

More

HyPower

The magazine for: More. Powerful. Solutions.



Issue one

April 2002

It's time your business profited from: **More. Powerful. Solutions.**

*On April 1, 2002 the Voith Siemens Hydro joint venture
celebrated its second anniversary.*



Dr. Hans Peter Schiffer

In these two years, the structures have been merged and new processes have been established in order to meet the challenges we have set for ourselves with

More. Powerful. Solutions.

- The integration of the mechanical and electrical hydro equipment businesses shall offer **More** value to our customers through complete scope, comprehensive knowledge and fewer interfaces
- The strength of our shareholders Siemens and Voith, as well as our full dedication to hydropower, shall make us a **Powerful** partner of the power generation industry, seeking maximum reliability of its long-term investments
- The wide scope of our products and experiences shall enable us to offer the most economical **Solutions** for all kinds of customer requirements. Our unique Integrated Solutions strategy supported by our advanced engineering tools shall make us the preferred partner of our customers.

Challenge means we had and still have to work hard for achieving our goals – we are not yet there.

Editorial

But we do not hesitate to let you know where we want to be and to let you judge where we are. Your response shall help us to further improve – for your benefit as well as for ours. Our common reference line is your long-term return on the investment in our products and services, our goal is to cooperate as your partner for optimizing this return.

With these considerations in mind we launch our new customer newsletter Hypower. Its chapters follow our claim, we present more issues in a powerful design, introducing selected solutions. Hypower shall be a platform for broader dialogue – in all phases of your investments, from feasibility studies to operation and maintenance.

One important aspect of partnership and dialogue is to know each other. This includes organizational structures as well as the responsible persons. Thus, I would like to inform you that after the successful post-merger integration I am resigning from my position as of April 30, 2002. After 22 years in the hydro business and 16 years as member of the Voith Corporate Management Board and President of Voith Hydro and Voith Siemens Hydro respectively, I hand over this responsibility to Dr. Hubert Lienhard. He has been deputy member of the Voith Corporate Management Board since November 1, 2002. With his vast experience in the plant engineering and power generation fields he will lead Voith Siemens Hydro effectively towards achieving its challenging goals.



*New management team at Voith Siemens Hydro:
From left: Dr. Siegbert Etter, Karl-Heinz Fessel,
Dr. Hubert Lienhard (Chairman), Jürgen Sehnbruch.*

He will be supported by a renewed management team with group division-wide functional responsibilities:

Dr. Siegbert Etter is responsible for Corporate Technology, succeeding Michael Olschewski, and Jürgen Sehnbruch will be responsible for Corporate Marketing, succeeding Horst Kübel. Karl-Heinz Fessel will continue in his position as CFO.

I would like to thank the departing members of Voith Siemens Hydro's management board for their important contribution to the success of the merger and wish all new members good luck and success in their business, providing to their customers

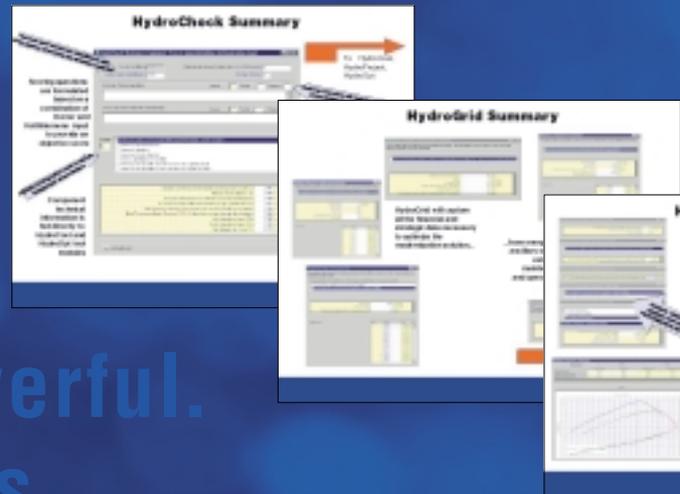
**More.
Powerful.
Solutions.**

Dr. Hans Peter Schiffer

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Works of art – styled with water

Several significant contracts have recently been awarded to Voith Siemens Hydro in North America, among them major orders for the modernization of one of the world's largest pumped storage plants, Dominion Generation's Bath County plant in Virginia, and for the 1300 MW Castaic plant of the City of Los Angeles Department of Water & Power. These contracts are based on the Voith Siemens Hydro Integrated Services business philosophy: A true partnership approach, wherein plant owner and supplier objectives become one; focusing on optimum return on investment (ROI) for the Owner. The Voith Siemens Hydro Integrated Services solution is rapidly gaining popularity among hydro owners as, by design, it typically cuts their bottom-line total ownership costs dramatically compared to the traditional approach to modernization projects, including significant benefits in reduced project implementation times.



