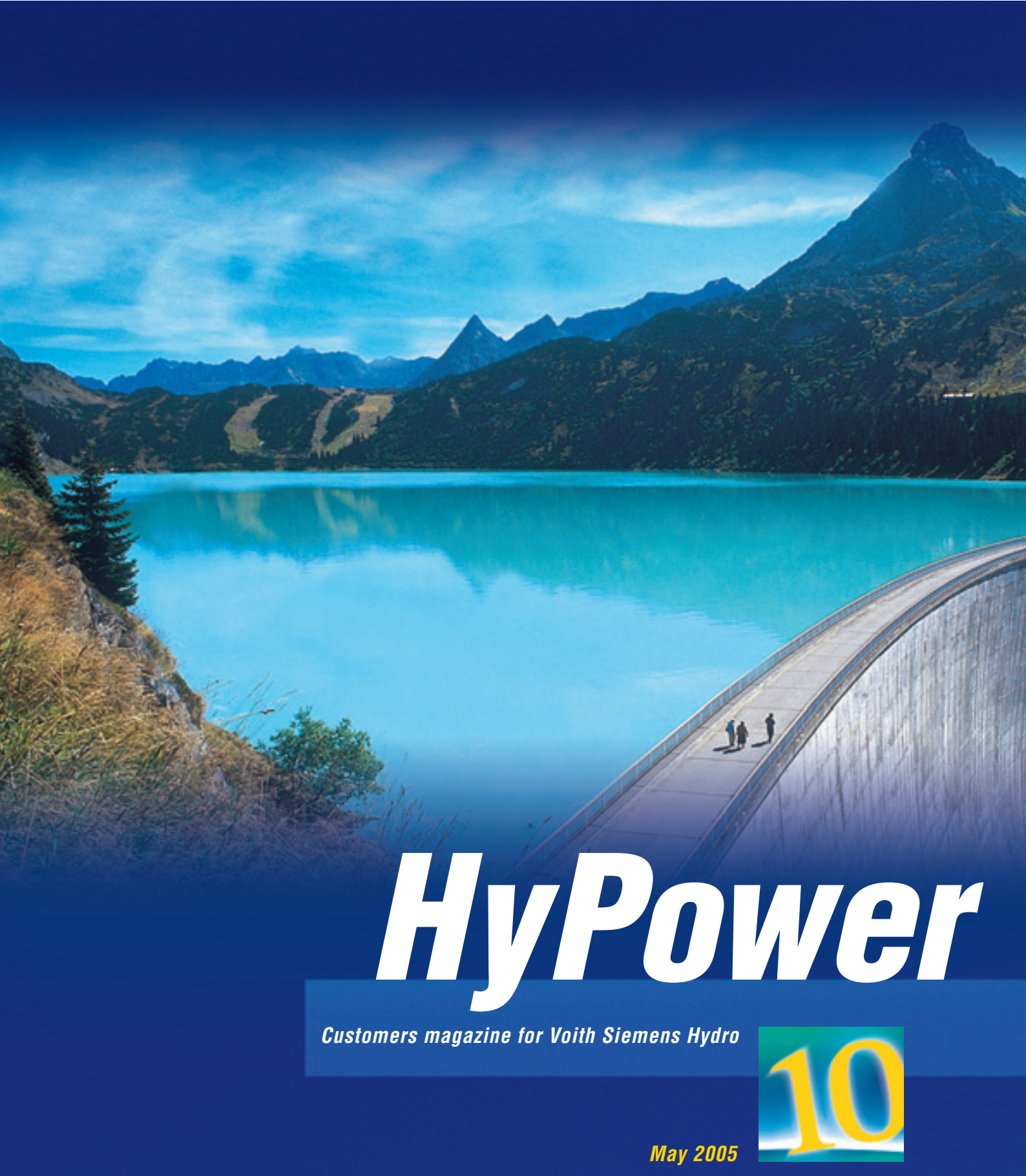


HyPower

Customers magazine for Voith Siemens Hydro

10

May 2005

Summary

Editorial

Voith Siemens Hydro Power Generation

Hydro – energy of scale

Dr. Hubert Lienhard
Chairman of the Board
of Voith Siemens Hydro
Power Generation

Dear readers,

In this issue, I am proud again to introduce you to the variety of markets in which we actively work. In Europe alone, we have experienced a great deal of activity from Italy through Austria to Turkey, but also in countries such as Afghanistan or regions in the Middle and Far East. We have been very fortunate to be able to provide the necessary equipment and services to many projects in these regions for the generation of clean, renewable energy. In some cases, we were able to rehabilitate existing projects and assist in the re-building of economies and infrastructure, helping the quality of living standards for many communities.

And despite all the current controversy it remains our firm conviction that hydro power remains the number 1 renewable source for energy generation with regard to the large volume it can produce: an energy that represents “energy of scale” in the range of renewables and has negligible environmental effects.

Hydro does not want to compete with other renewables. On the contrary, hydro wants to be recognized as an explicit partner in the renewables field. Hydro complements intermittent renewable sources, like solar and wind. And even more, wind needs hydro power in order not to use thermal power as backup.

We do not deny that hydropower stations do affect the environment. But in comparison and relation to overall negative impacts and total emissions, availability, reliability and grid balance, hydro still cannot be topped by any other conventional or alternative energy source.

