



ROLES OF HYDRO IN THE GLOBAL RECOVERY

International Conference and Exhibition
Palais de la Musique et des Congrès ~ Strasbourg, France
25 to 27 April 2022

Organized by:

THE INTERNATIONAL JOURNAL ON
**HYDROPOWER
& DAMS**

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HYDRO 2022 MISSION AND SCOPE

FRANCE WELCOMES HYDRO 2022

The French hydropower and dam industry welcomes the world hydro community to Strasbourg. After successful events in Lyon (2009) and Bordeaux (2015), delegates will have the opportunity to visit the Grand Est region, where EDF operates 10 hydro schemes on the Rhine, one of which (Vogelgrun) is a demonstrator project for the EU-funded XFLEX scheme.

The extensive experience of supporting organizations EDF and CNR, both within France and abroad, will be well reflected in the programme, and on the study tours.

France currently has around 25 732 MW of hydro capacity in operation, and a further 822 MW of hydro at various stages of development. Hydro generation was more than 61 TWh in 2021.

The two most important recently completed schemes were the addition of a 240 MW surface powerplant at the 320 MW La Coche pumped-storage scheme in the Isère valley, and the 92 MW Romanche Gavet scheme in the southwest, where six surface plants and five dams have been replaced by one underground powerplant. The country plans to double its renewable energy over the next ten years, with hydro, solar and wind schemes.

Strasbourg, the capital city of the Grand Est region of France, formerly Alsace, is also the formal seat of the European Parliament. On the border of Germany, and also close to Switzerland (and very close to many hydro plants on the Rhine) it is an ideal meeting point for the hydro industry. Its culture and architecture blend both German and French influences.

The newly refurbished Centre de la Musique et des Congrès is a state-of-the-art venue, modern and spacious, and has many measures in place for hosting a safe conference during the COVID recovery period.



MISSION AND SCOPE

The focus of the conference will be on the impact of hydropower worldwide, and optimizing its ongoing contribution to progress and development.

The theme 'Roles of hydro in the global recovery' is inspired by policies and plans set out by all the main policy drivers in the power sector, clearly indicating that hydro and pumped storage will have a much greater role to play in the energy transition, especially as the world recovers from the effects of the global pandemic, and continues the transition towards increased clean renewable energy, to mitigate the effects of climate change. The need for more renewable energy has become all the more poignant in view of the rising oil and gas prices resulting from the current global situation.

Special sessions are being hosted by the European HYPOSO initiative, and the International Energy Agency.

As always, much attention will focus on the potential and development needs of the less developed countries, and also on climate resilience, engineering for challenging sites, and the synergy of hydropower with other (intermittent) renewable energy sources.

One presentation will examine lessons learnt about siting hydro schemes in areas prone to natural disasters, in the light of the Chamoli disaster in northern India.

The conference aims to encourage an exchange of experience between experts from nations at various stages of developing their water resources.

The technical sessions on machinery and civil works will encourage best practice in researching, planning, designing, building, operating and refurbishing hydro plants.

This year we are devoting several sessions to hybrid systems, following the success of our virtual conference, SOLAR-HYDRO 2021, in July 2021.

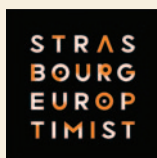
As always, our programme is designed to be practical and topical, forming the bridge between policy-makers and practitioners.



HYDRO 2022 TIMETABLE

Sunday 24 April	Monday 25 April	Tuesday 26 April	Wednesday 27 April
08.00 hrs Access to exhibition for those with custom stands	08.30 hrs Opening Plenary Session Welcome to the Conference and Opening Addresses (Aqua~Media, ICOLD, IEA, EDF and others)	09.00 hrs Session 10: Hydro plant maintenance Session 11: Small hydropower - 1 Session 12: Hazards and challenging sites	09.00 hrs Session 21: Climate Session 22: Solar-Hydro including FPV Session 23: Sedimentation management
09.30 hrs Small Hydro Workshop (Luxembourg)	Coffee (10.30-11.00 hrs)	Coffee (10.30-11.00 hrs)	Coffee (10.30-11.00 hrs)
11.00 hrs Departure of cultural excursion in Strasbourg with lunch	Session 1: Financing and procurement approaches Session 2: Hydro machinery - 1 Session 3: Civil works - Design and construction	Session 13: Hydro plant and penstock safety Session 14: Small hydropower - 2 Session 15: Hydro plant refurbishment	Session 24: Fish protection -2 Session 25: Pumped storage and hybridization Session 26: Project development
14.00 – 19.00 hrs Exhibition set-up for all exhibitors	Lunch (12.30-14.00 hrs)	Lunch (12.30-14.00 hrs)	Lunch (12.30-13.30 hrs)
19.00 hrs Meeting of Chairpersons (Varsovie)	Session 4: Promoting future hydro in Europe Session 5: Hydro machinery - 2 Session 6: Materials for dams	Session 16: IEA-TCP research programmes Session 17: HYPOSO - Part 1 Session 18: Innovation in data acquisition	Session 27: Spillways and gateworks Session 28: Pumped storage technology Session 29: Tunnels and tunnelling
19.45 hrs Briefing for Chairpersons and Speakers (Cassin)	Coffee (15.30-16.00 hrs)	Coffee (15.30-16.00 hrs)	Coffee (15.00-15.30 hrs)
20.15 hrs Reception for Chairpersons and Speakers (Etoile A)	Session 7: Cross-border projects Session 8: Electrical engineering Session 9: Dam safety and monitoring	Session 19: Work of the IEA Hydro Annexes Session 17 contd. : HYPOSO - Part 2 Session 20: Environment and ESG	Closing Plenary Session Key outcomes from the sessions Welcome to ICOLD 2022 and HYDRO 2023
	Evening: Welcome Reception Strasbourg Congress Centre (Etoile Suite)	Networking party in the Exhibition areas (Apéritifs and snacks after the sessions)	HYDRO 2022 Closing Dinner Restaurant à l'Ancienne Douane (Old Customs House) in the picturesque centre of Strasbourg

For detailed session titles, and times and details of individual presentations, please see the programme in the conference bags. Coffee and lunch times are estimated and may vary slightly. All lunches and refreshment breaks will be in the Exhibition Hall Rhin and the Rhin foyer. Please follow directional signage to the meeting rooms, which are all on the same level, and are accessed from the main foyer.



The HYDRO 2022 organizers gratefully acknowledge the support of Europtimist, in the City of Strasbourg, for arranging complimentary tram passes for delegates not staying in the hotels within walking distance of the Congress Centre.

THE INTERNATIONAL STEERING COMMITTEE

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PRE-CONFERENCE EVENTS – SUNDAY 24 APRIL



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, Danang, Gdansk, Namibia, and Porto, 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. The Workshop is led by Prof D. Williams and G. Black, of Learning Hydro, UK.

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.

HALF DAY EXCURSION WITH LUNCH

Departing from the Palais des Congrès in the mid-morning (after registration), the excursion will begin with a tour by boat of the most scenic and important areas of Strasbourg.

From the water, participants will discover the half-timbered houses of Petite France, the Imperial district and the European institutions, while learning a little of Strasbourg's history along the way.

Lunch will be served at the popular Brasserie Le Tigre, a brewery and bistro serving local specialities, including Tarte Flambée.

After lunch, participants will be invited to a private organ concert in one of Strasbourg's most architecturally and historically important churches, Saint-Pierre-le-Jeune.



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.

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 well in advance of the conference, to allow sufficient time for processing by the trustees.

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

Donations to the Foundation can be made at the time of registration.



A working lunch meeting of Foundation Trustees and those who were assisted by the Foundation to attend one of the previous HYDRO Conferences, discussing how they had benefitted from attendance of the event, and the outcomes and new contacts they would share on their return home.



CONFERENCE SESSIONS

MONDAY 25 APRIL - Morning (08.30 - 12.30 hrs)

Opening plenary session (08.30 hrs)

A welcome message and programme preview will be presented by Aqua-Media Director, Alison Bartle, and there will be opening messages by guest speakers from ICOLD, IEA, The World Bank, EDF and the EU HYDROPOWER EUROPE programme.

Session 1: Key financing and procurement approaches for hydropower

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

The session will begin with a summary of three projects in Uganda, each with a different financing structure, to illustrate the current principal approaches to finance. This will be followed by consideration of the main procurement strategies for large hydro projects: the traditional approach (FIDIC Red Book), DB (Design & Build FIDIC Yellow Book), Turnkey (Fidic Silver Book) and DB-O (DB & Operate Fidic Gold Book). The panel, with contributions from Mott MacDonald, the EIB and others, will then discuss the links between financing and procurement and other key questions to the future of hydropower development.

