

# Our Service – Part of Your Business HyService





# HyService helps you turn your plant's profit ability into profitability

Capim Branco, Brazil

Digital expertise and over 150 years  
of experience make Voith Hydro your  
best service partner.



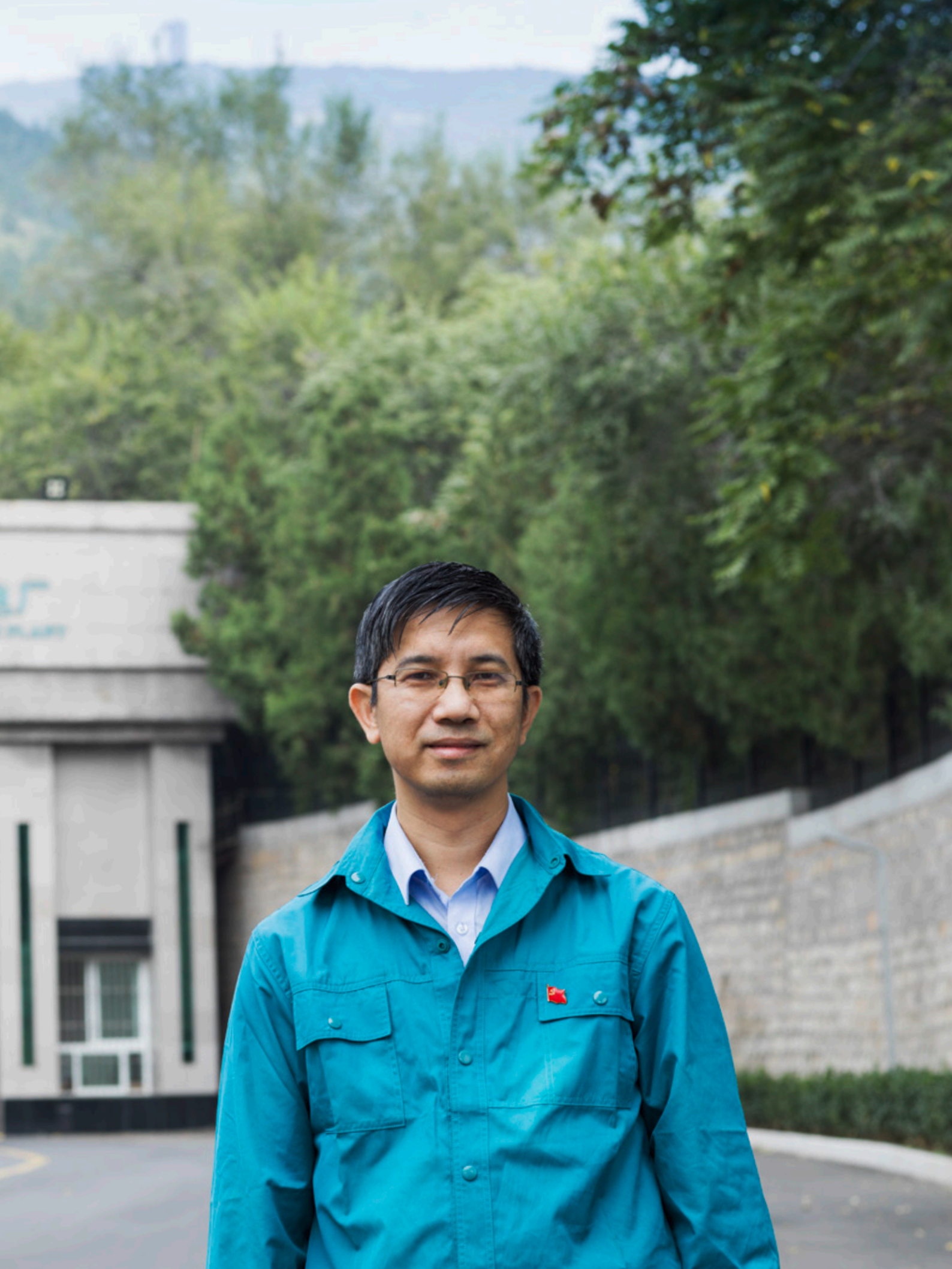
No matter if you operate a small or large hydropower plant – with our proactive services and customized service agreements, your hydropower plant will run at maximum profitability. Our experts provide support all over the world and around the clock, so you can get the best from your hydropower plant: smooth interaction of all components, maximum service life, and optimum productivity.

