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**HYDRO AND DAMS IN AFRICA ~ PROJECT FINANCE
SEDIMENT CONTROL ~ BEARINGS**

New development strategies lead to renewed optimism for hydropower

A total of 515 delegates representing 52 countries attended 'Hydro 2003: The Way Forward for Hydropower', in Cavtat (Dubrovnik), Croatia, from 3 to 6 November. This was *Hydropower & Dams*' tenth international conference.

Participants heard senior representatives of the World Bank and the Asian Development Bank re-affirm their strong commitment to supporting future water resources development projects, and discussing future specific plans, partnerships and new approaches to project financing.

Partnerships and best practice (in planning, developing, financing and technology) were key themes in the debates during the four day event; 14 sessions looked at hydropower potential, regional power trading, financing, social and environmental aspects, economics, refinements in machinery to improve safety and efficiency, innovations in civil works, sedimentation management, uprating and refurbishment, and public awareness concerning hydropower.

Organized and hosted by *The International Journal on Hydropower & Dams* with NetWork Events, Hydro 2003 was supported by the Croatian national utility Hrvatska Elektroprivreda, the World Bank, the International Hydropower Association, the International Commission on Large Dams, and the Croatian National Committee on Large Dams.

In terms of registered conference participants and countries represented, Hydro 2003 was *H&D*'s largest international event to date. It was generally agreed that this conference was also able to present a much more optimistic view than those in previ-



John Briscoe: "The Bank must re-engage, as a matter of moral principle, with issues of water resources development in the developing world. ... We look forward to working together!"

ous years on future prospects for accelerated hydropower development, based on wider acceptance of the role hydro can play in social and economic development.

High level delegations were present from many countries with major hydro development programmes under way or planned, such as: Ethiopia, Uganda, Cameroon, Kenya, D.R. Congo, Rwanda, Brazil, Canada, Turkey, India, Nepal, Laos, Malaysia, Thailand, and Japan. There was also increased participation from southeast Europe, including delegations from Slovenia, Romania, Albania, Serbia and Montenegro, Poland, Macedonia (FYR), and the Russian Federation.

The multilateral development banks were well represented, with a large

delegation from the World Bank, headed by Senior Water Resources Adviser John Briscoe, and including officers from the Asia Pacific region, the Latin American Caribbean region, and the Private Finance Guarantees Department. The World Bank had also facilitated the participation of representatives of the Ministry of Energy and Mineral Development of Uganda, and EEPKO of Ethiopia, who gave presentations on the Nile Basin Initiative.

John Briscoe, Alessandro Palmieri and Barry Trembath all gave comprehensive updates on the World Bank's re-engagement in large infrastructure projects such as dams and hydropower plants (including the rationale behind this move, and concrete actions which are planned), following the recent launch of the Bank's Water Resources Sector Strategy.

Two speakers from the Asian Development Bank outlined the ADB's approach to encouraging stakeholder partnerships in supporting hydropower schemes, and also the latest strategies for project financing.

The German bank Kreditanstalt für Wiederaufbau also presented its current philosophy on financing renewable energy projects.

This report includes an overview of some of the messages conveyed to the conference by the World Bank, Asian Development Bank, IHA, ICOLD, Hrvatska Elektroprivreda (HEP), SINELAC, and some of the conference chairmen, guests and participants. Elsewhere in this issue are more selected highlights from the conference, including: an article based on the Hydro 2003 presenta-

Far left, C. Viotti, President of ICOLD; centre, Prof. D. Altnbulek, elected as IHA President in Dubrovnik; and, general view of the audience.





The way forward for hydropower

I. Covič, President of the Management Board of HEP, welcomes Hydro 2003 participants to Croatia.



tions describing the Nile Basin Initiative (p45), a report of the session on project finance (p64), the paper on project finance presented by the ADB (p67), and one of the technical papers, on sedimentation management (p84).

More material from Hydro 2003 will be published in subsequent issues. The conference papers can be purchased from *Hydropower & Dams* (on CD).

Opening addresses

HEP welcomes participants to Hydro 2003

Alison Bartle, Publisher of *Hydropower & Dams*, welcomed participants to Hydro 2003. She noted that in the past few years, there had been several large-scale events on energy and water in the world, where politics had sometimes dominated; the advantages and disadvantages of water resources schemes had been debated at length, and some general philosophies had emerged, but without any certainty of progress. In this gathering, a group of more than 500 dedicated hydropower professionals would be looking at practical issues affecting hydro development, but starting from certain key premises:

- First, and probably most impor-

tant: acknowledgement of the vital role that hydro stations and dams can and do play in poverty alleviation. In this respect, she commented that those in industrialized nations had no right to place limits on less developed countries by recommending only energy conservation, or small scale energy systems which were clearly inadequate to meet the needs of their rapidly increasing populations.

- Second: the fact that social and environmental issues could be handled extremely prudently today, on the basis of several decades of experience. "We have seen the emergence of a vast multi-disciplinary expertise in this field", she said, "and a genuine willingness throughout the profession to ensure that those directly affected by projects are also direct beneficiaries". She added that more and more projects were becoming well known as good role models in countries with major development programmes under way, in particular in Brazil, Turkey, India, Pakistan, and Canada.

- Third: the fact that fresh approaches were needed to the financial and economic aspects of hydro development, for example in quantifying benefits, allocating and sharing investment risks in a more realistic way, and forming public/private partnerships for future major projects.