- How to choose the right contractual strategy to build and operate a hydro project - S. Giraud, Plan J Consulting, Switzerland

Session 2: Hydro machinery - 1

Chair: Daniel Paschini, EDF, Peru/France

- Pitfalls of specifying hydro-mechanical equipment - J.H. Gummer, Hydro-Consult Pty Ltd, Australia
- Reducing costs, risks and outage time through underwater robotized turbine runner inspection - O. Teller, GE Renewable Energy, France; D.A. Habel, GE Renewable Energy, Canada; C. Theurer, GE Global Research Centre, USA
- O&M return of experience from a large hydro plant with Pelton units in India - E. Parkinson, Andritz Hydro AG, Switzerland (presenter: P. Duflon)
- The Iso-Power method (or Index test without flow measurement) for optimization of the Kaplan's cam curves - J. Cavalier, EDF DTG, France
- On the benefits of air admission systems for the flexible operation of Francis runners - F. von Locquenghien, P. Faigle, T. Strauss and T. Eisenhardt, Voith Hydro Holding GmbH & Co KG, Germany

Session 3: Civil works – Design and construction

Chair: Michael Rogers, President, ICOLD; and Stantec, USA

- Janneh dam: Challenging construction of the cofferdam with an arch bulkhead - C. Savary, A. Yziquel and G. Mathieu, Artelia Eau & Environment, France; Z. Zahour, Ministry of Energy and Water, Lebanon
- La Romaine, Canada: Construction aspects of the most important hydroelectric project under way in north America - V. Alicesu, Hydro-Québec, Canada
- Optimum design of waterways made easy - T.S. Leifsson, Verkis, Iceland
- Comprehensive construction technology for mass concrete in high altitude regions during low temperature season - Cai Chang, Xiang Qian, Xiong Tau and Wei Hu, Sinohydro Bureau 9 Co Ltd., China
- Updating and adaptation of dams in operation - Dr E. Cifres, Independent Consultant, Spain
- Installation of a new intake at Idriss dam, Morocco - J. Bordignon, Hydrokarst, France

MONDAY 25 APRIL - Afternoon (14.00-17.30 hrs)

Session 4: How to promote future hydro development in Europe with a sustainable impact

Co-Chairs: J-J. Fry, Consultant, France; M. Morris, Samui France Sarl, France

Since November 2018, HYDROPOWER EUROPE, supported by a project that has received funding from the European Union's Horizon 2020 research and innovation programme, has been preparing a Research and Innovation Agenda (RIA) and a Strategic Industry Roadmap (SIR) for the hydropower sector, which are now available in their final versions. The challenge is to have a permanent voice through a forum gathering all hydropower stakeholders, so that the EU can use the recommendations which HYDROPOWER EUROPE has outlined in the RIA and SIR in making decisions regarding the clean energy transition. The purpose of this special session is to discuss in a roundtable how the future

development of hydropower in Europe can be promoted in a sustainable way. Ideas on how a sustainable and common voice for the hydropower industry at the EU level and how research initiatives with high industrial interest within the European context could be coordinated and supported will be discussed. The roundtable discussion will begin with the following introductory talks:

- Suggested research themes and strategic actions to promote hydropower as a catalyst for the energy transition in Europe - Prof A. Schleiss, Emeritus Professor, EPFL-LCH, Switzerland
- Hydropower in the energy transition - M. François, MFX Consulting, France
- How a sustainable and common voice can promote hydropower development in Europe through collaborative research and strategic actions - M. Morris, Samui France Sarl, France

Session 5: Hydro Machinery – 2

Chair: Dr Cecile Munch-Alligné, HEVS, Switzerland

- Insights into field measurements of a mega Kaplan and correlation with model test and CFD - R. Peyreder, Andritz Hydro GmbH, Austria; E. Ensbrunner, Andritz AG, Austria; M. Melot, Andritz Hydro Inc, Canada; R. Razdan, CK Power Public Co Ltd, Thailand
- Multidimensional vibro-acoustic diagnosis of cavitation: A case of a Kaplan turbine (Prototype and models) - B. Bajic, Korto Cavitation Services, Luxembourg; S. Weissenberger Andritz Hydro GmbH, Austria; M. Keller, Andritz Hydro AG, Switzerland
- Sluice mode operation of CNR's low head bulb turbines: Current status and numerical modelling - T. Foggia and B. Havad, CNR, France
- Reducing the runner blades movement in Kaplan and bulb turbines through advanced governor functions - H.A. Menarin and T. Nunes, Reivax, Brazil; J.C. Mazzoleni, Reivax Switzerland AG, Switzerland; L. Watanabe and M.S. Oliveira, CTG, Brazil

Session 6: Materials for dams

Chair: Dr Malcolm Dunstan, MD&A, UK

- World overview of RCC dam construction - M. Dunstan, MD&A, UK
- Key technology of RCC dam construction in Tibetan high-altitude and cold areas - Qian Xiang, Chaojian Liu and Tao Xiong, Sinohydro Bureau 9 Co Ltd, China
- Technique research on concrete aggregate and sandstone processing system for large-scale hydropower station with complex material sources - Bing Deng, Tao Xiong and Dan Luo, Sinohydro Bureau 9 Co Ltd, China
- Cemented soil dam: Engineering and design advances - C. Alléon, ISL, France; P. Cochet, PC Consultant; P. Agresti, Artelia, France
- Maintenance of embankment dams with bituminous upstream facing: Materials and design choices - E. Tita, M.V. Vignoli and L. Sarti, Cooperativa Edile Appennino, Italy
- Geomembranes in new pumped-storage schemes: Two ongoing innovative projects - G. Vaschetti, A. Scuero, M. Scarella and F. Tronel, Carpi Tech, Switzerland

Session 7: Cross-border hydropower projects

Chair: Eileen Burke, Global Lead for Water Resources, The World Bank

- The growing importance of transboundary water, water storage and hydro - E. Burke, The World Bank, USA
- Cross-border project for regional energy inter connectivity: The Baynes hydro project (Angola-Namibia) - Chefe Muyenga Muyenga, Angola-Namibia PJTC Secretariat, Namibia
- Shared benefits and challenges of transboundary cooperation: Case of the regional Rusumo Falls hydro project between Burundi, Rwanda and Tanzania - M. Rashid and Dr I. Alukwe, NELSAP Regional Water Resources Programme, Rwanda
- The Lakes Edward and Albert Basin: Integrated management of fisheries, water resources and inland water transport - G. Sengendo, M.A. Rashid and Dr I. Alukwe, NELSAP Regional Coordinator, Rwanda
- Benefits of transboundary electricity interconnections, and the significant role of hydropower in this context - H.A.M.H. Hawramany, Energy Consultant, Iraq
- The Indus Water Treaty: An excellent example of transboundary water management - U. Anwar, AIPEL Engineering (Pvt) Ltd, Pakistan and E. Qadir, WAPDA, Pakistan

Session 8: Electrical engineering

Chair: Dr Ralf Bucher, Tractebel Engie, Germany

- A virtual powerplant with hydro and battery plants to supply ancillary services - A. Koehl, and J-F. Balmitgere, EDF Hydro, France

CONFERENCE SESSIONS

- The Rapperswil-Auenstein generator replacement project: Challenges encountered and overcome during the installation phase of a rehabilitation project in Switzerland - A. Schürmann and K. Adler, AFRY Switzerland Ltd, A. Weber, SBB Ltd, Switzerland
- Investigating spontaneous effects on generator parameters at the Moragahakanda power station - H.R.J.H.M.K. Senanayake and S.R.K. Aruppola, Mahaweli Authority, Sri Lanka; J.B. Ekanayake, University of Peradeniya, Sri Lanka
- Monitoring magnetic poles of a hydro generator using vibration data: A case study - L. Fromageat, Meggitt, Switzerland; J.-C. Hidalgo, Termogram Consultores SA, Costa Rica; W. Sanchez, Grupo CEL, El Salvador
- Excitation systems for synchronous machines - I. Bartulovic, Končar, Croatia
- Optimizing operational performance of circuit breakers based on innovative contact erosion monitoring and controlled switching - P. Gugale and M. Palazzo, Hitachi Energy Switzerland; P. Khali, Hitachi Energy USA Inc, USA

