Digitalisation in Hydropower 2023

Experiences with implemented digital measures

vgbe/Axpo | Expert Event
28 and 29 September 2023
Zurich | Switzerland & Online

vgbe/Axpo | Expert Event

"Digitalisation in Hydropower 2023"

The 6th international vgbe Expert Event "Digitalisation in Hydropower" in cooperation with Axpo will provide again a comprehensive overview of important topics regarding digitalisation in hydropower dealing mainly with the results and practical experiences of newly developed and implemented innovative digital measures, tested products and tools from the view of the operators. Topics of the lecturers are:

- Asset Management
- Workforce Management
- Advanced Data Analytics
- Platform Solutions
- Digital Twins
- Inspection & Measurement
- Visualization (VR, AR, 3D GIS ...)

Based on practical examples, you will gain insights into how to implement and apply digital solutions successfully.

CONFERENCE VENUE

First day 28 Sep. 2023	Second day 29 Sep. 2023
Best Western Hotel Spirgarten Lindenplatz 5 8048 Zurich/Switzerland	Kraftwerke Sarganserland AG Vättnerstrasse 7314 Vadura/Switzerland

CONFERENCE OFFICE

The conference office will be open from 09.00 a.m.

CONFERENCE LANGUAGE

English

EVENING EVENT

On Thursday, 28 September 2023, starting at 7:30 p.m., all conference participants are invited to a get-together at the Best Western Hotel Spirgarten, Lindenplatz 5, 8048 Zürich, Switzerland

vgbe energy is the new name of VGB PowerTech since April 2022.

CONFERENCE TICKET

ON-SITE participation (for 1st and 2nd day)	Single ticket (1 participant)	Package ticket (3 participants)
vgbe non-members	€ 980.--	€ 2,500.--
vgbe members	€ 780.--	€ 2,000.--
Universities, Authorities	€ 380.--	€ 1,000.--

ONLINE participation*) (for 1st day only)	Single ticket (1 participant)	*) Minimum 10 participants for online transfer.
vgbe non-members	€ 380.--	
vgbe members	€ 280.--	
Universities, Authorities	€ 180.--	

The participation fees include the conference presentations (after the conference), coffee breaks, lunch and participation in the evening dinner event and bus shuttle on 2nd day. All participants of the conference are requested to register online. It is not possible to accept credit cards or currency at the conference office.

EXHIBITION OPPORTUNITY

Promote your company activities directly in the conference room on 28 September 2023 by booking our exhibition package (€ 450.-, 1 roll-up + own brochure display).

ONLINE REGISTRATION

https://t1p.de/digi23

SCAN ME

Have direct access to the event website.

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PRIVACY POLICY & GENERAL TERMS

Detailed information on data protection as well as the general terms and conditions can be found at:
https://t1p.de/vgbe-vsAGBen

vgbe/Axpo | Expert Event

“Digitalisation in Hydropower 2023“

Enhanced digital controls can contribute to improving the performance of hydropower equipment, plants and fleets by reducing costs and optimising asset management. Digital control systems can also play a major role in improving decision-making and supporting operations to work more efficiently. The fact that a growing number of the world’s hydropower plants need to be refurbished and modernised in the next few years makes the transformation process highly challenging.

Based on practical examples you will gain insights into how digital solutions are already successfully implemented and applied. This may contribute to improving and optimising digital solutions in your own company.

In this context and as a valuable complement to the lectures, on 29 September all participants are invited to visit the hydropower plant Mapragg with an installed capacity of 279 MW where Axpo will present implemented and currently tested digitalisation techniques.

The Expert Event will bring together experts from leading operator and manufacturer companies as well as related stakeholders to discuss challenges and opportunities for the operation of hydropower fleets accruing from digital transformation.