- Fourth: the fact that the industry was still very much full of innovative spirit, with developments to be discussed, for example on: new materials to reduce turbine abrasion and cracking, new turbine runner profiles, new products to reduce environmental impact, such as biodegradable lubricants and fish friendly turbines, new diagnostic techniques, innovative control systems, modern techniques for generator design, and innovation in the design of spillways, dams and tunnels. All of these were aimed at making the essential components of powerplants safer, more efficient and more economic, she said.

- Fifth: the vast hydro potential remaining in the developing world, where power was most urgently needed. The conference presentations would clearly demonstrate the major role that future hydropower development would play in the economies of countries such as India, Nepal, Pakistan, Turkey, Brazil, Peru the Mekong Basin countries of southeast Asia and the Nile Basin countries of Africa, and the countries with transitional economies in Southeast Europe and Central Asia.

Bartle then drew attention to the

amount of technically feasible potential remaining for development, particularly in Africa, Asia and Central and South America, and she summarized details of hydro capacity planned in these regions. "Our job this week is to help to remove some of the barriers to its implementation", she said.

In conclusion, she expressed the wish that, during the technical sessions and the many social events, some useful partnerships would be made, so that Hydro 2003 would make a real contribution to hydropower development in the coming years, and hence to poverty alleviation.

Welcome to Croatia from HEP and CROCOLD

Ivo Covič, President of the Management Board of Hrvatska Elektroprivreda, greeted the international participants and expressed his pleasure that *Hydropower & Dams* had selected Croatia as the venue for Hydro 2003, especially during the United Nations year of Freshwater. It was also a year in which HEP had received an award from Croatia's Ministry of Protection of the Environment, for the company's efforts in this field, which had yielded significant results.

Covič added that, in the last few months, a procedure had been successfully finalized for the green certification of HEP's hydro powerplants, and a certificate was to be presented in the closing ceremony of Hydro 2003 by the German standards institute TÜV.

He referred to Croatia's first hydro plant, Jaruga, constructed on the Krka river in 1895 (which would be visited on the study tour following the conference). Today, 108 years later, Covič said, the system of HEP

Some of the participants of the Opening Ceremony. From left: Prof Dr E. Mosonyi, Prof R. Lafitte, Prof J. Rupčić, C.B. Viotti and A. Bartle.



A. Palmieri outlined the World Bank's new Action Plan in the session on Best practice.

included 25 hydropower plants, with a total capacity of 2063 MW, producing 54 per cent of Croatia's electricity and generating 5.2 TWh in an average year.

Dr J. Rupčić, President of the Croatian National Committee on Large Dams, added some words of welcome to the international participants on behalf of CROCOLD, which was one of the supporting organizations of the conference.

World Bank opening address

J. Briscoe expressed pleasure that the World Bank was a co-sponsor of Hydro 2003, and observed that colleagues from all the major regions (East Asia, South Asia, Latin America and Africa) as well as the Bank's central units, were present. "If you are from those regions, seek these people out and see what we can do to work better with you", he said.

He recalled that the World Bank had been created by 180 countries after the Second World War as a financial co-operative, whose responsibility it had been to assist the economic development and poverty reduction of poor countries in the post-war years. In the early days, it was thus an institution to finance infrastructure.

But in recent years, Briscoe said, many questions had been raised about infrastructure projects in the developing world, particularly water resources development projects. While this had led to an era in which lending for such projects had slowed down, Briscoe demonstrated that there were now striking statistics to show a change in the World Bank's policy.

To illustrate the rationale behind this change in policy, and drawing on an example from personal experience, Briscoe said that he had lived

for some time during the 1970s in a very poor village in Bangladesh, where there had been no electricity or other basic services, and the average life expectancy for a woman had been 46 years. He had returned to the same village 22 years later, to find that although there was still no electricity supply, other benefits had been provided by infrastructural developments, such as flood protection, irrigation, and transport. The average life expectancy had increased from 46 to 68 (an increase which had taken about four centuries to achieve in Europe or Japan). The villagers, he said, were in no doubt about what had brought such a change: the fundamental answer was the improvements in the infrastructure.

He referred back to the statistics which had been shown by A. Bartle: more than 80 per cent of technically feasible hydro potential developed in Europe and North America, but less than 5 per cent in Africa.

"To advise African nations not to develop their available potential to assist in poverty alleviation, today stimulates very strong reactions", he said. Such strong reactions, from borrowing countries in the developing world and represented on the Board of the World Bank, had brought about a fundamental shift in discussions, Briscoe explained. This shift could partly also be attributed to the World Commission on Dams' report. While much good information could be found in that report, he said, "the bottom line for an institution like ours was that we were asked to comply with the 26 guidelines, which were appropriately defined by defenders of the report as 'terrific guidelines because, if they were followed, no other dams would be built'". Briscoe said that this constituted a 'wake-up call' for many of the developing country partners of the Bank.

He recalled that Paragraph 19 of the conclusions of the WSSD (Johannesburg Summit) put hydropower as one of the priorities for supporting developing countries. Brazil had taken leadership in that instance, on behalf of the developing countries, strongly supported by the African nations. In Kyoto also (at the Third World Water Forum), there had been a "resurgence of the voice of the developing world", symbolized by the South African Minister of Water Resources, R. Kasrils, who had described dams as being "absolutely essential for growth, peace and prosperity in Africa".

Briscoe stressed that a fundamental element of the new Water Resources Sector Strategy was that "the Bank



John Briscoe: "Our new policy is not just leading to statements; projects are already moving ahead in Asia, and many people in developing countries will soon see the World Bank engaging in this different approach".

must re-engage, as a matter of moral principle, with issues of water resources development in the developing world".