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The performance and availability of all hydropower plants gradually decline over the years. In a traditional approach, once economic ineffectiveness compels the owner to seriously consider modernization, time is of the

essence. The planning stages before the actual start of engineering are cost-intensive and time consuming: Bid solicitation and evaluation require the preceding development of mechanical and electrical specifications.

Integrated Services – Voith Siemens Hydro Power Generation's optimum modernization solution



*Pumped storage plant
Bath County, Virginia, USA.*

After contracts are awarded, ensuring effective cooperation of multiple suppliers is one of the biggest challenges to project management, as, due to the division of tasks and responsibilities, owner and suppliers do not share common goals. Further, the limited opportunity for in-depth dialog and coordination during the accelerated bidding process reduces the probability of a truly optimized solution.

By combining the knowledge of the power plant operator and that of Voith Siemens Hydro in the critical planning stages, a detailed scope optimization can be developed. This typically includes the mechanical and electrical performance optimization and a complete review focusing on the project's highest economic return prior to moving forward.

*The IS Toolbox –
the core platform of
Voith Siemens Hydro's
IS program.*

In contrast, the IS approach focuses on implementing life extension programs proactively, before unplanned, forced outages occur, the owner and the supplier having the common target of optimum ROI (Return on Investment) from project launch to completion.

A unique proprietary software system, the IS Toolbox, supports the initial assessment and planning and provides the owner with a clear picture of the work to be done, minimizing changes in scope and cost during the implementation phase. Due to the integration of state-of-the-art technologies and the unique experience level of Voith Siemens Hydro's specialized modernization teams, the solutions developed are able to significantly exceed those attained under the traditional approach.

Tool Name	Tool Description	Tool Category	Tool Status	Tool Version	Tool Location
HydraOpt	Hydro optimization tool	Optimization	Active	1.0	Hydro
HydraProject	Hydro project management tool	Management	Active	1.0	Hydro
HydroCost	Hydro cost management tool	Management	Active	1.0	Hydro
HydroValue	Hydro value management tool	Management	Active	1.0	Hydro
HydroSim	Hydro simulation tool	Simulation	Active	1.0	Hydro
HydroDesign	Hydro design tool	Design	Active	1.0	Hydro
HydroProc	Hydro process management tool	Management	Active	1.0	Hydro
HydroProcSim	Hydro process simulation tool	Simulation	Active	1.0	Hydro
HydroProcDesign	Hydro process design tool	Design	Active	1.0	Hydro
HydroProcProc	Hydro process management tool	Management	Active	1.0	Hydro
HydroProcSimProc	Hydro process simulation tool	Simulation	Active	1.0	Hydro
HydroProcDesignProc	Hydro process design tool	Design	Active	1.0	Hydro
HydroProcProcSim	Hydro process management tool	Management	Active	1.0	Hydro
HydroProcProcSimProc	Hydro process simulation tool	Simulation	Active	1.0	Hydro
HydroProcProcDesign	Hydro process design tool	Design	Active	1.0	Hydro
HydroProcProcDesignProc	Hydro process management tool	Management	Active	1.0	Hydro
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IS in events in 2001 and prospects for 2002

Voith Siemens Hydro's successful Integrated Services (IS) solution is a big attraction, also at public events.



In 2001, all our international trade fair exhibits were tuned to the IS concept. Our dynamic team at the Voith Siemens Hydro booth – in “more.powerful.solutions” design – held IS-Toolbox presentations in a separate hospitality suite, where details of the toolbox software were explained by IS-trained marketing people in a relaxed atmosphere.

Apart from the usual technical presentations and Voith Siemens Hydro guest evenings, this added the special element of customer approach to our trade fair and conference presentations.