Session 9: Dam safety and monitoring

Chair: Michel Lino, ISL, France

- Development of a software as a service platform for dam monitoring - R. Stucchi, R. Crapp and I. Fern, Lombardi Engineering Ltd, Switzerland
- Multipurpose real-time monitoring system for embankment dams - A. Ran, Ben Gurion University of the Negev, Israel
- Continuous dynamic monitoring of large arch dams and vibration-based damage detection - A. Alegria, LNEC/IST, Portugal; S. Oliveria, LNEC, Portugal; E. Carvalho and B. Matsinhe, HCB, Mozambique; P. Mendes, ISEL, Portugal; J. Proença, CERIS - IST, Portugal
- Keeping dams safe from space - C. Braithwaite, Rezatec, UK
- Rapid Acoustic Profiling (RAP) Passive Seismic Surveying: A new way of mapping leakage through, under and around dams - A. Hughes, Dams and Reservoirs, UK; V.O. Kofoed, R. Blanchard and M. Jessop, Willowstick Tech LLC, USA

TUESDAY 26 APRIL - Morning (09.00-12.30 hrs)

Session 10: Hydro plant operation, maintenance and asset management

Chair: Laurent Mouvet, Hydro Operation International, Switzerland

- Hydropower asset management in the time of pandemic - J. Mayrhuber, Verbund Hydro Power, Austria
- Predictive analytics: Leveraging asset data and models over different time frames - B. Neijens, Copperleaf, Canada
- Advances in hydraulic actuation and control solutions for hydropower and civil engineering applications - K.R. DuPont and P. Smith, Danfoss Power Solutions., USA; A. Shah, Danfoss Power Solutions, India; P. Claessens, Danfoss Power Solutions., Netherlands;
- Advanced analytics for the optimal management of hydro plants - C. Lanzetta, A. Piazzini, F. Ruffini, i-EM, Italy
- Digitally assisted under water inspections for hydro plants - M. Grömer and M. Artman, Verbund Hydropower GmbH, Austria
- Cost-effective ways of controlling water-borne debris - F. Stefanovic and M. Sims, Bolina Ltd, UK; T. Deprez, Bolina Ltd, United Arab Emirates
- Challenges of an effective policy for O&M of hydro installations in emerging countries: The case of Côte d'Ivoire - D.G.M. Kouame, E. Koffi Kouadio, Ivorian Electricity Co; M.L. Kouakou, Ozones Initiatives, Côte d'Ivoire

Session 11: Small hydro technology - 1

Chair: Pierre Duflon, Andritz Hydro, France

- Lessons learnt from small Pelton projects, from cavitation to bearing destruction - L. Smati, A. Choulot and V. Denis, MhyLab, Switzerland
- Low and very low head SHPP: Where is the efficiency hiding? Overview on several case studies - D. Cazzago and L. Papetti, Frosio Next S.r.l., Italy
- The Vallabregues small hydro powerplant: Design concept and feedback from CNR experience - N. Rivière and E. Maginot, Compagnie Nationale du Rhône, France
- Optimization potential of cross-flow-turbines through numerical calculations: Validation through experimental verification - C. Bodner and H. Jaberg, Prof. Dr. Jaberg und Partner GmbH, Austria; H. Benigni, Graz University, Austria
- Scaling effects on Archimedes screw generators - S. Simmons and W.D. Lubitz, University of Guelph, Canada; G. Dellinger, l'Ecole Nationale du Génie de l'Eau et de l'Environnement de Strasbourg, France

- Double regulated mixed flow turbine for small hydro applications: Design and operational experience - J. Schiffer and H. Jaberg, Prof. Dr. Jaberg und Partner GmbH, Austria; G. Pretis, EFG Energieforschungs- und Entwicklungs Ges.m.b.H. & Co. KG, Austria; H. Benigni, Technical University of Graz, Austria

Session 12: Hazards and challenging sites

Chair: Prof John Reynolds, Reynolds International Ltd, UK

- World Bank approaches to disaster risk management in hydro projects - P. Karki, The World Bank
- Integrated geohazard assessments to increase the resilience of hydropower schemes to future natural disasters in the Himalayan region - J. Reynolds, Reynolds International, UK
- Modelling of GLOF and its impact on hydropower projects: Case study of Nepal - P. Thapa, S. Palt and P. Schäfer, Fichtner GmbH & Co KG, Germany
- Risk analysis and seismic risk assessment of ten hydropower dams in Ethiopia - A. Aman, NELSAP-CU, Rwanda; M. Wieland, Consultant, Switzerland
- Effects of global warming on a hydro plant in the Himalayas - S. Palt, P. Schäfer and P. Thapa, Fichtner GmbH & Co KG, Germany; Prof. J. Reynolds, Consultant, UK; Dr J. Jose, Consultant, Germany; C. Friz, University of Karlsruhe, Germany
- Challenges of extreme floods: Dams and pumps - L. Deroo, ISL, France; F. Lempérière, Hydrocoop, France

Session 13: Hydro plant and penstock safety

Chair: Ole A. Westberg, Sivilingeniør Ole A. Westberg AS, Norway

- Construction of the YTOD surge tank - B. Borresen and A. Koksæter, Multiconsult, Norway; F. Mamia and T. Katu, PNG Power Ltd, Papua New Guinea
- FMEA for hydropower: Lessons learned and future advancements - B. Baratti, D. Cazzago and L. Papetti, Frosio Next S.r.l., Italy
- Improvement of hydraulic safety in the Videssos valley, Ariège, France - J. Schwach, EDF, France

Session 14 – Small hydro technology- 2

Chair: Vincent Denis, MhyLab, Switzerland

- Development of a new lift-based turbine for in-pipe applications - N. Maguin, N. Dellinger, J. Vazquez, Researcher, ICube Laboratory, France; L. Duarte, INSA National Institute of Applied Science, France; G. Dellinger, ENGEEES National School for Water and Environmental Engineering, France; L. Heme-de-Lacotte and N. Tcherniquin, Technip Energies, France
- Monitoring operation and maintenance of hydrokinetic systems through pilot installations in South Africa - C.M. Niebuhr and M. van Dijk, University of Pretoria, South Africa
- On-shore wave energy and coastal protection: perspectives in relation to rising sea level - A. de Bonviller, M. Jellouli and M. Bernicot, ISL Ingénierie, France; G.H. Hounguè, M. Houekpohéha and B.B. Kounouhewa, Abomey-Calavi University, Benin
- Using pneumatic technology for the automation and control of small hydro plants: A cost reduction and environmentally friendly approach - V. Vigolo, G.P. Conterato, T.A.B. Spada and V. J. De Negri, Federal University of Santa Caterina, Brazil; L.A. Weiss, Reivax, Brazil; L.L. Leoncini, P. Gayer de Araújo, M.A. Zanutto and Yang Yan, China Three Gorges, Brazil
- Determination of run-of-river SHP potential sites in Owan watershed Nigeria using RS & GIS techniques - O.A. Fasipe, Energy Commission of Nigeria; O.C. Izinyon, University of Benin, Nigeria

Session 15: Hydro plant refurbishment

Chair: Helmut Obermoser, AFRY, Switzerland

- To refurbish, to replace or to demolish: That is the question - M. Kullberg and B. Børresen, Multiconsult Norway; A. Thick, Multiconsult UK Ltd
- Upgrading of hydropower plants for EU-green deal: Efficiency upgrade projects for more generation and flexibility - J. Mayrhuber, D. Giefing, R. Doeltmayer and C. Ladreiter, Verbund Hydro Power, Austria
- Rehabilitation and upgrade of the 5 MW Wowwe hydropower plant in Northern Malawi - I. Vuckovic, Fichtner GmbH & Co. KG, Germany; A. Kandoje, Electricity Generation Company Ltd. Malawi
- Shardara rehabilitation project, Kazakhstan: Upgrade and replacement of Kaplan units - H. von Büren, S. Komaei and Y. Omelich, Fichtner GmbH & Co. KG, Germany

CONFERENCE SESSIONS

- **Ozalj 1, a cultural heritage monument: Reconstruction and uprating with continuous powerplant operation** - T. Miletić and M. Sabljak, HEP – Proizvodnja, Croatia; B. Križanić, Ministry of Culture, Croatia; L. Štrbac, Projektni biro Split, Croatia
- **Francis turbine refurbishment at HPP Schwarzach: CFD calculations and operational experience** - H. Benigni and P. Meusburger, Graz University, Austria; J. Schiffer, Jaberger & Partner GmbH, Austria; G. Penninger, Verbund Hydro Power GmbH, Austria; H. Jaberger, Graz University and Jaberger & Partner GmbH, Austria

TUESDAY 26 APRIL - Afternoon (14.00-17.30 hrs)

Session 16: International research programmes of the IEA Hydropower TCP

Chair: Dr Klaus Jorde, Secretary, International Energy Agency-TCP

- **IEA's Renewable Energy Market Report with a special focus on hydropower** - H. Bahar, Y. Abdelilah, F. Briens, P. Bojek, T. Criswell, G. Rodriguez and K. Veerakumar, International Energy Agency, Paris Headquarters, France
- **The USA/DoE Research Program on Hydropower** - S. Bockenbauer, D. McCoskey and K. Jackson, Hydropower Technology Department, US Department of Energy, USA
- **The Norwegian Research Centre for Hydropower Technology: HydroCen-** O. Gunnar Dahlhaug, SINTEF Energy Research, Norway; L.R. Hultgreen, HydroCen, Norway
- **IEA Hydropower TCP: Research Programme** - K. Jorde, Secretary, IEA Hydro TCP, Austria

Session 17: HYPOSO – Supporting hydro in Africa and Latin America

Co-Chairs: Prof Bernhard Pelikan, University of Natural Resources and Life Sciences, Austria; and, Ewa Malicka, President, Polish Association for Small Hydropower Development (TRMEW), Poland

This session will discuss opportunities for the European industry to support chances for small hydro development in Africa and Latin America. The findings of the EU-supported research project HYPOSO (Hydropower Solutions) will be presented..

