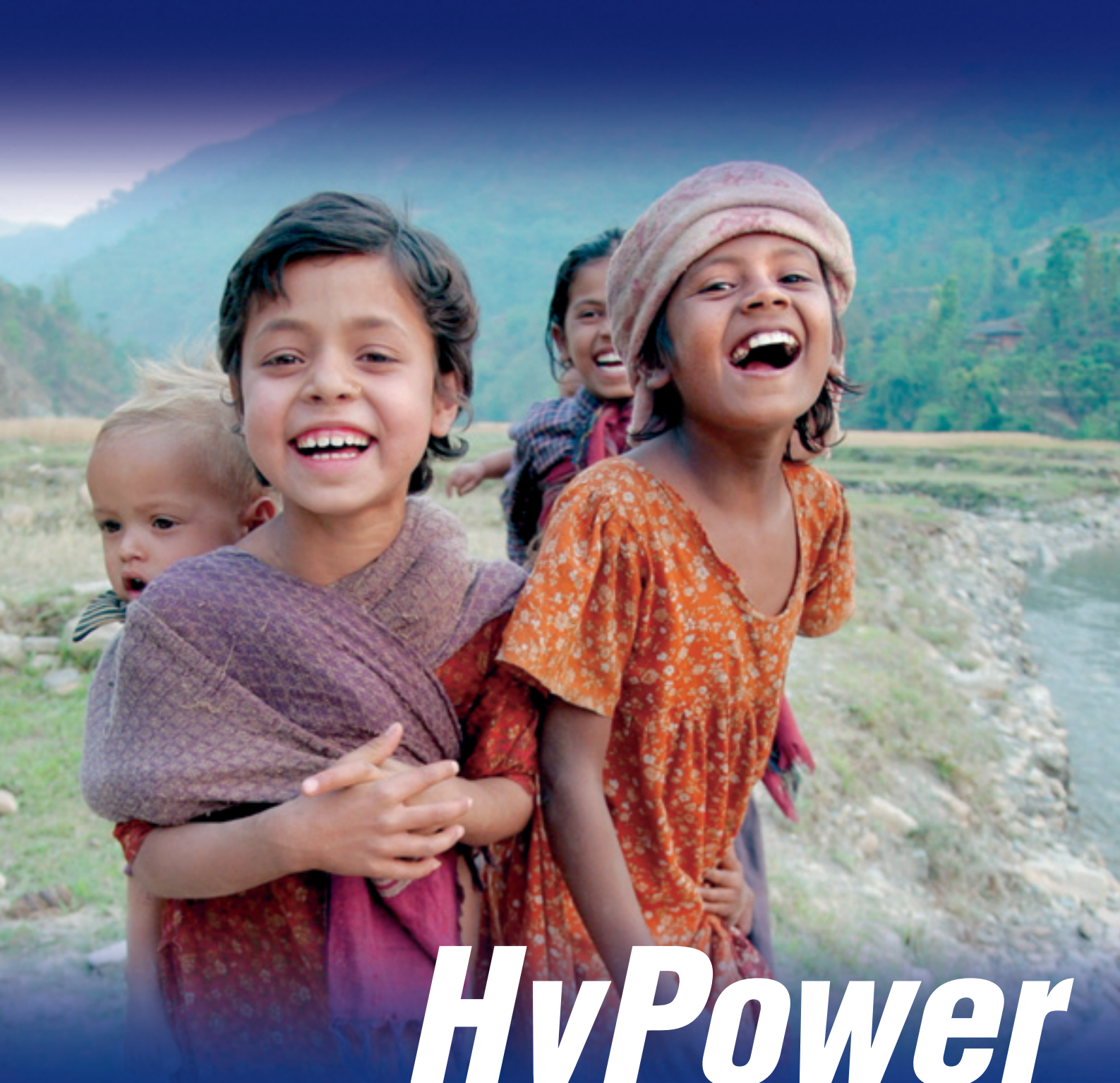


HyPower

Customer magazine
from Voith Siemens Hydro Power Generation

11

August 2005

Summary

Editorial

Voith Siemens Hydro Power Generation

Hydro – energy for growth and a cleaner environment

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

Dear Readers,

If you look at the growth rates in the major hydro markets, such as China and India, you will certainly see that they are way above the average of any other country or region in the world. With this growth, higher standards of living and elevation of poverty are inevitably connected. In order to boost both, clean, renewable energy for emerging economies and national infrastructure is necessary.

It is predictable that the worldwide need for energy will outgrow the world's current fossil resources. In addition, until those resources are exhausted, the CO_2 levels in our air will continue to increase if we do not strive for low-emission technologies for the future. Countries without fossil fuel reserves of their own will have to either bear the cost of importing or will have to look within for other resources to match their growth. Hydro, in this context, is not only a domestic resource, but also contributes to emissions reduction while generation still grows.

Enough energy, together with access to electricity, will be the key drivers for future development and poverty alleviation worldwide. Countries such as India would rarely reach this goal without a good share of hydro in their national energy mix. The same is true for China. Nepal can even avoid progressing deforestation through hydro power development instead of burning wood for household cooking and heating. In addition, trading this electricity to neighboring countries is an important source for the country's national income.

We can make a significant contribution to this development through our business. And we go beyond conventional hydro: While we are continuously improving our core business, we are also focused on a new aspect – wave energy. With the acquisition of Scotland-based Wavegen, we have taken the first step toward technological development from this different form of "water power", and we will develop this emerging resource to maturity and economically feasible solutions.

We're comfortable in the water. For over 138 years, we have been a leader in research and development for fluid machinery. Technical expertise and services from within the Voith group will support our wave energy development: drives and salt water-proven components from our transmission and marine technology divisions, services in operation and maintenance from our own and Voith's industrial solutions division.

