

## UNIDO to Collaborate with China on Environmental Programmes

VIENNA, 7 November - During his official visit to China, the Director-General of UNIDO, Kandeh K. Yumkella met with the Deputy Director-General of the China CDM Fund Management Centre, Chen Huan. The purpose of this meeting was to finalize a Memorandum of Understanding for Cooperation with regards to climate change and the Clean Development Mechanism (CDM) between the two institutions.

Under the terms of the Memorandum, signed on 6 November 2008, UNIDO and the China CDM Fund Center will develop and implement a series of joint programmes and projects over the next three years, in line with the Fund's operational programmes and UNIDO's regulations, rules and procedures. The Centre is part of China's Ministry of Finance.

Activities will focus on capacity building, mitigation of

and adaptation to climate change, transition to a low carbon economy, corporate social responsibility with regard to climate change, expanding transfer and adoption of technology and CDM.

On 6 November 2008, Kandeh K. Yumkella also met with the Minister of Commerce of China, Cheng Deming, and the Ambassador of Sierra Leone, Abdul Karim Koroma, to finalize the Memorandum of Understanding for the establishment of a small hydropower plant on the Bankasoka River, in Port Loko, Sierra Leone. This agreement was signed at a press conference held on the same day in Beijing, China.

As the first trilateral technical assistance project of its kind between UNIDO and the Governments of China and Sierra Leone, this project is expected to pave the way for further cooperation under UNIDO's 'Lighting-Up Rural

Africa Initiative'. The Memorandum of Understanding itself is the result of a series of negotiations started in 2007. Construction of the 1,000 kW (2 x 500 kW turbine systems) hydropower plant is foreseen to start in December 2008. The plant should be operational by the end of 2009.

The energy sector in Africa, particularly the rural energy sector, is characterized by lack of access, low purchasing power and over-dependence on traditional fuels, such as biomass, for meeting basic energy needs. UNIDO's 'Lighting-Up Rural Africa Initiative' aims to build a number of small hydropower plants for rural electrification and productive uses in African countries with abundant small hydropower resources and, at the same time, large rural populations, which have yet to be connected to power grids. ■

*Source: UN Information Service*

## Hydraulic Machinery Symposium, Oct. 2008, Brazil

IAHR (The International Association of Hydraulic Engineering and Research) 24th Symposium on Hydraulic Machinery and Systems held during Oct. 27-31, Foz do Iguassu, Brazil.

IAHR 2008 is an opportunity for international exchange on the up-to-date knowledge related to

Research, Development, Testing, Monitoring, Study Cases on Design and Operation as well as to hydraulic turbines, pump and pump turbines. The micro hydropower technology is listed in the theme of this symposium.

This Symposium is being organized by Universidade Federal

de Itajubá-UNIFEI, Universidade de São Paulo-USP, Universidade de Taubaté-UNITAU, Instituto Militar de Engenharia-IME, Centro de Excelência em Recursos Naturais e Energia-CERNE e CERPCH-Centro Nacional de Referência em Pequenas Centrais Hidrelétricas. ■

*Source: IAHR*

## 4th Hydropower for Today Forum in Abuja, Nigeria, 16th -19th Sept 2008

The 4th Hydropower for Today Forum was held in Abuja, Nigeria from 16th to 19th of September 2008. The Forum is carried out by the UNIDO Regional Centre for Small Hydro Power in Africa, African Energy Commission (AFREC), International Centre on Small Hydro Power in Hangzhou, China, with sponsorship from the Ministry of Water Resources of China, African Union, the UNDP Nigeria, the UNIDO, the INSHP, the Economic Community of West

African States (ECOWAS), and Ministry of Energy of Nigeria. Nearly 100 participants from 30 countries have registered for the Forum this year.