The image of hydro is still generating mixed emotions throughout the energy community. Its recognition in another public event, the United Nations Symposium on Hydropower and Sustainable Development in Beijing of October 2004, is proof-of-evidence that this energy is badly needed, also because other fuels decrease in their availability and increase in prices. It is obvious to us that the availability of fossil fuels is depending of the goodwill of a few supplying locations and of the relationships in the political arena. This makes them much more volatile than renewable energies.

We continue being convinced about the share that the fuel “hydro” can contribute to development and appeasement all over the globe. Besides the often long-desired access to electricity it is unique in bringing multiple-use benefits: irrigation, drainage, and drinking water supply for better living.

We are interested in your opinions and comments, please feel free to direct them to me personally.

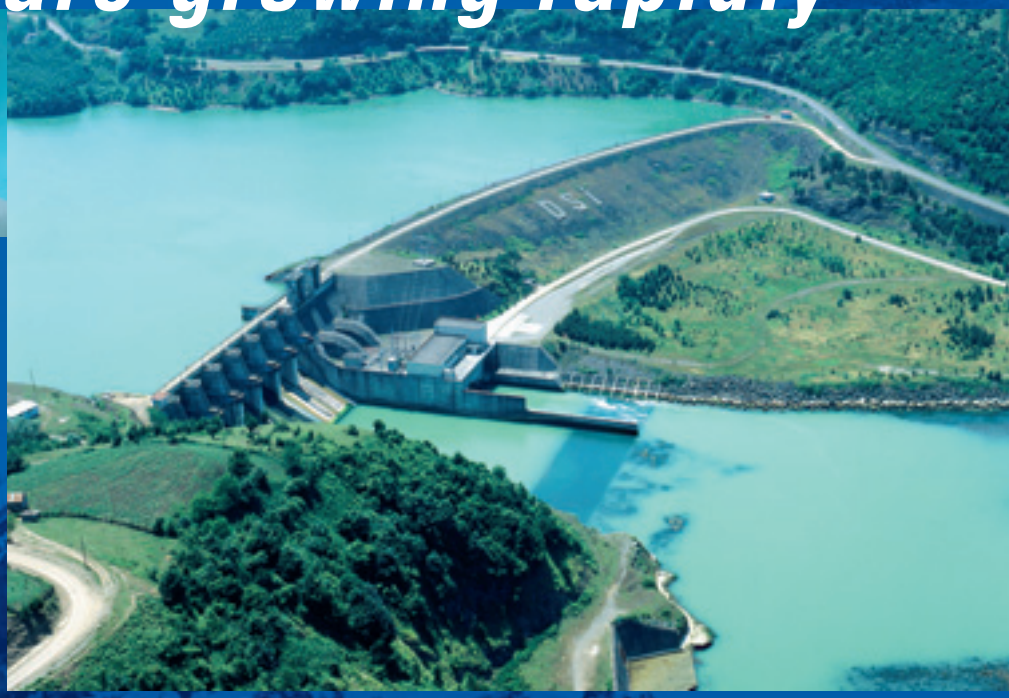
My e-mail address is Hubert.Lienhard@vs-hydro.com

Yours sincerely

Dr. Hubert Lienhard
Chairman of the Board
of Voith Siemens Hydro Power Generation

Turkey's energy demands are growing rapidly

Prof. Dr. Veysel Eroğlu, originally an academician at civil and environmental engineering departments in Istanbul Technical University (ITU). Director General of the General Directorate of State Hydraulic Works (DSİ– DEVLET SU İŞLERİ GENEL MÜDÜRLÜĞÜ). Chairman of Turkish National Committees, ICID (TUCID), ICOLD (TCOLD) and WWC.



Suat Ugurlu

With a sufficient supply of energy and electricity vital to social and economic development, electricity consumption in Turkey is increasing by six to eight percent per year on average. Similar growth is expected for the coming years. With electricity supply and demand studies showing a clear imbalance in Turkey, a shortage is anticipated for 2009.

Suat Ugurlu

European member states have begun negotiations on Turkey's EU accession. Since 2001, its economy has been expanding rapidly with high real growth rates. It is vital that economic growth and social development are not put at risk by the anticipated energy shortfalls.

In order to maintain and extend economic progress, Turkey needs to fall back on natural energy sources that are both crisis-proof and not dependent on fluctuating crude oil prices. Taking these factors into account, hydropower generation offers a viable alternative to conventional methods of power generation in Turkey.

Geographically privileged: hydroelectric potential in Turkey

Turkey's geography is highly conducive to hydroelectric power generation: the rectangular plateau peninsula, which is surrounded by sea on three sides (7,800 km of coastline), holds a gross annual hydroelectric energy generation potential of 433,000 GWh, nearly one percent of the world's total potential. Turkey's share in the total hydropower capacity in Europe amounts to approximately 16%.

The Black Sea watershed, for example, covers much of northern Turkey, where the Kizilirmak – at 1,335 km Turkey's longest river – forms the major source of hydroelectric potential. Much of south-western Turkey is served by the Mediterranean watershed, where rivers flow either south to the Mediterranean or west to the Aegean Sea. Eastern Turkey is served by the Aras/Caspian watershed, including the Aras River, which flows eastward and whose waters eventually empty into the Caspian Sea. At the southeast of Turkey, the Tigris and Euphrates are the main rivers of hydropower production which constitutes 21% of Turkey's potential. The two rivers merge at Shatul-Arab which runs into Basra Gulf.

