



Enhancing hydropower- plant facilities

**International conference
April 9-11, 2014
Grenoble (France)**

In 2010, the French association SHF (Société Hydrotechnique de France) organized a conference on hydropower environmental issues and in November of the following year, another conference on Pumped Storage Plants. These conferences had strong representation from most European countries and showed the interest in sharing experiences on new issues and directions for the development of hydropower.

The pillars of Hydropower development are both new hydropower projects and modernization of existing Hydropower plants. **The present conference is focused on exchanging experiences on enhancing hydropower plants facilities.** As hydropower is expected to deliver more services to the grid, and also to complement the development of intermittent sources, the conference includes the development of pumped storage plants from existing schemes.

The conference is aimed at sharing experiences on these issues, at the European and worldwide levels. It will also be an opportunity for professionals and researchers to meet and discuss technical and economic issues, both motivations and technical solutions to project enhancement.

Topics will include:

- Upgrading and repowering existing facilities: turbines or electrical equipment, fish friendly turbines, unpowered dams, monitoring technical and environmental performances.
- New pumped storage plants based upon existing hydropower facilities and associated ancillary services.
- Redesigning hydropower plants and schemes or new schemes including existing facilities and intakes, capacity of reservoir, ecological flows.
- New operating patterns.

Papers will address both motivations and technical solutions of upgrading, refurbishing, redesign and new operating patterns. Among these motivations are:

- Assistance and services to power systems and grids: contribution to the stability of power systems, availability, ancillary services, balancing intermittent energy sources
- Environmental sustainability: tackling water framework directive, ecological flows
- Improving availability and safety in plants operation
- Economical benefits of enhancing projects

Both small and large hydropower plants will be addressed by the conference.

Pierre-Louis Viollet
President of SHF Scientific and Technical Committee
Chair of the conference

SOCIETE HYDROTECHNIQUE DE FRANCE

25 rue des Favorites – F75015 PARIS – 33(0)1 42 50 91 03 – www.shf-hydro.org

SHF/PLV/BB/19/11/2013

Planning:

Wednesday April 9, 2014

- **Session A. Feedback** on completed enhancing projects: rehabilitation, repowering; including economical, environmental, safety and technical aspects.
- **Session B.** Operations or studies on **Powerplant components:** turbines - including fish-friendly turbines, penstocks, I&C. ...
- **Poster session and technical exhibition**

Thursday April 10, 2014

- **Session C. Global presentations** of scheduled or ongoing enhancing projects (refurbishment, repowering ...) prepared or planned
- **Session D. Pumped storage plants:** enhancing, repowering, new PSP from existing schemes, new services to the grid
- **Poster session and technical exhibition**

Friday April 11, 2014

Technical tour to the Hydropower plant construction site of Romanche-Gavet

Language of the Conference: English

Organizing committee

Pierre-Louis Viollet (SHF)

François Avellan (EPFL),
Guy Caignaert (ENSAM),
Guy Collilieux (CNR),
François Czerwinski (Alstom Power),
Jean-Charles Galland (EDF),
Claude Guilbaud (Artelia),

Véronique Lelièvre et Aurélie Dousset (France Hydroélectricité),
Sylvain Lopez (Tractebel Engineering),
Farid Mazzouji (Alstom Power),
Olivier Metais (ENSE3),
Didier Roullet (CNR),
Brigitte Biton (SHF),
Jean-Georges Phillipps (SHF)

Partners:



Wednesday April, 9th

8h00	Welcome and registration	
9h00	Conference opening D Loudière, President of SHF M.H. Battistel, Deputy of Isère Brigitte Plateau, General administrator of Grenoble INP Pierre-Louis Viollet, President of SHF Scientific and Technical Committee, Chair of the conference	
9h45	Professor François Avellan , director of the Laboratory for Hydraulic Machines (LMH), Ecole Polytechnique Federale de Lausanne (EPFL)	Invited lecture : Independent model testing for hydropower repowering projects, 30 years of EPFL practices
10h15	Session A Chair: Bruno Mathex, CNR	Feedback on completed enhancing projects: rehabilitation, repowering; including economic, environmental, safety and technical aspects.
5	Voitto Kokko (Fortum Power and Heat Oy, Finland) & Hans Bjerhag , Peter Hjerthén, Hans Ingfält, Karl-Erik Löwen, Arne Sjögren (Fortum Generation Ab, Sweden)	Development of Dalälven hydro power scheme in Sweden
3	Nicolas Rouge(ALPIQ), Nicolas Gapany (HYDRO Exploitation), Pierre Michel, Paul Thackray et Pierre-Louis Rossi (GIMB), Jorge Veiga and Abdel-Ilah Rhrich (Rainpower), Switzerland	Modernization of the Martigny-Bourg HPP
36	Joseph Virone , A. Cuvillier, C. Garnier, N. Juhel, C. Buchi, (ALSTOM Hydro, France)	Refurbishment of medium head Francis Turbine: Tungatinah case study
	Discussions session A1	
11h25	<i>Coffee break around the posters and booths</i>	
44	Deyou Liu (International Center on Small Hydro Power, and Hohai University, China) Chuanqi Ou (International Center on Small Hydro Power, China), and Ling Zhou (College of Water Conservancy and Hydropower Engineering, China)	Success cases in the project of enhancing and red signing small hydro power plants in China
48	Jean-Charles Galland , Frédérique Armand, Alain Guillot (EDF, France)	La Bathie: simultaneous power increase and river safety improvement
18	Bernhard Moestl , Klaus Engels (E.ON Global Unit Generation, Germany)	Enhancing Sustainability Performance of Hydropower Plants. Lessons Learned from the First IHA HSAP Application in Europe
	Discussions session A2	
12h35	<i>lunch</i>	
14h00	Session B1 Chair: Anne Penalba, France Hydro	Operations or studies on Powerplant components : turbines - including fish-friendly turbines, penstocks, I&C, ...
29	Sylvain Raynal, Ludovic Chatellier, Laurent David (Institut Pprime), Dominique Courret, Michel Larinier (Onema), France	Study on fish-friendly inclined and angled trashracks

31	Olivier Bertrand, Abdelhadi Mehdi Ghozali, Julien Schaguene (Artelia), Pierre Roumieu (CNR), Mahmoud El Hajem (INSA-Lyon), France	The use of physical and numerical modeling to analyze upstream section design of a low-head generating unit
6	Voitto Kokko and Jouni Ahtiainen, (Fortum Power and Heat Oy, Finland)	Ageing due to start-stop cycles and frequent regulation in lifetime estimation of hydro turbines and generators
11	Erik San Telmo , Esther Alonso (Ingeteam Power Technology S.A., Spain)	Hydroelectric power plants automation using IEC 61850: experiences and improvements for the user
	Discussions session B1	
15h20	<i>Coffee break around the posters and booths</i>	
15h40	Session B2 Chair : François Avellan, EPFL-LMH	Operations or studies on Powerplant components : turbines - including fish-friendly turbines, penstocks, I&C, ...
24	Maciej Kaniecki , Mariusz Hajdarowicz, Andrzej Łojek (ZRE Gdańsk S.A., Poland)	Rehabilitation of medium-head hydropower plants with exploited twin-Francis turbines.
39	Kirsten Winkler , Etienne Parkinson (Andritz Hydro AG, Switzerland)	Hydro-abrasive erosion: Problems and Solutions
37	Sylvain Tridon, Xavier Cornut, Laurent Tomas (ALSTOM Hydro, France)	Kaplan turbine refurbishment based on numerical simulation
42	Christof Gentner, Benoit Boulet (Andritz Hydro, Switzerland)	Refurbishment of the hydropower plant Sisteron (France) : Hydraulic development and mechanical improvement
	Discussions session B2	
17h00	Short oral poster presentations	<i>(discussions at the poster)</i>
17h45-19h00	Get-together around the Posters and Booths	