The Hydropower for Today Forum has been successfully organized for 3 consecutive years by the INSHP in Hangzhou since 2005 as a global platform for government officials, policy makers and hydropower experts, especially in SHP field. This year the Forum is shifted to INSHP Regional Center

in Nigeria with the theme of "Small / Mini / Micro Hydro Power Project Development and Management in Africa". It is the first time that the Forum is organized in collaboration with the INSHP Regional Center worldwide and the local government. The innovation is also in parallel with the successful approval of the Lighting up Rural Africa Programme by the Chinese government and UNIDO. ■

*Source: IN-SHP*

## The EU-Africa Energy Partnership Launched

More than 540 Millions people in Africa need access to renewable electricity must be the solution of first choice Good intentions are not enough.

The objective is improved access to reliable, secure, affordable, climate friendly and sustainable energy services and to boost investment in energy in Africa. This partnership will involve €55m EC support programme for the period 2007-2011.

"But good intentions are not

enough. We need rapid action. In Sub Sahara Africa more than 540 Million people live without electricity. Only 8 % of the rural population has electricity. That is why electrification must enjoy highest priority" underlines the President of the Alliance, Ernesto Macias. "Currently, only six African countries have integrated energy into their official country development strategies. This is absolutely insufficient" stresses Macias.

Renewable energies must become the first choice for rural electrification. They are not only more climate friendly but also more efficient than conventional systems. ARE calculations show that rural electrification systems which use renewable energies can break even after 3 to 6 years. Hence, access to electricity and the fight against climate change can be reconciled in a cost effective way. ■

*Source: ARE*

## The 10th Africa Energy Forum Held in Nice, France

2nd - 4th July 2008: "The 10th Africa Energy Forum" was held in Nice, France. The Africa Energy Forum (AEF), launched in 1999, is Africa's premier annual power and gas investment and business forum,

where governments and state utilities address the international energy community on opportunities available in Africa's power and gas sectors. The large gathering of decision makers increases the

likelihood that business will be done, and feedback suggests that this is indeed so. ■

*Source: ARE*

## The UNIDO Centre for South-South Industrial Cooperation officially opened

Beijing, 23 July 2008 - The UNIDO Centre for South-South Industrial Cooperation (UCSSIC) was officially opened on 23 July 2008 in Beijing, China. Ms. Qiu Hong, Assistant Minister of Commerce, and Mr. Wilfried Luetkenhorst, Chief of Cabinet and Director of the Bureau for Organizational Strategy and Learning, UNIDO, attended the ceremony.

The UCSSIC has been set up for the promotion of South-South cooperation in the field of industrial development. UNIDO believes that the essence of South-South cooperation is the



effective utilisation of the wealth of knowledge and capacity in the South. When this is systematically mobilized and shared, it can facilitate and accelerate the gainful participation of developing countries in the global economy. A similar centre has been opened in India and others are planned.

These centres will act as platforms for facilitating investment and manufacturing trade partnerships among developing countries. They will thereby enhance the dissemination of valuable development experiences and technological progress gained in China and other industrially more developed countries.

According to Mr. Tan Weiwen, Director of UCSSIC, some immediate priorities of UCSSIC include application of new and renewable energy and development of agro-industry projects. ■

*Source: UNIDO*

## International Conference on Dam Safety Management held in Nanjing, China

Sponsored by the Ministry of Water Resources, P. R. China, the World Bank and the International Commission on Large Dams (ICOLD), and hosted by Nanjing Hydraulic Research Institute (NHRI), the Dam Safety Management Center, MWR, P.R. China and the State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering, International Conference on Dam Safety Management was held in 23-24 Oct in Nanjing. Nearly 200 officials, experts and participants from about 20 countries and international organizations attended the conference. Over 30 experts gave presentations at the Conference



and over 100 papers were issued.

Director of HRC Dr Chen Shengshui presented his paper titled "Impact & Analysis of 5.12 Wenchuan Earthquake to Zipingpu Concrete-face Rock-filled Dams" and answered questions from the

audience.