We will make sure that energy from water in every form sustains a reasonable share in environmentally friendly and low-emission energy generation all over the world.

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

Hydro power drives development

Nepal, Solukhumbo, boy carrying water container.

A view on the role hydro power is playing in Asian countries shows a lot of contrast. Nepal only utilizes approximately one percent of its extensive hydro power potential yet, Japan as a high-tech country has harnessed its natural hydro resources almost completely, at least in the field of large plants. The emerging hydro-superpower China develops its gigantic potential in quantum leaps. India's ambitious target is to completely provide its population of one billion with electricity by 2012, and thus plans to increase its hydro power generation. This also promotes the interest of its northernmost neighbor – Nepal – to develop its own hydro projects.

Nepal – a natural country for hydro power

Nepal's geo-physical conditions can be regarded ideal for the generation of hydro electric energy. Within a narrow width of around 100 km, the elevation changes from 8,840 m above sea level to less than 100 m, creating a substantial head for any hydro power plant. The country's rivers provide a dependable flow, which is further enriched by ice and snowmelt.
The hydro power potential is estimated to exceed 80,000 MW, out of which 43,000 MW can be considered economically viable. But despite this enormous potential for future expansion, the Himalayan country only has made rather modest use of its hydroelectric resources to date. The abundant potential remains almost entirely untapped since the total output of Nepal's hydro plants amounts to not more than 600 MW. Severe power shortages are still quite common.

Gokoyo Lake, Nepal.

Ample hydro power opportunities for private investors

Developing its hydro power potential, Nepal could not only satisfy its entire domestic energy demand but also export power. The opportunities are abundant: India's energy deficit is expected to reach 20,000 MW by 2010, and China's deficit will probably pass 300,000 MW by 2015. Nevertheless, in order to harness and develop hydro power, private sectors will have to be involved. Nepal has undertaken some regulatory reforms and promulgated a new hydro power policy attracting private financial sources. Foreign investments are allowed to cover 100 percent of any hydro power project and power exports to external markets are possible.

Developing hydro power in Nepal

Dr. Janak Karmacharya, Managing Director, Nepal Electricity Authority (NEA).

In terms of per capita hydro power potential, Nepal is on par with the United States of America. However, the United States have already developed 70% of their hydro power resources, whereas Nepal has managed to exploit only about one percent of its technical and economical potential of 45,000 MW so far.

Market potential in India to boost hydro power in Nepal

Slow industrial growth, unfavorable topography, causing limited network expansion, and the lack of adequate infrastructure coupled with political instability are the reasons for the low development of hydro power resources, even despite the fact that Nepal is among the few nations in the world where a specific hydro power development policy has been promulgated. Nepal's domestic electricity market is relatively small compared to its huge hydroelectricity potential.

However, the huge market potential across the southern border creates a unique opportunity to develop hydroelectricity. On the one hand, the southern neighbor, India, is facing a peak deficit of approximately 13%; on the other hand, Nepal has identified at least 22,000 MW from storage projects, which include the 10,800 MW Chisapani Karnali, 6,480 MW Pancheswore and 3,400 MW Saptakoshi water resource projects. What is needed now is a well-defined commercial tie with respect to power sales. The need of the day is to attract investment through a politically assuring atmosphere and power sales agreements with India.

Hydro power in Nepal – contributing to overall economic growth and environmental preservation

Recent studies conducted in Nepal have established the hydro power sector as the main driving force for overall economic growth in Nepal. In order to bring the entire Nepalese population above the poverty level by 2027, nearly 22,000 MW of hydro power needs to be brought on line for both the domestic as well as the export market. Although rich in hydro power, only a small fraction of the country's energy needs – three percent – is actually generated by hydro. This has resulted in massive deforestation, as more and more fuel wood is used for satisfying current energy demand. Only an extensive use of hydro power could stop the trend of increasing deforestation. All these factors, considered together, lead to the necessity of expanding the exploitation of hydro power also for domestic use.

India's power market – in need of an additional 100 GW

The Government of India recently declared its target of giving its whole population access to electricity by 2012. The Central Electricity Authority of India has estimated that an additional 100 GW must be added to the Indian electricity system by 2012 in order to satisfy the electricity needs of both the population and the industry. This would mean expanding the installed capacity to more than 215,000 MW. By the year 2020 the total requirement is expected to exceed 300,000 MW. Currently, hydro power contributes only 25,000 MW creating an enormous potential for development.

The quality of electricity supply in India is another factor to be considered while assessing the market potential. The requirements of the Indian power system have been assessed by the Government of India to target a thermal-hydro generation mix with the ratio of 60:40. This is necessary in order to prevent the huge industrial losses caused by peak shortfalls and frequency fluctuation and will also help meet the goal of providing electricity to the entire population by 2012.

Legal framework for hydro power development

Policy changes are taking place both in Nepal and India to promote the development of hydro power. Nepal, as mentioned earlier, has promulgated a hydro power policy, which is considered to favor the private sector. The "Hydropower Development Policy 2001" includes incentive provisions and transparent processes for attracting private investors. Foreign investors are allowed to invest 100 percent for developing hydro power. Guarantees against nationalization have been provided, full repatriation of profit and dividend is allowed, and foreign exchange is guaranteed. Time extensions caused by geological and hydrological risks are also provided. Compensation for any additional costs accrued from changes in the law is also assured. Royalty rates are fixed for projects supplying electricity to domestic as well as export markets. A time-bound processing period has been defined within which various administrative steps must be completed by a one-window authority. The developer is allowed to export power to an external market.