Thursday April, 10th

9h00	Session C1 Chair : Jean-Charles Galland, EDF-DPIH	Global presentations of scheduled or ongoing enhancing projects (refurbishment, repowering ...) prepared or planed
10	Roald Nilsen (Statkraft Energi AS, Norway), Cécile Lacour (Statkraft France)	Enhancing hydropower plant facilities: Rehabilitation and extension of the Nedre-Røssåga power plant
7	Emmanuel Maginot , Lionel Orcel, Didier Jimenez (CNR-Compagnie Nationale du Rhône, France)	Refurbishment and upgrading of Chancy-Pougny hydropower plant
21	Thomas Blanié, Pascal Seret, Samuel Renaud (Tractebel Engineering France)	Repowering of Kainji Hydroelectric Power Station (Nigeria).
23	Dr. Klaus Oberhauser , DI Richard Kellner (VERBUND Hydro Power AG, Austria)	Electro-Mechanical efficiency enhancement and refurbishment of the Run of River Hydro Power Plant Ybbs-Persenbeug/Danube
27	Frédéric Marchand (Sorea, France), Olivier Crépon, Claire Gauthier (Setec Energy Solutions, France)	Enhancing plan of Neuvachette power plant
	Discussions session C1	
10h40	<i>Coffee break around the posters and booths</i>	
11h20	Session C2 Chair : Maryse François, Alstom Hydro	Global presentations of scheduled or ongoing enhancing projects (refurbishment, repowering ...) prepared or planed
33	Florent Baud (EDF, Unité de Production Alpes), Paul Gaudron (EDF, CIH) et Jean-Charles Galland (EDF, Direction Production et Ingénierie Hydraulique), France	EDF's Romanche-Gavet hydro project: from six to one unique plant, to enhance performances, public safety, environmental and social integration
1	Dr Eric Davalle (Public Utility of the City of Lausanne) & Brendan Quigley (STUCKY LTD, STUCKY-CNR-Bonnard & Gardel), Switzerland	Power Increase of Lavey (Switzerland) Hydroelectric Power Scheme, Lavey+ Project
34	Didier Rault , Magali Neymarc, Mathieu Ferrière, Pierre Roumieu (Compagnie Nationale du Rhône, France)	Increasing safety and reliability of Seyssel hydropower plant
47	Alain Garnier , Agnès Barillier (EDF, France)	The Kembs project: environmental integration of a large existing hydropower scheme
	Discussions session C2	
12h35	Remise du prix Jean Valembois à Hussein NOURI pour sa thèse : « Étude expérimentale de l'écoulement et de l'interaction entre deux rotors contrarotatifs subsoniques »	
12h45	lunch	

14h00	Session D Chair : Thibaut Ulrich, Artelia	Pumped storage plants: enhancing, repowering, new PSP from existing schemes, new services to the grid
19	Antoine Libaux , Arnaud Koehl, Frédéric Michaud, Solveig Gubert and Joël-Rémy Nicolas (EDF, France)	A generic method for the capability evaluation of hydraulic power-plant to participate to the Load-Frequency Control (LFC)
14	Thomas Hildinger (Voith Hydro Holding, Brazil), Ludger Ködding (Voith Hydro Holding, Germany)	Modern Design for Variable Speed Motor-Generators – Asynchronous (DFIM) and Synchronous (SMFI) Electric Machinery Options for Pumped Storage Power Plants
22	Nathalie Lefebvre (EDF-DPIH), Marie Tabarin, Olivier Teller (Alstom Hydro), France	Upgrading of Le Cheylas PSP to variable speed technology
25	Martin Rau (E.ON Kraftwerke GmbH, Germany)	Extension of PSP Waldeck 2 in Northern Hesse, Germany
35	Jean-Bernard Houdeline , Sylvain Antheaume, F. Dompierre, N. Juhel (ALSTOM Hydro), Gilles Duc , P. Laurier, P. Maruzewski (EDF-CIH), France	PSP Refurbishment: Large performances improvement of REVIN pump turbines (4 x 200 MW, Hr = 230 m)
43	Gaël Micoulet (ALPIQ Suisse SA), S. Herbivo (EDF-CIH, France), J.-M. Burnier (Stucky SA, Switzerland)	FMHL+ extension project of the existing Veytaux-power plant - On going works and interaction challenges
32	Xavier Mourrat (EDF DPIH, Hydro Engineering Center), Nathalie Lefebvre et Gilles Yahiaoui (EDF DPIH), France	La Coche hydropower station uprating: A high pressure pumped storage plant optimization
	Discussions session D	
16h30	Closing remarks, End of conference	