Pan Daqing, Shen Xuequn and Zhang Hua from Foreign Affairs & Training Division of HRC participated in the organization work of the Conference. ■

*HRC*

## **HIDROENERGIA 2008 held in Slovenia, 12-13 June**

12-13 June 2008, Bled, Slovenia Hydroenergia 2008, co-organized by ESHA and SSHA in Bled/Slovenia from 11-13 June 2008, gathered more than 200 participants to discuss the new opportunities for small hydropower in Europe and worldwide. HIDROENERGIA 2008 is a prominent forum for discussion about thrilling opportunities in these booming markets.

Hydropower today accounts for 17 % of EU's electricity generation. Small hydropower contributes about 3 % to the total electricity generation in Europe. With the binding target of 20 % renewable energy in final energy consumption by 2020, the role of hydropower contributing to the EU's energy mix is bound to

increase significantly offering a wave of exciting new investment opportunities and challenges in this well-established sector. The remaining European energy potential for small hydropower is still considerable, in particular the Balkan region offers a booming market with excellent opportunities for investment as it contains huge potential and offers very good conditions with predictable economic and political development.

Constant technological development together with its maturity gives small hydropower three times bigger energy transformation efficiency than any other technology. Over 200 leading small hydropower experts, industry and research are meeting today at

the Hydroenergia 2008 International Conference. HIDROENERGIA Conferences are organized by ESHA jointly with one of its Member Associations every two years bringing together the leading professionals of the sector to convey knowledge and best practice experiences to investors and professionals from different areas. HE08 will be held for the first time in one of the newest Member States of the EU, Slovenia - chairing the European Council Presidency. This year program is focused on two critical issues: the role of small hydropower within the EU Energy and Climate Package and Sustainability. ■

*Source: ESHA*

## **HRC Delegate Participated in International Conference about "Hydel Power Development in Pakistan"**

At the invitation of the Conference Organizing Committee, Mr. Lin Ning with HRC's Division of Foreign Affairs and Training visited Taxila in Pakistan for presenting a paper titled "SHP Training, R+D and Private Investment" on the International Conference about "Hydel Power Development in Pakistan" which was held during March 17-19, 2008 in University of Engineering & Technology (UET) Taxila. After that, a detailed discussion was held for enhancing the bilateral cooperation on SHP technical training, equipment R+D, export etc. during his stay.

This international conference was organized by Electrical Engineering Department in collaboration with Alternatice Energy

Development Board (AEDB), Higher Education Commission (HEC) and German Agency for Technical Co-operation (GTZ), which aims to tap the huge hydropower potential, reduce the dependency on oil import and stimulate the socio-economic growth etc in Pakistan.

More than 300 delegates have participated in this conference, including planners and decision makers from Pakistan governmental departments such as Planning Commission, Higher Education Commission etc., and various energy departments or organizations as Water and Power Development Authority (WAPDA), National Electric Power Regulatory Authority (NEPRA), Private Power and

Infrastructure Board (PPIB) etc. Meanwhile, over 100 private investors for SHP have also been attracted to this conference and the exhibition held during the same period.

10 foreign speakers from Australia, Germany and China etc. have been specially invited for exchanging ideas and information on hydropower development ways & means, improving economics through prudent planning and the use of advanced technology for design, construction and refurbishment, as well as new approaches to financing, environmental and social issues and so on. ■

*HRC*

## United Nations Day, 24 October 2008

### Message of the Secretary-General

On this 63rd anniversary of our Organization, I join you in celebrating UN Day.

This is a crucial year in the life of our United Nations. We have just passed the midpoint in the struggle to reach the Millennium Development Goals -- our common vision for building a better world in the 21st century. We can see more clearly than ever that the threats of the 21st century spare no one. Climate change, the spread of disease and deadly weapons, and the scourge of terrorism all cross borders. If we want to advance the global common good, we must secure global public goods.

Many countries are still not on track to reach the Millennium Development Goals by the target date

of 2015. I am also deeply concerned about the impact of the global financial crisis. Never has leadership and partnership been more important.