**Our Service – Part of Your Business.**

“Voith HyService has significant expertise and experience in the maintenance and retrofitting of hydropower plants in China. This is particularly important to us.”

**Zhang Heng**, Vice President Shisanling (SSL) Pumped storage power plant  
Beijing, China





# Voith has installed a quarter of the world's 40 000 hydropower units



## 1 Uniper Kraftwerke GmbH

Langenprozelten, Germany

- Modification and reconditioning of unit 1
- Reconditioning of start turbine
- Complete renovation of all main inlet valves

<b>Turbine type</b>	Pump-turbine
<b>Rated output</b>	83.15 / 73.50 MW
<b>Flow range</b>	24.17 m <sup>3</sup> /s
<b>Rated head</b>	310.4 m
<b>Speed</b>	500 rpm
<b>Diameter</b>	3 010 mm



## 2 Pumping station Süßenmühle

Lake Constance, Germany

- Disassembly / reassembly
- Complete renovation of six units
- Complete renovation of all main inlet valves

<b>Turbine type</b>	Centrifugal pump
<b>Rated output</b>	10 MW
<b>Flow range</b>	2.78 m <sup>3</sup> /s
<b>Rated head</b>	325.5 m
<b>Speed</b>	497 rpm
<b>Diameter</b>	1 692 mm

## 3 Pumped storage power plant Shisanling (SSL)

Changping District, Beijing, China

- Disassembly / reassembly
- Renovation of U3
- Complete renovation of main inlet valves (shutoff-valves)

<b>Turbine type</b>	Pump-turbine
<b>Rated output</b>	204 MW
<b>Flow range</b>	44 m <sup>3</sup> /s
<b>Rated head</b>	470 m
<b>Speed</b>	500 rpm
<b>Diameter</b>	3 679 mm



**4 Svartisen**  
Meløy, Norway

- Supply of a modernized generator with 320 MVA, one of the largest machines in Norway

<b>Commissioning</b>	2011
<b>Number of generators</b>	1
<b>Voltage</b>	18 kV
<b>Speed</b>	375 rpm
<b>Output</b>	320 MVA

**5 HydroSchool**  
Vancouver, Canada

- Practice-oriented learning content
- Taught by industry recognized subject matter expert trainer
- Detailed training documentation
- Certificate for professional development accreditation

<b>Course Title</b>	Hydro Generators, electrical and mechanical stator windings
<b>Client</b>	BC Hydro
<b>Duration</b>	5 days





## 6 Pumped-storage power station Bad Creek

Oconee County, South Carolina

- In 1991, Voith supplied the turbine and the shut-off valve
- Voith supports the owner with the planning of maintenance measures, supply of uprated or spare parts and advice

<b>Turbine type</b>	Pump-turbine
<b>Rated output</b>	420 MW
<b>Flow range</b>	130 m <sup>3</sup> /s
<b>Rated head</b>	353.6 m
<b>Speed</b>	300 rpm
<b>Diameter</b>	5 330 mm



Our Service –  
Part of Your  
Business.

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#### Growth as a result of acquisitions and joint ventures

- Siemens/Hydro, Germany
  - Westinghouse, USA
  - S. Morgan Smith, USA
  - Riva-Hydroart, Italy
  - Fuji Electric/Hydro, Japan
  - Kössler, Austria
  - Allis Chalmers, USA
  - SHEC, China
  - Vortex Hydrosystems, Canada
  - VG Power, Sweden
  - J/V WolgaHydro, Russia
- 

## We take care of all plants and components – by every manufacturer

In addition to our own products, we can also care for equipment produced by other manufacturers. Our market know-how results from participation in many joint ventures in the field of hydropower.