He said that in the midst of very elaborate politics, and with a Board of 180 members (representing countries from the richest to the poorest) "we are seeing a shift such as we have never seen before, with the developing countries such as China, India and Brazil taking leadership on the Board". These countries, he said, simply would not permit the Bank not to act (in the field of water resources) as this was so fundamental to development.

The Infrastructure Action Plan, to be discussed during the conference (and reported in more detail later in *H&D*) demonstrated, Briscoe said, that the Bank was back in the infrastructure business, because it was so important for the developing countries.

Briscoe stressed that this new policy was "not just leading to statements": projects were already moving ahead in Asia, and many people in developing countries would soon see the Bank engaging in this different approach.

"We must find ways of doing things which are socially and environmentally good, but which also provide



J. Karmacharya, Director of the Nepal Electricity Authority, contributes to the discussions.



S. Babbar of the World Bank discussed the challenges of encouraging the private sector to re-engage in hydro financing. (see also p65).



The way forward for hydropower

Prof R. Lafitte: "Hydropower is finally recognized as a renewable and sustainable energy". He stressed the role that IHA had played in increasing this awareness.



the basis for social and economic growth, without which poverty in the world will persist", he said.

Concluding with some comments on implications for the professional community, Briscoe said:

- A fundamental issue is that the centre of gravity is moving from the developed to the developing world. "That is where the action will be taking place in the next decades".
- In the industrialized world, where utilities have been managing hydropower and other energy resources: "we are seeing some quite alarming 'short-termism'", with emphasis on what will appear in the next quarterly report. "Hydro is about the long-term; it is about sustainability and long-term returns", he said, adding that it was in the developing countries that one could see a deep commitment to the intermediate and long-term.

He commended the amount of countries represented at the conference, but said it would be nice to see even more participants from countries facing development issues. He reiterated to the international delegates that representatives of all regions of the Bank were keen to speak with them, and to find ways of working together, making the Bank's outreach more effective.

The session on Best practice and social aspects, chaired by Dr E. Monosowski (second from right). Speakers shown are, from left: A. Scanton, Australia, W. Um, ADB, and A. Palmieri, the World Bank.



General view of the opening ceremony of the conference on 3 November.

He concluded that while there were indeed technical issues to discuss, such as problems of sedimentation and project design, as well as details of financing, the real issue was to move projects ahead "to make the world a better place to live in, and to give poor people an opportunity to escape from poverty. This is the task facing us, and we look forward to working together."

C.B. Viotti, President of ICOLD

ICOLD President Cassio Viotti began his opening address by pointing out that 5000 years ago, the Egyptians had built the Sad El Kafara dam, which is acknowledged to be the first dam ever built. They wanted this dam to store water during the rainy season, for use during the dry season. "It has thus been almost 5000 years that we have been developing the science of dam construction, and during this time dams have become an asset in the development of mankind, although this is not very often acknowledged", he said. He continued that while dams had provided protection from floods, improvements in navigation, power production and, above all, drinking water, in the last decades all human endeavours had been restrained by the new attitude of mankind towards environment and sustainability. In this respect, he stressed that those who put forward arguments against dams should not judge those built many years ago by the standards and procedures of today.

Viotti said that he had had a similar experience to that described by John Briscoe, having spent his childhood in a Brazilian town which, in the 1950s, had had almost no electricity and also water shortages. Then, in the late 1950s, he said, Brazil had started the construction of large dams, mainly for power production. But this led to the widespread development of technology.

"In the 40 years since we started building these large dams, electricity

production in Brazil (90 per cent provided by hydro) has increased 16 times, while the population has increased 2.5 times, and this has allowed for significant industrialization of the country as well as many other benefits. Also, the irrigation that this provided, by the availability of electricity and dams, had fostered an increase in the production of grain, in 40 years, from 20 million tons to 123 million tons. So while the population increased by a factor of 2.5, the grain production increased more than six times.

"In the 1960s, only 50 per cent of households were provided with water. Now in the cities 94.5 per cent of households are provided with water and this had brought about increased life expectancy in Brazil from 50 to 68 years, he continued.

"In today's world", Viotti concluded, "we have all the capabilities to build dams with enough environmental care to foster development, and we should make our best efforts within ICOLD to spread this technology, mainly to the developing countries, to provide the means for them to achieve their development, based on the experience of other countries".

Prof. R. Lafitte, IHA

Prof Raymond Lafitte, who was completing his six-year mandate as President of IHA in Dubrovnik, expressed his appreciation to the conference organizers, *Hydropower & Dams*, for inviting IHA to be one of the co-hosts, and he commended the choice of venue. A storm which participants had witnessed on arrival illustrated well, he said, how Croatia, with 975 mm/year of rainfall, had been able to construct nearly 2100 MW of hydro capacity for the welfare of its population of 4.4 million, supplying 54 per cent of its electricity. The fact that only 51 per cent of the country's technically feasible potential had been developed so far was another good reason to meet in

overall safety, he felt. It had been interesting to see one paper on the use of new composite materials for hydraulic turbines, which he said was surely a sign of things to come. "The whole world is going to composites and there is no reason to think that the hydro industry will be different". Likewise, Gummer continued, the use of new coatings on traditional materials to guard against cavitation damage and salt erosion was currently being developed.

"In all this exciting development work, environmental needs are not being forgotten", Gummer stressed "and we were told of an oil-free Kaplan turbine blade mechanism, and the use and effectiveness of biodegradable oils. This surely must be the way forward if we are to satisfy environmental needs safely in sensitive areas of the world".

Details of what Gummer described as "two pretty revolutionary trash-rack cleaning machines" had been presented, both of which were capable of clearing silt from the intakes of powerhouses. One of these had been used for this purpose with a resulting considerable increase in the efficiency of the generating unit. Obviously, this would not solve all silting problems, he observed, but it would alleviate the situation where the basic problem was silt accumulation at the intake.