Fully exploiting the hydroelectric energy generation potential

In order to meet the increasing power demand, the Turkish government is seeking to bridge the gap of the country's energy deficit. With the aim of achieving energy self-sufficiency and a reliable and economic electricity supply, Turkey is enforcing the utilization of its hydropower generation potential, with the goal of exploiting two thirds of its potential by 2015. The intention is to increase hydroelectric energy production to approximately 80,000 GWh by this date.

Fully exploiting the country's hydroelectric potential is an expensive venture and cannot be borne by the Turkish state water agency alone. Due to extensive financing requirements for new hydroelectric power plant investments, and limited budgetary resources, alternative methods of project allocation, implementation, operation and distribution have been promoted.

Financing models of hydroelectric power plant projects

The Turkish Energy Market Regulatory Authority (EPDK) is granting licenses to facilitate private investments in the energy sector, which has created considerable interest among international investors and financiers. Private companies are applying for "water utilization rights" from the Turkish General Directorate of State Hydraulic Works DSİ, and for HEPP (hydroelectric power plant) licenses from EPDK.

To date, the most successful way of bringing large-scale hydroelectric projects on line, is by turnkey implementation with containing full financing through bilateral cooperation agreements between Turkey and other countries. These projects (28 to date) have a total installed capacity of 7,530 MW, with an annual generating capacity of 24,986 GWh. The first example of the successful employment of this model is the Karkamis project (189 MW, 652 GWh). Comprising six bulb-type turbine generator units, it was realized by a consortium of companies including Voith Siemens Hydro. All of the plant's units have since been put into operation.

Focus on hydro power in Turkey

A third way of awarding hydropower projects is via international (or local) competitive bidding for a complete package of civil construction and electro-mechanical equipment. This has been the most common method of awarding projects in recent years. Now, this model is being applied to international competitive bidding on a full-financing basis.

Gökçekaya

Turkey's future hydropower market

Turkey clearly has an enormous task ahead to complete its full hydropower development plan. Foreign investors and financiers are expected to be interested in the Turkish hydropower market in the next three decades. Making combined use of the above-mentioned financing models, Turkey is striving to develop its full hydro-power potential by 2023, which coincides with the 100th anniversary of the foundation of the Turkish Republic.

Whether this ambitious goal can or cannot be fully achieved by then, is yet to be determined. However, the centennial celebration of the Turkish Republic is sure to be powered by substantially more hydro power.

For more information:
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On the way to energy self-sufficiency

Borçka power house on Coruh River.

Borçka: Runner in final phases of manufacture.

Borçka: Pre-assembly of unit 2 spiral case and finishing of unit 1 spiral case for site pressure test.

In order to secure sufficient and independent power supply, the Turkish government has started awarding and construction of hydroelectric power plant projects in various parts of the country.

Bridging the gap

One example of the efforts made to ensure energy self-sufficiency is the Borçka project, nearing completion: Located on the lower reaches of the Coruh River, approximately two kilometers from the outskirts of Borçka in the Northeast of Turkey, this hydroelectric power plant was delivered as a turnkey project by the contracting partners.

Voith Siemens Hydro's share in the scope of services comprises two vertical Francis spiral turbines with a nominal capacity of 150 MW and will operate at a speed of 136.36 rpm. The chromium steel runners have a nominal diameter of five meters, and a total weight of 65 tons, and will be shipped and transported in one piece to the Borçka site. The average annual power generation from this plant will be 1,039 GWh.

Focus on hydro power in Turkey

Alpaslan

The Alpaslan 1 project on the Murat River – the major head water of the Euphrates in eastern Turkey – is an another example of recent efforts to pursue new generation from hydro power.

The plant is equipped with four vertical Francis type spiral turbines, each with a capacity of 40 MW and a speed of 250 rpm. Our scope of supply includes main components for the turbine and inlet valves as well as engineering for the balance of mechanical equipment.

One of the runners for Alpaslan during final workshop manufacture.

Akköprü

In the future, the Akköprü dam and hydropower plant on the Dalaman River in the southwestern part of Turkey will contribute to ensuring Turkey's energy self-sufficiency.

DEVLET SU İŞLERİ GENEL MÜDÜRLÜĞÜ (DSİ) awarded Voith Siemens Hydro the contract for the delivery and erection of two vertical Francis turbine/generator sets, control system and electrical equipment. When completed, the power plant will generate 120 MW (60 MW per unit at a speed of 214.3 rpm); moreover, the dam will protect the region from flooding.