HyService provides support for the following components

**Turbines**



- Kaplan turbines
- Francis turbines
- Pelton turbines
- Pump turbines
- Bulb / Pit turbines
- Pumps

**Generators**



- Synchronous, asynchronous, permanent magnet
- Variable speed motor generators
- Synchronous condenser
- Thrust bearings
- Horizontal, vertical
- Cooling fans
- Excitation systems

**Main inlet valves**



- Annular valves
- Butterfly valves
- Spherical valves
- 

**Automation**



- Control systems
- Monitoring systems
- Diagnosis systems
- Software upgrades
- Parameter optimization

**Balance of plant electrical**

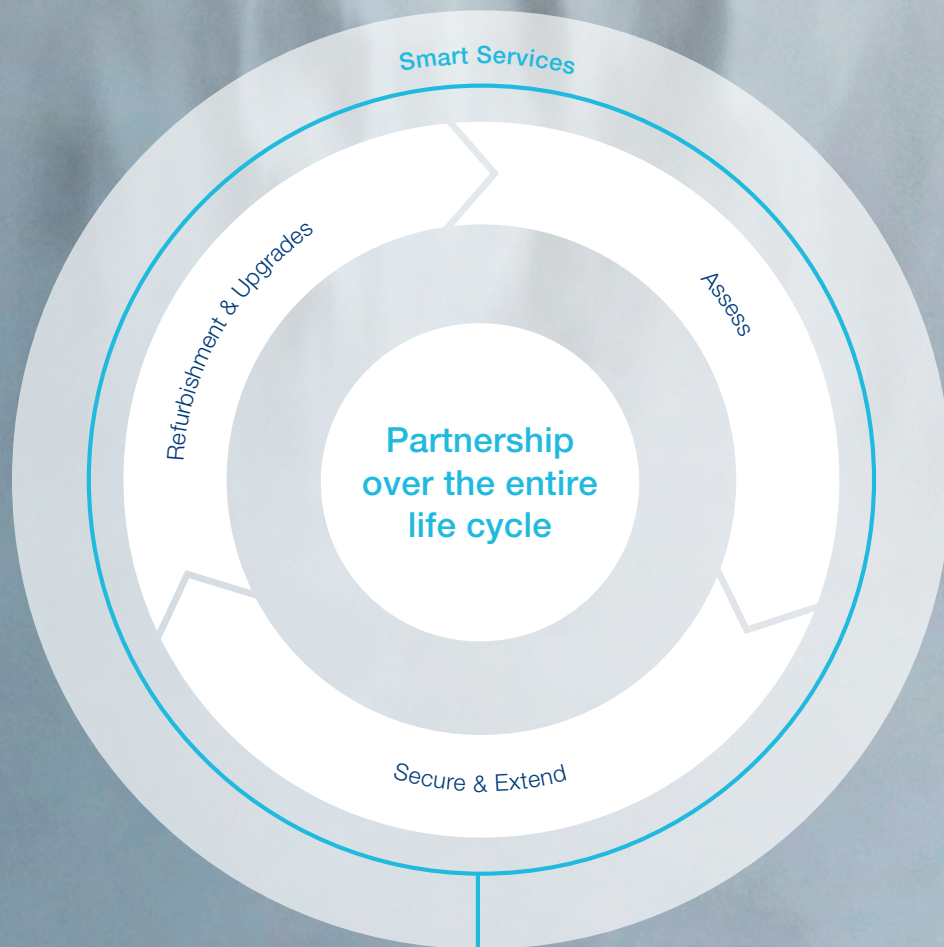


- Switchyards, switchgears
- Power transformers
- Frequency converters
- Circuit breakers
- Cable systems
- Bus ducts

**Balance of plant mechanical**



- Oil systems
- Blow down systems
- Cooling systems
- Air conditioning systems
- Cranes



As a single source provider, Voith HyService provides all of the services you need so that you can operate your hydroelectric plant efficiently and cost-effectively over its entire life cycle.