Part One

- **Hydropower solutions for developing and emerging countries: Updates from the HYPOSO project** - I. Ball and D. Rutz, WIP Renewable Energies, Germany
- **Exploring Uganda's small hydro development** - D. Malone Nabutsabi, Hydropower Association of Uganda Ltd (HPAU), Uganda
- **Ongoing evolution of small hydropower and framework conditions in Cameroon** - J. Kenfack, Solarhydropower (SHW) Cameroon; U. Nzotcha, Africa Group Co PLC, Cameroon; V. Nkue, Ministry of Energy and Water, Cameroon
- **Hydropower potential and development opportunities in Colombia** - C. Velasquez, CELAPEH, Colombia
- **Framework conditions of SHP development in Ecuador** - V. Minaya Maldonado, Escuela Politecnica Nacional (EPN), Ecuador
- **Framework conditions for SHP development in Bolivia** - V.A. Gonzales Amaya and F.A. Ledezma Perizza, Universidad Mayor de San Simon, Bolivia

Part Two

- **Hydropower potential sites determination and benefits of small hydropower systems using irrigation infrastructure applied to national electrification within HYPOSO** - F.A. Ledezma Perizza and G. Amaya, Universidad Mayor de San Simón, Bolivia
- **The HYPOSO map: Identification of potential small hydropower sites in Africa and Latin America** - P. Punys A. Dumbrasukas, G. Vyčienė and L. Jurevičius, Vytautas Magnus University, Lithuania; A. Balčiūnas, Vilnius University, (VMU), Lithuania
- **Pilot projects: Justification for selection, challenges and next steps** - B. Baratti, N. Frosio and L.L. Papetti, Frosio Next S.r.l., Italy Frosio Next S.r.l. Italy; B. Pelikan Austria
- **Knowledge and capacity development in the hydropower sector: Course organization and implementation** - M. Marenc, IHE Delft, The Netherlands; D. Marlone, Hydro Power Association of Uganda Ltd; J. Kenfack, University of Yaounde I and Solar Hydropower Ltd, Cameroon
- **Showcasing and promoting the European small hydropower industry** - T. Jawaaid and D. Hendricks, European Renewable Energies Federation (EREF), Belgium

Session 18: Innovation in data acquisition

Chair: Declan Kelleher, Stucky Consulting Engineers, Switzerland

This new session will focus on innovative remote systems for gaining reliable data, for planning, designing and monitoring. This will coincide with the commercial

launch of the HyPOS (Hydro Power Suite) EU Horizon 2020-funded research project, aimed at water resources and sedimentation management.

- **Web-based sediment analysis using satellite, modelling and in situ data and its application in European hydropower projects** - K. Schenk, T. Heege and E. Haas, EOMAP, Germany; A. Bartosova, SMHI, Sweden; M. Launay, Sediment Expert, France; M.L. Ribeiro, Stucky, Switzerland; C. Giardino, M. Bresciani, E. Matta and M. Amadori, CNR-IREA, Italy; N. Rüther and K. Schwarzwälder, NTNU, Norway
- **Advancing large scale hydrological and sediment modelling for hydropower industry operations** - A. Bartosova, C. Brendel, C. Canedo, I. Pechlivanidis, D. Gustafsson, J. Musuza, M. Elenius, B. Arheimer, R. Capell and J. Strömqvist, SMHI, Sweden; N. Rüther and K. Schwarzwälder, NTNU, Norway; M. Launay, Gruner Stucky, Switzerland; S. Haun, Stuttgart University, Germany
- **Using a SARIMA model to forecast the water surface elevation of Lake Victoria in Africa** - R.S. Barrera, Multiconsult, UK
- **Advanced monitoring of bearings or gearboxes in powerplants** - R. Tanner, Mechmine LLC, Switzerland
- **New lower Fiskumfoss hydropower project: Next generation BIM and the way ahead** - A. Gasslbauer and H. Bergsodde, Norconsult, Norway

Session 19: Work of the IEA-TCP Annexes

Chair: A. Harby, SINTEF Energy Research, Norway

- **Numerical simulations to improve Hydropower Plants flexibility** - C. Münch-Alligné, HES. SO Valais/Wallis, Switzerland
- **Hidden hydro and multipurpose projects: Overview and return on experience** - V. Denis, MhyLab, Switzerland
- **Tools to facilitate large-scale analysis of non-powered dams opportunities** - C. Hansen, Oak Ridge National Laboratory, USA
- **The benefits and value of flood control and drought management from hydropower** - A. Harby, SINTEF Energy Research, Norway; J. Damazio, CEPEL, Brazil
- **Hydropower enabling integration of variable renewables** - L.E. Schäffer, NTNU, Norway and A. Botterud, Argonne National Laboratory, USA
- **Final report on Hydropower and Fish: RoadMap on Best Practices** - M. Szabo-Meszaros, SINTEF Energy Research, Norway

Session 20: Environmental aspects and ESG

Chair: Steven Usher, Aqua-Media International, UK

- **Environmental and social strategies in a time of recovery and changing expectations** - S. Sparkes, Statkraft A.S., Norway
- **Monitoring eelgrass (marine plants) in La Romaine estuary, Québec, Canada** - A. Tremblay and J-P. Gilbert, Hydro-Québec, Canada; C. Lumière, Englobe, Canada
- **The case for methane capture from hydropower dams** - N. Rueda-Vallejo and L. Parlons Bentata, Bluemethane, UK
- **Environmental flow as a criterion for evaluating the potential of small hydro plants** - A. Cisneros Silva, M.A. Gomez Balandra, A.A. Palacios Fonseca and J. Avidan Jacome, Instituto Mexicano de Tecnología del Agua, Mexico
- **Improving performance and investability through ESG due diligence** - S.D. Usher, Aqua-Media International, UK
- **The application and importance of the Task Force on Climate Related Financial Disclosures (TCFD) recommendations for the hydro sector** - F. Quinlan, Mott MacDonald

WEDNESDAY 27 APRIL - Morning (09.00 - 12.30 hrs)

Session 21: Climate and flood management

Chair: Denis Aelbrecht, EDF, France

- **Climate change: Challenges and opportunities for hydro** - A brief introduction - D. Aelbrecht, EDF, France
- **Flood management and spillway capacity during works on the Kariba dam rehabilitation project** - P. Sipatela and S.Z. Mhlana, Zambezi River Authority, Zambia
- **A study of climatological impacts and mitigation measures in Pakistan** - U. Anwar, AIPEL Engineering (Pvt) Ltd, Pakistan; R.A. Hassan, Mott MacDonald, UK; F. Anwar, Consultant, Pakistan
- **Hydrological study revision for upgrading Adhaim dam's spillway with a fusegate for climate change mitigation** - M.A. Nayf Younis, Center of Water Resources Studies for the Northern Region, Iraq
- **Impacts and adaption in future climate for hydropower in Iceland** - A. Gunnarsson, H. Jóhannesson and Ó.G.B. Sveinsson, Landsvirkjun, Iceland

CONFERENCE SESSIONS

Session 22: Solar-hydro, including floating PV

Chair: Luc Deroo, ISL, France

- Defining the optimum solar/hydro combination - M. Bernicot, L. Deroo and B. Peltié, ISL Ingénierie, France
- HydroSun: Development of a fully integrated hybrid powerplant in Guinea - Ø. Engelstad, Scatec, Norway
- Floating PV in dynamic environmental conditions - N. Baderiya, SolarinBlue, France; L. Das Neves and Z. Samadov, IMDC, Belgium; D. Villaverde Vega, Sener Ing. y Sistemas SA, Spain; R. Bucher, Tractebel Engineering GmbH, Germany
- Small hydropower: Modelisation of adapted small hydro power plant in Burkina Faso - A. Nombre and M. Kaboré, IFEC; N.S. Yaoliré, Ministry of Water and Sanitation, Burkina Faso
- Considerations for the development and design of a floating PV plant - A. Wilshaw, RINA, UK
- Additional input from panellists including C. Gery, Seaflex, Sweden

