



# Enhancing hydropower- plant facilities

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

## **4<sup>th</sup> announcement and program**

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

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**SOCIETE HYDROTECHNIQUE DE FRANCE**

25 rue des Favorites – F75015 PARIS – 33(0)1 42 50 91 03 – [www.shf-hydro.org](http://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 Gavet Hydroelectric project site (Romanche). (Upon registration. The number of places is limited)

**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 Phillippis (SHF)

### Partners:



## Wednesday April, 9<sup>th</sup>

8h00	Welcome and registration	
<b>9h00</b>	<b>Conference opening</b> D Loudière, President of SHF M.H. Battistel, Deputy of Isère (subject to availability) 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 on Best practices in hydraulic machinery and hydropower repowering projects.
<b>10h15</b>	<b>Session A</b> <b>Chair: Bruno Mathex, CNR</b>	<b>Feedback</b> on completed enhancing projects: rehabilitation, repowering; including economic, environmental, safety and technical aspects.
<b>5</b>	Voitto Kokko (Fortum Power and Heat Oy, Finland) & Peter Hjerthén, Karl-Erik Löwen, Hans Ingfält, Arne Sjögren (Fortum Generation Ab, Sweden)	Development of Dalälven hydro power scheme in Sweden
<b>3</b>	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
<b>36</b>	J. Virone, C. Buchi, A. Cuvillier, C. Garnier (ALSTOM Hydro, France)	Refurbishment of medium head Francis Turbine: Tungatinah case study
	<b>Discussions session A1</b>	
<b>11h25</b>	<i>Coffee break around the posters and booths</i>	
<b>44</b>	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 redesigning small hydro power plants in China
<b>48</b>	Jean-Charles Galland, Alain Guillot, Frédérique Armand (EDF, France)	La Bathie: simultaneous power increase and river safety improvement
<b>18</b>	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
	<b>Discussions session A2</b>	
<b>12h35</b>	<i>lunch</i>	
<b>14h00</b>	<b>Session B1</b> <b>Chair: Anne Penalba, France Hydro</b>	<b>Operations or studies on Powerplant components : turbines - including fish-friendly turbines, penstocks, I&amp;C, ...</b>
<b>29</b>	Sylvain Raynal, Ludovic Chatellier, Laurent David (Institut Pprime), Dominique Courret, Michel Larinier (Onema), France	Study on fish-friendly inclined and angled trashracks

<b>31</b>	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
<b>6</b>	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
<b>11</b>	Erik San Telmo (Ingeteam Power Technology S.A., Spain)	Hydroelectric power plants automation using IEC 61850: experiences and improvements for the user
	<b>Discussions session B1</b>	
<b>15h20</b>	<i>Coffee break around the posters and booths</i>	
<b>15h40</b>	<b>Session B2</b> <b>Chair : François Avellan, EPFL-LMH</b>	Operations or studies on <b>Powerplant components</b> : turbines - including fish-friendly turbines, penstocks, I&C, ...
<b>24</b>	Mariusz Hajdarowicz, Andrzej Łojek, Maciej Kaniecki (ZRE Gdańsk S.A., Poland)	Rehabilitation of medium-head hydropower plants with exploited twin-Francis turbines.
<b>39</b>	Kirsten Winkler (Andritz Hydro AG, Switzerland)	Hydro-abrasive erosion: Problems and Solutions
<b>37</b>	Sylvain Tridon, Xavier Cornut, Laurent Tomas (ALSTOM Hydro, France)	Kaplan turbine refurbishment based on numerical simulation
<b>42</b>	Christof Gentner, Benoit Boulet (Andritz Hydro, Switzerland)	Refurbishment of the hydropower plant Sisteron (France) : Hydraulic development and mechanical improvement
	<b>Discussions session B2</b>	
<b>17h00</b>	<b>Short oral poster presentations</b>	<b>(discussions at the poster)</b>
<b>18h00</b>	<b>Allocution</b> by Marc Baietto, President of Grenoble-Alpes Métropole (subject to availability)	
<b>18h10-19h00</b>	<b>Get-together around the Posters and Booths</b>	