Friday April 11, 2014

Technical tour to the Gavet Hydroelectric project site (Romanche).
(Departure 8:30 Grenoble railway station)

POSTERS

	Session A (1 poster)	Feedback on completed enhancing projects: rehabilitation, repowering; including economic, environmental, safety and technical aspects.
9	Erik Høstmark et Clément Perchat (Statkraft France)	The Eiriksdal Makkoren project: An example of the enhancement of an existing hydropower scheme with improvements both on the environmental and the energy aspects
	Session C (2 posters)	Global presentations of scheduled or ongoing enhancing projects (refurbishment, repowering ...) prepared or planned

28	Christophe Nicolet (Power Vision Engineering Sàrl, Switzerland), Jean-Pierre Taulan (EDF-CIH, France), Jean-Michel Burnier (Stucky SA, Switzerland), Monique Bourrilhon (EDF-CIH, France), Gaël Micoulet, Alain Jaccard (ALPIQ Suisse SA, Switzerland)	Transient Analysis of Hongrin-Léman Pumped-Storage Power Plant for New Surge Tank Design.
8	Franco Podio, & Armando Cantore (Enel Produzione, Italy)	Performance improvement in old HPP rehabilitation and upgrading. Enel experience
	Session D (9 posters)	Pumped storage plants: enhancing, repowering, new PSP from existing schemes, new services to the grid
16	Dr. Florian Senn (VERBUND Hydro Power AG, Austria)	Efficiency Enhancement and Power Uprating of Kaprun Main-Stage Storage Power Plant
4	Alexandre Lapeyre (APS France)	Opportunities and benefits of using GRP pipe to refurbish an existing penstock or to install a new one
15	Jason M. Foust, Stuart Coulson (Voith Hydro Inc., USA), Norman Perkins (Alden Research Laboratory, USA) with Luciano Lorenzini (Voith Hydro, Germany)	Fish-Friendly Hydro Turbine Development
26	Young-Do Choi, Qingsheng Wei (Mokpo National University), Yeong-Ho Hwang (Shinhan Precision Co. Ltd) & Se-Wan Tak (K-water), Republic of Korea	Repowering of small hydropower plant by improving the performance of turbine system in Korea
30	Etienne Philiponet and Mohamed Belkadi (PMGA, France)	Improvement of electrical energy production: Case of low head hydropower plant
49	Stéphane Viennet (Hydreole) et Vincent Stellato (Prediag), France	Preventive maintenance and optimization of hydro-mechanical equipment
	Session E (2 posters)	Miscellaneous
50	Emmanuel Branche & Jean-Charles Galland (EDF CIH, France)	Implementation of the Hydropower Sustainability Assessment Protocol of IHA in France: the sustainability profile of Romanche-Gavet's project
	France hydro-électricité	Coordinated operation for upgrading equipment compliance on Saison

INFORMATIONS PRATIQUES / PRACTICAL INFORMATION

Lieu/Venue: ENSE3, Grenoble campus, Amphithéâtre A 022 Louis Néel, 11 rue des Mathématiques, St Martin d'Hères

Access: Tramway, line B or C. - From Grenoble railway station: line B (20 min. to Gabriel Fauré station)

Inscriptions/Registrations : consultez et complétez le bulletin d'inscription joint, à retourner **avec le paiement ou un bon de commande** à/Read and complete the registration form below, to be sent with the payment to SHF (25 rue des Favorites, F 75015 Paris – Tél. 33(0)1 42 50 91 03 – Fax 33(0)1 42 50 59 83 – mail shf@shf.asso). L'inscription inclut la participation aux conférences, le recueil des textes des interventions, les déjeuners/Registration includes proceedings and lunches.