"We were treated to a tale of great adventure with the Wave Dragon experiment", Gummer continued. "Here wave energy is collected on the high seas and diverted through essentially standard water turbines. It would be wonderful to think that this project would be a success, and that a whole new area will be open for the development and installation of hydraulic turbines".

Moving on from the technology sessions to some more general concluding remarks, Gummer said: "A short time ago, *The Economist* published an article on the economies that would soon outstrip those of the USA and Europe. *The Economist* called them the 'BRIC' economies, which is short for Brazil, Russia, India and China. It is interesting to note that all of these have strong hydro potential, and based on passed precedents, are determined to exploit it. The benefits of hydro in their respective economies could be tremendous. We were told during a presentation from Itaipu Binacional that, last year, the Itaipu plant produced 95 TWh of energy, which accounted for 24 per cent of Brazil's electrical demand. Brazil's electricity is 95 per cent supplied by hydropower.



Panel of speakers in the Closing Ceremony of the conference; future prospects for hydropower were discussed in the light of the presentations at Hydro 2003.

"Nobody can stop this sort of development, which after a few more blackouts in the USA and Europe and a few more hot summers, will gain even more acceptance and approval. In my opinion, a new age of hydro is upon us. It only remains for it to be seen if we are up to the challenge".

Sessions on civil works

Of the ten papers accepted for the Proceedings on civil works, seven were presented, covering a large spectrum of subjects: research and development in the field of cost savings for dams, dam monitoring, flood protection, risk analysis, the use of gabions for dam rehabilitation, sedimentation of reservoirs in Himalayan rivers, and membranes to reduce friction losses in tunnels.

Summarizing the session, chairman Prof Raymond Lafitte, drew attention to three particular points:

- The importance, for the concept of a dam, of research and development, with a 'non-conformist spirit' taking into consideration the potential reduction of costs as a result of judicious methods of construction. He stressed that the views of the contractor should always be taken into account.
- The interest of using a reservoir not only to produce electricity, but also for flood protection, and other functions (and this advantage should be made known to local populations).

• The need for continuing research and development on the question of reservoir sedimentation, and ways of avoiding it; today this problem raises questions about the sustainability of reservoirs.

A paper on the Kenyir dam in Malaysia had demonstrated, Lafitte said, that in a country with no legal requirements for legislation on dam safety, the national utility, Tenaga Nasional Berhad, had developed its own regulation, being strongly conscious of its responsibility to control its dams; he commended this initiative.

Closing discussions

Hon. Peter Rae, REGA and Hydro Tasmania, Australia

The Hon. Peter Rae endorsed the view that hydro was entering a new era, with changing views exemplified by the points raised by Prof Mosonyi concerning aesthetics. He recalled the time when the primary concerns of the profession had been with engineering and science. "But as we move into the 21st century we must add political science and social engineering", he said, as these would be very relevant to new challenges being faced, such as global warming and climate change, population growth and fossil fuel depletion. All these were adding to the worldwide recognition of the need for sustainability, he continued.



Left: The Hon. P. Rae, Hydro Tasmania: "We should welcome those who seek to provide an escape from poverty for the billions without access to clean water and electricity."

Right: B. Trembath, World Bank: "We are in the 'business development mode'".



The way forward for hydropower

Woochong Um of the Asian Development Bank: "I have been learning a lot of things here about hydropower that one tends to forget, especially good things, and I feel like I have found 500 long-lost relatives; it has given me a lot of energy to go back and continue my work."



Rae observed that so much had changed since the Brundtland report of the 1980s. "The concepts of limits to growth identified by the Club of Rome have been completely shattered", he said; "Growth is exploding in many ways, but particularly as regards population, which has trebled during most of our lifetimes".

He commented that the progressive depletion of exhaustible supplies of fossil fuels and the threat of global warming had created pressures for renewable resources to be developed, naturally including hydropower. He stressed, however, the importance of developing all renewables, and of considering how they could best fit together.

Both the WSSD in Johannesburg and the World Water Forum in Kyoto had concluded that it was vital for water and energy to be developed, especially in the countries where this offered opportunities for a new life, and an escape from poverty.

Having developed the clean development mechanism under the Kyoto Protocol, as well as renewable energy certificates, green power and carbon trading "we have truly entered a new era for hydropower", Rae said.

"We should welcome those who

seek to provide an escape from poverty for the billions of people without access to clean water and electricity, as well as those who seek to develop all renewable sources of energy, and those who will join in the 21st century new era of sustainable hydropower".

B. Trembath, The World Bank Asia-Pacific Division

Barry Trembath, in his concluding comments on behalf of The World Bank, reiterated that the Bank had "a mandate to re-engage in hydropower". He commented that one might ask exactly how that was going to be manifested on the ground, and added that lending for hydropower may take some time to pick up speed: "The World Bank is a little like a large battle ship trying to turn round", Trembath said. "Our pipeline is empty and to some extent our staff pipeline is almost empty, although there are a few dinosaurs, like myself, still around!" But he added that a new Vice President in South Asia very much involved in the Water Resources Sector Strategy and advocating this approach would be pushing this new philosophy very hard and very quickly.

"In East Asia I can tell you that we are in a 'business development mode'. We are being pushed to find new projects in infrastructure, including hydropower".

Trembath stressed that it was up to borrowing countries, if they wanted to develop hydropower, to make their voices known, and to insist that hydropower is what they want to develop in their country as a priority. "Insist on this in the country assistance strategy talks", he advised, "as this is where projects enter the pipeline.