In 2002 Voith Siemens Hydro will be present at the following events:

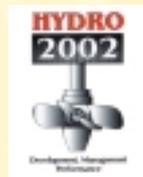
**Hydro Vision
Portland, Oregon,
USA:**



July 28, 2002
to August 02, 2002
booth 425

Theme presentations:
Fish passage survival
Vibration reduction in pumped-storage plants

**Hydro 2002
Kiris, Turkey:**



November 03, 2002
to November 07, 2002
booth 210/211/304/305

Theme presentations:
Challenges and experiences on rehabilitation in Poland
Hydropower modernization with IS in USA
Pelton runner manufacturing concepts

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Voith Siemens Hydro's Integrated Services (IS) solution gains popularity in Brazil

Voith Siemens Hydro's Integrated Services (IS) solution which has already proven to be very successful in the United States, has been gaining popularity among hydro owners in Brazil, too. Before the end of 2001, Duke Energy International directly negotiated and awarded three major contracts to Voith Siemens Hydro Power Generation São Paulo; all of them based on the IS philosophy.

The September 2001 award of the turnkey electrical and mechanical rehabilitation and automation of two 18 MW vertical Kaplan units of the Salto Grande hydroelectric power plant, was the largest modernization contract signed by Voith Siemens Hydro in Brazil until then. Following quickly in December, the turnkey contract for the electrical and mechanical rehabilitation and automation of two 50 MW vertical Kaplan units and power station auxiliary systems of Duke Energy's Jurumirim plant was signed. Finally, at the end of December, the order for the Capivara 3 uprate project, consisting of one vertical 160 MW vertical Francis units, was secured.

The success of the IS approach in Brazil does not come as a surprise. The cooperative project approach based on partnering has been proven to result in the lowest total ownership cost for the customer.

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*Brazil's success in IS.
From left to right:
Stanley Kocon,
Hydro Modernization Manager –
Voith Siemens Hydro Brazil,
Sérgio Parada,
Executive Director –
Voith Siemens Hydro Brazil,
César Teodoro,
Operations Director –
Duke Energy International.*



World leaders visit Voith Siemens Hydro

Malaysian Prime Minister at Voith Siemens Hydro Power
Generation in Heidenheim.



Dr. Siegbert Etter, Head of Corporate Technology (left) explains the technology of Francis turbines to the Malaysian Prime Minister Dr. Mahatir bin Mohamad, (middle).

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Dr. Mahatir Mohamad, the Malaysian Prime Minister, informed himself about modern hydropower technology. Prior to his state visit in Germany in mid-March, he visited the Corporate Technology center of Voith Siemens Hydro Power Generation with regard to the technical possibilities in the forthcoming award of the Bakun project in Malaysia.

The Prime Minister and his high-ranking economic delegation were welcomed by Dr. Hermut Kormann, Chairman of Voith AG, and Dr. Hubert Lienhard, Member of the Board of Management Voith Siemens Hydro Power Generation. During the following tour through the Brunnenmuehle, Dr. Siegbert Etter, Head of Corporate Technology, explained the energy generation with Francis turbines to the delegation, presenting several models. Afterwards all visitors could experience the further highlights of Voith Siemens Hydro technology in a three-dimensional virtual reality presentation.

German Chancellor Gerhard Schröder meets Voith Siemens Hydro staff in São Paulo to celebrate the inauguration of Brazil's 100th Power Plant.



German Chancellor Gerhard Schröder at Voith Siemens Hydro, Brazil.

Hydro power plant Jauru is located in Mato Grosso in Central Brazil. It is the 100th hydro power plant in Brazil featuring Voith Siemens turbines and generators.

For Germany's chancellor Gerhard Schröder the occasion of this historical milestone provided a splendid backdrop for a visit to Voith Siemens Hydro's plant where the Mato Grosso equipment is being manufactured.

Edgar Horny, President of Voith Siemens Hydro São Paulo (left) had been receiving high-ranked guests (from right to left): Head of Siemens, Heinrich von Pierer; German Minister of Economy Werner Müller, German Chancellor Gerhard Schröder; President of German BDI, Dr. Michael Rogowski; Translator.

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Voith Siemens Hydro Power Generation São Paulo is the global competency center of the group for the production of hydraulic components and turbine runners. Moreover, it is known as a leading supplier of ultra-modern generator technology.