The settlement of disputes will be governed by the agreement or by prevailing law on foreign investment and technology transfer.

An assured market, both inside and across the Nepalese border, coupled with a very supportive and friendly policy ensures the development of hydro power. The poverty alleviation program is largely based upon development of these resources. Under these circumstances, Nepal is bound to evolve into a major center of hydro power development in the foreseeable future.

For more information:
Janak@Mos.com.np

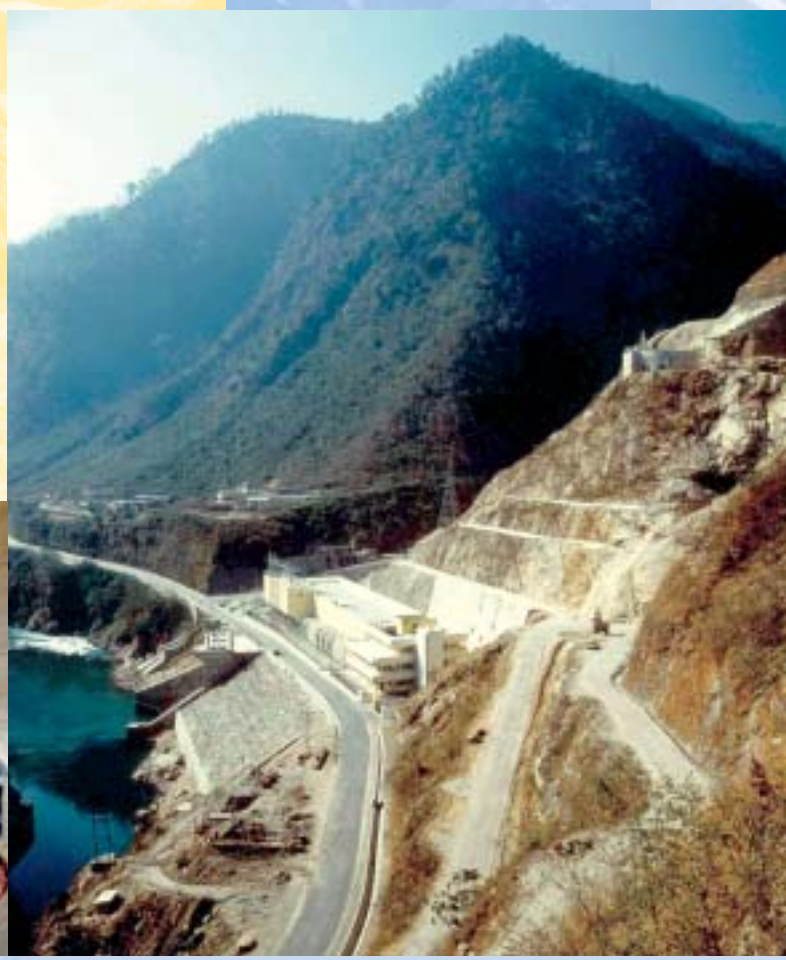
Nepal: A new runner for Marsyangdi

Voith Siemens Hydro, Heidenheim, has been awarded the supply of new spare runner for the Marsyangdi hydro power plant. And there is an option for a second.

A special feature: The spare runner will be both hard- and soft-coated. The Francis runner has a nominal diameter of 2,171 mm and is rated at 26 MW. Located in the Marsyangdi River Valley, some 170 km west of Kathmandu, the Lower Marsyangdi hydro power plant is an undertaking of the Government owned Nepal Electricity Authority (NEA).

The installation of a coated runner will significantly contribute to the further development and longevity of the hydroelectric power plant.

For more information:
Ulrich.Juegler@vs-hydro.com



India – ambitious hydro plans

A reliable and sufficient supply of electrical power is essential to guarantee India's future economic development. Today, India suffers from a significant peak load shortage, and projections foresee a dramatic increase in energy demand. To bridge the gap between demand and supply, total installed capacities will have to be dramatically increased by 2012 to approximately 210,000 MW. Boosting hydro power capacities plays a prominent role in the ambitious plan of the Indian government to achieve this goal.

Hydro share to be doubled

The installed capacity of India's hydro power stations represents roughly one fourth of the Indian power mix. There is an estimated potential of 150,000 MW of hydroelectric power in the country, of which only about one fifth has been harnessed so far. Since the government clearly sees the advantages of hydro electricity as a non-polluting and secure form of energy – contrary to thermal generation, hydro is virtually unsusceptible to price fluctuations – it has given high priority to the development of hydro power projects. Plans have been drafted to accelerate exploitation of the vast untapped hydro potential and expand the hydro share to 40%. An accelerated development plan for 162 sites with a potential of 50,000 MW has been launched by the government.