**Smart Services**

- Smart monitoring
- Remote maintenance
- Asset performance management
- Mobile services
- Cyber security

# HyService – An overview of our services

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## Service agreements

**We guarantee that we'll do what you need**

- + Customized service packages
- + Regular inspections and measures for improvement
- + More control over costs and budget

**More details on page 18.**



## Spare parts

**Quality and quick local availability all over the world**

- + Customized and standard spare parts, from seals to turbine runners
- + Spare parts for any third-party products
- + Continual cost reduction with spare part prediction and management
- + Intelligent logistics for quick worldwide delivery
- + Upgrading to the most advanced technology

**More details on page 20.**



## Assessment and consulting

**Set benchmarks for your progress**

- + Monitoring and diagnostics
- + System recovery and updates
- + Optimization of operating procedures and identification of unnecessary costs
- + Audits with regard to legal and safety compliance
- + Improvement of environmental, health and safety aspects

**More details on page 19.**



## Diagnosis and repair

**Immediate, both remotely and on-site**

- + Quick, flexible response
- + Repairs on-site
- + Reduced downtime
- + Fewer unplanned outages

**More details on page 21.**



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**Longer service life, higher reliability and more performance.**



### Education and training

#### HydroSchool –

#### Courses for beginners and professionals

- + Basic courses and course programs for experts and beginners
- + Customized courses
- + Learning level based precisely on previous knowledge
- + Wide variety of subjects
- + Instructions for cost-effectively doing your own maintenance and repair
- + Qualification for the next generation

**More details on page 25.**



### Refurbishment and upgrades

#### For maximum performance – today and tomorrow

- + Technical refurbishment measures on-site
- + Hardware and software upgrades
- + Addition of improved or new functions
- + Increase in hydropower plant flexibility and functionality
- + Electrical power production with greater efficiency and profitability

**More details on page 23.**



### Maintenance and operations

#### For lasting top performance

- + Regular maintenance intervals
- + Timely troubleshooting and analysis of weaknesses
- + Planned maintenance, can be fully automated
- + Precise overview of the current status
- + Ongoing consultation and refurbishment

**More details on page 22.**



### Smart Services

#### Intelligence in hydropower plants

- + Smart monitoring solutions for detecting weaknesses early on
- + Asset management systems for managing and assessing your hydropower plant
- + Cyber security for the seamless protection of your IoT environment
- + Smart equipment for remote maintenance
- + Transformation of your data into company value

**More details on page 23.**



**Avoid unplanned outages, avoid hidden costs, avoid reductions in value and service life.**

# Our Service – Part of Your Business.



Unplanned repairs, troubleshooting, or waiting for spare parts – every minute of hydropower plant downtime costs you money. We support you in each phase of the life cycle of your hydropower plant with customized and planned solutions and service packages.

Diagnostics play a significant role in machine repair and maintenance. Our intelligent solutions provide you with support so

you can take proactive and planned action. Our HyService experts understand the challenges you confront every day and ensure that the value of your hydropower plant is maintained and its performance optimized. Our services include not only technical support, but also assessment and consultation services and training for your employees.

Voith HyService – Your partner over the entire life cycle.



“Their reliability and quality leave nothing to be desired. HyService is uncomplicated, competent, and friendly. We have already benefited from a long cooperation marked by trust.”

**Roland Regenscheit**, Group Leader Mechanical Engineering  
Pumped storage power plant, Lake Constance, Germany







## Service agreements

### We guarantee that we'll do what you need

With Voith HyService, you can get the best from your hydropower plant over its entire life cycle: maximum availability, the highest performance, and optimum productivity. A service agreement gives you the security of always having consultation and assistance when you need it – for small or large hydropower plants.