This makes our success at the high-level MDG event in September all the more remarkable. We brought together a broad coalition for change. Governments, CEOs and civil society. We generated unprecedented commitment in pledges and partnerships to help the world's poor.

The final tally is not in yet, but the total amount pledged at the MDG event may exceed 16 billion dollars.

Partnership is the way of the future. Just look at the advances on malaria. Our global malaria effort has brought us within range of containing a disease that kills a child every 30 seconds. It is doing so

through focused country planning. Greater funding. Coordinated global management. Top-notch science and technology.

We need models like these to tackle other challenges, including climate change, as we approach the conferences on Poznan and Copenhagen. We need them to achieve all the other Millennium Development Goals.

Let us keep building on this as a way forward. There is no time to lose. The United Nations must deliver results for a safer, healthier, more prosperous world. On this UN Day, I call on all partners and leaders to do their part and keep the promise."

Ban Ki-moon, UN Secretary-General ■

*Source: UNIDO*

## African Bank Funds Niger's 125-MW Kandadji Dam, Ecosystems

NIAMEY, Niger 11/6/08 (HCI) — The African Development Fund (ADF) has approved a combined loan and grant of 40 million Units of Account (UA) (US\$62 million) for the Kandadji Ecosystems Regeneration and Niger Valley Development Program.

Part of the funding is to help finance construction of the 125-MW Kandadji Dam on the Niger River. Niger President Mamadou Tandja laid the first brick of the project August 3, about 180 kilometers northwest of Niamey. The dam is due for completion in 2013.

ADF, the concessionary window of the African Development Bank approved a loan and a grant of

UA20 million (US\$31 million) each October 29. The funding is to help provide solutions to the recurrent drought in Niger and the degradation of natural resources by regenerating the riverine ecosystems and boosting agricultural production with poverty reduction as the ultimate goal.

The program includes construction of a dam of 1.6 billion cubic meters for regulating the flow of the Niger River in order to provide the water needed for irrigation, drinking water, sanitation, ecology, grazing, and fisheries. About 629 GW•h of electricity will be provided annually as a by-product that will make the structure as profitable as possible, the bank said.

The project's first phase is estimated to cost UA186.2 million (US\$290 million), about 56 percent of the overall cost of UA333.82 million (US\$519.8 million). Part of the ADF money will go to implementation of environmental and social plans and program management.

Earlier this year, the Arab Bank for Economic Development in Africa agreed to lend US\$10 million to Niger to help finance the first phase of the dam. Kandadji Dam also is being funded by the Islamic Development Bank, which has pledged US\$236 million. Financing for the hydropower station is due to come from a public-private partnership, the government has said. ■ *Source: HCI*

## National Rural Hydropower Symposium Held in Nanning

On Dec. 22nd, 2008, the national rural hydropower symposium was held in Nanning, Guangxi province. Leaders of local hydropower bureau (division) from Water Resources Department of related provinces (autonomous regions and municipalities) attended the meeting. Chiefs of International Network on Small Hydropower and National Research Institute for Rural Electrification were invited to the meeting. At the symposium, Director of Bureau of Rural Hydropower and Electrification Development, Mr Tian Zhongxing gave a speech entitled "Deepen the study and practice of Scientific

Outlook on Development, create a new situation for rural hydropower". The speech, a thorough summary of the rural hydropower work in 2008, not only offers an analysis to the opportunities and challenges we are facing, but also puts forward "three focuses" and "five measures" of our work. Participants from Guangxi, Jilin, Hubei, Hunan and Guizhou respectively delivered speeches at the symposium. Mr. Zhong Xiangting, Director of Water Resources Department of Guangxi Zhuang Autonomous



Region attended and addressed at the symposium. At the end of the symposium, Deputy Director of Bureau of Rural Hydropower and Electrification Development, Mr Xing Yuanyue gave a sum-up speech. ■

## SHP Special Committee of China Society of Hydroelectric Engineering Set up in Hangzhou



At the special time of 30 years' anniversary of China's reform and opening-up, the whole hydropower sector is carrying out a nationwide activity of "study and practice the Scientific Outlook on Development" to promote the development and reform of China's hydropower industry. On Dec. 15th, 2008, SHP Special Committee

of China Society of Hydroelectric Engineering was set up in Hangzhou.