CET	28 SEPTEMBER 2023
10:00	Welcome and opening of the vgbe/Axpo | Expert Event *J. Huwyler, Axpo* Current activities of vgbe in digitalisation on hydropower *M. Bachhiesl, vgbe energy*
10:30	**SESSION 1** Lecture 1 Central data access point “Datendrehscheibe” *A. Stergiotis, A. Fürst, illwerke vkw* Lecture 2 EDP’s journey deploying predictive analytics on a diversified Iberian generation portfolio *J. Jordão, EDP* Lecture 3 Predictive Maintenance – Feedback from the deployment to a pumped-storage power plant *J. Studer, HYDRO Exploitation; M. Boden, Alpiq*
12:00	Lunch
13:30	**SESSION 2** Lecture 4 From “Digital Hydropower Plant” to “Digital Hydropower Generation” *B. Hollauf, VERBUND Hydro Power* Lecture 5 From data to value *M. Fink, ANDRITZ Hydro* Lecture 6 Digital inspection management (Smart check) for improved Asset Management *A. Benanti, ENEL Green Power*
15:00	Coffee Break

CET	28 SEPTEMBER 2023
15:40	**SESSION 3** Lecture 7 Asset-centric digitalisation @Uniper Hydro *C. Kunze, Uniper Hydro* Lecture 8 Progress in cavitation intensity and erosion monitoring in hydropower plants *A. Jung, J. Lochschmidt, Voith Hydro Holding GmbH & Co. KG* Lecture 9 Follow up on the development of digital twins of hydroelectric generating units at Hydro-Quebec *A.-M. Giroux, Hydro-Quebec*
17.10	Outlook of visit at HPP Mapragg *E. Bieri, Axpo*
17:30	Closing words
19:30	Evening Dinner and Get-together at Best Western Hotel Spirgarten Lindenplatz 5, 8048 Zurich, Switzerland

Information about our Hydropower Industry Guide 2021/22

Get an overview of the leading companies in the hydropower industry and find out about the many topic-specific offers of our media partners.

Free download here:
https://www.vgbe.energy/en/hydropower

Site visit and demonstration of Axpo´s digital hydropower plant in Mapragg

Demonstration of implemented digital systems in Mapragg power plant (demonstration project of Axpo)

On the second day of the Expert Event, Axpo will present versatile digital systems in the pilot hydropower plant Mapragg. The participants can take part in a guided tour with max. 5 stations (rounds) in the morning. At each station, one digital test system will be explained and demonstrated by Axpo and project partners. In the afternoon the participants can do a self-guided tour of the stations (open house). Experts will be on-site for answering questions and having intensive technical discussions.

Please note: Sturdy shoes are required for the plant visit!

CET	FRIDAY – 29 SEPTEMBER 2023
08:00	Departure via bus shuttle to hydropower plant Mapragg
10.00	Arrival at hydropower plant Mapragg and grouping of participants for the guided visit **Guided visit to the demonstration stations**
12.30	Networking Snacks, soft drinks, coffee **Self-guided visit to the demonstration stations** Get in touch with the experts for knowledge exchange at the stations (Open House)
15.00	End of visit
14:00 15:00	Departure via bus shuttle 1 to Zurich airport Departure via bus shuttle 2 to Zurich airport

Demonstration stations and the presenters

Station 1 (Axpo, Voith)
Access Asset Documentation with eDoc
Live Demo and User Story (operational)

Station 2 (Axpo, Sogema)
Digital Workforce Management in HPP
Live Demo and User Story (operational)

Station 3 (Axpo, Partners)
Useful Frontline Apps
Demo of various digital tools (operational)

Station 4 (Axpo)
Asset Identification with PowerOwl
Live Demo and User Story (PoC system)

Station 5 (Axpo)
Hydro Insights - Analyze Operational Data
Live Demo and User Story (operational)

Station 6 (Axpo, etaeval)
etahydro - Online Efficiency Monitoring
Presentation of optimization in HPP Filisur

Station 7 (Axpo, Schuck, Verbund)
Underwater Inspection
Live Demo at HPP Mapragg (PoC system)

