss, EPFL, Switzerland*

## Sessions 13: Civil works – Safety I

**Chair: M. Rogers, President, ICOLD, and Stantec, USA**

- Monitoring of the embankment dams at the Upper Atbara hydropower plant in Sudan – *Y. Scheid and F. Zöllner, Lahmeyer International GmbH, Germany; M. Mukthar, Ministry of Energy and Dams, Sudan*
- Implemented solutions to enhance the safety of the alluvial foundation of the Crestuma-Lever dam – *I. Fernandes, C. Lima, M. Queralt, EDP-Gestão da Produção de Energia, Portugal; L. Caldeira and L. Miranda, LNEC - National Laboratory for Civil Engineering, Portugal*
- Intelligence from the underground: Improving dam safety and hydropower plant performance – *R. Kerschbaum, Valmet GesmbH, Austria; S. Ylönen, FinMeas, Finland*
- Analysis of tensile stresses arising in the concrete slab of CFRDs in seismic areas – *E. Catalano, R. Stucchi and R. Crapp, Lombardi Engineering Ltd., Switzerland; R. Basso, Lombardi Engineering Ltd, Chile*
- The Nam Ngum 3 CFRD dam: An advanced numerical analysis to prevent upstream face damage – *F. Andrian, M Monkachi, N. Ulrich and X. Ducos, Artelia Eau & Environnement, France*
- Getting prepared for the next decades: Strengthening of dam and dykes of Angat multipurpose scheme – *S. Moll, Pöyry Energy Ltd. Thailand; S. Ehlers, Pöyry Switzerland Ltd, Switzerland*
- Rehabilitation grouting at Mosul dam, Iraq – *R. Granata and C. Crippa, Trevi SpA, Italy*

## Sessions 14: Fish protection

**Chair: Prof B. Pelikan, Univ. of Nat. Resources and Applied Life Sciences, Austria**

- Fisheries and hydropower: A collaborative approach to best practice design – *P. Kibel, T. Coe and A. Fryer, Fishtek Ltd, UK*

# CONFERENCE SESSIONS

- LIFE4FISH - An ambitious programme targeting silver eel and salmon smolt protection at six successive hydropower plants along the river Meuse (BE): First results and presentation of the programme 2018-2022 – *D. Sonny and J. Beguin, Profish Technology, Belgium; and R. Roy, Profish Technology, France*
- Downstream fish passage at hydropower plants by fish guidance structures – *I. Albayrak, C. Beck, J. Meister, H. Fuchs and R. M. Boes, Swiss Federal University of Technology (VAW) ETH Zurich, Switzerland*
- Minimization of barrier effect of dams at fish communities: Case study of the Vilariça compensation habitat – *R. Moura, J.M. Oliveira, L.M. Carvalho and T. Rocha, EDP Gestão da Produção de Energia, S.A. Portugal*
- Fish friendly Kaplan turbine technology applied in a European turbine refurbishment project – *M. Lang, Michelcic, P. Romero-Gomez and S. Weissenberger, Andritz Hydro GmbH, Austria*
- Sauveterre fish pass and small hydropower plant – *A.Schaeffer, H. Chapuis, N. Leignier and C. Mulot, CNR, France*

## Session 15: Civil works – Safety II

**Chair: Dr R. Charlwood, Consultant, USA**

- Special dam safety features at Uganda dams: Case studies of the 183 MW Isimba and 600 MW Karuma hydro plants – *F. Wasike and R. Ariho Ayebare, UEGCL, Uganda*
- Improving dam safety across Indonesia – *T. Hartanto, Ministry of Public Works and Housing, Indonesia*
- Towards a more detailed evaluation of the consequences of dam failure and a more realistic dam safety classification – *G.H. Kiplesund and C. Almestad, Multiconsult Norge AS, Norway; A.M.H. Ruud, Statkraft Energi AS, Norway*
- Managing landslip risk during the construction of an 80 m-high hydropower dam in Albania – *T. Blower and S. Davidson, Mott MacDonald Ltd, UK*
- Managing the alkali aggregate reaction to the concrete at Dinas dam – *P. Mason, Stantec Ltd, UK*
- Extending the lifetime of Skagen hydro plant subjected to alkali-aggregate reaction by stabilizing the foundations of electromechanical parts – *A. Reynaud, H. Thorsen and S. Johansen, Norconsult AS, Norway; J. Bruheim, Hydro Energi AS, Norway*

## Session 16: Transboundary projects

**Chair: J-M. Devernay, Consultant, France**

- Development opportunities and regional collaboration in Energy between Bhutan, Bangladesh, India and Nepal (BBIN) – *Dasho Chhewang Rinzin, Bhutan*
- An organization for hydropower exporting countries? Maybe not a bad idea – *C.R. Head, Consultant, UK*
- The Fomi multipurpose scheme: A cross-border project and a shared vision of water resources – *C. Fargette, J.M. Bocquet, O. Amogu and L. Aljounaidi, Tractebel, France; A.S. Conde, Ministry of Energy and Hydraulics, Guinea*
- The Gabon-Congo interconnection project: Infrastructures development and planning strategies under PEAC's aegis – *G. Pietrangeli, S. Galantino, I. Colucci and R. Vignoli, Studio Ing G. Poetrangeli s.r.l, Italy; A. Ngari, Ministry of Energy and Hydraulic Resources, Republic of Gabon; J-M. Iwandza, Ministry of Energy and Hydraulics, Republic of Congo*

*(Additional presentations to be announced)*

## Session 17: Hydro and the environment

**Chair: Prof M. Aufleger, University of Innsbruck, Austria**

- Sustainable design in renewable energy projects through BIM – *F. Fougner and C.K. Sandvik, Norconsult AS, Norway*
- Improvement of EIA methods for large reservoirs by using network thinking analysis approach: A case study of Azad dam, Iran – *M. Nikravan, M. Azizi, A. Kiaei, M. Payami, M. Sadeghi, A. R. Zarrati, Amirkabir University of Technology, Iran; A. Amini, Y. Fessler, J. Martin, L. Müller, A. Sauvin, N. Schmid, A.J. Schleiss, EPFL, Switzerland*
- Multi-criteria analysis for the assessment of the environmental and social impacts of hydropower plants: Twenty years of history and some recent developments – *G. Frosio and L.L. Papetti, Studio Frosio S.r.l., Italy*
- Xayaburi hydropower project: New standards in run-of-river hydro powerplant design – *P. Diggelmann, Pöyry Switzerland Ltd, Switzerland; K. Sierotzki Pöyry Energy Ltd.,Thailand; M. Raeder, Xayaburi Power Company Ltd, Thailand*