Mr. Hu Siyi, Vice Minister of MWR, and Mr. Li Jugen, Executive Vice Chairperson and General Secretary of CSHE, attended the inaugural ceremony and delivered speeches. At the ceremony, Mr. Zhou Shangjie, Deputy Secretary of CSHE read to the audience the approval document of establishing SHP Special Committee and announced the members of the committee as well as the organization to which the committee is affiliated. In addition,

some other leaders also addressed at the ceremony, including Mr. Tian Zhongxing, Director of Bureau of Rural Hydropower and Electrification Development, Mr. Xu Wenbin, Chief Engineer of the Department of Water Resources of Zhejiang province, Mr. Liu Xiaotian, Chief Engineer of Bureau of Rural Hydropower and Electrification Development and Mr. Zhang Jianyun, Director of Nanjiang Hydraulic Research Institute. Mr. Tian Zhongxing gave a keynote speech at the ceremony entitled "Small hydropower, big strategy". The ceremony is presided over by Mr. Chen Shengshui, Deputy Director of NHRI and Director of HRC. (Continued on Page 8)

## China has Combed Out 3415 Illegal Rural Hydropower Stations of Various Types for the Past 5 Years

On April 18th, Mr. Hu Siyi, Vice Minister of Ministry of Water Resources, revealed that as the Chinese Ministry of Water Resources has conducted the thorough check and a concentrated treatment throughout the country since 2003, some 3415 illegal rural hydropower stations have been combed out in the whole country.

At the National Symposium on Investigation and Rectification of Illegal Hydropower Stations, Mr. Hu introduced that these illegal hydropower stations were mainly concentrated in southern provinces. Classified by the type of violations, the hydropower stations which were approved against rules and regulations occupy 28.8%, and 48.2% without approval of preliminary design, 47.6% without supervision and 71.9% without acceptance before water storage or after the project construction. In regard with the investment channels, fund from private channel in these hydropower stations accounts for 81.8%.

As introduced by Mr. Tian Zhongxing, the Director of Department of Rural Hydropower and Electrification Development, MWR, China has exploitable rural hydropower resources of 128 million kilowatts, ranking the first in the world. By the end of 2006, China has built more than 40,000 rural hydropower stations with the annual power generation of over 150 billion kWh. Therefore, it represents about one third of the total hydropower output of the country, and has been the important component of the state power supply. Half of the area, one-third of the counties and a quarter of the population mainly depend on the rural hydropower to supply the electricity across the country.

"Due to unclear management responsibilities, ineffective supervision, delayed plan, lack of corresponding laws and regulations, there are some problems in the rapid development of the rural hydropower." Mr. Hu Siyi expressed that the main

reasons for illegal hydropower stations include: First, unclear and insufficient safety supervision and management; Second, inadequate laws and regulations related to rural hydropower development, unclear construction procedures and discordant technical standards; Third, the weak awareness of scientific development in some places, too anxious to attract investment and intended evasion of the basic construction procedures.

Mr., Hu Siyi emphasized: at present nearly one-third of the illegal hydropower stations have not been rectified. Therefore, all the regions of the country should have a timetable for a full completion of the rectification task, putting forward rectification deadline and implementing one by one. The rectification must be completed for hydropower stations not in conformity with planning and with serious security risks. Strive to fully complete this task by the year 2010. ■

*(Continued from Page 7)* Leaders from Ministry of Water Resources and IN-SHP are also among the participants attending the ceremony. And some 75 representatives from 43 organizations including governments, institutes and

universities in 23 provinces (autonomous regions and municipalities) nationwide are present at the ceremony. Congratulations are received from China Society of Hydroelectric Engineering and Zhejiang Provincial Society of Water Resources.