"Once you succeed to get a hydro project in the pipeline", Trembath continued, "you can expect a lot of emphasis on safeguard policies, environment, resettlement, issues relating to indigenous people, etc." There was a strong emphasis on these aspects in the World Bank, he explained, so that projects were subject to all kinds of scrutiny and risk aversion. "These aspects have to be covered rigorously, and the emphasis should be on substance and not on volume, so that we actually look at the important environmental issues, and study those in great detail, rather than concentrate on producing environmental impact assessments 2 ft thick!"

Elaborating on what a hydro project developer could expect of a World Bank Task Manager (speaking in his capacity as one who had been

responsible for advancing at least one major hydro scheme and three pumped-storage projects to the Board in the last few years), Trembath said: "Expect for me to be promoting best practice, going beyond the safeguard policies, especially in social areas. The project as a development opportunity is the theme that people have heard from me for the last three or four years."

The last aspect he commented on was the financing model: would projects be public, would they be private, or would they be somewhere in between? "The answer is yes, they will be all of those", he said, "depending on the particular country, and the particular context". He gave some examples of the very poor nations, where private development, especially for a large scale scheme, would not be a realistic option. But he stressed that things were beginning to happen. "If the private sector is interested in developing a project, then the World Bank is interested in partnering with the private sector", he confirmed.

In conclusion, Trembath noted the increase in constructive discussions on finance at Hydro 2003: "I have been very impressed at this conference by the financing session. There is a lot less 'wringing of hands, saying what are we going to do, and how are we going to get out of this?' Instead, we have heard very constructive discussion on how the private and public sector can cooperate. J-M. Deverney's checklist on what the public and private sectors could do is basically exactly what it should be. I am glad to have been here on behalf of the World Bank, and hope there will be a new era for hydropower in the future".

W. Um, Asian Development Bank

Woochong Um, representing the Asian Development Bank, said that he was currently processing a hydropower project within the ADB, which had been attracting a lot of attention, but unfortunately many negative aspects of hydropower had been highlighted. He said that his mind had therefore been conditioned to look at hydropower in a negative light all the time.

"But spending four days at this conference has been such a pleasant surprise", he said. "I have been learning a lot of things about hydropower that one tends to forget, especially good things, and I feel like I have found 500 long-lost relatives, who are here now, and it has given me a lot of energy to go back and continue my work".

"A number of people have spoken



The Hon. Minister of State for Energy of Uganda, D. Migereko, puts a question to the panel.

about the negative image of hydropower in recent years. There are many ways of combating them, by lobbying, or by getting into a debate, but the most effective way is delivering high quality projects with many benefits and few or no adverse impacts. Through this process we can deliver the good news to everyone".

Um said that the ADB could play a significant role in this respect, in delivering good hydropower projects through three mechanisms. "First we can play a role in providing project financing", he said; "Second, we can ensure that social and environmental mitigation measures are addressed adequately. And finally we can help in bridging the gap in terms of communication. We are basically owned by all the stakeholders in the region, and we can speak on behalf of everyone. I would like to mention that to deliver high quality projects we must work together with all the stakeholders, and not fight with each other about various aspects, wasting resources and energy".

E. Monosowski, World Bank

Dr Elizabeth Monosowski, Senior Environmental Adviser at the Latin American and Caribbean Department of the World Bank, commented on 'sustainable dams and the hydropower sector, in this brave globalized new world'. She felt that the discussions during Hydro 2003 had demonstrated well that "we have come a long way in understanding what our projects are and what our next steps should be. First, the notion that hydropower is one among multiple social demands on water resources and on dams. This means that we have to start to talk about the proper economics of dams, as a motive for development, both at local and national levels, and it means maximizing the overall benefits, which may not coincide with maximizing hydropower only".

The second point she stressed was the obvious need for water, and that dams were a way to manage water; there was a need to look at biodiversity, environmental flows, of irrigation schemes, and other economic activities around dams.

Another important issue was that internalizing benefits at the local level was not automatic, and required pro-active approaches in terms of both social and environmental impacts. "This is a task much bigger than one for any individual company or professional group", she said. "This is development, and development requires partnerships. We need to develop some negotiating skills,

with governments and local communities, and with civil society and beneficiaries of dams as a whole, and look at how we will deal with the trade-offs, what kind of choices we will make, and how we will finance local development in public/private partnerships. J-M. Devernay's paper is extremely interesting in that sense. It points to some very constructive ideas".

Monosowski pointed out: "We are beyond mere compensation on social and environment impacts, which is a necessary level, but not sufficient. We are not only talking about the damage, we are talking about the opportunities, the benefits that could be generated if we are creative and intelligent in our design and planning, operation and refurbishment, and decommissioning of dams. We have to look at the whole life-cycle of dams.

"The good news is that the World Bank is back, that financing the mitigation and compensation measures is already accepted in the industry as a standard component of building hydropower dams, and is an integral part of the project costs."

She suggested that it would be a good idea to explore further creative approaches to financing local regional development, and to promote this in terms of dams.

Monosowski observed that hydropower could become a bi-product of a strategy aimed at coping with climate change, and this should be considered further. An example was the concept of royalties for the use of national resources, which had been incorporated in the Brazilian Constitution in the 1980s. She added that this would mean comprehensive river basin management and development, and noted that the experience with the Nile river basin was useful in seeing how to identify these windows of opportunity, and how to develop the resources attending to multiple stakeholders and multiple interests. "Sectoral strategic planning is back, and we need to pay attention to it", she said.