# Tuesday 16 October - Afternoon

## Sessions 18: Pumped storage

**Chair: B. Trouille, Mott Macdonald, USA**

***(a) Technical aspects***

- Load rejection field test of large pump-turbine and inversion calculation analysis in transient process – *Gaohui Li, Shunyi Chen, Delou Wang and Tianchi Zhou, PowerChina Huadong Engineering Corporation Ltd, China*
- Numerical design of high pressure concrete lining and application to a pumped-storage hydropower plant under construction – *J.-R. Lherbier, P. Agresti and J. Perello, Artelia Eau & Environnement, France*
- Advanced control and new testing facilities allowing transient sequences of hydro storage plants – *A. Rochas, P-Y. Lowys, J.M. Verzeroli and R. Guillaume, GE Renewable Energy, France*
- Frades II: Europe largest and most powerful doubly fed induction machine: A step ahead in variable speed machines – *T. Hildinger, Voith Hydro Ltda, Brazil; L. Ködding, A. Kunz and H. Henning, Voith Hydro Holding GmbH & Co. KG, Germany; Eilebrecht, Voith Fuji Hydro K.K. Japan*
- Live test results of the joint operation of a 12.5 MW battery and a pumped-hydro plant – *R. Bucher and A. Schreider, Lahmeyer International GmbH, Germany, and S. Lehmann, Engie Deutschland GmbH, Germany*

***(b) The case for pumped storage***

- The benefits of pumped storage hydro to China – *LI Xinyu, YE Jianqun and Huang Ziping, Power China Huadong Engineering Corporation Limited, China, Zhang Yannan, Shi Leiming, Yao Chenchen and Yang Lifeng, PowerChina Huadong Engineering Corporation Ltd, China*
- Pumped-storage benefits to the grid: Case study in South Africa – *C.L.E. Van Dongen and R.S.J. Van Wyk, AECOM, South Africa; B. Bekker, Eskom, South Africa; J. Wright, CSIR, South Africa*
- Enhancing power generation at 7 Forks hydro dams cascade through pumped-storage scheme – *J.A. Swabu and T.M. Bakabsha, Kenya Electricity Generating Co Ltd, Kenya*
- The value of pumped storage plants in the context of integrating the united power system of Ukraine with the European Power System ENTSO-E, Ukraine – *Y. Landau and I. Stashuk, Ukrhydroproject PrJSC, Ukraine*
- Pumped-storage atlas of Australia – *M. Moeini, Entura Hydro Tasmania, Australia*
- High power electronics innovation perspectives for pumped-storage powerplants – *M. Basic, P.C.O. Silva, and D. Dujic, EPFL, Switzerland*

## Session 19: Civil engineering – Materials

**Co-Chairs: Prof Xu Zeping, CHINCOLD/IWHR, China; and Dr M.R.H. Dunstan, MD&A, UK**

- Prediction of concrete compressive strength using deep neural networks (DNN) machine learning algorithm – *Yifeng Lin and C. Noret,Tractebel, France*
- Trial mix methodology: One of the effects for changing the properties of RCC in Myanmar, Myanmar – *Zaw Min San, Ministry of Electricity and Energy, Myanmar*
- Gibe III dam: Design of RCC zoning – *A. Pietrangeli, A. Cagiano de Azevedo and G. Pittalis, Studio Ing. G. Pietrangeli Srl, Italy; A. Masciotta, Studio Masciotta, Italy*
- The renaissance of asphaltic cores for embankment dams (ACED) in Europe – *J. Knoop, Walo Bertschinger AG, Switzerland*
- Considering the durability of Polihali dam's rockfill: Past, present and future – *M. Wainstein, Gibb, South Africa; C.N. Gamboa, Tractebel Engineering SA, France; T. Blower, Mott MacDonald, UK*
- Dealing with saprolite as materials and foundations of embankment dams: Case study of the Bagre dam, Burkina Faso – *A. Nombre, BUCOD, Burkina Faso*
- Key technologies for dolomite aggregate dam construction in Longkaikou hydropower station – *Li Xinyu, Y Jianqun and Huang Ziping; PowerChina, Huadong Engineering Corp Ltd, China*
- Are GFRDs the future of rockfill dams? – *P. Perazzo, G. Lilliu and M. Scarella, Carpi Tech, Switzerland*

## Session 20: Multipurpose hydropower

**Chair: A. Palmieri, Water Resources Specialist, Italy**

- Introductory talk from Poland's Ministry of Maritime Economy and Inland Navigation
- Inland waterways combined with hydropower plants in Romania - *Bogdan Popa, University Politehnica of Bucharest, Romania and Florica Popa, University Valahia of Targoviste, Romania*
- The Włocławek barrage on the Lower Vistula – *W. Majewski, Institute of Meteorology and Water Management, Poland*
- Small hydro on inland navigations: An ideal partnership – *N. Crosby, KGAL Consulting Engineers Ltd, UK*
- Presentation on technical and economic aspects of the Rio Madeira scheme, Brazil/Bolivia – *(speaker to be announced)*
- *The new Assiut barrage and hydropower plant near completion, Egypt - E. Failer and L.Römer, Lahmeyer International, Germany; M. Abass, RGBS, Egypt; M.A. Kader, HPPEA, Egypt*

## Session 21: Social aspects

**Co-Chairs: L. Nielsen, IEA, Australia; Dr S. Sparkes, Statkraft, Norway**

- Infrastructure development induced resettlement - Does it happen?: Lessons learnt from the Karuma hydro project – *J. Asiimwe, Geotropic Consults Ltd, Uganda; M. Otim, UEGCL, Uganda*
- Resettlement and community support programme of the Bui hydroelectric project – *M.W. Salifu and F. Oware, Bui Power Authority, Ghana*
- The use of mobile devices and applications for data collection in large resettlement action plans: The case of Kandadji dam in Niger – *N. Tomczak, R. Brito and C. Meunier, Tractebel Engineering SA, France; A. Harouna, Kandadji Dam Agency, Niger*

# CONFERENCE SESSIONS

- Innovative approaches to financing local development for communities affected by hydropower reservoirs: Guinea as a case study – *J. Skinner, Global Water Initiative West Africa, UK; B. Trouille, Mott MacDonald,USA; J. Klundouno, IUCN Water Programme, Senegal; D. Lansana Kourouma, CEMED, Guinea*
- Development initiatives and CSR: How much is enough? – *S. Sparkes, Statkraft AS, Norway,*
- Programme management in developing countries: A holistic approach to capacity building and social upliftment – *M.R. Matchett, CDM International Inc. Lesotho*
- Social aspects of the 231 MW Chamera III hydro station in India – *P. Kaul, National Hydroelectric Power Corporation (NHPC), India*
- Developments in stakeholder communications in Côte d'Ivoire – *D.G.M. Kouame and E.M. Koffi Kouadio, CIE, Côte d'Ivoire; M.L. Kouakou, Ozone Initiatives Plus, Côte d'Ivoire*