The anniversary equipment for Jauru, – three Francis turbines and generators of 40,5 MW each, – is dwarfed by the giant equipment for Itaipu and for Sanxia, also produced in São Paulo. On the other hand this order has brought the total output of hydro generation equipment delivered by Voith Siemens Hydro from its São Paulo facilities to more than 25.000 MW, representing more than half of the installed hydro capacity in Brazil.

German Chancellor Gerhard Schröder and his delegation in front of one of the turbines for Jauru.

This figure is even more impressive when one considers the fact that the largest country in the Southern hemisphere is producing more than 90% of its electricity at hydro power plants. To this effect, the German Chancellor emphasized the important role Voith Siemens Hydro has played in supporting the energy supply production in this gigantic tropical country.

Next year will provide yet another reason to celebrate. 2003 will mark the 100th anniversary of Voith Siemens Hydro's energy partnership with Brazil. The company had shipped its first order to Cachoeira, a power plant in the Brazilian state of Rondônia in 1903.

The most impressive project completed in the almost one hundred years of cooperation between Voith Siemens Hydro and Brazil was the construction of the huge power plant at Itaipu, for which Voith Siemens Hydro manufactured two thirds of the turbines and half of the generators – the most powerful units in the world. Two more units for Itaipu are currently manufactured by Voith Siemens Hydro in Brazil.



Sampa tops them all

High-ranked visitors and large contracts in Brazil.

The São Paulo plant already saw very important leaders in 2001 such as the Brazilian Prime Minister Ernesto Cardoso...



...who, on meeting China's Prime Minister Jiang Zhe Min, handed over the famous photo of the largest generator stator frame in the world for China's Sanxia project, being manufactured in the Voith Siemens Hydro plant in Brazil as well.



Recent awards to the São Paulo ("Sampa") operating unit of Voith Siemens Hydro Power Generation:

Irape-Brazil

3 Francis units, unit output 125 MW, 3 m runner diameter, 158 m head, turnkey supply of complete hydro power station equipment.

Corumba IV-Brazil

2 Francis units, unit output 68.4 MW, 3 m runner diameter, 63 m head, turnkey supply of complete hydro power station equipment.

São Salvador-Brazil

2 Kaplan units, unit output 124.5 MW, 8 m runner diameter, 23 m head, turnkey supply of complete hydro power station equipment.

Peixe Angical-Brazil

3 Kaplan units, unit output 150 MW, 8.6 m runner diameter, 24 m head, turnkey supply of complete hydro power station equipment. Commissioning of first unit 36 months after award in April 2002.

Voith Siemens Hydro's powerful pillar in

Shanghai Hydro-Power Equipment Company Ltd. (SHEC) is Voith Siemens Hydro's powerful pillar in Asia-Pacific. Since its operational launch in the spring of 1997, the Shanghai corporate site has gone through an impressive development: In less than five years SHEC evolved into an internationally acclaimed complete provider. Today, SHEC offers leading Voith Siemens Hydro technology in both turbine and generator production.

The Shanghai facility's first complete order for new turbines involved two Francis machines of 180 MW each for Wan Jia Zhai, received in 1996. These Francis turbines with runners of 5.7 meters diameter had long been in service on the Yellow River. SHEC established itself as a reliable supplier in record time and was therefore integrated into large international Voith Siemens Hydro Group projects early on. In this context, the close cooperation with other Voith Siemens Hydro sites was of crucial importance and it tremendously aided the quick absorption of production know-how.

This high-speed development is particularly evident in the turbine segment, where it is reflected in the huge dimensions of current projects: The runners for Sanxia in China with a diameter of 9.7 meters are designed for the impressive output of 700 MW, the Brazilian hydropower plant Itaipu, currently the most powerful in the world, and the East German pumped storage plant Goldisthal are all ranked at the top of the class in terms of turbine performance power – and all receive components manufactured by SHEC.

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Runner for the Chinese Wan Jia Zhai Project.

Shanghai/China

Spiral casing for Germany's pumped storage plant Goldisthal.



The fact that SHEC enjoys solid competitive standing in the generator business as well was confirmed by the order for four 128 MVA generators for the Xinjiang Jilintai, which was awarded in August of last year. The application will benefit from the latest in Voith Siemens Hydro technology, such as VPI insulation technology and a single shaft structure.

With the wealth of turbine business experience and support from the worldwide network of Voith Siemens Hydro experts, the young Chinese facility is now in a position to successfully handle hydropower projects of any size and complexity.