For more information:
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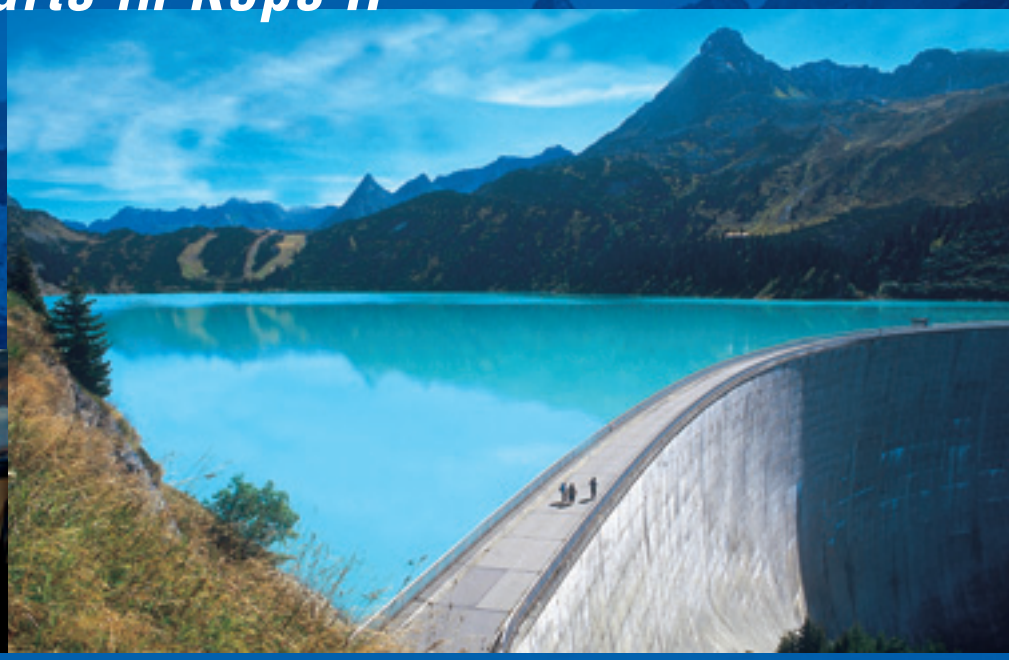
General view of the Akköprü construction area.

Expertise in pumped-storage technology Construction starts in Kops II



On November 13, 2004 in Gaschurn-Partenen in Montafon, Vorarlberg, a ceremonial commencement of work marked the official start of construction of the new Kops II pumped-storage plant. It is being built by Vorarlberger Illwerke AG. The Kopswerk II project is a new large-scale pumped-storage plant being implemented by the Austrian power supply industry and comes twenty years after the Häusling plant was built, the most recent of its kind.

The Kops II pumped-storage plant is a parallel plant to the existing 247 MW Kops I storage power plant, which was commissioned in 1969. Like the existing plant, the new 450 MW power station, which utilizes a head of around 800 meters, has been designed as a cavern power plant.

The plant cavern, with its three vertical-shaft, 150 MW pump/turbine generators are comprised of a six-jet Pelton turbine, motor generator, hydraulic torque converter and three-stage storage pump. They will be built within the mountain between the tourist resorts of Gaschurn and Partenen and can be accessed from there by tunnel.

Kopswerk II will share the Kops storage reservoir with the existing plant. The upper reservoir is approximately 1,800 meters above sea level. The new headrace tunnel to be built is an approximately 5,500 meter-long pressure tunnel (4.60 - 5.30 meters in diameter) and will lead to the Tafamunt surge tank. From there it is led through a 1,380 m long pressure tunnel (3.80 meters in diameter) to the distributing conduit and pumped-storage cavern.

The existing Rifa reservoir serves as a lower reservoir and has been expanded for Kops II. It is connected to the powerplant cavern via a new tailrace tunnel over 360 meters in length.

Except for the new building for the SF6-switchgear and the entrance tunnel gate to the power cavern, located opposite the Rifa reservoir, the new Kops II is invisible from the outside and there is no impact on the surrounding area.

In conjunction with the necessary installation depth of the storage pumps, the design is a direct result of one of the peculiarities of this new plant. The arrangement of the vertical-shaft Pelton turbines beneath the tailwater water levels of the Rifa reservoir, has been made possible because the turbine outlets will be equipped with a tailwater compressed air surge tank. This provides the required exposed head for operation of the Pelton turbines. It also achieves the tailwater level reduction required in the turbine downstream pit in each case – by means of using excess atmospheric pressure, as a result of the regulated injection of compressed air via the turbine housing in the downstream pit. To ensure the financial feasibility of this design, the Pelton turbines, which can accommodate partial loads, were spatially arranged over the 210 MVA motor generators.

News from Europe

The most significant feature of the new Kops II plant – which makes the plant one of the most modern and technically advanced pumped-storage power plants today – is that, with its three quickly adjustable hydroelectric generating sets, it can be used extremely flexibly in terms of energy efficiency for network regulation. These machines are suitable for back-to-back hydraulic operation, during which a motor generator, storage pump and turbine are operated simultaneously in each case. Depending on requirements, it is possible to both feed peak-load energy into the network from plus 130 MW to minus 150 MW (by switching to turbine operation) as well as to use energy that is not needed from the network (by switching to pump operation).

Completion and commissioning of the Kops II pumped-storage plant is scheduled to take place between end of 2007 and the beginning of 2008. This new order perpetuates the long established and successful business relationship between Voith Siemens Hydro Power Generation and Vorarlberger Illwerke AG, which dates back almost 70 years to the completion of the Vermuntwerk, Illwerke's first plant.