## Session 22: Spillways

**Chair: Dr P.J. Mason, Stantec, UK**

- Kariba plunge pool rehabilitation – *I. Stojnic, C. Yilla, A. Amini, G. De Cesare and A.J. Schleiss, LCH, EPFL, Switzerland; E. Bollaert, AquaVision Engineering Ltd, Switzerland; S.Z. Mhlanga and D.Z. Mazvidza, Zambezi River Authority, Zambia*
- Grand Ethiopian Renaissance Dam design of stepped spillway – *G. Pietrangeli, A. Bezzi, G.M. Beltrami and S. Marfurt, Studio Ing. G. Pietrangeli Srl, Italy*
- Spillway at the Deg dam: Innovative solutions developed and implemented, Norway – *L. Lia and K. Belete, NTNU, Norway; R. Guddal and K. Vereide, Sira-Kvina Power Company, Norway*
- Consolidation of the Komani dam scour area – *H. Obermoser and M. Friedrich, AF-Consult, Switzerland; F. Bundo, KESH, Albania*

## Session 23: Reservoir operation

**Chair: Prof B. Popa, University Politehnica of Bucharest, Romania**

- Optimization of a multi-purpose multi-reservoir system in Sudan – *Dr J. Moedinger and Dr B. Dibrani, Lahmeyer International, Germany*
- Increase in performance of a hydropower plant cascade as exemplified by Bratsk and Ust-Ilimsk hydropower plants: Utilization of digital twins for accelerated implementation and analysis of expected results – *S. Fomin and V. Lelin, Rakurs Engineering LLC, Russian Federation*
- Practice of flood control operation mode for the Three Gorges reservoir's optimized operation under climate change – *Li Shuai, Gao Yulei, Zhou Man and Wang Hai, China Three Gorges Corporation, China*
- Study of rehabilitation plan of bottom outlet service and emergency gates for the de-sedimentation tunnel at the Shahid Abbaspour dam and powerplant – *M. Ghaderi, Fanavari Novin Niroo Co, Iran*

## Session 24: E&S insights from Nam Theun 2, after 10 years of operation

**Chair: D. Fields, The World Bank, Lao PDR**

Ten years after impoundment, the Nam Then 2 project in Lao PDR continues to support local development and wider economic growth. As the World Bank's first major investment in a hydro project following the World Commission on Dams report, the NT2 scheme has often been referenced as a template for successful environmental and social management. This special session will consist of presentations and a panel discussion by key project staff (past and present) to reflect on the successes and challenges during the past decade. Particular emphasis will be on:

- The key obligations that have been met and the associated costs and management structures employed to achieve these.
- A synthesis of socio-economic data, including the Living Standard Measurement Survey and the opinions of the Environment and Social Panel of Experts.
- The 'transition period', which includes closure of resettlement implementation and the 'take off ramp' for the Government.

# Wednesday 17 October - Morning

## Session 25: Powerplant safety and cyber security

**Chair: O.A. Westberg, Consultant, Norway**

- Cyber-security in hydropower plants' penetration test and security assessment: A 'Band of Brothers' – *W. Voigt and S. Heiser, Lahmeyer International GmbH, Germany*
- Hydraulic transient survey at Cleuson-Dixence with real-time hydro-clone monitoring system – *C. Nicolet, M. Dreyer, A. Béiun and E. Bollaert, Power Vision Engineering Sàrl, Switzerland; S. Torrent, Hydro Exploitation SA, Switzerland; J-D. Dayer, ALPIQ AG, Switzerland*
- Hydro powerhouse drainage and dewatering systems – *J.H. Gummer, Hydro-Consult Pty Ltd, Australia*
- A review of Lao electric power technical design standards (LEPTS) – *Sychath Boutsakitirath, Ministry of Energy and Mines, Lao PDR; P.C. Jose, Entura Hydro Tasmania, India; C. Grant, Multiconsult UK Ltd*

## Sessions 26: Upgrading and refurbishment – Civil works

**Chair: Dr Y. Thanopoulos, Consultant, Greece**

- Underwater rehabilitation of Studena buttress dam with an upstream geomembrane – *A. Scuero, G. Lilliu and F. Wagner, Carpi Tech, Switzerland*
- Construction of a barrier dam to increase the volume of the upper reservoir of the Tashiyk pumped-storage plant in the context of the operation of the South Ukrainian nuclear plant – *A. Prymak and C. Ryzhyi, Ukrhydroproject PRJSC, Ukraine*
- Rehabilitation of a concrete-faced rockfill dam (CFRD): Dam Smørøya, Norway – *B. Kiplesund, B. Skatvold and B. Dalsnes, Sweco Norge AS, Norway*
- Asbestos in Hydropower rehabilitation projects: Stucky Ltd's recent experience – *D. Kelleher and P. Droz, Stucky Ltd, Switzerland*
- Leakage detection at hydro plants – *A. Hughes, Consultant, UK*

## Sessions 27: Small hydro I

**Co-Chairs: E. Malicka, TRMEW, Poland; V. Denis, Mhylab, Switzerland**

- The negative aspects of classifying the hydropower plants according to their installed capacity – *A.Adamkowski, M. Lewandowski and S. Lewandowski, Polish Academy of Science, Poland; S. Lewandowski, Polish Hydropower Association, Poland*
- Leap-frogging the hydro capacity gap – *P. Maher, Hydromatch Ltd, UK*
- Small-scale hydropower for rural electrification – *R.T. Seabi and M. van Dijk, University of Pretoria, South Africa; J.N. Bhagwan, Water Research Commission, South Africa*
- Small and low head hydro: Isolated schemes for rural electrification in Kenya – *R.K. Langat and P.M. Mukeu, Kenya Electricity Generating Company, Kenya*
- Nigerian rural areas and the quest for hydro-kinetic turbine water wheel as a renewable energy harvester – *I. A. Masud and Y. Suwa, Shibaura Institute of Technology, Japan*
- Concept for gentle hydropower use at ecologically sensitive sites – *B. Brinkmeier and M. Aufleger, Innsbruck University, Austria*
- Sustainable supply chain in hydropower development: A case study of a 10 MW run-off scheme – *D.Z.B.A Kashim and M.F.B. Ibraham, Sarawak Energy Bhd, Malaysia*

## Session 28: Gateworks and penstocks

**Co-Chairs: Paulo Erbisti, Consultant, Brazil; B. Leyland, Consultant, New Zealand**

- Some preliminary remarks on the experimental results of the laboratory tests on high-head gates – *P. Zenocchini and F.M. Renna, ATB Riva Calzoni, Italy; U. Fratino, D. Malcangio and G. Peschechera, Polytechnic University of Bari, Italy; A. Pagano, CNR-IRSA, Italy*
- Linth-Limmern hydro storage station downstream gate: Design for safety and technical challenges – *F. Lepoutre, C. Chatron, R-M. Lakehal and L. Morel, GE Renewable Energy, France*
- Benefits of saturation diving for dam bottom outlet rehabilitation – *J. Brunet-Manquat and J. Bordignon, Hydrokarst, France*
- Artvin bottom outlet aeration: An innovative arrangement – *P-A. Chambas, M. Comelli and P. Djordjalian, GE Renewable Energy, France*
- Dams, siltation and low-level outlets – *B. Leyland, Consultant, New Zealand*
- Penstock leak detection system – *R. Wimmer and R. Bachmann, Rittmeyer Ltd, Switzerland*
- Extending the lifetime of the penstock at a pumped-storage plant by surface mechanical treatment of the welded joint – *B.Chanzy and M. Akrout, Tractebel Engineering SA, France*
- Fitness for service of penstocks made of T-1 high-strength steel – *O. Chène, E. Papilloud and N. Rouge, Alpiq SA, Switzerland; A. Kronig, Grande Dixence SA, Switzerland*