The green energy market, Monosowski felt, could be a source of funding for dams "Hydro is winning the war, and this has been accepted in Johannesburg and Kyoto", she said, adding that the clean development mechanism needed to be lobbied, however, to change its thresholds.

She then turned to the question of funding of rehabilitation and refurbishment. "I think the notion of a second life for reservoirs is a very attractive one, and should be studied more systematically. What could we do with the large number of existing



Dr E. Monosowski: "We have to start to talk about the proper economics of dams, as a motive for development, both at local and national levels".

aging dams in a systematic way, that is cost effective and responds to the new needs of society?"

Another point which could be interesting to look at, Monosowski said, was how to explore the flexibility of hydropower technology. "Maybe we should start reviewing operation plans more often in the light of better information and changing social goals towards dams, sometimes short-term, sometimes long-term".

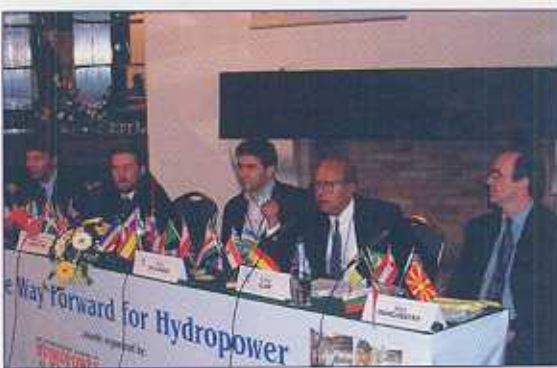
"Finally, for all this we need to look at the other 'coalitions of interest' that should be built, by recognizing those global political processes that are taking place, and by recognizing the emergence of the legitimate interests of civil society at local, national and international level. We have interests in common, and these are the ones we should be exploring.

"Let's embrace the notion that people do have rights. There are risks involved, but we can embrace them and deal with them. Let's add the third R, responsibilities, and let's share them, work together and see if we can get to the fourth R: rewards. That means rewards for society, for our countries, and for the economic hydro sector as a whole".

C. Kayitenkore, SINELAC

Claude Kayitenkore Managing Director of SINELAC (a tri-national

The session on sedimentation management, chaired by Sultan Alam of France (second from right).



Financial fillip for hydro in the developing world

New approaches to the financing of hydro plants and dams were presented and discussed at Hydro 2003 by representatives of the major multilateral development banks and financial experts from the hydropower profession. Some of the highlights of the session are summarized here.

Brighter times clearly lie ahead for the hydro industry, with international financial institutions, led by the World Bank, at the vanguard of a movement to revive hydropower and dam development, as the cornerstone of a wider policy to promote sustainable economic and social development in the developing world. For while the issue of risk (environmental, financial, social or technical) continues to pervade lenders' thinking, it was clear from the series of presentations on new approaches to project financing at Hydro 2003, that in the context of the sharp decline in commercially financed power projects in emerging markets, the involvement of international finance institutions (IFIs) and development banks is more vital than ever for the successful implementation of new hydro infrastructure.

No more so than in the case of the World Bank, which, after a major re-analysis of its approach to infrastructure lending, has firmly recommitted itself to supporting hydropower and dam development. It was appropriate that Hydro 2003's session on new approaches to project finance should open with a presentation by one of the chief architects of the Bank's new Water Resources Sector Strategy, John Briscoe. The new Strategy, according to Barry Trembath, the Bank's Lead Power Engineer for East Asia and the Pacific, is considered to have been "the catalyst for the bank's subsequent infrastructure sector plan".

The shift in the World Bank's thinking, John Briscoe said, "can be linked to several developments: growing demands from stakeholders in the developing world for desperately needed new infrastructure, falling IFI lending and diminishing private sector investment".

While in the 1990s the World Bank and other IFIs had been happy to rely on the private sector to finance infrastructure development, this only worked so long as the private sector was interested. That was the case for much of the last decade, said Briscoe, with private sector investment in infrastructure in developing countries rising from US\$ 10 billion a year in the early 1990s to a peak of US\$ 128 billion in 1997. Then came the Asian financial crisis, followed soon after by similar crises in virtually every emerging market from Brazil to Russia, as investors pulled out *en masse*. Private sector financing for infrastructure had declined sharply and last year stood at just US\$ 58 billion. While this was still high, in comparison, for example, with official development assistance (ODA), Briscoe felt, the impact on the hydro sector, as for all infrastructure sectors had been damaging. Today, private sector capital in hydro represented less than 5 per cent of all such investment in developing world infrastructure, and accounted for only 20 per cent of the estimated \$ 15 billion/year that was invested publicly in hydro in the developing world, he added.

Of equal concern, Briscoe continued, had been the changing role and politics of public financing in IFIs. Examining the evolution of IBRD hard loan investment lending over the last 20 years, he noted that it



Three speakers from the World Bank described the Bank's new approach to funding infrastructure projects, at Hydro 2003. From left: Suman Babbar, John Briscoe and (session chairman) Barry Trembath.

had never been lower than in each of the last three years. "The situation is summarized very dramatically if you look at World Bank lending in the early 1990s of almost a \$1 billion/year, down to a level of about 10 per cent of that currently. The major causes for this included the requirements the Bank has imposed on borrowers".

Much of this situation had been caused by the Bank's previous "bricks and mortar approach to infrastructure, and especially large-scale projects", often provoked the ire of human rights groups and environmentalists because of their alleged harmful environmental and social impacts and inadequate mitigation measures. As a result, the Bank had placed stricter controls on lending for hydro projects, slowing the disbursement of funds and reducing overall investment.