## Thursday April, 10<sup>th</sup>

<b>9h00</b>	<b>Session C1</b> <b>Chair : Xavier Ursat, EDF-DPIH</b>	<b>Global presentations</b> of scheduled or ongoing enhancing projects (refurbishment, repowering ...) prepared or planned
<b>10</b>	Roald Nilsen (Statkraft Energi AS, Norway)	Enhancing hydropower plant facilities: Rehabilitation and extension of the Nedre-Røssåga power plant
<b>7</b>	Emmanuel Maginot & Lionel Orcel (CNR-Compagnie Nationale du Rhône, France)	Replacement and upgrading of Chancy-Pougny hydropower plant
<b>21</b>	Thomas Blanié, Pascal Seret & Samuel Renaud (Tractebel Engineering France)	Upgrading and repowering of Kainji Hydroelectric Power Station. Rehabilitation project Stage 1
<b>23</b>	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
<b>27</b>	Frédéric Marchand (Sorea, France), Olivier Crépon, Claire Gauthier (Setec Energy Solutions, France)	Enhancing plan of Neuvachette power plant
	<b>Discussions session C1</b>	
10h40	<i>Coffee break around the posters and booths</i>	
<b>11h30</b>	<b>Session C2</b> <b>Chair : Maryse François, Alstom Hydro</b>	<b>Global presentations</b> of scheduled or ongoing enhancing projects (refurbishment, repowering ...) prepared or planned
<b>33</b>	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
<b>1</b>	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
<b>34</b>	Magali Neymarc, Mathieu Ferrière, Pierre Roumieu, Didier Roul (Compagnie Nationale du Rhône, France)	Increasing safety and reliability of Seyssel hydropower scheme
<b>47</b>	Alain Garnier, Agnès Barillier (EDF, France)	The Kembs project: environmental integration of a large existing hydropower scheme
	<b>Discussions session C2</b>	
<b>12h45</b>	<b>lunch</b>	

<b>14h00</b>	<b>Session D</b> <b>Chair : Thibaut Ulrich, Artelia</b>	<b>Pumped storage plants:</b> enhancing, repowering, new PSP from existing schemes, new services to the grid
<b>19</b>	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)
<b>14</b>	Thomas Hildinger (Voith Hydro Holding, Brazil), Holger Henning, 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
<b>22</b>	Nathalie Lefebvre (EDF-DPIH), Marie Tabarin, Olivier Teller (Alstom Hydro), France	Upgrading of Le Cheylas PSP to variable speed technology
<b>25</b>	Martin Rau (E.ON Kraftwerke GmbH, Germany)	Extension of PSP Waldeck 2 in Northern Hesse, Germany
<b>35</b>	S. Antheaume, F. Dompierre, J.-B. Houdeline, N. Juhel (ALSTOM Hydro), G.Duc, P. Laurier, P.Maruzewski (EDF-CIH ), France	PSP Refurbishment: Large performances improvement of REVIN pump turbines (4 x 200 MW, Hr = 230 m)
<b>43</b>	J.-M. Burnier (Stucky SA , Switzerland), S. Herbivo (EDF-CIH, France), G. Micoulet ( ALPIQ Suisse SA)	FMHL+ extension project of the existing Hongrin-Léman power plant - on going works and interaction challenges
<b>32</b>	Mourrat Xavier (EDF DPIH, Hydro Engineering Center), Gilles Yahiaoui et Nathalie Lefebvre (EDF DPIH), France	La Coche hydropower station uprating: A high pressure pumped storage plant optimization
	<b>Discussions session D</b>	
<b>16h30</b>	<b>Closing remarks, End of conference</b>	

## Friday April 11, 2014

**Technical tour** to the Gavet Hydroelectric project site (Romanche).

## POSTERS

	<b>Session A (1 poster)</b>	<b>Feedback</b> on completed enhancing projects: rehabilitation, repowering; including economic, environmental, safety and technical aspects.
<b>9</b>	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
	<b>Session B (1 poster)</b>	Operations or studies on <b>Powerplant components:</b> turbines - including fish-friendly turbines, penstocks, I&C, ...
<b>16</b>	Dr. Florian Senn (VERBUND Hydro Power AG, Austria)	Efficiency Enhancement and Power Uprating of Kaprun Main-Stage Storage Power Plant

	<b>Session C (2 posters)</b>	<b>Global presentations</b> of scheduled or ongoing enhancing projects (refurbishment, repowering ...) prepared or planed
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
	<b>Session D (8 posters)</b>	<b>Pumped storage plants:</b> enhancing, repowering, new PSP from existing schemes, new services to the grid
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
17	Aurélie Dehouck Thibaut Gazet (EDF R&D, France)	Experimentation of IEC61850 communications on an EDF hydropower plant platform
26	Young-Do Choi (Mokpo National University), Yeong-Ho Hwang (2Shinhan 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
46	Ling Zhou (College of Water Conservancy and Hydropower Engineering, China), Deyou Liu (International Center on Small Hydro Power and Hohai University, China), Bryan W. Karney (Univ. of Toronto, Canada), and Chuanqi Ou (International Center on Small Hydro Power, China)	Effects of adding an air cushion surge chamber in the upgrade of hydropower plant with a long-distance head-race conduit
49	Stéphane Viennet (Hydreole) et Prediag, France	Preventive maintenance and optimization of hydro-mechanical equipment
	<b>Session E (2 posters)</b>	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	Opération coordonnée de mise en conformité des ouvrages sur le 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](http://www.hotel-gloria-grenoble.com), from 50 €

Hotel Institut\*\*, 10 rue Barbillon, 38000 Grenoble, [www.institut-hotel.fr](http://www.institut-hotel.fr), from 50 €

Hotel Suisse et Bordeaux\*\*, 6 Place de la Gare, 38000 Grenoble, [www.hotel-sb-grenoble.com](http://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.

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