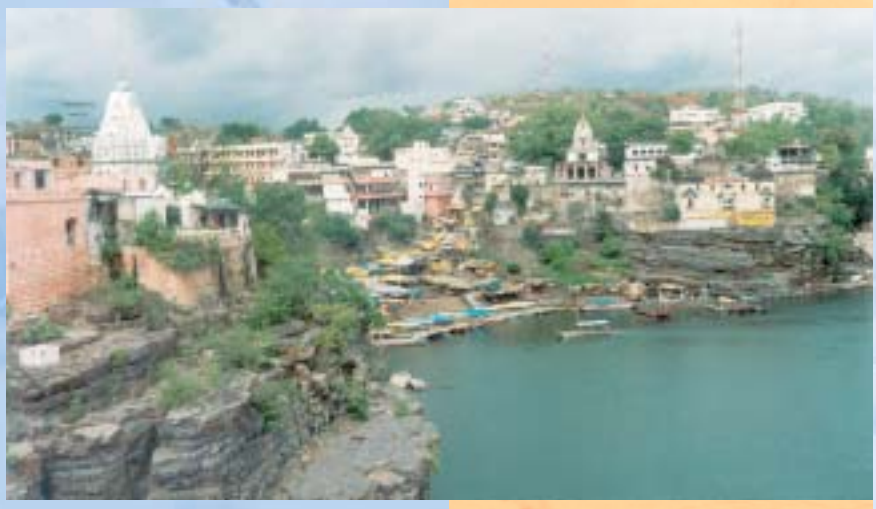
Decisive role of public corporations

Major hydro power projects targeted for development are concentrated in the northern and north-eastern regions of the country. Almost two thirds of India's new hydro projects, totaling 20,000 MW of additional capacity, shall be undertaken by public corporations of the Central Sector (federal government) by 2012. The remaining share of planned capacity additions will almost equally be divided among private companies and corporations of the respective state governments. In the current five-year plan (2002 to 2007) rehabilitation, modernization and upgrade schemes as well as new projects with an aggregate capacity of more than 10,000 MW are included.

Projects in India – an overview

Shortly after establishing the office in India in July 2002, Voith Siemens Hydro Private Limited has won the contract for the prestigious Omkareshwar hydro plant. Since then Voith Siemens Hydro has been involved in a number of key projects on the subcontinent:

Omkareshwar village.



Omkareshwar
This project was awarded to a consortium of Voith Siemens Hydro and M/S Jaiprakash Associates Ltd., New Delhi in June 2003. It is one of the multi-purpose projects being developed on the Narmada River approximately 90 km from the city of Indore in Madhya Pradesh, India. This project envisions power generation with an installed capacity of 520 MW and irrigation of approximately 283,300 hectares of land annually.
Voith Siemens Hydro is the turnkey contractor for all electro-mechanical equipment and has been entrusted with on-shore supply as well as all inland services including storage on site, erection, testing and commissioning of all electro-mechanical works.

To date, an extensive amount of equipment for the projects has been ordered. Model testing has been conducted and accepted by the client. The installation of draft tubes and other embedded parts is in progress.

Hirakud
Two 24 MW units at the Hirakud hydro power plant are now being renovated and uprated to 32 MW each. Voith Siemens Hydro is the turnkey contractor and is responsible for all mechanical/electrical and associated civil works for this project. The units are currently being commissioned.

Baglihar I
The first 450 MW stage of the 900 MW hydro power plant Baglihar is currently being set up on the Northern Indian state of Jammu and Kashmir. Voith Siemens Hydro is the leader of the consortium responsible for turnkey execution of the electrical/mechanical works. Erection of embedded parts and development of infrastructure as well as civil works are almost completed. At present, turbine assembly is in progress.

Omkareshwar site impressions.

Baglihar II
Voith Siemens Hydro is also the consortium leader in the second stage of the 900 MW Baglihar hydroelectric project in northern India. The scope of supply includes three vertical generators with an output of 168 MVA per unit along with excitation systems, bus ducts, 400 kV single-phase transformers, 400 kV gas-insulated switchgear and 400 kV cables.

Baspa Stage II
The generators and entire electrical equipment for the Baspa Stage II 300 MW project have been supplied by Voith Siemens Hydro. The project has already been commissioned and has been supplying electricity to the grid since June 22, 2003. Baspa Stage II is a good example of developing a project together with a private promoter, Jaiprakash Industries Ltd., who also executed all civil works.

Ghatgar
Voith Siemens Hydro is involved in the electrical and mechanical works for the two Ghatgar 125 MW pumped storage units in Maharashtra state.

Nathpa Jhakri
The 1,500 MW Nathpa Jhakri hydroelectric project is an underground power station consisting of six 250 MW units. Voith Siemens Hydro is a member of the consortium group – EUCONA – which is responsible for the electrical and mechanical portion of the project.

For more information:
Pvsn.Murty@vs-hydro.com

Baglihar hydro power site.

Indo-German Joint Cooperation

From April 4 to 5, 2005, German Minister of Economics and Labor, Wolfgang Clement, visited New Delhi on the occasion of the 15th Session of the Indo-German Joint Commission on Industrial and Economic Cooperation. He was joined by Members of the German Parliament and a high-profile business delegation. The delegation was led by Dr. Hubert Lienhard, Chairman of the India-Economic Committee, Asia Pacific Committee of the German Business, and CEO of Voith Siemens Hydro Power Generation, Member of the Board of Voith AG.

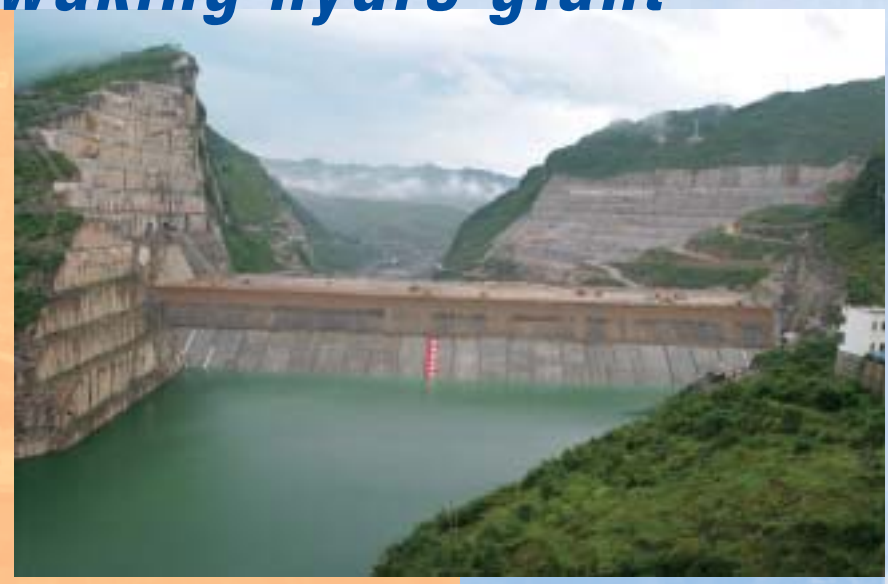
Minister Clement underlined, among others, that there was a long tradition of Indo-German economic relations and that both sides were increasingly interested in bringing the economic partnership even closer. He highlighted that the business communities of both countries were engaging in debates with other companies and the government, thus working on potential improvement to the business environment, from trade to investments and specific corporate cooperation.