This more cautious approach had, in turn, led to frustration among its stakeholders, who either looked elsewhere for financing or were forced simply to put projects on hold. Briscoe cited examples from consultations held with two types of borrowers, whom he termed as 'middle-income countries with alternatives to the IFIs' and 'lower-income countries without choices'. In the first category, he quoted the Governor of a Brazilian State who had said: "When I build a 10 m-high dam in the middle of a semi-arid region, the Bank requires that I do due diligence as though I am building Itaipu". In the second category, he cited Uganda's President speaking more than a year ago about his country's Bujagali hydro project, at the time when the project was due to start: "I am not happy because a project which should have taken two years has taken seven years to start; all this hullabaloo was a waste of time and a lack of seriousness. This is a circus". Eighteen months on, work has still to begin.

Water Resources Sector Strategy

The situation required action, and from this emerged the Bank's new Strategy, in February this year, which, Briscoe explained, had six main messages:

- water management and development are essential for growth and poverty reduction;

- developing countries need better management, but also more development and more investment in infrastructure;
- the management challenge is not vision but so-called 'principled pragmatism';
- the need to assist countries develop and maintain appropriate stocks of well-functioning infrastructure;
- the need to follow a new business model for engagement with 'high-risk, high-reward' infrastructure; and,
- tailoring these policies to particular country circumstances.

The new business model which Briscoe termed as 'the centrepiece' entailed giving continuing high priority to environmental and social safeguards, but moving towards implementation which was more efficient, practical and focused on the real material issues, rather than long lists of boxes to be ticked, he said. "It aims at producing transparent, quick, time-bound and predictable decisions".

The successful adoption of the strategy and "ongoing repositioning of the bank vis-à-vis both infrastructure in general and risky infrastructure in particular" had come about largely as a result of the "unprecedented leadership by developing countries on the board of the bank for support for major re-engagement with infrastructure", he explained. "The Executive Directors for China and India, our two largest borrowers, expressed the view that infrastructure investment was central to the Bank's mission of poverty reduction, and they would like senior management to commit to at least two high risk, high benefit projects per region", he said. "This marked a fundamental change in the governance of the Bank".

With the strategy in place, the Bank had taken a further step forward in July 2003, with the development and approval of an infrastructure action plan. "This is an evolving model for infrastructure service delivery in which we see the road as one in which there is a lot more pragmatism from the Bank saying that cost-recovery is critical, but we have to find politically acceptable timetables for these", he said.

This was a significant change for the World Bank, which had previously measured the success or otherwise of infrastructure projects in terms of factors such as delays or cost overruns. "Under the new strategy it now defines it largely in terms of how effectively services are delivered, and to how many people". Providing wider access to, and more reliable, power supply was central to project evaluation, and to the creation of growth, economic development and reducing poverty, which in turn were key to the Bank's overall 2030 Millennium Goals, Briscoe said.

The Bank's infrastructure action plan would, he said, respond to clients' needs and therefore depended tremendously on what the clients actually said they wanted. To help its clients achieve their aims, Briscoe said the Bank would deploy an array of new and existing instruments ranging from classic loans to credits, guarantees, IFC loans and MIGA guarantees, which would be employed in developing infrastructure "anywhere along the spectrum from full private to full public, depending on what the particular needs of the sector are". Briscoe recognised, however, that the World Bank could not and would not do it alone. "It is perceived very strongly that the Bank needs to lever funding from all sources, from domestic public, domestic and foreign private sources, from the regional development banks and other donors, with the Bank only providing a small part of total investment financing and this obviously has to be part of a much broader set

of sources that are mobilized", he commented.

In conclusion, Briscoe said: "We see a major change in the World Bank positioning on hydro; an evolving understanding. I think, within the Bank that the private sector is a complement to, not a replacement for, public financing; a commitment to re-engage in the financing of hydropower - good hydro projects of all sizes; a commitment to use the bank's full range of lending, analytic and guarantee instruments.

"To translate this into results, it's good to have these things on paper but we want projects to produce results. This is going to require a continued mobilization of all the professional associations into the politics of public financing on hydro, continued leadership most vitally by developing countries in the international governments arena, on the boards of the Asian Development Bank, the World Bank, etc, and probably most important of all, good projects which can be done on time and on budget, respecting social and environmental standards, projects which can give people a better life".

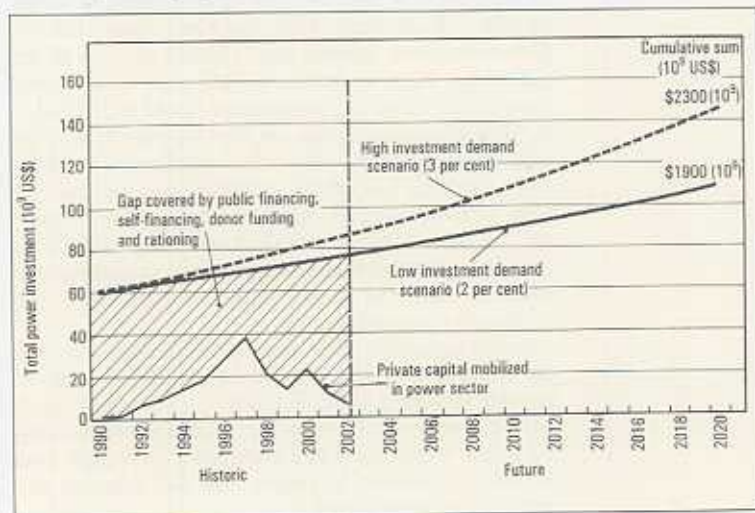
Public-private partnerships

The next challenge, it was agreed, was to re-engage the private sector in investing in hydro projects, which, as Suman Babbar, acting Director for Private Participation and Finance Department of the World Bank, explained, "may not be as difficult as many think". For while numerous risks existed, he said, and would always exist, particularly in the developing world, innovative forms of public-private partnerships (a few examples of which he examined in his presentation) were at hand, so that some of the risks were taken away and mitigated by the public sector.