The inaugural ceremony is organized by National Research Institute for Rural Electrification (HRC), to which the committee is affiliated. ■

## Attending Luncheon Given by the President of Pakistan



On 15 October, Ms. Cheng Xialei, Deputy Director of HRC, and Mr. Pan Daqing, Head of Foreign Affairs and Training Division, attended the luncheon given by Mr. Asif Ali Zardari, the

President of Pakistan. The luncheon was held in the Fangfei Garden in Beijing Diaoyutai State Guesthouse. Over 300 representatives from some 100 institutions attended the luncheon.

On 18 October, Dr. Kamal, Energy adviser to the President of Pakistan, and Mr. Tallae, Technical Counsellor of Pakistani Embassy to China received Ms. Cheng Xialei and Mr. Pan Daqing in the Pakistani Embassy to China. During the meeting, Dr. Kamal introduced development and management of

water resources, agriculture, electric power and so on in Pakistan, while Ms. Cheng Xialei introduced the situation of small hydropower in China as well as work currently undertaken by the Center. The two parties conducted detailed discussion on the cooperation of small hydropower, including training, consultation, design, technical reconstruction, equipment supply and so on. After the meeting, they had lunch together and took a group photo. ■

## Retired Staff of HRC Congregated in Celebration of Gold and Diamond Wedding Anniversary

On Dec. 9th, 2008, over 40 retired staff of HRC had a get-together at Xixi National Wetland Park to celebrate the 50th and 60th wedding anniversary for 7 couples. The elders were all dressed in colorful clothes and flowers with smiles rippling on their faces. The celebration was simple yet ceremonial. The 7 couples received warm congratulations from others.

Leaders including Ms. Cheng Xialei, Executive Deputy Director of HRC, Mr. Xie Yimin, Office Director of HRC were in full



support of the activity and took part in the celebration. Not only brought gifts to the elders, they also delivered passionate speeches in praise of the contribution the veteran staffs have made for HRC. In addition, they wished the elders a happy family life and good health and transferred greetings and congratulations from Mr. Chen Shengshui, Director of HRC.

Mr. Zhu Xiaozhang and Mr. Zhou Renshi gave an impromptu speech respectively. Besides a brief account of the development of HRC, they expressed their gratitude

for the organization of this activity and more for the reform and opening-up policy carried out by the Party, which guaranteed a happy life for them in later years.

Afterwards, photos were taken for the elders in memory of this happy moment. Besides, 4 retired staff of HRC were also given congratulations for reaching 70 years age.

At the end of the celebration, every one was immersed in the sea of happiness, enjoying every bite of the anniversary cake. ■





## Second Workshop on SHP CDM Project Capacity Building Held at HRC

On April 23, the second workshop on CDM project capacity building officially kicked off at HRC in Hangzhou sponsored by Rural Hydropower & Electrification Bureau of MWR, jointly implemented by National Research Institute for Rural Electrification and Hydropower Committee of CHES (Chinese Hydraulic Engineering Society). More than 30 participants from 11 provinces attended the 4-day-long Workshop. HRC has paid great efforts on the preparation with several lectures and panel discussions included in an attempt for a successful conclusion of the workshop. ■



## Boundless Love——Donation by International SHP Training Workshop Participants

On May 26th, a special donation ceremony took place in the multi-function hall of HRC.

58 participants from 34 countries were attending the Training Workshop of Small Hydropower Technology. Despite of different colors and faces, the participants and the staff of HRC have brotherly care towards each other while staying in the warm family of HRC. Words such as "shocked", "sympathy", "condolence" and "support" were frequently uttered by our participants when they spoke of the earthquake disaster in the Sich-

uan Province of China. Speeches, though short and simple, were filled so much with care and support from the participants to the earthquake affected regions in Sichuan.