Voith Siemens Hydro Austria, with an order volume share of € 60 million out of € 300 million total volume, is supplying the following equipment:

- Three vertical-shaft, three-stage storage pumps, each unit having the following specifications:
  - Impeller diameter 2,780 mm,
  - Pumping capacity 18 m^3/s,
  - Operating speed 500 rpm,
  - Power input 152 MW
- Three hydraulic torque converters and the appertaining pump and converter control units,
- Six 1,500 mm (PN 115) pump and turbine spherical valves, accessories and control units
- and for the Kops II valve chamber at the beginning of the new supply channel:
  Two pipe-break valves, nominal value 4,300 mm, (PN 16) with intermediary pipe, hydraulic system, accessories and control units.

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Kick-off for 167.5 MW Mese in Italy

Voith Siemens Hydro Italy recently was awarded a contract for design, manufacture, installation and commissioning of five Pelton turbines for the Mese hydroelectric project in the Lombardy region, district of Sondrio.

The plant situated in the North of the Lombardy region has an impoundment of around 207 km^2, at an average altitude of 1,700 m. When the original powerhouse went into service in 1927 it was the most powerful hydro plant in Europe. A unique feature of this plant is that each hydraulic component of the plant – from the upstream channel over the load basin to the penstock – is situated in a tunnel.

Each of the units delivered by Voith Siemens Hydro will have an output of 33.5 MW with a net head of 740 m. Commissioning of the new units is scheduled for June 2006 (two units), June 2007 (two units) and May 2008 (one unit).

For more information:
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Equipment of San Giacomo di Fraele initiated

Voith Siemens Hydro Italy was awarded the contract for equipping the San Giacomo di Fraele Hydroelectric Project in the Valtellina area in the northern part of the Lombardy region.

The scope of supply includes a seven-blade Kaplan turbine with an output of 10 MW. Commissioning of the new unit is scheduled for August 2006.

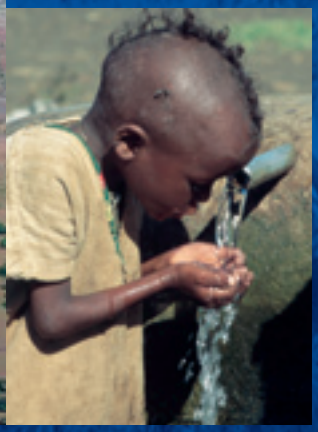
The new turbine will be part of the San Giacomo di Fraele hydropower complex which exploits the head between San Giacomo and Cancano lakes.

The eight hydropower stations are mainly fed by the Adda river, which, over a 30 kilometer distance, transcends more than 1,800 m until it reaches the Lago di Como.

All eight hydropower stations combined generate approximately 1.8 million MWh per year.

For more information:
Roberto.Brivio@vs-hydro.com

Gilgel Gibe II: Next step for hydro in Ethiopia



Gilgel Gibe II is located in south central of Ethiopia, about 270 km from Addis Ababa and produces 40% of the present installed capacity of the country.

This expansion, scheduled for the end of 2007, will be financed by the European Investment Bank.
The project is located 27 km from the Gilgel Gibe river who provides his water via a gallery. The nearby Omo river will serve as the project's tail-water. Voith Siemens Hydro will supply four vertical six-jet Pelton turbines. Each of the turbines is rated at a capacity of 105 MW at a net head of 487 meters. The four generators have a rated output of 125 MVA.

Additionally, Voith Siemens Hydro will equip the plant with controls, monitoring systems and auxiliaries, such as the ventilation and air conditioning system, lighting, fire protection, security and measuring as well as a telecommunication system.
Gilgel Gibe II will provide a stable supply of electricity to its neighboring regions and the country's capital, Addis Ababa, the largest city in Ethiopia.

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Modernization of Nkula Falls 'A' in Malawi

Malawi has developed a number of hydroelectric projects since getting its independence. All projects have enhanced the electricity generating capacity of the country and significantly contribute to the rural electrification program. Three power plants have been constructed on the Shire River, the most important river in Malawi. The Shire is 250 miles long, beginning at the southern shore of Lake Nyasa and enters Lake Malombe five miles south of Mangochi.

Nkula Falls is also a Shire River project and was first commissioned in 1962 with two separate power stations. Plant A and B have an overall installed rated capacity of 116.5 MW and contribute considerably to the 283 MW total installed hydro capacities of Malawi.

Recently, Voith Siemens Hydro was awarded a contract by ESCOM Malawi for the supply of one uprated Francis runner. Its new hydraulic design will increase the power output from 8 MW to approximately 9 MW at Nkula Falls 'A' Power Station and is scheduled to be commissioned in 2006.

For more information:
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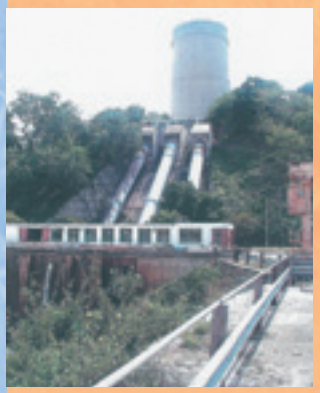

Voith Siemens Hydro USA receives award for Kajakai, Afghanistan

A contract has been awarded to Voith Siemens Hydro York, for the rehabilitation of two Francis units at the Kajakai Hydroelectric Station located on the Helmand River in Afghanistan.