Voith Siemens Hydro has already delivered proof of this engagement by founding a subsidiary in New Delhi, India, in 2002. This unit is to provide closer service and contact to customers and to the Indian market and to coordinate project administration and site erection for Indian projects.

For more information:
Barbara.Fischer-Aupperle@vs-hydro.com

Meeting of the Indo-German Joint Commission with the German Minister Wolfgang Clement (center) and Dr. Hubert Lienhard (right).

China – the waking hydro giant



Yinlong Lake, the reservoir of Hongjiadu, on Wujiang River.

There is no other country that has increased its hydro power generation capacity faster. Still today, only one fifth of China's vast hydro power potential is being utilized. As air pollution worsens due to the tremendous number of coal-fired power plants, environmental awareness is on the rise. Therefore, the Chinese government plans to increase power production through hydro power by 8% every year.

Breathtaking pace of hydro development

Efforts to expand the generation of hydroelectricity are already under way. There are several major hydroelectric projects presently under construction. The largest is the Three Gorges hydro power plant on the Yangtze River with its foreseen world record output of 18,200 MW. When fully commissioned in 2009, it will supply more than 100 million people and the regional industry. Several other hydro schemes with individual capacities exceeding 1,000 MW have been brought into operation recently or are approaching completion. More than 50 GW of hydro capacity is planned for construction. Furthermore, China will increase efficiencies of all its current hydro power stations and also survey small rivers to tap their hydroelectric potential, especially in regions lacking of coal resources. The country's total exploitable hydro power resources are estimated to be at least 290,000 MW, ranking first in the world.

Second contract from Wu Jiang Company

After the successful commissioning of Hong Jia Du in 2004, Voith Siemens Hydro, Shanghai, was awarded a second contract by Wu Jiang Hydro Power Development Company.

The Silin hydro power plant, located on the Wu River in China's province Guizhou, will be equipped with four vertical Francis turbines each with an output of 270 MW. As the runners' dimensions (diameter of around 7 m) exceed the average transportation regulations, they will be manufactured at site.

The commissioning of the first unit of this new hydroelectric project on the Wu River is scheduled for August 2008. In 2012, Si Lin shall be fully connected to the grid. According to the Chinese government's plan the hydro power station will deliver the electricity produced to the eastern provinces.

For more information:
Xiaping.Shen@vs-hydro.com

The contract was officially signed in Guiyang City on April 13, 2005. From left to right: Luo Xiaoqian, Deputy General Manager, Wu Jiang Hydro Development Co. Ltd., Dai Shaoliang, Chairman of Board, Wu Jiang Hydro Development Co. Ltd., Aage Dalsjoe, President, Voith Siemens Hydro, Shanghai.

Successful model acceptance test for Laxiwa hydro power

Experts from the Yellow River Upstream Hydro Power Development Company with Voith Siemens Hydro's specialists.

Voith Siemens Hydro, Shanghai, was awarded the contract for five 711 MW Francis turbines, including site manufacturing for the runners by Yellow River Upstream Hydro Power Development Company Ltd. in August 2004.

In March 2005, the model acceptance test was successfully performed at the Brunnenmühle laboratory in Heidenheim, Germany. The model turbine, designed and optimized for the unique Laxiwa power station requirements, was extensively tested. The next step will be detailed engineering and manufacture of major components for the prototype.

The Laxiwa Project is part of the Chinese National Hydro Power Development Program and is the biggest hydro project along the Yellow River. Commissioning for the first unit is scheduled for June 2008.

For more information:
Weirong.Hou@vs-hydro.com

Longtan site – completion of runner building

The Longtan hydro power station, located on the Hongshui River, will be one of the largest hydro power plants worldwide. Voith Siemens Hydro, Shanghai, in consortium with Dongfang, is responsible for the supply of seven 700 MW Francis turbines and will also supply seven runners, manufactured in a specially erected workshop at site.

Manufacturing began on the 1st of March, 2005 in the newly constructed manufacturing facility at site. The workshop is fully equipped and includes a compressed air system, welding and grinding areas, electrical systems, machining tools, a stress relief furnace, inspection facilities, an assembly area and an office, all based on Voith Siemens Hydro standards and procedures for runner manufacturing.

For more information:
Guoqing.Chen@vs-hydro.com

Longtan on-site runner building.

A Milestone in Tai'An

Four reversible pump-turbine units, each with an output of 250 MW will be supplied by Voith Siemens Hydro, Shanghai, for the Tai'An Pumped Storage Project in Shandong Province, China. The contract includes pump-turbines, motor-generators, supervisory and control systems and spherical valves.

Tai'An spherical valve.

Celebrating the delivery of Tai'An spherical valve.

The spherical valves, set on the upstream side of spiral case, play an extremely important role in the safe operation of a pumped storage power plant.