Our experts analyze your system and put together a service package that meets your needs precisely or you can choose exactly what you need from the HyService portfolio – from system operation, consulting, repair and refurbishment to training. Regular maintenance noticeably increases the reliability of your hydropower plant. You receive customized solutions for your problems and have more control over costs and budget. See all of the services at a glance on page 13.

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#### Scope of work

- Detailed analysis of the hydro-power plant history and current requirements
  - Creation of a customized service package
  - Contractual agreement guaranteed services such as regular inspection, tools for analysis and assessment, remote diagnostics, repair and maintenance, digital solutions
  - Regular preventative and improvement measures
-



## Assessment and consulting

### Set benchmarks for your progress

Over 150 years of experience and expert knowledge in the area of hydropower create the basis for HyService. We are well-equipped to investigate hydropower plants and problems systematically, to assess them, and to make continuous improvement possible.

We measure and observe hydropower equipment and systems and generate solutions that make your hydropower plant safer, more environmentally friendly, and more reliable. A majority of these assessments can be performed with little or no down and in a minimally intrusive manner.

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#### Value add

##### Assessment:

- Monitoring and diagnostics: Vibration and alignment measurement, noise analysis
- Optimization of system dependencies
- System recovery and upgrades
- Supervision

##### Consultation:

- Identification of hidden or unnecessary costs
- Optimization of operating procedures for greater output or device utilization
- Audits with regard to legal and safety compliance
- Improvement of environmental, health and safety addressed in previous item and sustainability aspects
- Maximization of performance and lifetime



## Spare parts

### Quality and quick local availability all over the world

Every part counts. For this reason, HyService values the highest quality for spare parts. No matter if it's standard or customized, or if it's by Voith or another manufacturer: All spare parts fit perfectly together, and if you order spare parts, we spare no effort to make sure that your system is running smoothly.

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#### Value add

##### Customized products

- Complete turbine runners
- Control units
- Wicket gates and mechanism components
- Generator poles and windings

##### Standard spare parts

- Seals
- Components of bearings, brakes, controllers
- Spare parts for any third-party products

- Spare part prediction and management
  - Upgrading to the most advanced technology
  - Intelligent logistics for quick world-wide delivery
-



## Repair

### Immediate, both remotely and on-site

For technical problems, we provide our customers with professional support as quickly as possible. Voith has the largest service network in the hydropower industry. We are ready to get started, whenever and wherever you need us.

You can reach us anytime on our emergency hotline. Experienced experts analyze your problem remotely and respond to all of your operational and technical questions. If you need a technician on-site, our service team will do everything they can to help you as soon as possible.

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#### Scope of work

- 24/7 emergency hotline
- Diagnostics and consultation via remote maintenance
- Experienced service technicians
- Repair of any part, even from third-party manufacturers
- Quick repairs on-site: static and dynamic balancing, in-situ welding and machining when needed
- Compliance with strict safety provisions



## Maintenance and operations For lasting top performance

Without regular maintenance measures, the performance and availability of even the best hydropower plant decreases over time. With HyService, your hydropower plant stays in top form. Together with you, we specify the services in a service agreement. In a service agreement, you can establish the intervals at which our experts will come for inspection and which services they will implement regularly. We recognize weaknesses early on and fix them before significant damage or downtime occurs.

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### Scope of work

- Regular maintenance and trouble-shooting with the most advanced remote monitoring systems
  - Thorough analysis of your hydropower plant and production conditions
  - Timely analysis of weaknesses
  - Planned maintenance, can be fully automated with service agreements
  - Ongoing consultation and refurbishment
  - Customized service agreements
-



## Refurbishment and upgrades

### For maximum performance – today and tomorrow

Regular refurbishment measures keep your hydropower plant in good shape and brings it into state-of-the-art condition. Make the old new again – our HyService experts can recondition all of your mechanical and electrical equipment where appropriate or recommend modern replacement where necessary.