Session 23: Sedimentation management

Chair: Prof Anton Schleiss, Consultant, Switzerland

- World Bank's global study on Sediment Management in Reservoirs and Run-of-River hydro plants - N. Efthymiou, The World Bank, USA
- Storage and risk value analysis of reservoirs exposed to high sediment load - H. Nøvik, Sweco Norge AS, Norway; S. Stokseth, Statkraft AS, Norway; B. Glover, Multiconsult AS, Norway; N. Ruther, NTNU, Norway; E. Solvang, Sintef, Norway
- Enhanced design of desanding facilities at hydropower schemes - R. Boes and D.F. Vetsch VAW, ETH, Switzerland; C. Paschmann, Spiekermann Ingenieure GmbH, Germany
- Sediment-adapted multi-method approach to obtain sediment characteristics and siltation rates - S. Hilgert, K. Sotiri, and S. Fuchs, Karlsruhe Institute of Technology, Germany
- Integrated dredging sediment solution with positive environmental impact - R. Gaillard and F. Gauch, Watertracks, France; S. Caffo, EDF Hydro CIH, France
- Sediment monitoring system - R. Bachmann and R. Wimmer, Rittmeyer AG, Switzerland

Session 24: Developments in fish protection

Chair: Prof Markus Aufleger, University of Innsbruck, Austria

- A hydraulic Fishheart fishway: Innovative solutions for fish protection and passage - M. Sohlberg and M. Breitenstein, Fishheart Ltd, Finland
- An innovative fish pass with promising results - B. Mayrhofer, Fishcon GmbH, Austria
- Research on rapid construction technology for a long fishway at a high dam in an alpine canyon - Chaogui Liu, Chaogui Luo and Xiaojin Zhe, SinoHydro Bureau 9 Co Ltd, China
- Implementation of the FishProtector at a pilot plant: Functional checks - J. Haug, R. Tutzer and M. Aufleger, University of Innsbruck, Austria; B. Brinkmeier, HyFish GmbH, Austria
- Simplifying matters for hydropower operators: Advancements in fisheries data and Elver passage - M. Messina and S. Dearden, Whoosh Innovations, USA
- Fish deterrent associated with hydraulic flow rate increase in bulb turbines - T. M. da Silva, W.S. Figueiredo and L.F. Zara, University of Brasília (UnB), Brazil; L. L. de Oliveira Silva, J.O. Melo Junior, F. de Souza Lima Ribeiro and M.K.T. Obara, Energia Sustentável do Brasil - 'Jirau Energia', Brazil

Session 25: Pumped-storage and hybridization

Chair: J-L. Drommi, EDF-DPIH, France

- The role of pumped storage in the global recovery - U. Casewit, The World Bank
- Solar-hybrids and HVDC interconnectors as key drivers for Africa's renewable energy infrastructure - R. Bucher, Tractebel Engineering GmbH, Germany
- A hydro-solar simulation tool for pumped-storage power plants - M. Jellouli, N. Pepin and M. Bernicot, ISL Ingénierie, France; A. de Bonviller, Consultant, France
- Licensing of offshore wind in the North Sea brings new initiatives to pumped storage projects - L. Lia and L. Pitorac, NTNU, Norway; K. Vereide, Sira-Kvina kraftselskap, Norway
- Pumped-storage hydropower to balance large scale wind and solar power: The Faroe Islands on the way to a fully renewable power production in 2030 - F. Ludescher-Huber and A. Reynaud, Norconsult, Norway; D. Reinert Hansen and T. Nielsen, Elfelagiø SEV, Norway
- Hybridization of pumped-storage plants: From concept to implementation - R. Guillaume, H. Mesnage, F. Errigo, Q. Boucher and J-P. Payre, Supergrid Institute, France

Session 26: Project development

Chair: S. Deschler, Crossboundary, UK

- Experiences from the frontline: Updates on large hydro PPP tenders in Malawi and Ecuador - S. Deschler, Crossboundary, UK
- How are lenders' expectations evolving for technical and E&S due diligence and construction monitoring? - A. Choudhary, Mott MacDonald, UK

- Foreign investment for hydro development in Nepal - G.P. Kayastha, Chilime Engineering & Services Co Ltd, Nepal
- Additional input to discussions from HSF, UK (legal aspects); O. Tricca, European Investment Bank, UK, and, Scatec, Norway (TBC)

WEDNESDAY 27 April - Afternoon (13.30-17.00 hrs)

Session 27: Spillways and gates

Chair: Prof Leif Lia, NTNU, Norway

- Technical innovations and economical optimization in spillway physical model studies - S. Roux, CNR, France; and F. Del Rey, Hydroplus, France
- Plunge pool scour and bank erosion: Assessment of protection measures for Ilarion dam by physical and numerical modelling - R. van Mol, C. Mörtl, A. Amini, A. Schleiss and G. De Cesare, EPFL, Switzerland; S. Siachou, PPC SA, Greece
- Construction of the spillway for the Nam Theun 1 hydropower project - S. Gloimüller, S. Martin, G. Escobar and D. Rothweiler, AFRY, Switzerland.
- Applied research of underwater inspection robot in spillway area in hydropower stations - Xie Huidong, Cai Wei and Zhong Heng, China Yangtze Power Co., Ltd., China
- Innovative live 'Digital Twin' for hydraulic structures - L. Grau and C. Condemine, Morphosense, France; Y. Masson, CNR-DGAC, France
- A new intake gate at the Chivor life extension project - M. Pujol, Lombardi Engineering Ltd, Switzerland; B. Tapia, Lombardi Engineering Ltd, Ecuador; D. Del Rio, AES Corp, Colombia

Session 28: Pumped-storage technology

Chair: Prof Bogdan Popa, University Politehnica of Bucharest, Romania

- New business model that makes pumped hydro widely feasible - P. Siitam, Energiasalv Pakri, Estonia
- More than 1500 m head with a single-stage storage pump: Model test on pressure pulsations and compensation methods - H. Benigni, S. Leithner, H. Jaberg and P. Meusburger, Graz University, Austria; C. Bodner, Jaberg & Partner GmbH, Austria; A. Prackweiser, C. Kirilowitsch, D. Giefing and G. Penninger, Verbund Hydro Power GmbH, Austria
- Ranking of pumped hydro potential plants based on multi-criteria analysis to provide sustainable flexibility to the system - J. Alterach, A. Danelli, G. Stella, A. Gatti and R. Calisti, RSE - Ricerca sul Sistema Energetico, Italy
- Project Malta: First direct MMC converter for variable speed pumped hydro storage - C. Haederli and T. Thurnherr-Schlumpf, A. Christie and A. Faulstich, Hitachi ABB Power Grids, Switzerland; C. Ladreiter-Knauss, Verbund AG, Austria
- Minimization of power during the shutdown process of a large high-head pump-turbine in the pumping mode - J. Veselý Litostroj Engineering, Czech Republic

Session 29: Tunnels and tunnelling

Chair: Dean Brox, Dean Brox Consulting, Canada

- Hydropower tunnel inspections: Recommendations for industry practice - D. Brox, Dean Brox Consulting, Canada
- Design and performance of the underground hydraulic circuit at Laúca in Angola - S.B. Katereniuk and J.F. Pinheiro Machado, Intertechne Consultores, Brazil; P.C. Thá, Fugro, Brazil
- Increased dam safety by combined mechanized tunnelling and drilling campaigns - W. Dolsak, DSI Underground Austria GmbH, Austria; M. Lübbers, Herrenknecht AG, Germany
- State-of-the-art hybrid injection methodology for stopping water inflow in tunnels - A. Heizmann, Renesco GmbH, Germany; G. Lilliu, Renesco Holding AG, Switzerland
- Inspection of the headrace tunnel of Villarino powerplant with unmanned aerial and manned terrestrial vehicles - A. Vaquero Mateos and C. Mayoral Ranedo, Iberdrola, Spain; F. Espada, Moreno, Hovering Solution, Spain

Closing Plenary Session

- Outcomes of HYDRO 2022 by session chairpersons
- Announcements about ICOLD 2022 and HYDRO 2023
- Conclusion of HYDRO 2022 sessions

Evening: Farewell Dinner at l'Ancienne Douane

ACCOMPANYING PERSONS' PROGRAMME

A package of three cultural and touristic visits have been arranged for accompanying persons during the three days of the conference. Tours will not depart before 09:00 hrs and will return in good time for some relaxation and free time before the evening programme

The group will travel by luxury coach, with a guide. The first day includes a walking tour. Accompanying persons are also invited to all evening events.