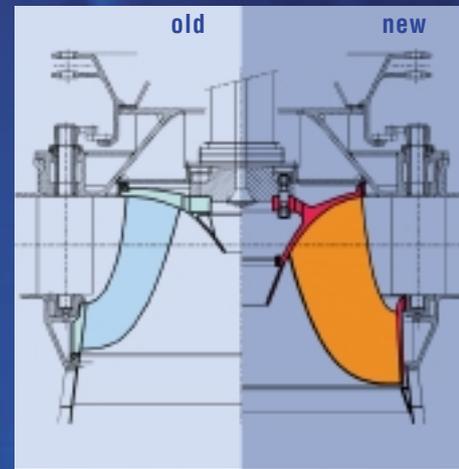
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Celebrating the Sanxia runner turnover in SHEC.

Solina power plant modernization yields increased lifetime and profitability

The modernization of existing facilities is a matter of trust. This is particularly true if a vendor other than the original supplier is commissioned to perform the work. Warsaw-based energy provider Elektrownie Szczytowo-Pompe had good reasons to entrust Voith Siemens Hydro Power Generation in St. Pölten with the overall renovation of two complete units of the Solina power plant in south-eastern Poland.



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Technical Specifications

	Prior to Renovation	After Renovation
Turbine Type	Francis vertical	
Quantity	2 units	
Runner diameter D1(mm)	4100	4100
Net head (m)	42 - 60	42 - 60
Discharge (max.) (m ³ /s)	127	139
Speed (rpm)	136.4	136.4

A thorough evaluation of the units to be renovated by an international team of Voith Siemens Hydro experts had already identified all of the optimization potential. Thanks to state-of-the-art computer technology and unique Voith Siemens Hydro assessment software, the experts were in a position to project the potential for increased performance, the expected

duration of the required modernization work and pertinent costs even before the order was placed. This precise calculation allowed the customer to determine the benefits the work would yield right away. The Voith Siemens Hydro team, which is in charge of Eastern Europe, had already proven its dependability in two previous projects.

When the order was negotiated at the end of 1998, two vertical Francis turbines with an original output of 48 MW and their generators as well as controls were to be refurbished. The operator was complaining especially about vibrations in the lower partial load segment and of course an increase of the unit capacity to the maximum possible is always the target. Based on their assessments, the Voith Siemens Hydro modernization specialists were in a position to contractually guarantee a power increase of more than 50% to 73 MW. This huge performance increase was contingent upon the careful adaptation of all equipment components: The turbine control had to be switched to digital technology, the oil supply and pressurized air system had to be adapted, a thrust bearing lifting device had to be installed and the existing excitation equipment had to be replaced with a static one.

The most crucial engineering challenge, however, was the optimization of the turbine, which originally had been designed by a third party. To utilize all of the increased power potential and to ensure vibration-free operation, the Voith Siemens Hydro engineers developed a completely new runner. In conjunction with the precise new alignment of the turbine guide bearing and the installation of a stabilizing air system, the projected performance increase was attained while the vibrations in the agreed-upon operational segment were eliminated. During the release analysis, Danzig-based Turbo Institute established that the vibration-free partial load segment actually exceeded the contractually agreed segment.

Stringent time management measures yielded yet another benefit: The refurbishing activities were completed a solid two weeks ahead of the agreed-upon schedule. This was particularly impressive since after the second machine had been dismantled, cracks in the turbine shaft were discovered and a new 20 ton shaft had to be produced in record time.

In the end, thanks to the overall renovation, the operator gained a lot: The power plant's output was substantially increased, the operational range broadened and its lifetime extended by at least 30 years.

Voith Siemens Hydro, on the other hand, landed another satisfied client. Consequently, the Solina project was a complete success for everyone involved, which was also confirmed in a congratulatory client letter written by the Elektrownie Szczytowo-Pom-powe's general manager.