## Session 29: Capacity building and training

**Chair: A. Nombre, Consultant, Burkina Faso**

- Transformation expected in the development of small hydro in sub Saharan Africa energy scenario: Role played by UNIDO and the Universities through capacity building – *J. Kenfack, University of Yaoundé, Cameroon; R.P. Singh, UNIDO, Austria*
- Hydro generator stator assembly training to enhance operations and maintenance: Karuma hydropower plant – *I.P. Sedirimba, J.C. Akiror, and O. Aryanyijuka, UEGCL, Uganda*
- Engineers' training on T&D in low-income countries: A case study in Africa – *S. Galantino, I. Colucci and R. Vignoli, Studio Ing. G. Pietrangeli Srl, Italy*
- Training programme of a hydropower plant in Sudan – *Feng Xingcheng, Liu Changdong, li Hui, Yang Yan, Li Yanzhou and Song Peng, China Three Gorges Corporation, China*
- Capacity building in Uganda in preparation for operation and maintenance, UEGCL, Uganda – *R. Lutaaya, J.C. Akiror, G.T. Muteweka and H.E. Mutikanga, UEGCL, Uganda*
- Toward the development of small hydro plants in Kenya: The impact of a training course at SERC – *I.W. Maranga and S.O. Odera, Strathmore Energy Research Center (SERC), Kenya*
- 'Operation Starship' – *R. Stearnes, Tacoma Power, USA*

# CONFERENCE SESSIONS

## Session 30: Upgrading hydro plants

**Chair: W.D. Hakin, Manitoba Hydro International, Canada**

- Refurbishment of hydropower plants in Kenya and Zambia: The challenges and the successes – *S. Kaleb and J. Sudarevi , Koncar Power Plant and Electric Traction Engineering Inc., Croatia; R.M. Lacey, Westglen Consult Ltd, Scotland*
- Optimization of Francis turbine start up procedure to extend runner lifetime – *Z. Čepa, G. Ališ and D. Dolenc, Litostroj Power, d.o.o., Slovenia*
- Repowering existing hydropower plant infrastructure for the next 70 years: Retrofit of the St. Anton powerplant with increased power output and flexibility – *S. Höller and H. Jaberg, Graz University of Technology, Austria; P. Pinamonti and P. Frasnelli, Eisackwerk S.r.l., Italy; A. Dengg, Studio G GmbH, Italy*
- Increase hydropower plant performance and flexibility: The Cabril hydropower plant repowering case – *M.R.C.M. Pacheco and J.E.S. Correia, EDP Gestão da Produção de Energia, SA, Portugal*
- Renovation of hydraulic powerplant: How to select the best technical options? – *C. Landry and C. Nicolet, Power Vision Engineering Sàrl, Switzerland; J. Gomes, L. Andolfatto and F. Avellan, EPFL Laboratory for Hydraulic Machines, Switzerland; C. Todde, Groupe E SA., Switzerland*
- A study on the timely modernization plan of aged hydropower plant – *B-J. Jun, J-H. Yin, B-J. Kim, J-P. Gil and E-T. Jung, K-water, Republic of Korea*
- Itaipu hydropower plant technological update: Challenges and main aspects of the basic design – *G. Nakamura, G.S.C. Rocha, C.A. Souza and E. Murasaki,WorleyParsons, Brazil; J.A.R. Sanchez, J.S.M. Escober, J.A.S. Stransky, H.A.L. Samaniego, and V.F.O. Casco, Itaipi Binacional, Paraguay; J.H.H. El Khouri, E.M. Finco, A. Mebielli, J.R. Da Silva, B.M. Fontes and C.C. Martins, Itaipu Binacional, Brazil*
- Secondary systems refurbishment and problems concerning the control system upgrade at the Fala hydropower plant– *M. Rebernik and D. Taljan, Drava River Power Co d.o.o., Slovenia*

## Session 31: Small hydro II

**Co-Chairs: Prof D. Williams and G. Black, Learning Hydro, UK**

- Kota 2 small hydro: A fit-for-purpose solution – *M. Moeini, Entura Hydro Tasmania, Australia*
- Efficient evaluation and ranking of eight hydropower sites in Indonesia based on HPC and a multi criteria analysis – *T. Mohringer, T. Efthymiou and P. Schäfer, Fichtner GmbH & Co. KG, Germany; D. Cahya and N. Ardhiyangga, PT PLN (Persero), Indonesia*
- Upgrading control systems of small hydropower plants in Poland: The challenges and the achievements – *D. Downar and M. Porzeziński, Institute of Power Engineering, Poland*
- Hydrokinetic turbine farm on the Rhône river: Demonstrator for the ecology and energy transition – *A. Khaladi, N. Perez and E. Dubost, Compagnie Nationale du Rhône, France, J-F. Simon and T. Jaquier, HydroQuest, France*
- Predictive maintenance in small hydro through condition monitoring: Opportunity and complexity – *S. Mazzoleni and L.L. Papetti, Studio Frosio S.r.l., Italy*
- Facing over-pressure and over-speed issues during the commissioning of hydropower plant – *M. Baggio, R. Clementi, A. Di Vittorio and F. Pasut, S.T.E. Energy SpA, Italy*

## Session 32: Sediment

**Chair: Dr C. Auel, ILF, Austria**

- Evolution of reservoir flushing and emptying practices in a cascade of large reservoirs across several decades, EPFL, Switzerland – *P. A. Manso, S.L. Vorlet, S. Guillén-Ludeña and G. De Cesare, EPFL ENAC IIC PL-LCH, Switzerland; J. Stamm, B. Schwegler and A.U. Fankhauser, Kraftwerke Oberhasli AG, Switzerland*
- Sediment management in Northern India– *S. Bhardwaj and V. Kumar, SJVN Ltd, India*
- Reducing economic risks in hydropower developments through independent satellite based turbidity and sediment measurements in the river systems of Georgia – *T. Heege, Eomap GmbH & Co KG, Germany; D. Kelleher, Stucky Ltd, Switzerland*
- Dealing with sediments at hydropower schemes: design of desanding facilities and bypass tunnels – *R. M. Boes, D. F. Vetsch, M. Müller-Hagmann and I. Albayrak, Swiss Federal Institute of Technology (VAW) ETH, Switzerland; C. Paschmann, Spiekermann Consulting Engineers, Germany*
- Floating modular unit for controlled sediment flushing regarding sediment size and concentration – *B. Mongiardino, Open Mechanics Research Ltd, Italy; G. De Cesare, LCH, EPFL, Switzerland*
- Energy requirements for reservoir maintenance dredging – *M.O. Winklelman, A. Stout and O.P Marcus, Damen Shipyards, The Netherlands*
- Implementation of an automic SediCon dredge into an existing forebay in Chile – *I. Mora and A. Jiménez, SediCon SA, Costa Rica; J. Hernández, Colbun SA, Chile*

# Wednesday 17 October - Afternoon

## Session 33: The Must Renewable Energy programme

**Chair: C. Almestad, Multiconsult, Norway**

Multiconsult is highly committed to attracting students to the hydropower business and to showcase the life of a hydropower engineer. In addition to supporting and supervising Bachelor- and Master's level theses, the initiative 'Multiconsult for Students' (Must) aims to recruit talented and committed students to bring new knowledge to the company. Every summer, Multiconsult's Department of Energy engages three to four students for the Must Renewable Energy International Hydropower summer programme. The 2018 project involves a revised pre-feasibility study of the Usueni hydro scheme in Kenya. The clients are Malthe Winje AS and Empower New Energy. The Usueni project is in Kyuso sub-county of Kitui County, about 280 km northeast of Nairobi. The hydropower plant uses water from Tana river which has a catchment area of approximately 85 000 km$^2$.