Monday 25 April

European Parliament, Lunch at Bouclier d'Or Hotel and the Alsatian Museum

Strasbourg is home to the world's largest transnational parliament. The group will visit the European Parliament, located within the European Quarter of Strasbourg, a short distance from the Palais des Congrès. The building's plenary chamber has served as the backdrop to many important parliamentary debates and votes, and participants will be able to take a tour of the building's tall, hollow oval structure and hear about the role of the European Parliament, and the process behind making law for the whole of Europe.

Lunch will be at the elegant Bouclier d'Or hotel, a tastefully renovated Bourgeois-style mansion in the

heart of the UNESCO World Heritage-listed historical centre of Strasbourg. After lunch, participants will have a tour of the Alsatian Museum. Housed in three former houses, the museum displays a fascinating range of artefacts which tell the story of the region's history and identity.

Tuesday 26 April

Mount Sainte-Odile, Spindler Marquetry and Geispolsheim Chocolate Museum

The group will start the day by travelling to Mount Sainte-Odile, a convent dedicated to St Odile, the patron saint of Alsace. At an elevation of 753 m on pink sandstone cliffs, the site provides a stunning panoramic view of the Plain of Alsace. The group will then visit Maison Spindler. Charles Spindler, a painter, marquetry inlayer, writer and photographer, was also a supporter of Alsatian regionalism. He founded several institutions for the promotion of Alsatian culture.

A guided tour of the museum and workshop will give participants an insight into the heritage of the family, and the technique of marquetry.

The group will then explore Obernai, a fortified medieval town in the heart of the Bhas-Rhin region.

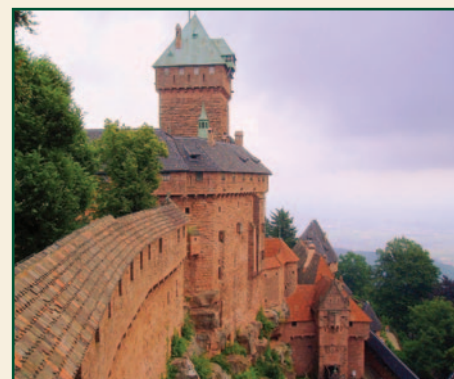
There will be an opportunity to enjoy Obernai's narrow lanes and half-timbered houses, and to see the Kappelturm tower in the attractive market square. Then the group will go on to the Geispolsheim for a tour and to sample some regional chocolate treats.

Wednesday 27 April

Haut-Koenigsbourg Castle and wine tour and tasting

The final excursion will start with a visit to the medieval Haut-Koenigsbourg Castle, located in the Vosges mountains, with a spectacular view of the Upper Rhine Plain. The castle has a rich history and the group will have an exclusive guided tour of the most important rooms, and also access to the grounds which offer views across the Alsace region.

The group will then journey further into the heart of the wine region, to enjoy an afternoon of lunch and wine tasting. There will be a tour of the wine route, with a stop at a popular vineyard for a leisurely lunch, and a visit to the historic wine cellar to learn about the wine-making process. There will be a chance to sample some of the most popular wines.



CULTURAL AND SOCIAL PROGRAMME

The HYDRO 2022 conference will offer a full social programme, especially important this year to enable delegates and accompanying persons to reunite with international friends and colleagues, as well as to make new contacts, in a relaxing and convivial atmosphere.

This will be a chance to enjoy Alsatian specialities and international cuisine, as well as some musical and cultural entertainment.

Sunday 24 April

Pre-Conference dinner for Chairpersons and Speakers at 20.15 hrs (After briefing at 19.30)

After meetings and briefings about arrangements for the conference, those chairing or co-chairing sessions, and speakers presenting accepted papers, will be welcomed to a reception with dinner. The event is an opportunity for all session participants to get together ahead of the sessions.

Monday 25 April

Welcome Reception at 19.30 hrs

This opening reception for all participants will take place in the Etoile Suite at the top of Palais des Congrès, appropriate for socializing (also allowing for social distancing for those who wish to). A light supper, featuring local specialities, will be served, and the evening will be an opportunity to relax with friends.

Tuesday 26 April

HYDRO 2022 Networking Party in the Exhibition Halls at 17.30 hrs

Refreshments and snacks will be served in the exhibition halls, which will remain open for up to two hours after the sessions, on the second day of the conference. This a great way for delegates to meet exhibitors they may have missed during the coffee breaks and lunches, for extended discussions. Exhibitors are invited to prepare special demonstrations

of equipment, or to welcome key groups of delegates to their stand for drinks.

Wednesday 27 April

Farewell Dinner at 19.30 hrs

The Farewell Dinner will take place at the Restaurant à l'Ancienne Douane (old customs house) in the picturesque historic centre of Strasbourg beside a canal. We aim for this to provide a memorable end to the long-awaited HYDRO 2022 event in Strasbourg.



EXHIBITION AND SPONSORSHIP

A major element of HYDRO 2022 will be the Technical Exhibition, running for three days alongside the conference (25 to 27 April). The exhibition areas will be the main hubs for business networking between delegates and industry representatives who will be exhibiting their supplies and services. Exhibitors typically comprise consultants, contractors, manufacturers, developers and professional associations.



All lunches and refreshments will be served in the exhibition, with catering points arranged to allow delegates to 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. All parts of the conference and exhibition are open to all registered participants.

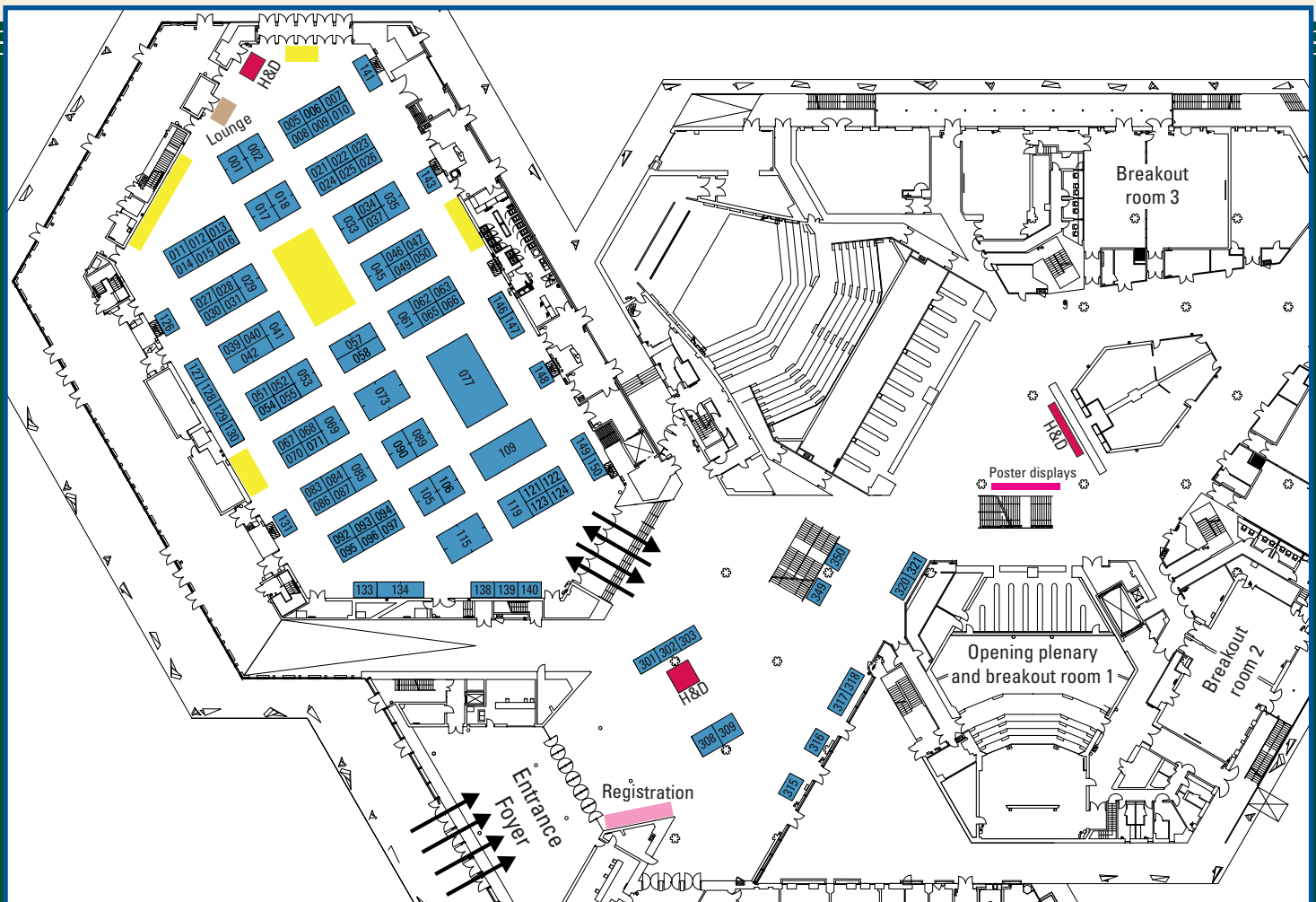
The exhibition will remain open for a networking reception after the conference sessions end on Tuesday 26 April, to provide extra opportunities for business meetings in an informal atmosphere.