These valves weigh in at 180 tons, and have a flow-through diameter of 3.15 m and a height of 5.3 m, setting a new milestone in the history of spherical valves, manufactured in the Shanghai workshop.

For more information:
Xiaping.Shen@vs-hydro.com

Japan – a well advanced hydro power market

With an installed hydroelectric generating capacity of more than 45 GW – thereof 25 GW in pumped storage schemes – hydro power contributes about 19% of total power generation in Japan, the second largest economy in the world.

Due to its long history in hydro power generation – the first Voith Siemens Hydro machines were delivered to Japan already more than 100 years ago – Japan commands a well proven and very advanced technology in hydro power generation. About 60% of the domestic hydro power potential have been already developed.

Today, the large installed capacity provides for a solid and major business in rehabilitation and modernization. Opportunities for new projects are often driven by environmental considerations which are supported by the Japanese governement and cover mainly small hydro plants.

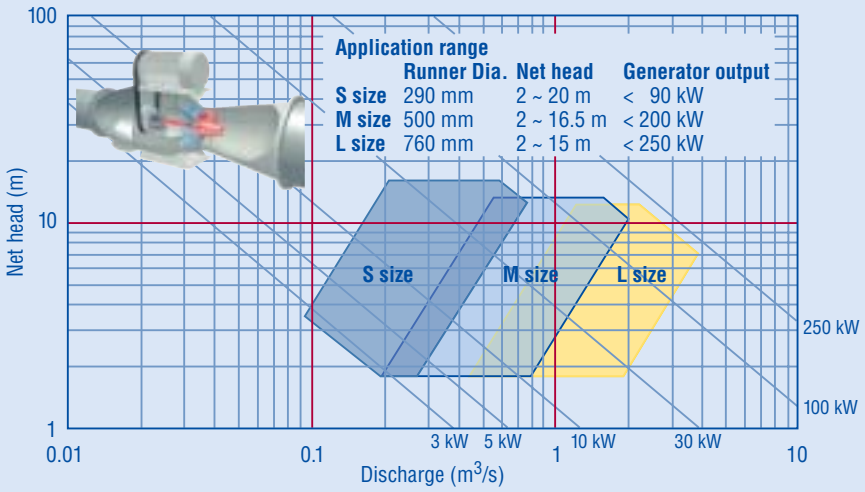
Micro tubular units – utilizing small hydro resources

Japan has an immense potential of low head schemes with an output of less than 100 kW. It does not come as a surprise that the micro tubular turbine developed to exploit such energy was introduced there.

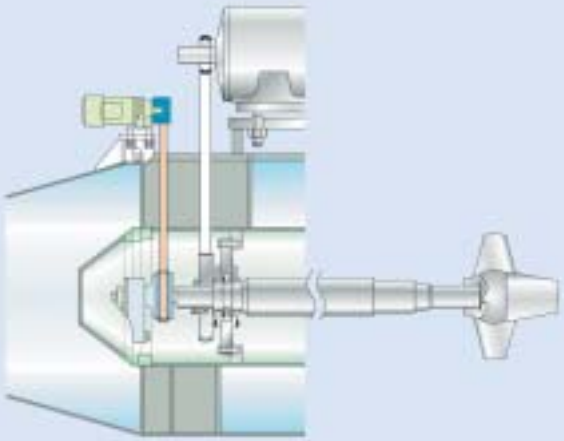
Micro tubular turbine installed on Egasaki Drinking Water Treatment Plant (Serial arrangement of 2 units).

Hydro power resources can be harnessed not only from natural bodies of water and developed reservoirs: factories, waterworks, sewage treatment plants and irrigation canals also hold an enormous potential. Non-utilized head as a byproduct of line operation could be employed very effectively for on-site power generation.

Application range of micro tubular turbine.



Runner blade adjustable mechanism.



Tadashi Tsukamoto, who was conferred the degree of Doctor of Engineering at the Kyushu Institute of Technology, Japan on March 25, 2005, for his doctoral thesis on the "Research of a Micro Tubular Turbine in the Broad-Band Operation", describes the hydraulic turbine's features as follows: "Their serial arrangement allows for the units to be applied at sites with the head higher than that of the units' actual application range. The units may also be applied at sites with a variable flow rate due to adjustable runner blades."

Being arranged in series, the performance of the downstream turbine is affected by the draft tube exit flow of the upstream turbine. This influence was investigated during numerical flow analysis and model turbine tests. Since then, prototype units have been installed in several locations, among others, at drinking water treatment plants, sewage water treatment plants, and agricultural irrigation canals. The application of these micro tubular turbines is a step toward generation of clean energy and will contribute to the reduction of CO_2 emissions and effective use of unemployed energy.

For more information:
Tadashi.Tsukamoto@vs-hydro.com

New project to raise the Dominican Republic's hydro capacity

Voith Siemens Hydro, São Paulo, will supply the equipment for the Pinalito Hydroelectric Project in the Dominican Republic. It has signed the contract in the beginning of this year with the civil contractor, CNO – Norberto Odebrecht.

The Pinalito project is part of the Dominican Republic's Government program to increase power generation capacity in the country. The hydro power project on the Tireo River will be located between the cities of Bonao in Monseñor Nouel province and Constanza in La Vega province.

Voith Siemens Hydro will supply two Pelton turbines (25 MW each), two generators (each with 35 MVA) and two spherical valves. Commissioning is scheduled for March 2007.

For more information:
Valni.Muller@vs-hydro.com

Starting of civil works in Pinalito.