The Must project is divided into three phases, each lasting for two weeks:

- Desk study, including evaluation of available material and planning for field investigations
- Field survey at Kikuletwa river, Tanzania
- Evaluation of gathered data and completion of the report.

The four students will report each area of this work during the session as well as reflect on the general experiences gained from their first overseas project.

## Session 34: Identifying and developing the potential of hidden hydro (IEA session)

**Chair: N. Nielsen, IEA-Hydro, Australia**

In many countries a significant number of the hydro projects which are most economic have already been developed. However, there are opportunities for new hydropower by utilizing unharnessed flow and head at both new and existing project sites, as well as improving the performance of existing facilities. These can be categorized into: Updating and refining existing hydropower inventories to seek additional potential; Improving the performance of existing facilities; and, Adding power to non-powered dams, distribution infrastructure such as irrigation schemes and water supply facilities. The work of IEA Hydro is to understand the potential for hidden hydro not already addressed through traditional approaches to hydro development planning and identify improved development approaches through technology innovation, regulation policies and deployment measures

- Needs for identification of the potential for hidden hydro not addressed through traditional approaches to hydropower development planning in Japan – *Y. Miyanaga, CRIEPI, Japan*
- Resource assessment approaches for hidden hydropower in the USA – *P. O'Connor, Oak Ridge National Laboratory, USA*
- Experience gained from adding power to a water supply scheme in Norway for the transfer of knowledge – *F. Arnesen and T. Jensen, NVE, Norway*
- Upgrading small hydro units with an improved design at an irrigation scheme in the USA – *A. Eaton and J. Chaplin, Gilbert, Gilkes and Gordon Ltd., UK*
- Overview of hidden hydro in Japan – *H. Murashige, JEPIC, Japan*
- A Review of innovative hidden hydro projects in southern Australia – *N. Nielsen, IEA Hydro, Australia*

Discussion: Identifying and developing the potential of hidden hydro, led by N. Nielsen, IEA Hydro

## Session 35: Operation and maintenance

**Co-Chairs: H. Obermoser, AF-Consult, Switzerland; F. Coelho da Rocha e Silva, Senior Advisor for REN, Portugal**

- MonitorX: Experience from a Norwegian-Swedish research project on industry 4.0 and digitalization applied to fault detection and maintenance of hydropower plants – *T.M. Welte, Sintef Energy Research, Norway; M.H. Nielsen, Energy Norway; M. Adsten, Energiforsk, Sweden*
- Predictive maintenance and life cycle estimation for hydro power plants with real-time analytics – *A. Willersrud and A. Åsnes, Hymatek Controls, Norway; F. Kretz, Rainpower, Norway; L. Imsland, NTNU, Norway*
- Cavitation monitoring in hydraulic turbines – *J. Necker and E. Taghi Zoghi, Voith Hydro Holding GmbH & Co. KG, Germany; J.M. Nieto Diaz, Voith Digital Solution, Germany*

## Session 36: Electrical engineering

**Co-Chairs: R. Bucher, Lahmeyer International, Germany; Prof J-J. Simond, EPFL, Switzerland**

- A test bench combining real-time comparison between reality and dynamic models of hydro generators and HIL testing – *M. Langevin and A. Bahjaoui, OPAL-RT Technologies Inc., Canada*
- Magnetic thrust-bearing for a 10 MW hydropower generator with a Kaplan turbine – *C.J.D. Abrahamsson, J.J. Pérez-Loya, M. Fregelius, F. Evestedt, J. Bladh and U. Lundin, Uppsala University, Sweden*
- Experimental identification of endwinding mechanical impedances based on continuous vibration measurements – *O. Husnjak and O. Oreškovic, Veski Ltd, Croatia; D. Bojic and N. Vrkic, HEP – Proizvodnja d.o.o, Croatia*
- Challenges of meeting governor response requirements of hydro generating units within primary grid frequency control per Commission Regulation (EU) 2016/631 – *D. Dolenc, M. Klopcar and J. Mazij and J. Gale, Litostroj Power, d.o.o., Slovenia*

## Closing Session: HYDRO 2018

# ACCOMPANYING PERSONS' PROGRAMME

A three-day package of excursions is being organized for accompanying persons during the three days of the Conference. The provisional programme is as follows:

15 October: The Baltic region is home to the largest known deposit of amber, and it has been estimated that forests in the region have created more than 100 000 tons of the material. Gdansk has been the center of amber artistry for hundreds of years.

Accompanying persons will visit a workshop to learn more about the origins of amber, the history of the trade, and to see an expert craftsman at work.

There will then be a short journey by coach to the district of Oliwa, for an organ concert in the cathedral built in the mid-18th century. The famous organ comprises 7876 pipes made of oak, fir, pine and tin. The tour will continue to the nearby town of Sopot, on the Baltic coast, for lunch. Sopot, the 'summer capital' of Poland, is renowned for its art nouveau style houses, beaches, and pier. There will be time for a walk along the sea front after lunch, before the return to Gdansk.

16 October: The group will travel about 40 km from the city, to the picturesque Kashubian Forest area, to see its post-glacial landscape of thick forests and hundreds of lakes and hills. The area is famous for its unspoilt nature, excellent local food and handicrafts. There will be a short walk through a forest to the Wiezyca hill and viewing tower (the highest point on the North European Plain). A visit is then planned to an open air museum, with a chance to learn more about the region. The next stop, after lunch, will be a craft workshop, before the return trip to Gdansk.

17 October: The final excursion planned is to Malbork castle, the largest Gothic defence structure in Europe, constructed in the 13th century. It was originally built by Teutonic knights, a German Catholic religious order of crusaders. It has served as Polish royal residences and was classified as a World Heritage Site in 1997. There will be a tour of the castle, with a chance to see a courtyard full of life-size iron warriors, the chapel, and the corridor of cloisters, and to learn about the history and restoration work on the castle.

The return to Gdansk will be in good time to relax before the Farewell Dinner in the evening.