In cooperation with (www.axpo.com)

Demonstration stations and the presenters

Station 8 (Axpo)
Drone Indoor Inspection
Live Demo at HPP Mapragg (PoC System)

Station 9 (Axpo)
hydrone - Drone Outdoor Inspection
Live Demo at HPP Mapragg (operational)

Station 10 (Axpo)
State of the art Dam Monitoring
SmartMeasure, DATAL, WATAL (operational)

Station 11 (Axpo)
Automated Real Time Fish Detection
Presentation of test case HPP Stroppel (PoC)

Station 12 (Axpo)
Hydropeaking Modelling
Methods to verify hydropeaking impacts

Station 13 (Axpo, WZ Systems)
Digital Transformation & Projects
Data coverage, mobile devices, consulting

Station 14 (Axpo)
Asset Optimization with RevOpt
Live Demo and User Storry

LECTURE CONTENT FROM THE SPEAKERS

Welcome and opening of the Expert Event

Speaker: **Jörg Huwyler,** Head Division Hydropower & Biomass, Axpo

Digital technologies are changing rapidly and there are many challenges, which make the application so highly demanding. With regard to the generation of electricity, business models and processes in hydropower will substantially change through new concepts, methods and digital tools we call "Hydro 4.0". Machine learning, predictive maintenance, internet of things and cloud services change operation and maintenance of hydropower plants. This bears unexploited potential for reducing costs and increases the effectiveness of workforce management. Axpos´s goal is to evaluate all conceivable possibilities of digital applications for hydropower and to put the most promising technologies to operation in their fleet. Therefore, exchange of information plays a relevant role in implementation of digital measures.

Current activities of vgbe energy in digitalization on hydropower

Speaker: **Dr Mario Bachhiesl**, Head of Department Renewables, vgbe energy e.V.

Within the vgbe hydropower community a comprehensive experience transfer takes place in several committees. Profound experiences on topics regarding digitalization including latest findings and examples of implementation are part of the discussion in vgbe´s Working Group Hydro "Digitalisation". Based on practical examples members report on how digital solutions have been successfully implemented and how are the practical experiences in operation. Getting information from the view of operators with practical experiences are offering valuable insights for your own implementation strategies for digital measures.

Session 1

Central data access point "Datendrehscheibe"

Speakers: **Alexander Stergiotis**, CPA Expert & Innovation Manager,
Anja Fürst, Hydro Power, Innovation Management,
illwerke vkw AG

The company illwerke vkw has collected its operating data in several databases. Each with its own administrator. With the growing number of evaluations, a central data access point was introduced based on which all data is easily available to the employees.

EDP's journey deploying predictive analytics on a diversified Iberian Generation Portfolio

Speaker: **José Luis Homem de Macedo Jordão,** Eletrical Engineer, EDP Gestão da Produção

In the past 5 years the conventional generation platform at EDP featuring hydro, gas and coal power plants has faced several changes on the regulatory and market context. So, the stage was set to shed new light into asset management defining it as a new strategic priority. Several O&M strategy initiatives were launched during that period including the partnership established between EDP and GE Digital for a digital transformation project aimed at pursuing predictive O&M strategies with real business impact [X.FIT]. This led to the creation of the remote Monitoring and Diagnostics center in 2018. In this presentation we will share our journey so far and the next steps going further.

Predictive Maintenance – Feedback from the deployment to a pumped-storage power plant


Speakers: **Jürgen Studer,** Project Engineer, HYDRO Exploitation S.A.
Martin Boden, Project Engineer, Alpiq

In this talk, we will present the predictive maintenance solution developed by Hydro Exploitation and Alpiq and share our experience from its deployment to a pumped-storage power plant. We will highlight that predictive maintenance goes beyond technical solutions and requires the development of a comprehensive monitoring process tailored for the plant's unique needs. We will discuss the technical challenges we faced in analyzing large volumes of sensor data, training machine learning models and visualizing data effectively. Additionally, we will emphasize the crucial role of collaboration between the asset owner, operator, and maintenance teams in developing an efficient predictive maintenance solution, as well as the importance of change management to ensure successful implementation.