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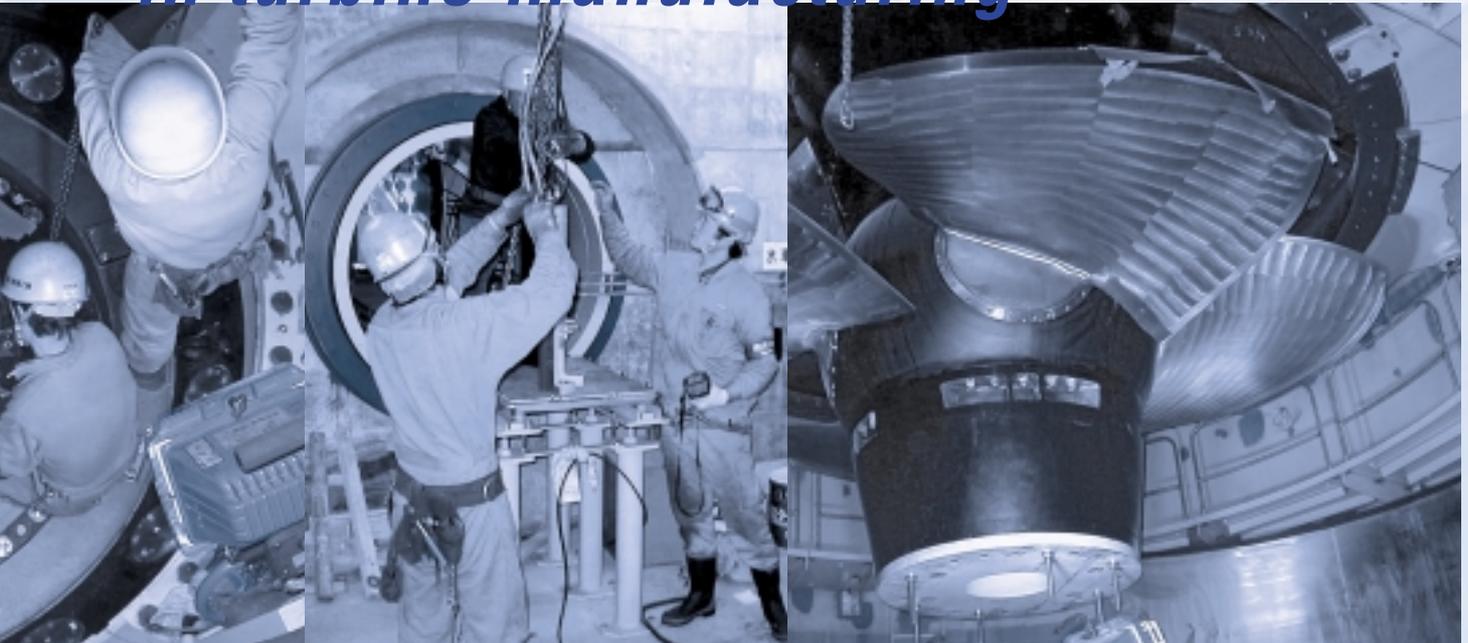
Few Japanese rivers carry as much water as the Agano. No wonder the Japanese implemented the logical idea to utilize these water masses for energy production over 70 years ago. To this effect, water power plant Kaminojiri 1 was built on top of the Kaminojiri lock and dam which has been harnessing the water ever since. Rapidly increasing energy demand caused operators to look into even more intensive Agano water power utilization in the early 90s. Plans called for the construction of a second power plant at the Kaminojiri dam.

Even the first inquiry received from the Tohoku EPC alerted the experts of Voith Fuji Hydro in Kawasaki. There was a problem that conventional solutions could not address: Site conditions limited the space available for Kaminojiri 2 to the point where building the power plant would either not have been economically feasible or unmanageable with existing technology. Nonetheless, the Voith Fuji Hydro engineers accepted the challenge.

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***Voith Fuji Hydro
achieves technological milestone
in turbine manufacturing***



On site installation of the large capacity vertical bulb turbine.



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In close cooperation with Tohoku EPC, the buyer, various approaches to a potential solution were evaluated. Initial plans, which called for a horizontal bulb turbine, were soon given up. The required horizontal water feed would have resulted in the relocation of an entire street, which would have made construction costs prohibitive. Given that the Voith Fuji Hydro experts had plenty of experience with bulb turbines and generators, a workable idea was developed: The utilization of a vertical bulb turbine would reduce construction cost to an economically acceptable level. This unique vertical solution promised the following benefits:

- space saving water feed,
- compact power plant building size,
- low construction costs and
- it could be realized in spite of very restrictive space conditions.

From engineering and technical standpoints, this economically promising approach was a true challenge, given that the utilization of a vertical bulb turbine was unprecedented in a project calling for the capacity Kaminojiri 2 was supposed to deliver.