# SOCIAL PROGRAMME

### Sunday 14 October: Reception for Chairmen and Speakers

After meetings and briefings about arrangements for the conference, at AMBEREXPO, those chairing or co-chairing sessions, and speakers presenting accepted papers will be welcomed to a reception with a buffet supper at the Hilton Hotel, which overlooks the Marina in the old part of the city. Transport will be provided from AMBEREXPO. The Hilton is one of the main HYDRO 2018 where rooms have been blocked. Other hotels where rooms have been reserved are nearby.

### Monday 15 October: Welcome Reception

The Welcome Reception on 15 October will take place in the European Solidarity Centre, a museum and library devoted to the history of Solidarnosc – the Polish trade union and civil resistance movement which marked a major turning point in Poland's history in the late 1970s and early 1980s, and also deeply influenced other eastern European nations. The movement led to former shipyard worker Lech Walesa becoming a national hero, and eventually President of Poland.

Drinks and a light supper will be served, and this informal evening will be an opportunity to catch up with friends and make new contacts in the hydro industry, as well as to learn about Poland's industrial and political history.

### Tuesday 16 October: Networking Party in the Exhibition

When the sessions have ended on the second day of the conference, all participants are invited to an informal party in the exhibition halls, with a chance to sample some famous Polish beer, as well as soft drinks and snacks. The halls will be opening for an extra two hours, to provide an opportunity for all delegates to get around to some of the stands they may have missed during coffee and lunch breaks.

Exhibitors are invited to prepare special demonstrations of equipment, or to welcome key groups of delegates to their stand for drinks and to view material of special interest.

### Wednesday 17 October: Farewell Gala Dinner

The Polish Baltic Frédéric Chopin Philharmonic, on the bank of the Motlawa river, is the largest music institution in the northern Poland. The Farewell Gala dinner, featuring some specialities of Northern Polish cuisine, will take place in the restaurant and foyers of the Concert Hall; it will be preceded by a short classical concert, and a drinks reception.

# POST-CONFERENCE STUDY TOURS

Three options will be available for those wishing to visit some hydro and pumped-storage plants, and associated hydraulic works, in Poland. Detailed planning of the tours is still being finalized, so the itineraries below may be subject to minor change.

## Tour A – One day

For delegates who are short of time but would like to see a major powerplant within a day, Tour A will be a local excursion to the 680 MW Zarnowiec pumped-storage plant. Completed in 1983 and upgraded between 2007 and 2011, it is the largest hydro installation in Poland, housing four 170 MW Francis pump-turbines. There will be a technical briefing at the powerplant, and then a tour, including a visit to the upper reservoir.

There will then be a short visit to the 'Kashubian Eye'. Set in attractive gardens, this is an observation tower offering views over the surrounding countryside.

Lunch will be in a scenic area, with a chance to visit a country manor house, before the bus journey back to Gdansk.

## Tour B – Three days

The first day of this tour will be the same as Tour A, with the groups joining to visit the Zarnowiec pumped-storage plant.

In the late afternoon, on arrival back in Gdansk, the group will continue to the charming seaside town of Sopot (about 20 minutes by road from the centre of Gdansk), to check in to the hotel on the coast where the group will stay for three nights.

On the second day, after breakfast, the tour will leave for a short bus journey to the first in a series of small hydro plants in the Radunia cascade development, operated by Energa and constructed between 1920

and 2005. It is provisionally planned to visit a total of five of the schemes, which are located quite close together. These are: Straszyn (2.45 MW), Rutki (448 kW), Lapino (2.3 MW), Kolbudy and Bielkowo (7.2 MW). The Radunia river is a tributary of the Motlawa, which flows into the Gulf of Gdansk. A total head of 162 m is available along the 103 km-long river, and the nine small plants have a total capacity of 14 MW.

The group will return in the late afternoon, and there will be an option for sightseeing and possibly a concert in a nearby church.

The third day will provide a chance to travel through the Vistula Marshland, to Malbork castle, where some time will be spent sightseeing in this Teutonic Order castle before lunch. In the afternoon the next stop will be the Szonowo lock and small hydro plant, and the final visit will be to the Michalowo small hydro plant.

## Tour C – Three days

After breakfast, the group will depart at around 08.00 hrs for a bus journey of slightly more than two hours, to the 160 MW Wloclawek powerplant on the Vistula river, which is the largest classical hydro plant in Poland. There will be refreshments, a briefing, and a technical tour. The group will then proceed to Czestochowa for lunch, followed by a sightseeing tour of the Jasna Gora sanctuary.

In the afternoon the journey will continue to Bielsko Biala for dinner and an overnight stay.
The second day will start with a visit to the Porabka-Zar

pumped-storage plant, operated by PGE. After a welcome with refreshments and a technical briefing, there will be a visit to the plant, including the upper and lower reservoirs.

The tour will then continue to the Swinna Poreba flood protection and hydro dam, on the Skawa river, operated by RZGW Krakow.

Lunch will be at a country inn before the onward journey. Dinner and the overnight stay will be at Niedzica.

On the third day after breakfast, the group will drive a short distance to Niedzica dam and powerplant, for a briefing and guided technical tour.

After lunch, the tour will continue to Krakow, and there will be an afternoon tour of the charming old town, including a chance to see the picturesque market square, and the Wawel Royal castle.

The overnight stay will be in Krakow, where the tour will end after breakfast.

# HYDRO 2018 EXHIBITION AND SPONSORSHIP

A major element of the HYDRO 2018 event will be the Technical Exhibition, running for three days alongside the conference (15 to 17 October). The spacious, purpose-built exhibition pavilions will be the main hub for business networking, between delegates and the industry representatives who will be exhibiting their supplies and services. Exhibitors typically comprise consultants, contractors, manufacturers, developers and professional associations.