The 33 MW hydro station was commissioned in 1975 with two Allis-Chalmers turbines and Westinghouse generators. It includes a third bay for expansion. The existing units have experienced poor maintenance due to a lack of materials and proper tools. Thrust bearing problems occurred last year causing both units to be out of service. One unit is now back on line at a reduced load. The plant is needed back into full operation as soon as possible because it is the main power source for Kandahar with a population of 500,000. The replacement power is currently provided by diesel generation with a fuel cost of US $ 1,000,000 per month.

The scope of the project includes replacement runners, miscellaneous generator and balance of plant components from the North American operating units in York, PA, USA and Mississauga, Canada. Site related activities such as condition assessment, dismantling, rehabilitation, reinstallation, testing and commissioning of the equipment are supported from Voith Siemens Hydro headquarters in Heidenheim, Germany.

The USAID contract is a result of extensive negotiations between Louis Berger Group (LBG), Acres International, and Voith Siemens Hydro York.

For more information:
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Kajakai signing in York

Turbines for 4,284 MW hydro project Xiaowan in China

Voith Siemens Hydro – in a consortium with Dong Fang Electrical Machinery Company – has been selected to supply six 714 MW Francis turbines for the Xiaowan hydroelectric project in Yunnan Province, China.

The contract, which was signed on January 6, 2005, by representatives of Voith Siemens Hydro, Shanghai, and Dong Fang Electrical Machinery Company, enables Voith Siemens Hydro to provide the hydraulic design of six Francis turbines.

The scope of supply comprises four runners as well as auxiliaries for three turbines, with commissioning of the first unit scheduled for 2009.

The Xiaowan hydro project harnesses the abundant hydropower resources in Southwest China's Yunnan Province. With approximately 90 million kW of exploitable capacity, Yunnan is ranked second among the best hydropower regions in China. Lancangjiang river has long been an energy depot not only for China but also for Southeast Asian countries: Power generated by this project will be transmitted to Guangdong and Hong Kong.

For more information:
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Hydro power still going strong in the Americas

In North America there is still a high demand for Voith Siemens Hydro's expertise in the field of plant modernization. Two large projects are currently under way in central Washington and Kentucky and both confirm the strong trend to enhance the environmental compatibility of hydropower plants through fish-friendly turbines and oil-free bushings. In South America Voith Siemens Hydro has just completed two successful years as a plant operator and maintenance service provider.

Operation and maintenance services keep Brazilian plant functioning at its best

No one knows a hydropower plant as intimately as the company that designed and manufactured the respective machines. So why should not the plant owners benefit from this expertise? This simple thought has given rise to the idea of offering plant operation and maintenance services. Two years ago, Voith Siemens Hydro signed the first such contract for the Brazilian Jaurú hydropower plant.

Jaurú, Brazil

Voith Siemens Hydro São Paulo supplied the equipment for the 120 MW plant in the Brazilian state of Mato Grosso, near the Bolivian border. Employing the philosophy of the company's Integrated Services approach, forming a specialized operations and service team seemed to be a logical next step. Since the signing of the contract, the service team has always ensured the best operation conditions for the plant.

To determine the ideal operation parameters and optimize maintenance these highly experienced personnel have kept in close contact with the engineering staff in São Paulo.

Thus, it came as no surprise that the 8,000-hour overhaul of the plant last October ran very smoothly and without any problems – much to the satisfaction of the client, Queiroz Galvão Energética, who witnessed the work at Jaurú. For years to come, optimum operation and ideal machine maintenance will continue to keep the costs for unscheduled service repairs low and the plant's life expectancy high.

For more information:
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Louisville Gas and Electric awards Ohio Falls rehabilitation

The Louisville Gas and Electric Company released a US $ 53 million dollar award to Voith Siemens Hydro in York, Pennsylvania. EON, the parent company of LG&E, is located in Germany. The two companies serve 21 million customers with EON at 14 million in Germany and Europe and LG&E at 7 million customers in the United States.

The project involves the upgrade and modernization of eight 4.6 meter propeller type hydro turbines.
The work includes new runners with a model test – that was performed at the company's York hydraulic testing laboratory – generator rewind, rotor rehabilitation, automation, miscellaneous electrical components and field installation. The project is planned for completion at one unit per year over the next eight years beginning with the first outage in 2005.

This project was developed through a partnership that was established between the two companies who had already completed a number of business exchanges over the past 16 years. Through this partnership and significant synergies between the companies, the project was developed with LG&E engineers, power marketers and business management personnel focusing not only on mechanical and electrical needs but also the very important financial aspects to insure an optimum ROI (return on investment).

The Ohio Falls plant began commercial operation in 1928 and is located on the Ohio River in Louisville, Kentucky. The upgraded units will each generate approximately 12 MW of power for LG&E. Along with new runners and upgraded generators, the plant modernization includes fish-friendly oil-free bushings throughout the turbine as well as new electronic governors, system automation additions and a new servomotor system. The overall system was automated several years ago by Voith Siemens Hydro under a separate contract.