New turn key solution for El Gallo, Mexico

Voith Siemens Hydro, São Paulo, also signed a turn key contract with Mexicana de Hidroelectricidad (Mexhidro) S. de R.L. de C.V. Company. The US$ 19.6 million contract includes the supply of two 15.6 MW vertical Francis turbines, two 16/19 MVA generators, the entire construction work and overall project management.

The El Gallo hydro power plant is located in Guerrero state, on the Cutzmala River, near the city of Cutzmala de Pinzón in southern Mexico. This project will contribute to and accelerate the commercialization of renewable energy in Mexico.

The demand for electricity in Mexico is expected to grow on average by six percent over the next ten years. The project shall produce 147 GWh per year.

For more information:
Pedro.Fernandes@vs-hydro.com

New equipment for Unit 1 of Peixe Angical, Brazil

Voith Siemens Hydro, São Paulo, is currently supplying three turbine generators to ENERPEIXE, the owner of the Peixe Angical hydro power plant. These Kaplan machines are the largest of their kind to be manufactured in the Brazilian location.

When complete, the total installed power will be 450 MW. The first 153 MW turbine has been delivered and will be fully commissioned by May 2006.

The Peixe Angical project is located on the Tocantins River, and is connected to the North-South Interconnexion for power supply within Brazil.

For more information:
Luiz.Gabelini@vs-hydro.com

Peixe Angical Kaplan runner. Nominal runner diameter 8,600 mm.

The State of California's DWR relies on Voith Siemens Hydro for service

Voith Siemens Hydro, York, has been working with the State of California's Department of Water Resources (DWR) for over 40 years. From the equipment at Edmonson and Chrisman pumping stations to the high power Devil Canyon Pelton turbines, DWR has become familiar with original Voith Siemens Hydro equipment.

Recognizing the benefits of working closely with the original equipment manufacturer during refurbishment, DWR has recently renewed a long-standing service contract with Voith Siemens Hydro to provide equipment and services for all Westinghouse, Siemens, Allis-Chalmers generators as well as the Voith and Allis-Chalmers turbines and pumps.

DWR's Chrisman Pumping Plant near Bakersfield, California.

WeldMart, a subsidiary of Voith Siemens Hydro, has been very active with a rehabilitation concept developed specially for the pumping units in DWR's system. A carefully planned sequence of cutting, welding and grinding is used to refurbish the pump diffuser. In-place machining is then used to prepare the pump casings for the impellers. The administration of the services contract has allowed the State to expedite their Engineering and Project Management resources to procure their needed components and services in far less time, thereby saving the State of California significant internal costs and resulting in reduced outage schedules.

For more information:
Jerry.Busch@vs-hydro.com

IEC meeting back to Germany

The "Brunnenmühle", corporate technology and research and development facilities of Voith Siemens Hydro in Heidenheim, was among several tour stops for this distinguished group.

In May, 2005, the international members of the International Electro-technical Commission (IEC), the Technical Committee TC4 – Hydraulic Turbines, held their plenary meeting in Stuttgart, Germany. It had been 30 years since this meeting was held in Germany.

As part of the meeting's program, the experts had the opportunity to have a closer look at the long tradition of successful German hydro power technology, its recent achievements and further perspectives.

In addition, the committee honored Otto Eichler with the "1906 IEC award" for his intense long-time contribution to the efforts of numerous IEC working groups during his 35 years of active professional life within Voith Siemens Hydro.

For more information:
Joachim.Klein@vs-hydro.com

Dr. Hubert Lienhard – Chairman of HEA

On May 1, 2005, Dr. Hubert Lienhard of Voith Siemens Hydro Power Generation in Heidenheim was named Chairman of the Board of the Hydro Equipment Association (HEA).

The HEA had been founded as an equipment supplier organization in 2001 by Voith Siemens Hydro, Alstom Power Hydro and VATech Hydro in order to jointly promote sustainable development and public acceptance of hydro power.

HEA's mission is to participate in the public debate about the development of energy supply strategies, taking full account of hydro's techno-economical, social, environmental and political aspects and to be a partner in coalitions that promote good practice in hydroelectric projects.

Together with the Chairmanship, the General Secretariate has been moved to Heidenheim and will be coordinated by Barbara Fischer-Aupperle as the Secretary General.

For more information:
Barbara.Fischer-Aupperle@vs-hydro.com

Voith Group Conference 2005 – Working on our innovations

April 2005 saw the second major Voith Group Conference in Ulm – bigger, more colorful and even more motivational than the previous event "Working on our future" in 2002.

More than 700 senior executives and experts, mainly from Research and Development, gathered over two days for fascinating presentations on the latest and most future-oriented developments of Voith's paper, hydro, and transmission divisions.

Voith Siemens Hydro introduced its long-term strategy to extend its business into the field of alternative generation from water, specifically from ocean waves.

For more information:
Barbara.Fischer-Aupperle@vs-hydro.com

Investment into future-oriented wave energy

As a step to boost the development of innovative technologies for energy generation from water and to assume a leading role in the field of wave energy, Voith Siemens Hydro in May 2005 purchased Wavegen in Inverness, Scotland.

The company which was founded in 1990 is a leader in the construction of wave energy systems and in the research and development of this technology.

Wavegen is also expert in so-called power take-off (PTO) systems – power extraction systems operating via turbines and generators.

Wave tank in Inverness.

For the commercialization of existing technologies for near-shore power stations, a number of projects have already been identified. Consulting, concept, operating and maintenance services for wave-to-wire plants, as well as the development of new technologies for energy generation from ocean currents, are also part of the future activities of the company.

Voith Siemens Hydro envisages its future strategic orientation, jointly undertaken with Wavegen, in the commercialization of existing technologies for shoreline and near-shore power stations.