Even before this donation ceremony, many participants from various countries have expressed their compassion and sympathy for the loss suffered by the Chinese people in this disaster to the organizers of this training program. Meanwhile, they have also extended their concerns and supports for China's relief efforts.

At this donation ceremony,

the international participants and some of HRC staff donated 14,085 Yuan RMB and \$ 100 in total. Money donated is limited, but the love disseminated is priceless. Let's all join the love relay team and help those disaster affected people.

Staff from the Hangzhou Charity Federation, officials from the Jiulian Community where our center is located, and leaders of HRC were present at this ceremony. Journalists from the Zhejiang TV Station Channel 6 interviewed some of the participants and HRC leader. ■

## 2008 SHP Training Workshop Concluded

2008 training workshop on small hydropower technology from May 15th to June 23rd was held in HRC (National Research Institute for Rural Electrification), as entrusted by the Chinese government.

In total, 58 participants from 34 countries covering 5 continents attended this training workshop. It is for the first time that HRC has ever conducted the workshop with so many participants from so many

countries since its establishment in 1981.

In his speech at the closing ceremony on 23rd June by Mr. Mu, the Division Chief of the Executive Bureau of International



Economic Cooperation, Ministry of Commerce, he pointed out: "In recent years, in order to assist other developing countries in training their personnel and improving the capability of self-development, the Chinese government has constantly increased the degree of intensity in human resource development and cooperation. Up to now, there have been nearly 100,000 officials, managerial and technical personnel coming to China to participate in various training workshops"; "It is highly expected that you will continue to pay close attention to the development in relationship between your own country and China. Meanwhile, I hope you would become friendly messengers and make more contribution to the cooperation among nations. "

This training workshop has gained a complete success, just as Mr. Plat, one of the monitors, who comes from Uruguay mentioned in his speech on behalf of all participants: "Congratulations for the excellent organization. Course arrangement and study tours are just proper. The case studies are very beneficial. Thank you very much."

Olasupo Olayode Adesola coming from Nigeria said: HRC staffs have done very well at the organization and management of the training workshop. Their efforts are highly commendable. The staff members are very hospitable. They

have actually promoted a good image of the People's Republic of China. I wish that the collaboration between China (HRC) and Nigeria (Represented by National Agency for Science and Engineering Infrastructure, Nigeria) will further be strengthened.

Gomez who comes from Dominica commented: firstly I want to express my sincere gratitude and appreciation to the government and people of this great country, China. Special thanks to Mr. Pan and Mrs. Shen for their patience, kindness and diplomacy to all of our participants. I think this is a world of information and knowledge with reference to SHP and the lectures of teachers together with their great experience and professional skill have made the training very successful and effective. I recommend that the training be made more public to the rest of the world. I would like to express my thanks to China on behalf of my government and company.

Mrs. Merita Borota who comes from Serbia expressed that with so many participants in this training workshop, the preparation was quite good.

Rini Nurhasanah coming from Indonesia indicated that thanks to Mr.

Pan, Ms. Shen, Ms. Cheng, Mr. Li and all other training teachers and organizing staffs. They are very kind and so patient in taking care of all participants, not only during the daily course activities but also during many sightseeing and study tours and even when the participants need some helps. They, with their warm smiles, are always ready to help! Thanks to the Director of HRC and all staffs, for having held the 2008 Training Course on SHP successfully and professionally. Thanks to the Ministry of Commerce of the People's Republic of China, for giving me the financial support to participate in the 2008 Training Course on the SHP held by the HRC in Hangzhou.