Exhibition space is generally sold in units of 6 m², and multiple units can be combined to create larger displays, including custom-built stands.

Sponsorship packages are available and provide an excellent way of standing out among competitors (such as coffee breaks, lunches, social events and more).

Please contact: sales@hydropower-dams.com
or visit: www.hydropower-dams.com/hydro2022/exhibition-plan

TECHNICAL EXHIBITION PLAN



EXHIBITORS

Stands reserved, as of early April 2022

Acebron Group, Spain	www.acebrongroup.com	87	Končar, Croatia	www.koncar.com	73
Adams Schweiz AG, Switzerland	www.adams-armaturen.ch	77	Landustrie Sneek BV, Netherlands	www.landustrie.com	131
AFRY	www.afry.com	85	Litostroj Engineering a.s., Czech Republic	www.litostroj-eng.com/en	89
Alpiq AG, Switzerland	www.alpiq.ch	77	Mapei, France	www.mapei.com	146
API spa Trash Rakes, Italy	www.apispa.net	14	MC - Monitoring SA, Switzerland	www.mc-monitoring.com	126
AquaVision Engineering SA, Switzerland	www.aquavision-eng.ch	77	Mechmine, Switzerland	www.mechmine.com/de/	77
Arcon Overseas Ltd., UK	www.arcon-aquapro.com	315	Meggitt SA, Switzerland	www.meggittsensing.com/energy/	349
Armatury Group, Czech Republic	www.armaturygroup.cz	67	Merck Animal Health-Biomark, USA	www.biomark.com	141
Artelia, France	www.arteliagroup.com	37	Metalvar New srl, Italy	www.metalvarnew.it	55
ASI Group Ltd, Canada	www.asi-group.com	303	Mhylab, Switzerland	www.mhylab.ch	77
ATB Riva Calzoni, Italy	www.atbrivacalzoni.com	53	Milsa Trillo Galicia, S.A., Spain	www.milsatrillo.com	105
Atlantium, Israel	www.atlantium.com	62	Montanhydraulik, Germany	www.montanhydraulik.com	6
ATP SpA, Italy	www.atpgroup.it	27	Muhr, Germany	www.muhr.com	17
Auma Actuators, Germany	www.auma.com	69	Multiconsult, Norway	www.multiconsult.no	115
Bavarian Pavilion	www.bayern-international.de	109	Nidec Leroy-Somer	https://acim.nidec.com/generators/leroy-somer	134
BGH Edelstahlwerke GmbH, Germany	www.bgh.de	35	Norconsult, Norway	www.norconsult.no	115
BH2M, France	www.bh2m.fr	10	Norwegian Energy Partners, Norway	www.norwep.com	115
Bluttech Hydro, France		90	Obermeyer Hydro Inc, USA	www.obermeyershydro.com	40
Borflex, France	www.borflex.fr	9	Oiles, Germany	www.oilesglobal.com	317
Braun Maschinenfabrik, Austria	www.braun-tech.com	124	Omexom, France	www.omexom.com	42
Business Iceland	www.islandsstofa.is	41	Power Vision Engineering SA, Switzerland	www.powervision-eng.ch	77
C.I.B. Srl Carpenteria Industriale Bresciana, Italy	www.cibcarpenterie.com	2	Prediktor, Norway	www.prediktor.com	115
CAAST spa, Italy	www.caast.it	106	Prof. Dr. Jaberger und Partner GmbH, Austria	www.jabergerundpartner.com/en	54
Carpi, Switzerland	www.carpitech.com	29	PXL Seals, France	http://pxlseals.com	83
CMA Hydro, Italy	www.cmahydro.com	21	Rainpower, Norway	www.rainpower.eu	115
CMD Gears - Groupe CIF, France	www.cmdgears.com	16	Reivax of Switzerland AG	www.reivax.com	23
CNR, France	www.cnr.tm.fr	58	Renesco, Switzerland	www.renesco.com	13
Cooperativa Edile Appennino, Italy	www.cea-coop.it	148	Rezatec, UK	www.rezatec.com	123
Costronic SA, Switzerland	www.costronic.ch	77	Rittmeyer AG, Switzerland	www.rittmeyer.com	77
Dolsar Engineering Inc. Co., Turkey	www.dolsar.com.tr	140	ROV Expert, France	www.rov-expert.fr	130
Douce-Hydro, France	www.doucehydro.com	46	Rubberart Ltda, Brazil	www.rubberart.com.br	15
DSD Noell GmbH, Germany	www.dsd-noell.com	18	Ruhfus Systemhydraulik GmbH, Germany	www.ruhfus.com	316
Dyrhoff, UK	www.dyrhoff.co.uk	127	Sadafzar Co. Ltd, Iran	www.sadafzar.ir	34
Ecooast, United Arab Emirates	www.ecooast.com	12	Schmiedewerke Gröditz, Germany	www.stahl-groeditz.de	92
EDF, France	www.edf.fr	57	Scotta Spa, Italy	www.scotta.it/en	321
Elledi s.n.c, Italy	www.elleditech.com	26	Sedicon, Norway	www.sedicon.no	86
EMerald Geomodelling, Norway	www.emerald-geomodelling.com	115	Ševčík Hydro s.r.o., Czech Republic	www.sevcik-hydro.cz	22
EOMAP, Germany	www.eomap.com	109	Sevinç Makina Sanayi Ve Ticaret AŞ, Turkey	www.sevincmakina.com.tr	96
EPFL Laboratory for Hydraulic Machines, Switzerland	www.epfl.ch	77	SKF Sealing Solutions, Austria	www.skf.com/seals	50
Faure Herman – Ultraflux, France	www.ultraflux.com	52	SMI-Drulingen SAS, France	www.smi-drulingen.fr	138
Federal Mogul Deva GmbH, Germany	www.deva.de	61	Sogéa-Satom, France	www.sogea-satom.com	42
Fishheart Ltd., Finland	www.fishheart.com	1	Solétanche Bachy International, France	www.soletanche-bachy.com/en	25
Franke-Filter GmbH, Germany	www.franke-filter.com	149	Sparks Instruments, Switzerland	www.sparksinstruments.com	126
Freyssinet, France	www.freyssinet.com	42	Stahlhandel Gröditz GmbH, Germany	www.stahlportal.com	63
Ganz Transformers and Electric Rotating Machines Ltd, Hungary	www.ganzelectric.com	318	Stern Hidraulica, Spain	www.sternhidraulica.com	143
Geppert GmbH, Austria	www.geppert.at	121	STM srl – Sviluppato Tecnologie Meccaniche, Italy	www.stmpotenza.com	8
Glual Hydraulics, Spain	www.glual.com	31	Sub-C Marine, France	www.submarine.com	93
Graz University of Technology, Austria	www.tugraz.at	51	Subdron GmbH, Austria	www.subdron.com	129
Gruner Stucky Ltd, Switzerland	www.stucky.ch	47	SuperGrid Institute, France	www.supergrid-institute.com	28
GWF Technologies GmbH, Germany	www.gwf.ch	139	Swiss Pavilion		77
Heico Group, France	www.heico-group.com	119	Tacquet Industries, France	www.tacquet-industries.fr	5
HES-SO Valais, Switzerland	www.hevs.ch	77	Talleres Aratz, Spain	www.talleresaratz.com	65
Hibbard Inshore, LLC, USA	www.hibbardinshore.com	68	TES Vsetín, Czech Republic	www.tes.cz/en/	147
Hydac International, Germany	www.hydac.de	45	Thordon Bearings Inc, Canada	www.thordonbearings.com	97
Hydro 21, France	www.hydro21.org	302	TIS Service SpA, Italy	www.tisgroup.it	30
Hydro Air Bank Srl, Italy	https://hab.it	301	Tractebel	www.tractebel-engie.com	308
Hydro Maintenance Service, Switzerland	www.hmservice.ch	94	Troyer SpA, Italy	www.troyer.it	24
Hydro-Construct GesmbH, Austria	www.hydroconstruct.at	309	Turbiwatt, France	www.turbiwatt.com	71
Hydroalp S.r.l, Italy	www.hydroalp.eu	90	Verbund Hydro Consulting, Austria	www.verbund.com/en-at	128
Hydrogrid GmbH, Austria	www.hydrogrid.eu	11	Vinci, France	www.vinci.com	42
Hydrokarst Group, France	www.hydrokarst.fr	133	Vortex Hydra, Italy	www.vortexhydradams.com	70
Hydroplus, France	www.hydroplus.com	42	Whoosh Innovations, USA	www.whoosh.com	84
HyFish – University of Innsbruck, Austria	www.hyfish.at	66	Wiegert & Bähr Turbinen und Stahlwasserbau GmbH, Germany	www.wb-hydro.de	7
i-EM Srl, Italy	www.i-em.eu	320	Willowstick Technologies, USA	www.willowstick.com	95
ICOLD (International Commission on Large Dams)	www.icold-cigb.org	350	Worthington Products, USA	www.tuffboom.com	122
Ingeteam Indar Machines SA, Spain	www.ingetteam.com	33	ZT-Fritsch GmbH, Austria	www.zt-fritsch.at	309
Innovasea – Fish Tracking, Canada	www.innovasea.com/fish-tracking/	150			
ISL Ingénierie, France	www.isl.fr	49			