For more information:
David.Gibb@wavegen.com

Tea – more than just a drink

With a worldwide annual production of around 2.9 million tons, tea is the world's most popular drink. In certain regions, however, it is much more than that. In large areas of Asia, the aromatic infusion has been used for over 3000 years as a religious and cultural drink. The tea plant is, besides rice and wheat, one of humanity's oldest useful plants.

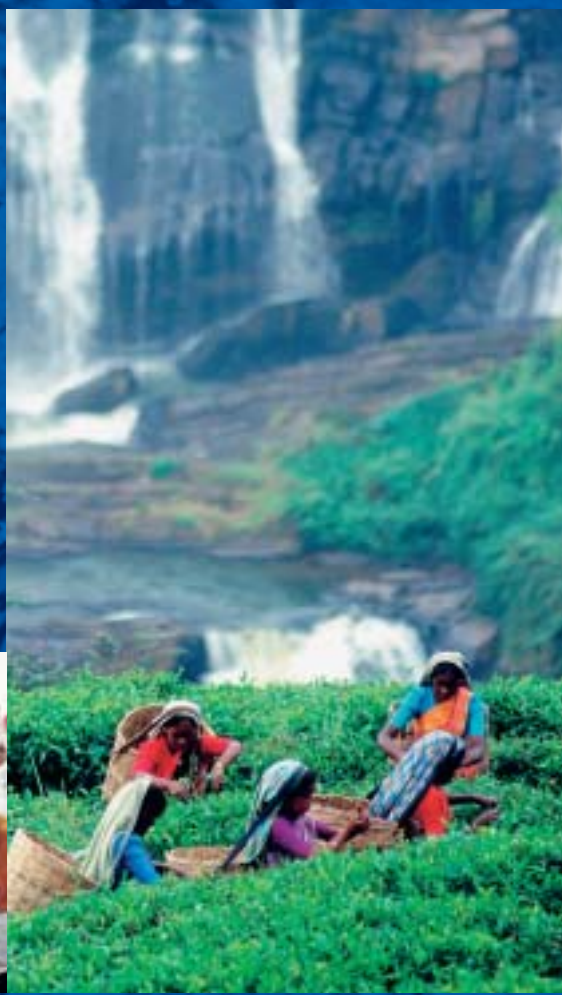
Man's preoccupation with tea can be attributed to the Chinese. Consumption of tea lay at the philosophical and cultural heart of the Empire.
Today, however, the largest consumer of tea is India, with around 640,000 tons annually, followed closely by China with around 466,000 tons.
The nation with the largest tea consumption per capita is Paraguay, where 14.6 cups are drunk per person per day.

Numerous legends surround the discovery of this drink. A gust of wind is said to have helped the Chinese Emperor Shen Nung (2737 BC). A few tea leaves blew into a kettle of boiling water and gave off an aroma that appealed to him. The new drink impressed the Emperor so much that he introduced the entire land to tea drinking.

In 552 AD, Buddhist monks brought the art of tea preparation to Japan. To this very day, the term "teaism" refers to the Japanese people's almost religious devotion to tea.

In the 8th century, several tea merchants commissioned the Chinese author Luh Yü to write a three-volume book about tea.

The result was the first documented history of tea, which was at the same time a hymn of praise for the highly popular drink. Ever since, Luh Yü has been regarded as the patron saint of tea.



Tea picking is a craft that requires considerable experience, for the time of picking has a considerable effect on the color and flavor of the end product. Harvesting takes place up to three times per year. In spring comes the “first flush”, in summer the “second flush” and in autumn the “autumnal”. For the highest-quality teas, the pickers take only the bud and two leaves from the shoot.

Traditionally, tea is produced in four different varieties. White tea – so called because the downy hairs on the underside of the dried tea leaves have a silver-white appearance – is made when young shoots are harvested and, like herbs, dried without being fermented. Only the best tea varieties are suitable for preparation in this manner. For green tea, the leaves wither in iron pans over a fire before drying. Oolong is produced by shaking tea in wicker baskets after harvesting, then fermenting the juice released with the oxygen in the air.

This process is halted by heating the leaves in iron pans. Black tea – which is actually called red tea in East Asia – is made in the same way as Oolong, but the fermentation process is not interrupted. The final tea product can then be classified as “leaf tea” (pekoe), “broken tea” (broken pekoe), fannings or dust, both of which are suitable only for teabags.

The Champagne of tea varieties comes from Darjeeling in North-East India. The cultivated areas of the 3,000 km^2 region are at a height of around 2,000 m, on the south slopes of the Himalayas. Darjeeling teas have a light, gently aromatic flavor.

Assam from North India, grown in a high region, almost as large as Germany, and near the Brahmaputra river, is strong, dark and spicy.

Hangzhou in China produces a flowery, natural green tea. Tea from Japan is rarely seen in shops abroad, since it is consumed in large quantities within the country. The somewhat cooler climate gives it a special quality.

In Japan and China, tea is prepared and enjoyed rather differently from western countries. Strainers are not used – on the contrary, hot water is poured directly onto the tea in the cup or the pot. The wet tea leaves are heavier than water and therefore break apart. Moreover, whole tea leaves tend to be reused, and are steeped up to three times. But regardless of the method of preparation, tea gives water a flavor that is appreciated throughout the world – and the purer the water, the better the tea will taste.

VOITH SIEMENS
HYDRO POWER GENERATION

Voith Siemens Hydro
Power Generation GmbH & Co. KG
Alexanderstraße 11
89522 Heidenheim/Germany
Tel. +49 7321 37 68 48
Fax +49 7321 37 78 28
www.voithsiemens.com

Editorial coordination:
Barbara Fischer-Aupperle

10000 www.msw.de