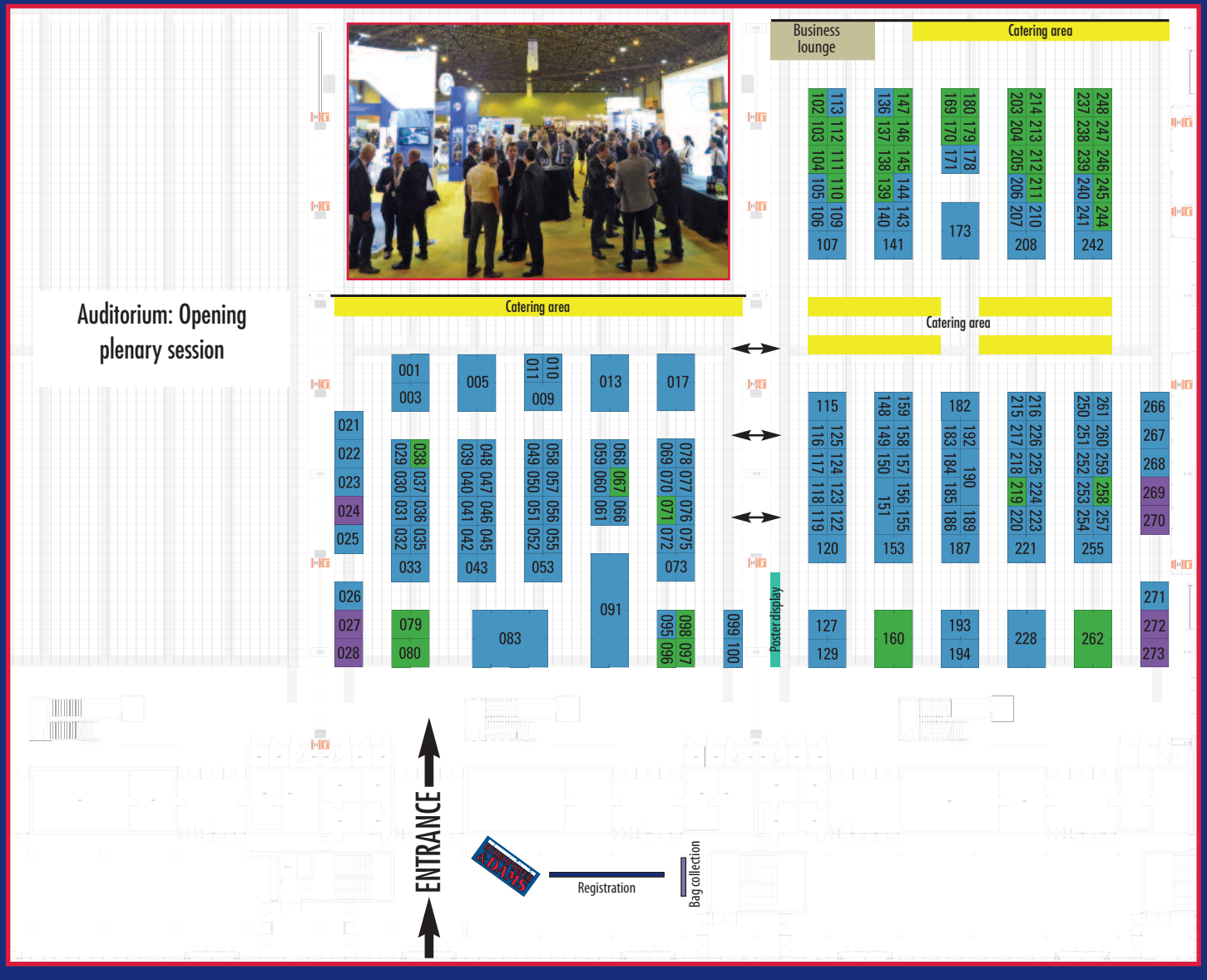
All lunch and refreshments will be served in the exhibition pavilions, with catering points arranged to ensure that delegates will move around the whole area regularly during the three days. Feedback from previous events indicates that delegates maximize the opportunities to circulate in the exhibition, and that valuable contacts are made, which are maintained after the event. The pavilion will remain open for a networking event after the conference sessions on Tuesday 16 October, to provide extra opportunities for business meetings in an informal atmosphere.

Stands are sold in units of 6 m² and 9 m², and multiple units can be combined to create larger displays. Standard or custom-built stands can be arranged.

Sponsorship packages are available for various items associated with the event. This can be an excellent way of making your company stand out among competitors.

## TECHNICAL EXHIBITION PLAN AND PRICING (Blue denotes reserved)

**Single stand prices:** 3 x 2 m (6 m²) = €3125 | 3 x 3 m (9 m²) = €4650

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# EXHIBITION STANDS BOOKED

## Stands reserved, as of August 2018:

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| Alpiq AG, Switzerland | www.alpiq.com | 124 |
| American Governor Company, USA | www.americangovernor.com | 182 |
| Amiblu, Poland | www.amiblu.com | 23 |
| API SpA Trash Rakes, Italy | www.apispa.net | 123 |
| AquaVision Engineering Sàrl, Switzerland | www.aquavision-eng.ch | 51 |
| Arcon, UK | www.arcon-aquapro.com | 193 |
| Armatury Group, Czech Republic | www.armaturygroup.cz | 76 |
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| ATB Riva Calzoni, Italy | www.atbrivacalzoni.com | 141 |
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| DSD Noell GmbH, Germany | www.dsd-noell.com | 115 |
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| Nord-Lock Group, Switzerland | www.nord-lock.com | 194 |
| Norwegian Energy Partners, Norway | www.norwep.com | 91 |
| Obermeyer Hydro Inc, USA | www.obermeyerhydro.com | 158 |
| Oiles, Germany | www.oiles.de | 78 |
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| Polish Hydropower Association | www.tew.pl | 192 |
| Powel AS, Norway | www.powel.no | 91 |
| Powerchina Huadong Engineering Co Ltd, China | www.ecidi.com | 225 |
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**Alternatively we invite you to book exhibition space online via our website: www.hydropower-dams.com**

# BOOKING CONDITIONS

The Conference HYDRO 2018 - Progress through Partnerships, 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. 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).

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 registration desk will be open from 08.30 hrs on Sunday 14 October 2018, at the AMBEREXPO Conference Centre, and bags can be collected from 14.00 hrs. 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 hotels in several price categories in Gdansk. Accommodation bookings are being handled by ASK Event Management. Please include your hotel booking at the time of registering (using the on-line booking system). **Beware of scam accommodation bureaux who are operating this year, falsely claiming to represent HYDRO 2018. We recommend that you do not pass credit card details to them.** We 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 2018 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 2018 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 Polish 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 Poland

Poland 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 Polish embassy or consulate in your country if in doubt about requirements, or visit:

https://www.msz.gov.pl/en/p/msz_en/travel_to_poland

### Applying for a letter of invitation to support a visa application

In some cases, letters of invitation from Aqua-Media in the UK and one of our partner organizations in Poland 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.

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 24 August 2018 | From 25 August to 21 September 2018 | On or after 22 September 2018 |
|---|---|---|---|
| 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 sent directly to Exhibitors by our Sales & Marketing Department. | | | |

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

## CONTACT DETAILS

For enquiries concerning registration and accommodation, contact:


**ASK Event Management Ltd**
Abigail Stevens or Keta Hunt, Co-Directors
**hydro 2018@askeventmanagement.com**
Tel: +44 (0)1725 519287
On-line registration via: 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: hydro2018@hydropower-dams.com
Website: www.hydropower-dams.com

# BOOKING INFORMATION

**The online HYDRO 2018 registration will open in early July, and bookings can be made via: www.hydropower-dams.com**
**The system is simple to use, but in the event of any difficulties, please contact ASK Event Management.**
**Email: hydro2018@askeventmanagement.com ~ Tel: +44 (0)1725 519287**
**Prices for each delegate category and conference activity are given below.**

**FULL DELEGATE FEE:** 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 — €1080 (until 24 Aug) €1185 (from 25 Aug)

**REDUCED DELEGATE FEE:** For existing subscribers to *Hydropower & Dams*. — €1010 (until 24 Aug) €1115 (from 25 Aug)

**FEE INCLUDING NEW SUBSCRIPTION TO *H&D*:** (6 issues from No. 5, 2018 + Atlas + Maps)
(This represents a saving of about 35 per cent on the normal *H&D* subscription rate). — € 1210 (until 24 Aug) €1315 (from 25 Aug)

**SPEAKER FEE:** Includes all facilities described above for Full Delegates, plus an additional reception on Sunday 14 October.
NB: This fee applies to one person per paper (main author or presenter). — €610

**FIRST EXHIBITOR FEE:** (One full participant fee is included with exhibition booking). — €0

**SECOND + THIRD EXHIBITOR FEE:** (Fee per person for up to two additional exhibitors).
(Includes all benefits available to full delegates). — €765

**SMALL HYDRO TRAINING SEMINAR:** (Full day on Sunday 14 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 €385.

**HALF DAY EXCURSION:** The details of this are presented on a previous page. The cost for joining the tour including lunch, is €80 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.