Take advantage of our many years of experience to increase the value, service life and efficiency of your hydropower plant. This investment pays off in terms of a longer life span and noticeably higher performance. You can rely on professional consultation and installation by Voith.

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#### Scope of work

##### Refurbishment:

- Processing turbine runners on-site
- Rewinding of generator poles
- General reconditioning

##### Upgrades:

- Hardware and software upgrades
- Addition of improved or new functions
- Replacement of primary components like the turbine runner
- Generator upgrade for more efficient electrical power production
- Optimization for peak load or load-dependent operation based on demand







## Education and training

### HydroSchool – Courses for beginners and professionals

No matter how much specialized knowledge you already have – the HydroSchool courses are consistently aligned with your knowledge level and need for information. We offer specialized training for employees on the technical or commercial side, for operations and for management. The spectrum extends from introductory and overview courses to detailed technical courses for hydropower engineers.

In addition to regular basic courses, we also design customized training sessions or packages that are tailor made precisely for your needs. We show you how to predict malfunctions in a timely manner and repair the defects yourself. That saves you time and money. HydroSchool ensures that expert knowledge is transferred to the next generation of employees.

For detailed information about the courses and registration, see:

[www.voith.com/hydroschool](http://www.voith.com/hydroschool)

[hydroschool@voith.com](mailto:hydroschool@voith.com)



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#### HydroSchool course overview

- **Turbines:** Turbine design, refurbishment and reconditioning, operation and maintenance
- **Generators:** Generator design, refurbishment and reconditioning, operation and maintenance, and related subjects such as stator winding
- **Hydropower plants:** Hydropower technology and functions as well as related subjects such as hydropower plant safety, pumped-storage, and peripheral plant equipment
- **Hydraulic governors:** Function and maintenance of governors
- **Control and automation:** Automation as a mode of support for operating a hydropower plant, implemented automation and control systems

A blurred background image of an industrial factory setting with various machinery and equipment.

**“HyServices offers high quality services and quick response times. In the commitment of our team, you can see our ongoing dedication to excellent customer service.”**

**Markus Kaufmann**, Project Manager, Voith HyService  
Heidenheim, Germany



VOITH  
Hydraulics

**We're on your side,  
whenever you need us**





#### **Flexible, fast, on-site service**

Our HyService team is available around the clock to support you with remote diagnostics or on-site. We analyze your problem and initiate all of the measures required to solve it.

Our service vehicles are ready to go so that a specialist with the right equipment can get to you quickly in an emergency.

We are able to replace or repair components without disconnecting them from the hydropower plant unit. Because we work on many components on-site, you can avoid heavy load transportation and reduce the downtime of your hydropower plant to a minimum.

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#### **Your benefits**

- + Higher flexibility and short response times**
  - + Experts come to your site with the proper equipment**
  - + Unnecessary transportation of your hydropower plant components – we offer you the most efficient solution economically and logistically**
- 

**Pumped storage power plant  
Süßenmühle  
Lake Constance,  
Germany**



## Smart Services Intelligence in hydropower plants

To stay one step ahead, we are always developing new methodologies for efficient data analysis. For plant maintenance, diagnostics as well as data analysis, Voith offers a wide range of automation components. Increasing digitization will revolutionize the way industries are developing. Products and services will become smarter, more effective and efficient. Voith strives to be your trusted partner for smart digital solutions in the hydropower industry.

# Voith brings intelligence into the digital hydropower plants

## Open up data – securely in the cloud

Together with our customers we are making available a pool of technical and system-related data for the power plant and its infrastructure – securely in the cloud. Here the data is prepared for more in-depth analysis.

## Visualize processes – detect variances

Intelligent process control technology and monitoring solutions from Voith provide information on operational processes, point out deviations from the optimum state, detect risks and indicate necessary maintenance measures. The solutions can be used for all of the plant's infrastructure.