A joint research project with Tohoku EPC aimed at solving the technical issues. This extremely fruitful cooperation helped the parties involved to overcome the construction hurdles in the implementation process, but it also led to the development of an innovative direct cooling system, which stemmed from a concept study of the mutual research and development team. Consequently, no additional water cooling system was required and forced ventilation fans as well as forced lubrication oil pumps, which are generally utilized in applications of this nature were redundant. The benefits were outstanding:

- low equipment maintenance needs,
- very few outage hours for service and
- high level of dependability.



The successful Kaminojiri 2 project team.

From the very beginning, the Kaminojiri project team considered technical feasibility and economical viability equally important goals. Thanks to the trust and respect the Voith Fuji experts from Kawasaki had earned during the joint research phase, Tohoku EPC found it easy to select a suitable partner for the implementation of the innovative power plant project: Voith Fuji Hydro landed the order to design, produce and install the new turbine and generator.

The exterior installation of the 14 MW turbine, which began last October, is now almost complete. Initial tests were performed in March, which should allow Kaminojiri 2 to begin commercial operations in June of this year. H. Watanabe, Tohoku EPC's manager on site, is pleased with the progress: "Kaminojiri 2 is the first power plant unit in the world equipped with a larger capacity vertical bulb turbine. We are certain that this milestone in water power technology will cause quite a stir in the industry."

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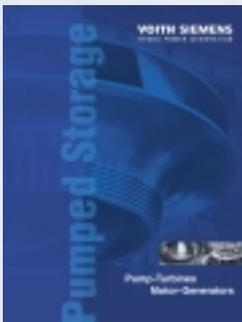


*Mr. H. Watanabe,
manager of Tohoku EPC on site.*

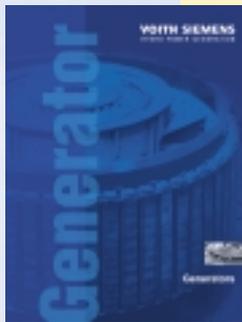
Take advantage of our new information material

The latest Voith Siemens Hydro brochures are now available:

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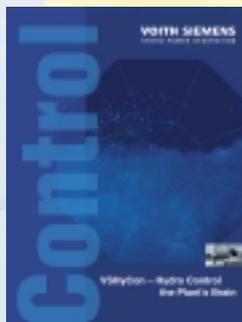
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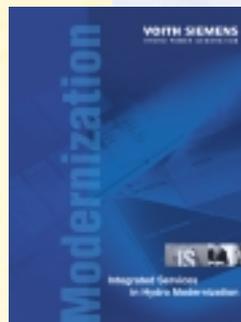
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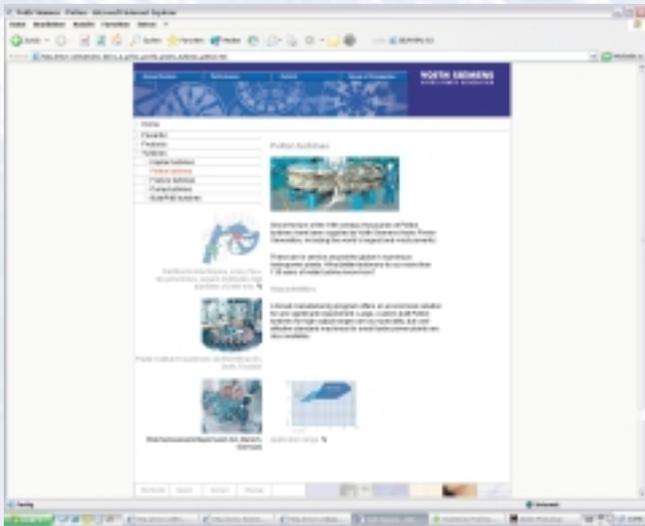
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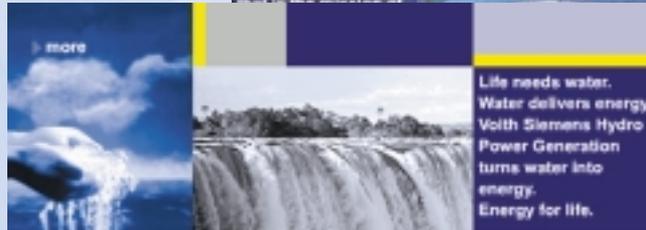
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The new Voith Siemens Hydro Internet website is online.