Session 2

From "Digital Hydropower Plant" to "Digital Hydropower Generation"

Speaker: **Bernd Hollauf**, Project Manager, VERBUND Hydro Power GmbH

The systematic testing of digital innovations at the Rabenstein pilot power plant began in January 2018 with an ideas workshop in the "Digital Hydropower Plant" project. The "Digital Hydropower Plant" was completed on schedule in December 2022. The results and findings from this project have formed the basis for the development of the follow-up programme "Digital Hydropower Generation". The main results and the potential for further development are presented.

From data to value

Speaker: **Michael Fink,** O&M Hub Manager Austria, ANDRITZ Hydro GmbH

Digitalisation in hydropower comprises a broad spectrum of possible activities. The lecture "From Data to Value" focuses on the question how actual tangible value for the operator/owner of a hydro power plant can be created by a combination of the right digitalisation activities.
Real life examples on how digitalization can be done right will be presented and their impact on plant availability, overall production, maintenance costs, insurance and finance models, etc., will be discussed.

Digital inspection management (Smart check) for improved Asset Management

Speaker: **Alessandro Benenati**, ENEL Green Power S.p.A.

Integrated and digital asset management is a crucial key for the increased efficiency of Maintenance and risk assessment. The presentation will focus on:
- Maintenance strategy link between preventive, predictive, prescriptive
- Failure mode classification as exchange key
- Inspection as key element of preventive in Reliability Centered Maintenance
- All round digitalized inspection outcome in the Smart Check program

Session 3

Asset-centric digitalisation @Uniper Hydro

Speaker: **Dr Christian Kunze**, Head of Operational Performance & Business Development, Uniper Hydro Power

The declared ambition of Uniper Hydro Power is to become a "Digital Hydro Power Operator" by 2025. The path towards this ambition initially led to the development of many solutions aimed at supporting employees in their work during a people-centric phase. Since 2021, the focus has increasingly shifted towards processes and asset-centricity with the further strengthening of the IT infrastructure. The presentation will introduce the current developments and target visions for selected use cases in the areas of hydro power operations and maintenance.

Progress in cavitation intensity and erosion monitoring in hydropower plants

Speakers: **Dr Alexander Jung**, Head of Digital Hydro Technology,
Jörg Lochschmidt, Vice President Digital Hydro,
Voith Hydro Holding GmbH & Co. KG

The presentation will summarize the latest progresses of in-process monitoring of cavitation intensity and cavitation erosion damage and discuss the resulting opportunities and value adds for hydropower O&M.

Follow up on the development of digital twins of hydroelectric generating units at Hydro-Quebec

Speaker: **Anne-Marie Giroux**, Research scientist, Hydro-Quebec

A long-term R&D project for the development of digital twins of hydroelectric generating units was launched at Hydro-Quebec in 2019. An overview of the roadmap will be presented.
This presentation will also give more information on the infrastructure put in place to give access to data and ease the implementation of algorithms.The example of a new algorithm implemented this year will be shown in more details. This algorithm automatically integrates operational data in order to update the risk of cracking of a turbine blade, estimated previously with a fatigue risk assessment methodology based on the Kitagawa-Takahashi diagram.

Outlook of visit at HHP Mapragg

Speaker: **Emil Bieri**, Head Digital Transformation Hydro, Axpo

Axpo and some of Axpo's partners will present versatile digital systems at the Mapragg pilot hydropower plant as part of 14 different stations. Participants can take part in a guided tour with a maximum of 5 stations (rounds) in the morning. At each station, a digital system in operation or test stage at Axpo will be explained and demonstrated. In the afternoon, participants can visit the stations independently (open day). Experts will be on hand to answer questions and guide through intensive technical discussions.