Conference exhibitor sponsors are listed in bold text



To receive further details of the exhibition and/or sponsorship opportunities, please contact:

Mrs Melanie Ganz or Miss Tanita Chondrunaiko • Tel: +44 20 8773 7250/7251/7252 • Email: sales@hydropower-dams.com

Alternatively, we invite you to book Exhibition space online via our website: www.hydropower-dams.com/hydro-2022/exhibition-plan

TECHNICAL EXCURSION



Study Tour: 28-29 April

(On the Rhine, Grand Est region)

The study tour will visit EDF's Kembs low-head run-of-river hydro plant (originally 160 MW) on the Rhine, which has some exceptional features for environmental enhancement, including fish protection. An 8.4 MW hydro plant was added recently to increase energy production and to provide various environmental benefits. It produces 28 GWh/year, and discharges into a newly created river, the 'Petit Rhin' (Little Rhine), which flows to wetlands to enhance biodiversity.

After touring the powerplant, and taking lunch in a local restaurant, delegates will go on to EDF's remote control and e-monitoring centre, which controls 10 major run-of-river schemes and regulates the water levels of the Grand Canal d'Alsace and the Rhine.



The group will then travel on to the picturesque town of Guebwiller for dinner and an overnight stay. The following morning there will be a tour of Thann, a delightful commune on the river Thur, at the foot of the Vosges mountains. Its church, known as the Collégiale, is a good example of the Gothic architectural style that flourished in the Rhine valley in the late Middle Ages. The group will then travel back to Strasbourg, with a stop at Strasbourg Airport (Entzheim) for those wishing to leave the tour there.

You can book this study tour when registering for HYDRO 2022 (or by editing your existing registration).

Places are limited to 30, so if you would like to take part, please register without delay.



HYDRO 2022 HOTELS

As always, our event management company has negotiated favourable rates, and blocked rooms at a selection of hotels. Some may be booked through our website, and others will be reserved for delegates to book direct.

Full details are available at the conference registration site. Some are in walking distance of the congress centre. Others have very easy links by tram, and some complimentary tram passes are being generously offered by the City of Strasbourg.

It is important to book accommodation as soon as possible, to ensure that your first choice is available, as our allocations of rooms are almost fully booked, and the city of Strasbourg will be busy during the week of HYDRO 2022 with a European Parliament event.



BOOKING CONDITIONS

The Conference HYDRO 2022 - Strategies for future progress, is being organized by *The International Journal on Hydropower & Dams* with administration by Event Management Services (EMS), UK.

On-line Registration

You can register on-line via the *Hydropower & Dams* website at: www.hydropower-dams.com. This is a secure site. Registrations are handled by EMS 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; the registration site provides more information about the event. Pre-registration is required.

In the unlikely event of any difficulties using this system, please contact EMS (see contact details below).

Picking up conference documents and badges

The registration desk will be open from 08.30 hrs on Sunday 24 April 2022, at the Strasbourg Palais de la Musique et des Congrès, and delegate bags can be collected from 09.00–11.00 hrs, and from 14.00 to 19.00 hrs.

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; or,
- By bank transfer (see details on the registration form).

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

Accommodation

Beware of scam accommodation bureaux who are operating as usual, falsely claiming to represent HYDRO 2022. We recommend that you do not pass credit card details to them.

In view of the postponement of the conference, new contracts are being finalized with hotels, where rooms have been blocked for conference participants. Details will be announced in good time.

Disclaimer

All best endeavours will be made to present the programme as printed. The HYDRO 2022 organizers and their agents reserve the right to alter arrangements, timetable, plans or other items relating directly or indirectly to HYDRO 2022 for any cause beyond its reasonable control. 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 EMS. Cancellation charges will be payable as shown in the Table below, **except in the case of a resurgence of COVID-19 preventing the event to go ahead as planned, or a delegate being unable to travel to France from his/her home country**. Substitution of delegates, speakers or exhibitors 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 French 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.

In the unlikely event that it is necessary to cancel any of the conference arrangements or postpone the conference, a 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 France

France 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 French embassy or consulate in your country if in doubt about requirements, or visit:

https://france-visas.gouv.fr/en_US/web/france-visas/tourist-or-private-visit

Entry restrictions to France have now been lifted, and health passes are not necessary. Those not vaccinated should have a negative PCR test result. PLEASE CHECK THE FRENCH GOVERNMENT WEBSITE IN CASE OF CHANGES TO REGULATIONS BEFORE THE DATE OF THE CONFERENCE.

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 France 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, unless this is specified. 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 cancellation conditions below apply.

Date cancellation received	From 11 February to 31 March 2022	On or after 1 April 2022
Registration for the Conference	50% of fee will be forfeited	No refund
Technical Excursions (Study Tours)	No refund unless place can be resold	No refund
Accommodation	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 speakers, current subscribers to *Hydropower & Dams*, and those taking a new subscription. See booking information form for details.

CONTACT DETAILS

For enquiries concerning registration and accommodation, contact:



HYDRO 2022 Secretariat, Event Management Services (EMS).
hydro2022@ems-ltd.org • Tel: +44 1225 258 013

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

Tel: + 44 (0)20 8773 7244 • Email: hydro2022@hydropower-dams.com

Regular updates and on-line registration via: www.hydropower-dams.com

BOOKING INFORMATION



Online HYDRO 2022 registration is via the website: www.hydropower-dams.com
The system is simple to use, but in the event of any difficulties, please contact EMS.
Email: hydro2022@ems-ltd.org ~ Tel: +44 1225 258 013
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 €1200

REDUCED DELEGATE FEE: For existing subscribers to *Hydropower & Dams*. €1130

FEE INCLUDING NEW SUBSCRIPTION TO H&D: (6 issues from No. 1, 2022+ Atlas + Maps)
(This represents a saving of about 35 per cent on the normal H&D subscription rate). €1340

SPEAKER FEE: Includes all facilities described above for Full Delegates, plus an additional reception on Sunday 24 April. NB: This fee applies to one person per paper (main author or presenter). €650

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). €785

SMALL HYDRO TRAINING SEMINAR: (Full day on Sunday 24 April - 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. €495

HALF DAY EXCURSION: View the city and its canal system by boat; lunch; and, an afternoon concert €105

OPTIONAL DONATION TO THE AMI HYDROPOWER FOUNDATION: As in past years, there is an 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 EXCURSION (Thursday 28 April and Friday 29 April)

Two-day excursion, Grand Est

The low head run-of-river Kembs plant on the Rhine, operated by EDF, will be visited. This plant offers aspects of interest with regard to upgrading, innovative technology, environmental enhancement and navigation. EDF's control and e-monitoring centre will be visited later in the day. It controls 10 plants on the Rhine. Overnight in Gruebville, and next day, a trip to Thann, on the river Thur, in the foothills of the Vosges mountains

€450 per person, single room; €425 per person, sharing a double room

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

VISA REQUIREMENTS: Please let us know if you need an invitation letter to support your visa application.

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.