For more information:
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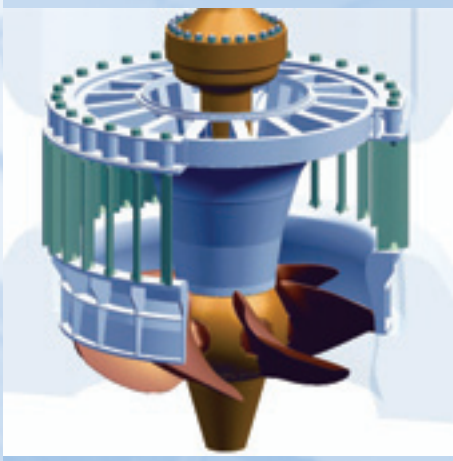
Milestone for fish-friendly modernization

**A major milestone for the ten unit Kaplan project located on the Columbia River in central Washington occurred on November 18th, 2004.
The "Big Pick" included setting the assembled runner, turbine shaft, packing box, turbine bearing housing, inner head cover and intermediate head cover into the embedded components. The impressive assembly weighed 290 metric tons. Commissioning and index testing of the first unit was achieved in 2005 with additional fish passage testing to continue through the end of 2005.**



at Wanapum

The modernization project for the 1960's vintage equipment includes replacement of the ten existing 7.239 meter diameter, five-bladed Kaplan units with Voith Siemens Hydro 7.747 meter diameter six-bladed fish friendly EFISHENT™ Kaplan units. The Kaplan hub and blades are designed with minimum gaps at both the hub and periphery and the replacement wicket gates also have minimum gaps for fish passage survivability improvements. The new equipment is also designed to increase the rated power from 89.5 MW to 111.9 MW.

Additional work scope includes a redesigned-32 gate distributor, fully spherical discharge rings, outer head covers, turbine shafts and turbine guide bearings. In addition to equipment supply, Voith Siemens Hydro is responsible for the removal of existing embedded components, embedment of the new components, field assembly of the runners and field technical support for Grant County PUD's reassembly work. The equipment is supplied from Voith Siemens Hydro operating units located in the United States, Brazil and China with services supported from York.

The project continues with the next unit outage scheduled in 2006 and completion of all units by October 2012.

For more information:
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Events

5th International Conference on Hydropower
Stavanger, Norway
23 - 25 May 2005

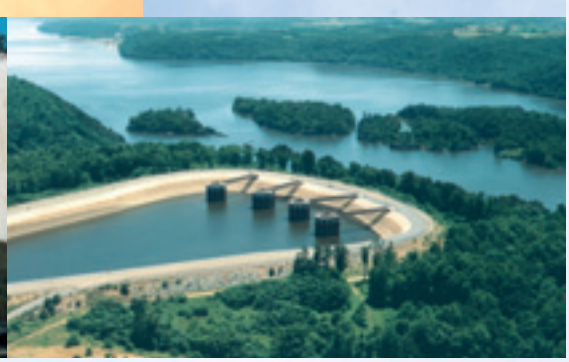
Waterpower XIV Conference
Austin, Texas, USA
18 - 22 July 2005
Voith Siemens Hydro: Booth No. 501:
– Wanapum Turbine Replacement, Jay Hron (MWH, Denver, CO, USA), Randy Seifarth (Voith Siemens Hydro, York, PA, USA), Brad Strickler (PUD No. 2 of Grant County, Washington, USA)
– Richard K. Fisher jr. (Voith Siemens Hydro, York, PA, USA), Stuart Hammond (Grant County PUD), Tom Dresser (Grant County PUD), Dilip Mathur and Paul Heisey (Normandeau Associates, Inc.)
– The Digital Governor – A Money Saving Machine (Kennetz Lucas, Lower Colorado River Authority, Austin, TX, USA), Gregory Yohe (Voith Siemens Hydro, York, PA, USA)
– Upgrade, Rehabilitation and Aeration of Exelon's Conowingo Hydro Turbines (James Kepler, Voith Siemens Hydro, York, PA, USA), Guy Hager (Exelon Power, Philadelphia, PA, USA)
– Electromagnetic and Ventilation Aspects in Motor-Generators – Experience in Bath County Pumped Storage Station (Thomas Hildinger, Egidio José Faria and Antonio Carlos Meyer, Voith Siemens Hydro Power Generation, Germany and Brazil)

Hydro 2005
Villach, Austria
17 - 20 October 2005
Booth No. 37-38, 42-43

Seven ways to sustainability

Hydro power is an energy source that satisfies the requirements of today without risking the future generations of tomorrow by:

- Reliable electricity supply
- Irrigation
- Drinking water
- Flood control
- Clean air
- Long service life of power stations
- Protection of natural resources



The Beijing Declaration – the way forward

Bearing in mind that the world's poor use only one twenty-fifth of the energy consumed by the world's rich, it is good to know that the international community has recognized over the years the important role of hydro power as a leading renewable energy technology. It represents a huge potential, accounting for some 20% of world electricity supply.

Promoting hydropower development that is environmentally friendly, socially responsible and economically viable, is now also a goal for Governments, United Nations agencies and other international organizations and non-governmental organizations and civil societies.

The United Nations' Symposium on Hydropower and Sustainable Development, which was held from October 27 - 29, 2004, in Beijing, China, was convinced of the need to develop sustainable hydro power, along with other options, including the rehabilitation of existing facilities and the addition of hydro power to present and future water management systems. It, therefore, called on governments and financing agencies to accelerate sustainable hydropower development.

