

PROGRAMME HIGHLIGHTS

Once again, we will have a full and varied programme for our conference in April, covering a range of practical topics, and including some new session themes. Details of specific papers can be seen on our website; updates are being made regularly.

◆ In the light of the success of our recent SOLAR-HYDRO 2021 virtual conference held in July, which brought together solar PV experts with hydro and dam engineers, to discuss practical aspects of **floating solar PV on hydro/dam reservoirs**, we intend to introduce this topic to HYDRO 2022 with a track of sessions. The number of questions, and amount of discussion at the recent event clearly indicated that more time is needed on this important and rapidly emerging technology, which has a major future role to play in so many parts of the world.

◆ Another session will deal with **hybridization of renewable energy systems**, and the role of pumped-storage working in synergy with intermittent renewables. One paper will deal with a hydro-solar simulation tool for pumped-storage powerplants. Another will discuss an economic model for revenues of hybridized pumped-storage plants.

◆ On **pumped-storage**, there will be a talk on model studies to look at pressure pulsations and compensation measures in the case of a 1500 m head single-stage storage pump; a case study featuring the first direct MMC converter for variable speed pumped hydro storage; and, a description of the first underground pumped-hydro scheme (500 MW) planned to go ahead in Estonia.

◆ **Hydropower technology** will form an important part of the programme, with two sessions on hydraulic machinery. Subjects will range from the pitfalls of specifying turbine parameters for bidding, to technical issues such as: waterhammer analysis in Francis units; field measurements compared with model tests and CFD for large Kaplan machines; methods for diagnosing cavitation; robotics for the underwater inspection of turbine runners, to reduce costs, risks and outage time; and, air admission systems to enhance flexible operation of Francis units.

◆ The future of **hydropower development in Europe's energy transition** will be discussed in a roundtable session focusing on the HYDROPOWER EUROPE programme, which is supported by the EU's Horizon 2020 research and innovation programme. The main outcome

of the on-going EU initiative is to establish a research and innovation agenda, and a strategic industry roadmap for hydropower.

◆ A new session this year 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. Topics will include: earth observations; the use of Drones/UAVs; geospatial tools; remote sensing; and remote supervision.

◆ **Small hydro** is once again a popular topic this year, speakers will discuss technical advances, innovation and case studies. Examples will include: exploring the efficiency of low and ultra-low head small hydro plants; optimizing cross-flow turbine operation; a double-regulated mixed flow turbine for SHP applications; a new micro hydro turbine for in-pipe installations; design concept and operational feedback on a small hydro plant on the Rhône; and, lessons learnt from small Pelton projects, regarding cavitation and bearing damage.

◆ A session on **finance** will be entitled: 'The Good, the Bad and the Ugly? – three key financing approaches for hydropower'. 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 hydropower projects: the traditional approach (Fidic Red Book), DB (Design & Build Fidic Yellow Book), Turn-key (Fidic Silver Book) and DB-O (DB & Operate Fidic Gold Book). The panel will then discuss the links between financing and procurement and other key questions to the future of hydropower development.

◆ Among the topics to be presented on **sedimentation** will be: an innovative sediment pre-assessment study to facilitate sediment removal activities; optimizing the use of dredged sediment for use in the building industry; recent advances in hydraulic modelling, and in sedimentation modelling; Web-based sediment analysis using satellite, modelling and in situ data; and, enhancing the design of desanding facilities.



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◆ **Hydro plant safety, upgrading and refurbishment** will be another important subject to be tackled, with upgrade studies presented from Malawi, Kazakhstan, Croatia and Austria; and, a talk on asset management during the pandemic. One speaker will address hydro efficiency upgrades for the 'EU Green Deal', and another will outline operational problems and their solutions at Indian hydro plants.

◆ Our track of sessions on **civil engineering** will focus on developments in design and construction, dam monitoring and safety, remedial work, materials for civil works, challenging sites, as well as drilling and tunnelling work. Innovative hi-tech monitoring systems will be described, and there will be safety-related case studies or research reports from many parts of the world.

◆ On **spillways and gates** there will be talks on the hydraulics of a large stepped spillway, case studies of spillway upgrades, modelling to optimize operation of spillways, and the new intake gates for the Chivor extension project in Colombia.

◆ Our session on the **hazards** facing hydro projects either at sites with challenging physical conditions, or in areas prone to extreme climatic events will again highlight key aspects threatening the safety of water infrastructure. One expert will discuss lessons learned from the Chamoli disaster in India. Other topics will include **flood management, seismic safety**, and **GLOFs**.

◆ Innovative systems for **fish protection**, including new developments in both passes and deterrents, as well as turbine designs to ease

fish passage will be the subject of a number of papers within the session on **Environment**. There will also be discussions on ESG. **Environmental, social and governance** factors present a range of key risks and opportunities of material consequence to the long-term financial performance and viability of organizations in the hydro industry. This session introduces financial, regulatory, and ancillary incentives for ESG due diligence and will provide examples of how they can be managed to support strategic goals.

◆ **Cross-border projects** will be the theme of another set of presentations, following the great success of the session on this topic last year. There will be discussion on transboundary schemes in Africa, Asia and Europe, highlighting the regional benefits of these projects, and drawing on some case studies.

◆ A special 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 with particular emphasis on the HYPOSO Platform and the promotion it provides for the European small hydropower industry and stakeholders from five target countries: Uganda, Cameroon, Colombia, Ecuador and Bolivia.

◆ Two sessions are being organized by the **International Energy Agency**, one on the studies being carried out globally on both the future of hydropower and research initiatives to support this growth, with the other a general session on the work of the Hydropower TCP.

Additional papers may still be submitted for some sessions

Some changes in the programme have been inevitable, as speakers from a few countries may still be unable able to travel to Europe. As a result, we have left our call for papers open, and we have capacity to accept one or two more papers in the following sessions:

- ◆ Maintenance and asset management;
- ◆ Electrical engineering;
- ◆ Cross-border collaboration;
- ◆ Floating solar PV on dam reservoirs;
- ◆ Hydraulic machinery;
- ◆ Hydro plant safety; and,
- ◆ Challenges and achievements during the pandemic. Contact Margaret Bourke at:

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Hydro and dam engineering professionals are keen to get back together and meet colleagues from around the world. The signs are good that HYDRO 2022 will be able to go ahead in Strasbourg at the end of April. The venue is one of the most modern and spacious in Europe, and we hope to see you there.