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

Tour A - 1 day: Zarnowiec pumped-storage scheme, lunch and Kashubian Eye visit — €75 per person
Tour B - 3 days: Zarnowiec, Radunia cascade (SHP), Vistula Marshland, Szonowo lock, Malbork Castle — €745 per person, single room; €625 per person sharing double room
Tour C - 3 days: Wloclawek, Porabka Zar (PS), Swinna Poreba flood protection , Niedizca dam, Krakow — €795 per person, single room; €705 per person sharing double room

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

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

*NB: Attendance of the Welcome Reception and Farewell Dinner are included within the registration fees for all participants. However, we request a nominal contribution of €15 per event for those wishing to attend, to encourage a firm commitment to participate. This is important to enable us to assess numbers for catering, and avoid food wastage.*

# HYDRO 2018 HOTELS

### Q Hotel Grand Cru, 4* Superior

Location: Rycerska 11, 80-882 Gdańsk
Distance to AMBEREXPO Congress Centre: Approx. 15 min drive.
Check in: from 14.00 hrs / Check out: by 12.00 hrs

The Q Hotel Grand Cru is a modern stylish hotel close to the historic waterfront of the city. The hotel offers 24-hour access to a fitness centre and sauna. Free WiFi is available in all the rooms, as well as being equipped with a TV, safe, kettle and ensuite with shower. The hotel's restaurant, Grand Cru, offers traditional and modern cuisine and is open seven days a week from 13.00 hrs to 22.00 hrs. A buffet breakfast offering a wide selection of hot and cold items is included.

Single occupancy: €89.00
Double occupancy: €103.00
www.qhotels.pl

### Craft Beer Central Hotel, 4* Superior

Location: Podwale Grodzkie 4, 80-895 Gdańsk
Distance to AMBEREXPO Congress Centre: Approx. 15 min drive.
Check in: from 15.00 hrs / Check out: by 12.00 hrs.

This boutique hotel is close to the Gdansk main railway station and a 10 minute walk from the Old Town. The hotel has a gym, and the rooms are newly refurbished and include a TV, kettle, ensuite bathroom and free WiFi. The hotel has a restaurant serving Polish cuisine, which is open seven days a week from 13.00 hrs to 22.00 hrs. The hotel's bar-brewery is open until 23.00 hrs. A buffet breakfast with a wide selection of hot and cold items is included.

Single occupancy: €86.00
Double occupancy: €100.00
www.centralhotelgdansk.pl

### Mercure, 4* Superior

Location: Jana Heweliusza 22, 80-890 Gdańsk
Distance to AMBEREXPO Congress Centre: Approx. 15 min drive.
Check in: from 14.00 hrs / Check out: by 12.00 hrs

The Mercure business hotel is located in a commercial area of the city. The hotel has a fitness centre and spa, as well as basic computer and printing facilities. Rooms include a TV, kettle, ensuite bathroom and free WiFi. The hotel's restaurant, Winestone, serves international cuisine seven days a week from 12.00 hrs to 23.00 hrs. An international buffet breakfast is included with a wide selection of hot and cold items. Parking is available at the hotel, please contact ASK Event Management for further details and costs.

Single occupancy: €83.00
Double occupancy: €95.00
www.mercurehotels.com

### Scandic Gdansk, 4*

Location: Podwale Grodzkie 9, 80-895 Gdańsk
Distance to AMBEREXPO Congress Centre: Approx. 10 min drive.
Check in: from 15.00 hrs / Check out: by 12.00 hrs.

This business hotel is located near the Gdansk main railway station. The rooms have been recently refurbished and are equipped with a TV, kettle, ensuite bathroom and free WiFi. The hotel has a wellness centre and basic printing facilities. The hotel's restaurant serves international cuisine seven days a week from 12.00 hrs to 23.00 hrs. The bar is open until 23.30 hrs. An international buffet breakfast with a wide selection of hot and cold items is included.

Single occupancy: €75.00
Double occupancy: €87.00
www.scandichotels.com

### Hotel Number One, 3* Superior

Location: ul. Jaglana 4, 80-749 Gdańsk
Distance to AMBEREXPO Congress Centre: Approx. 12 min drive.
Check in: from 15.00 hrs / Check out: by 12.00 hrs.

This new hotel is located on the south bank of the Motlawa river. The historic Old Town is 10 minutes walking distance. The rooms include a TV, kettle, ensuite shower and free WiFi. Guests have access to an indoor pool and wellness centre. The hotel's restaurant serves European cuisine seven days a week from 12.00 hrs to 23.00 hrs. A buffet breakfast with a selection of hot and cold items is included.

Single occupancy: €52
Double occupancy: €64
www.hotelnumberone.pl

### Bonum, 3*

Location: Sieroca 3, 80-839 Gdańsk
Distance to AMBEREXPO Congress Centre: Approx. 15 min drive.
Check in: from 14.00 hrs / Check out: by 12.00 hrs.

This hotel is located five minutes from the waterfront area of the city. This historic property was originally two separate building which have been combined. The rooms include TV, kettle, ensuite shower and free WiFi. The hotel has a restaurant serving European and Polish cuisine seven days a week from 17.00 hrs to 22.00 hrs. A buffet breakfast with a selection of hot and cold items is included. Guests are advised that step-free access is not available at this hotel.

Single occupancy: €56
Double occupancy: €66
www.hotelbonum.pl

### Ibis Stare Miasto, 3*

Location: Jana Heweliusza 24, 80-861 Gdańsk
Distance to AMBEREXPO Congress Centre: Approx. 12 mins.
Check in: from 14.00 hrs / Check out: by 12.00 hrs.

This modern hotel is located near the commercial centre of Gdansk. The hotel's rooms have been recently refurbished and include TV, en suite bathroom and free WiFi. The restaurant, Ibis Kitchen, offers international cuisine seven days a week from 12.00 hrs to 22.30 hrs. A buffet breakfast with a selection of hot and cold items is included. Limited parking is available at the hotel, please contact ASK Event Management for details.

Single occupancy: €49
Double occupancy: €59
www.ibishotels.com

ask event management

**ASK Event Management**
Contacts: Abigail Stevens or Keta Hunt, Co-Directors Tel: +44 (0) 1725 519287
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Unit 7, Town Farm Workshops, Sixpenny Handley, Salisbury SP5 5PA, UK

HYDRO 2018