But many sustainable hydropower projects will not be developed unless credit is given for the clean power and additional services they can provide. So there continues to be a lot to do for organizations like the International Hydropower Association (IHA). The Beijing Declaration is an important step in meeting the world's water and energy needs. The large remaining potential in developing countries, as well as in countries with economies in transition, can be harnessed to bring benefits to these countries. And also will help to achieve Millennium Development Goals and the Sustainable development goals and targets contained in Agenda 21 and the Johannesburg Plan of Implementation.

For more information:
www.hydropower.org/tempo/beijingdeclaration.pdf

Financial support from the hydro community to Tsunami victims

The disastrous pictures touched millions around the globe: On December 26, 2004, a powerful earthquake in the Indian Ocean, with its epicenter off the Northwest coast of Sumatra, caused a Tsunami that brought devastating damage and tremendous loss of life to the coastal areas of South East Asia. With a magnitude of 9.0 on the Richter scale it struck regions as far away as East Africa.

Aid has been provided since and field help in the respective areas is still being carried out vigorously. In order to make a contribution to the aid program, the Managing Directors of the Voith subsidiaries located in South East Asia donated € 200,000 in support of the Tsunami victims.

The amount was passed directly to the Indian and Indonesian aid organizations. That way, a purposeful distribution of the funds was ensured and the financial aid reached the areas in need without delay and to the most advantageous effect.

The following message was in response to another donation given through the "Hydro 2004" community.

Dear Hydro 2004 participants,

This week we have transferred UK £ 5000 from the Hydro 2004 delegate fees to the Tsunami Earthquake Appeal fund, administered by the UK Disasters Emergency Committee (www.dec.org.uk).

This organization groups 12 national and international charities currently working in the affected area (including, the British Red Cross, Action Aid, Oxfam, Save the Children, and others).

We made the donation in the name of all the international participants of the Hydro 2004 conference, and thought you would therefore like to know that your presence in Porto helped to make this possible.

We take this opportunity to express our condolences to those affected by the tragic event.

With kind regards,

The Hydro 2004 Team
Hydropower & Dams
Aqua~Media International Ltd.

Essay

Water invites challenge

Alongside air, water is the most important element in our lives. No wonder mankind has felt the need to challenge water and has also attempted to master it. We are talking about swimming, of course, which is why a look at the well-documented history of this now perfected human ability appears to be a worthwhile undertaking.

The classical cultures left behind a multitude of testimonies to their swimming abilities. An Old Egyptian relief dating from 2000 BC depicts a swimming style similar to the crawl, in which the arms are raised above the water. The Assyrians, Hittites, Minoans and other early cultures produced a wealth of paintings and depictions of swimmers and divers.

The first book about swimming was published in the year 1669. Entitled "L'art de natation", it was written by Thévénot, a Frenchman, and gave a detailed description of the art of the breaststroke. The subsequent English translation of the work resulted in the breaststroke becoming the standard worldwide worldwide for the centuries that followed.

England claims to be first country to have understood swimming as a sport. Modern-day competitive swimming was developed in 1837 in newly built indoor pools in London. The National Swimming Society specified the rules: the two acceptable strokes were the breaststroke and the sidestroke.

From these, John Trudgen developed hand-over-hand swimming. This style of swimming duly became known as the Trudgen stroke, and was introduced in England in 1873. It derived from Trudgen's observations of South-American Indian tribes, who had perfected this fast method of moving through water.

Although man has been swimming since time immemorial, the various strokes were, however, only refined during the last 100 years. Again it was competitive swimming, this time at the Modern Olympic Games of 1896 in Athens, that triggered the public's wider interest in faster swimming styles.

It can also be noted that women were excluded from the inaugural Olympic Games because, in keeping with the Victorian age, it was firmly believed that they were too delicate to participate in competitive sports. It was only in 1912 that this prejudice was overcome.

People have been swimming for enjoyment since the end of the 19th century. In the USA, the first pool open to the public was built in 1887 in Brookline, Massachusetts. Public pools in New York City soon followed, and the first swimming boom took hold in the United States. Within a short time, there were thousands of pools, including numerous estates with private pools on their own grounds. The era of public pools in Switzerland started when the first indoor swimming pool, the “Badewannenmoschee”, opened in 1900 in Winterthur. The “Volksbad”, presumed to be the second indoor pool, opened in 1908 in St. Gallen. The country’s oldest open-air pool opened to swimmers in 1927 in Hofwyl in the canton of Bern. It closed in 1971.

Huge numbers of people throughout the world enjoy swimming simply for what it is and without knowing its history. We, however, wanted to find out more about it.

One of the most well-known Olympic swimmers was Johnny Weissmüller. He won five Olympic medals and did not lose a single race in his 10-year career. He then launched a successful “second” career as Tarzan.

Scientific research into swimming has, without doubt, helped to refine techniques. This research resulted in achieving higher speeds and developing a better understanding of propulsion through water.

In 1934 for instance, David Armbruster, a coach at the University of Iowa, made a new discovery: why should not both arms be brought forward simultaneously above the water and then drawn backwards beneath the water? This “butterfly” style increased the swimmer’s speed through the water, and the butterfly, as the stroke later became known as, was born.

Swimming has always been and remains a fight against nature. In 1875, Captain Webb was the first person to conquer the English Channel. He swam across it in 21 hours and 45 minutes. The first female Channel swimmer was Gertrude Ederle, who held the record for this achievement long after she had set it in 1926.

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