## Analyze intelligently and extend hydropower plant life cycle

Voith's data analysts apply state-of-the-art analytical methods to the operational and system data of hydropower plants, drawing on years of expertise. They develop new solutions to optimize operational processes and improve the safety and flexibility of these processes.

## Run simulations and maintain proactively

With the help of our digital knowledge and decades of hydropower experience, we develop virtual representations of real power plant processes. In the future, digital twins will allow the early detection of imminent problems and proactive maintenance measures.

## Decide intelligently – with the help of self-learning systems

Together with our customers, we develop self-learning systems that intelligently support power plant operators and asset managers in decision-making. We connect internal data streams and visualize them for a holistic view, enabling clients to maximize their plant's revenue – today and in the future.



## Examples of our products and services

- Smart monitoring solutions for early detection of weaknesses
- Asset management tool for managing and assessing your hydropower plant
- Cyber security for the seamless protection of your IoT environment
- Smart equipment for remote maintenance
- Transformation of your data into corporate value

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## Your benefits

- + Intelligent process control
  - + Proactive maintenance with data analysis and diagnostics
  - + Extensive transparency for your hydropower plant assessment
  - + Quick communication with Voith experts
  - + Real-time connection between the hydropower plant and the HyService team
  - + Reduced downtime
  - + Proactive and cost-efficient
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**“HyService stands for punctuality, trustworthy cooperation, compliance with the contractual framework and the achievement of the common goals.”**

**Jens Müller**, Project Manager Uniper Kraftwerke GmbH  
Langenprozelten, Germany



# HyService around the world



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### Regional service centers

- 1 **Gamle Fredrikstad, Norway**  
Fredrikstad.HyService@voith.com
  - 2 **Västerås, Sweden**  
Vasteras.HyService@voith.com
  - 3 **St. Pölten, Austria**  
St.Poelten.HyService@voith.com
  - 4 **Heidenheim, Germany**  
Heidenheim.HyService@voith.com
  - 5 **Malans, Switzerland**  
Malans.HyService@voith.com
  - 6 **Cinisello Balsamo, Italy**  
Milano.HyService@voith.com
  - 7 **Šenčur, Slovenia**  
Sencur.HyService@voith.com
  - 8 **Bucharest, Romania**  
Bucuresti.HyService@voith.com
  - 9 **Podgorica, Montenegro**  
Podgorica.HyService@voith.com
  - 10 **Tolosa, Spain**  
Tolosa.HyService@voith.com
  - 11 **Söğütözü Ankara, Turkey**  
Ankara.HyService@voith.com
  - 12 **Moscow, Russia**  
Moscow.HyService@voith.com
  - 13 **Noida, India**  
Noida.HyService@voith.com
  - 14 **Shanghai, China**  
Shanghai.HyService@voith.com
  - 15 **Kawasaki-shi, Japan**  
Kawasaki.HyService@voith.com
  - 16 **Mississauga, Canada**  
Mississauga.HyService@voith.com
  - 17 **York, USA**  
York.HyService@voith.com
  - 18 **Mexico City, Mexico**  
Latam.HyService@voith.com
  - 19 **Medellín-Antioquia, Colombia**  
Colombia.HyService@voith.com
  - 20 **Cuenca, Ecuador**  
Ecuador.HyService@voith.com
  - 21 **Miraflores – Lima, Peru**  
Peru.HyService@voith.com
  - 22 **Santiago de Chile, Chile**  
Chile.HyService@voith.com
  - 23 **São Paulo, Brazil**  
Brazil.HyService@voith.com
- **Workshops, sales offices, sales representatives**
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# HyService More than a partner for generations



Shisanling (SSL)  
Pumped storage power plant  
Beijing, China

More than

500

HyService experts

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Several

1 000

service calls per year

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Gaining experience since

1 867

Local  
presence  
in more  
than

50  
countries

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We support you

24/7



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