Publication : le recueil des textes est remis aux participants. Il peut aussi être commandé indépendamment de la participation au colloque (voir le bulletin d'inscription)/ Proceedings may be ordered separately as mentioned in the registration form.

Hébergement/Accommodation : les réservations hôtelières ne seront pas faites par la SHF. Une liste d'hôtels est proposée ci-dessous. / Hotel reservation should be done by yourself. A short list of hotels is provided below.

Formation : Cette manifestation est **imputable au budget de la formation professionnelle continue** (participants français uniquement). (N° de formateur : 11 75 02902 75)

Ce congrès entre dans le cadre de la formation professionnelle continue (France)

QUELQUES HOTELS / SOME HOTELS

(No special conditions - see more hotels and book on <http://hotelgrenoble.info>)

Hotel Alizé*, 1 rue Amiral Courbet, 38000 Grenoble, <http://www.hotelalize.com/>, from 30 €

Hotel Gloria**, 12 Rue Aristide Bergès, 38000 Grenoble, www.hotel-gloria-grenoble.com, from 50 €

Hotel Institut**, 10 rue Barbillon, 38000 Grenoble, www.institut-hotel.fr, from 50 €

Hotel Suisse et Bordeaux**, 6 Place de la Gare, 38000 Grenoble, www.hotel-sb-grenoble.com, from 55€

Ibis Grenoble gare**, 27 Quai Claude Bernard, 38000 Grenoble, <http://www.ibis.com/fr/booking/hotels-list.shtml>, from 69€

Ibis style Grenoble centre gare**, 25 Avenue Félix Viallet, 38000 Grenoble, <http://www.accorhotels.com/fr/hotel-7953-ibis-styles-grenoble-centre-gare/index.shtml>, from 90€

Residhotel central gare***, 8 Place de la gare, 38000 Grenoble, <http://www.resid-hotels.com>, from 75€

Royal hotel***, 2, rue Gabriel Peri, 38000 Grenoble, <http://www.royalhotelgrenoble.com/>, from 70€

SOCIETE HYDROTECHNIQUE DE FRANCE

Non-profit association founded in 1912

FLUID DYNAMICS AT THE SERVICE OF MANKIND

The SHF, working at the forefront of research and industrial processes, carries out its activities in the following areas:

-in the field of water, under various aspects of resources management, everyday use for human needs, energy, agriculture, industry and transport, including environmental impact and the study of natural phenomena related to hydrology, meteorology, flood, low flows and drought;

-and the more general field of fluid mechanics of all types, industrial applications and hydro machinery.

► **ACTIONS:** The association's purpose is to encourage progress in and development of scientific culture and knowledge in all the fields relating to water resources and hydrotechnical sciences (Clause 1 of its statutes). It is a meeting point for scientific exchanges between researchers, engineers, government services and local communities, industrials, students ...

The results of the SHF's work are reflected in the great variety of events organized by the association. Reports and papers are printed on transactions, guides and other topics which are published in great part in the journal "La Houille Blanche"

La Houille Blanche (International journal on water) proposes detailed analysis of the most up-to-date developments in all branches of hydraulics. Its theme files, prepared by renowned specialists, make "La Houille Blanche" a reference for water engineers and researchers not only in France but all over the world.

► **ANNUAL AWARDS:** The Henri MILON award is granted to the author of a book or thesis related to hydrology. The Jean VALEMBOSIS's prize is awarded to the author of a book or thesis related to the field of fluid mechanics. The Jean MASSE price is awarded to the author of a thesis related to social sciences applied to the field of water. The winner of the "Grand prix Hydrotechnique" is elected for his large contribution to the fields in which the SHF is active.

25 rue des Favorites – F 75015 Paris France – Tel. 33 (0)1 42 50 91 03 - Fax : 33 (0)1 42 50 59 83 - shf@shf.asso.fr - www.shf-hydro.org