"The only way to develop new hydro capacity is going to be a joint partnership. There is no defined proportion of public-private funding or involvement. It is something which is driven by each transaction, and there's a pragmatic way of looking and trying to mobilize money for all infrastructure development", he said. "What the private sector is looking for is not that there should be no such issues - I think they are willing to handle it as long as there is certainty in what is required", he added.

The first example he considered was tailored more for large hydro projects where the public sector/government explicitly takes on financing of a particular component of a project such as the civil works "which is where most of the risks lie", with the private sector financing the equipment, mobilizing financing from

Financing required for the power sector in emerging markets, 1990-2020, according to S. Babbar of the World Bank.





export credit agencies. "If you can put that together under the umbrella of a single EPC contract, which the banks would normally insist on, you can create a structure of shared risks between the public and the private sector", he explained.

Another option, he continued, was to use the traditional method of completing civil works under public sector ownership. Public sector constructs and finances and leases the civil works to the private operator, while the private sector finances the powerhouse, and operates and maintains the dams and hydropower plants. "This structure hasn't been used in the context of hydro projects, but we have done a transaction where this was used for a thermal complex where the government constructed a number of thermal plants, gave them on lease and then got the private sector to finance additional capacity. The project worked very well and was able to mobilise a substantial amount of money for the new operation", he added.

In terms of funding civil works contingencies, considered one of the major concerns especially for large dam construction, Babbar offered the example of a road construction project. "This is a structure, which hasn't been used for hydro projects, but which covers similar issues. We used this for a road project, which involved about US\$ 150 million of tunnelling, where the geological issues were very challenging because of the extent of the project, and it was very difficult to make an assessment of the construction risk". In this case, Babbar explained that, based on an estimated 20 per cent probability of cost overruns for geological reasons, the government had first told the private sector to plan for it and finance the project. There was, he said, a low likelihood for high-level contingencies beyond that – estimated at 20-50 per cent – and the government agreed in this case to share the risks and in the case of a high level of contingencies, it would provide full coverage. Then, over and above that, the government had decided that it would pick up all the risk at that stage, so that even if the costs went beyond a particular value, the government would fully finance it. "The advantage of this was that we were able to get very attractive civil works rates, which reflected basically the high probability contingencies and did not plan for contingencies, which were not likely to come up", he said. "This has worked extremely well in the case of road projects, and certainly it is something that could be looked at in the context of hydro/dams and civil works components".

In this particular case, one of the concerns for the government was that it may not actually be able to provide financing at the time when it was really needed, since every government had its budgetary processes, so the World Bank had provided a contingent loan to the government to ensure that the funding was available when required.

In addition to project-specific risks, the biggest concern of the private sector was generally the ability of a given government to honour its obligations, which could vary over time. In this case, said Babbar, "the private sector is looking for a stable revenue stream of 15-20 years. To assist, the World Bank and multilaterals can offer certain risk mitigation instruments such as guarantees, which basically back government obligations". Export credit agencies, meanwhile, provided extensive political risk cover, he added.

Babbar said the Bank could also offer a guarantee for solvent risk on electricity offtake from a developing project, whereby the Bank would guarantee the government obligation defined under the construction contract using IBRD resources (funding used for countries that can borrow at commercial level). "This structure is able to get the lenders to provide long-term financing. We've been able to move up to 16-17 year' funding - it hasn't been possible to go up to 20-25 year' funding but it make these projects viable".

J-M Devernay of EDF, France, continued on the theme of public/private partnerships, discussing the strengths and weaknesses of both sides of the partnership, and how he felt they they could work together in a 'win-win' situation, with an appropriate allocation of risks and benefits. He called for "imaginative public/private partnerships, fitting multipurpose projects" with an enhanced role of local investors and local banks, together with strong support from the multilateral development banks. He foresaw this leading to a "brighter hydropower future".

The role of development banks

Edvard Baardsen of the Asian Development Bank (ADB) and Klaus Gühr of Kreditanstalt für Wiederaufbau (KfW), Germany, outlined the role that development banks can play both in providing finance and attracting private capital for the development of hydro infrastructure. The speakers presented contrasting approaches, which have been tailored to meet the objectives of their stakeholders and needs of their target markets. For while ADB is focusing on the development of new, generally large-scale hydro infrastructure in the Asia and Pacific region to meet rapidly growing demand, KfW, whose core markets are the more mature emerging markets of Central and Eastern Europe, is focusing on rehabilitation as opposed to greenfield developments.

Baardsen, deputy head of ADB's mission in Laos, examined how the ADB works with the private sector, specifically in the context of Theun Hinboun. Baardsen also presented the instruments employed to bring private investors on board (see pages 67-73 for his full paper).

The presentation by Klaus Gühr, a senior project manager on the European desk of KfW, focused on the Official Development Assistance (ODA)-related activities of KfW, which pursue German Government policy to promote renewable energy and energy efficiency in the context of bilateral development cooperation to reduce greenhouse gas emissions. With expected annual funding of Euro 33 million over the next five years, KfW is to continue its programme of refurbishing or expanding existing hydro plant, which it sees as providing a number of advantages: highly cost-efficient solutions with low investment costs; low transaction costs since the planning process is relatively quick and simple; less risky on hydrological and construction terms, and a higher degree of social acceptance. ◊