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t 3174 e



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Essay

In the day-to-day business of hydro power we are usually only interested in the medium in its liquid, free-flowing state – generally considered to be its typical condition. We all too easily disregard the fact that nature stores more than 90 percent of the earth's fresh water – our elixir of life – not in this particular physical condition, but in its solid state, that is to say in the form of ice, and wisely so, since such ice is only liquefied in small portions at a time, provided that mankind does not bring the climate into disarray.

The majority of our fresh water reserves are stored in gigantic ice masses in the Antarctic and the Arctic. The earth's two ice houses have their thresholds effectively on the Polar circles; the further one passes beyond these geographic lines, the more the temperatures go down. Nevertheless, millions of people make their homes in the Arctic and Antarctic boundary regions, evidently enjoying a great sense of well-being in the healthy air and amid the natural surroundings of their home countries, a fact that many inhabitants of more Southern or Northern latitudes simply fail to understand.

Since time immemorial, human beings' adaptability has produced amazing results. Whereas in other places culture and arts have been devoted to and expressed in wood, clay and other materials, beyond the thresholds of the northern polar regions – from Hokkaido to Alaska and Northern Norway to Russia – world champi-

onships are organized for the Art of Ice – enormous sculptures, pagodas as masterpieces of the imagination, or as imitations of famous buildings and edifices. In the meantime, an international guild of renowned ice artists has formed, now including representatives of the European Alpine regions as well. Alpine countries are now trying to divert part of the growing annual stream of tourists who visit the increasingly popular Ice Art festivals in the Northern Hemisphere to its traditional skiing and winter sports resorts.

But it is by no means only the arts that have discovered frozen water as a rather special raw material for attracting tourists. Two hundred kilometres north of the Arctic Circle, the Swedish village of Jukkasjärvi with its 700 residents builds, of all things, an all-ice hotel, consisting of 50 ice rooms and 10 ice suites, decorated with ice sculptures done by various ice artists.

Ice sculpture inside the Icehotel.

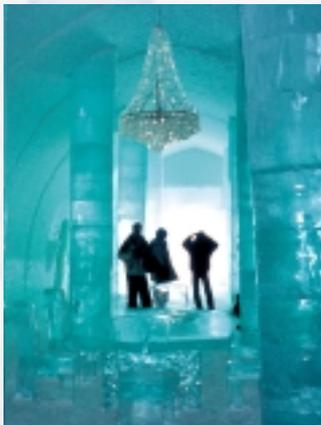


Works of art – styled with water



*The Absolut Ice Bar
in the Icehotel.*

Entry area.



This translucent palace is repeatedly rebuilt from approximately 3,500 ice blocks, each weighing about a ton and a half. This hotel even boasts a conference room that accommodates 120 persons and is equipped with ultra-modern media technology – highly recommended for a cool conference atmosphere or perhaps more logically for heated debates that need cooling down slightly.

The ice hotel has now been in existence for eleven years and claims to be achieving increasing popularity. Excerpts from the hotel information provide the following picture: “The ice hotel is a source of unique impressions. Every year, many new guests broadcast its reputation in the world at large. The ice hotel is one of the few real, if difficult to conceive, doors that still open the way to nature for us. It is the reason why people from all continents make the pilgrimage to the land of the aurora borealis. The ice hotel is noted for simplicity, purism, tranquillity and sensitivity. It makes us look back to our roots and ahead into a new future.”

Despite its simplicity, the hotel evidently offers adequate comfort, since the brochure continues: “You will sleep in a warm bed covered with reindeer furs, in an ultra-warm sleeping bag. The snow protects you from the cold and this miracle of safety and cosiness wraps you in a bedroom that is only 5 degrees Celsius warm, through the ceiling of which you can see the enchanting polar light in the night sky and the stars glittering.”

With these words, we would like to propose a completely new, ultimate holiday experience close to Kiruna in the Sami region to anyone who feels a close affinity with water in any state and who happens to be tired of his or her typical holiday destination. Meet other international guests at the natural-ice bar and at the cooling-off pool specially cut into the frozen river, after your visit to the Finnish sauna!

For more information:
www.icehotel.com

VOITH SIEMENS
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