Nevertheless, the training organizer of HRC will spare no effort to observe, reflect, analyze and take necessary measures based on the comments and recommendations by the participants, as there is still much room for improvement in implementing training programs in the future. ■



## Turkey Guests visited HRC

On February 1st , two guests from Turkey paid a visit to HRC. At the meeting, both sides discussed on the construction and equipment supply for a Francis type power station in Turkey. In that afternoon, visitors were arranged to visit the manufactory in the snow. The international reputation and outstanding achievements on hydropower business made by our center won the praise from the guests who also expressed the will to strengthen the mutual cooperation on the hydropower sector. ■

## Philippines Guests Visited HRC

On April 21, 2008, three engineers from Clean and Green Energy Solutions in the Philippines paid a visit to our center. During their stay in HRC, visits to the recommended SHP equipment factories and HRC designed small hydropower stations were followed with a detailed discussion for their potential SHP projects in the Philippines. They were quite satisfied with the production capability of Chinese equipment manufacturers and HRC's technical service, which would enhance our cooperative relationship in the near future. ■

## Turkish Customer Visited HRC

During April 14-18, FILYOS, the owner of one Turkish project we are supplying electro-mechanical equipment for, paid a visit to us. Both sides have discussed the technical details and agreed to facilitate the equipment production. ■



## Remote Metering and Monitoring System Accepted

The project of transformation for agricultural science and technology achievements undertaken by HRC as entrusted by Chinese Ministry of Science and Technology ----remote meter reading and monitoring system for rural power grid, passed the acceptance conducted by Department of International Cooperation, Science and Technology of Water Resources Ministry on April 22nd. The system is able to implement remote automatic reading and monitoring for those small hydropower plants connected to the grid, making it possible for grid dispatching enterprises to know well about the operating condition of small hydropower plants. Due to its stable operation, the system greatly raises the managerial level of automatic operation and improves the quality of power supply and safe operation condition of rural power grid. During the execution period of the project, 5 sets of remote meter reading and monitoring system were popularized and applied, covering 328 small hydropower plants. The expert panel unanimously agreed that this project brings both economic and social benefits and has a bright prospect for application. ■

## World Bank Expert Visited HRC

On 30 Oct. accompanied by Ms. Miao Hong, Deputy Director of China Renewable Energy Scale-up Program Management Office, Mr. Enno Heijndermans, consultant of the World Bank, visited HRC.

Two parties held talks on topics regarding training cooperation between HRC and some Vietnam organizations, compilation of list of SHP equipment manufacturers of China and some other issues. Mr. Heijndermans spoke in high praise of the contributions that HRC has made to the promotion of SHP on a global basis by means of training, R&D, consultation and

export of hydropower equipment since its establishment in 1981.

Ms. Cheng Xialei, Executive Deputy Director of HRC, Mr. Xu Jincui, Deputy Director of National Research Institute for Rural Electrification and related division chiefs, including Pan Daqing, Li Zhiwu, Lin Xuxin, Lu Jianping and Lin Ning attended in the reception and discussion.



In addition, Mr. Heijndermans paid a visit to the training facilities and laboratory of HRC. ■

## HRC Expert Was Invited to 2008 Forum on China's Energy and Resources Issue

From Sept. 23rd to Sept. 25th, the 3rd Exposition of China's International Environment Protection and Comprehensive Utilization of Resources was hosted at Pudong New International Exposition Center of Shanghai.

During the period, 2008 forum on China's Energy-saving, emission-reduction and comprehensive utilization of resources was held. Li Zhiwu, division chief of Science, Technology and International Cooperation of HRC, was specially

invited to give a report titled China's SHP technology and CDM project development and conducted extensive exchange with other participants. ■

## 2008 SHP Training Workshop for Africa Concluded with Success

On Sept. 22nd, in the golden season of autumn, the 40-day-long Training Workshop on SHP for African Countries wrapped up with success. The solemn closing ceremony was held as scheduled in the multi-functional hall of HRC.

Leaders, professors and working staff of HRC and altogether 32 technical officials in the field of hydropower and energy from 17 African countries congregated for the ceremony. The special guest, a Chief from Zhejiang Foreign Trade

& Economic Cooperation Bureau, also took time off and came for the ceremony.

With melodious music, rosy flowers and genial smiles, the closing ceremony commenced, which was presided over by Mr.



Pan Daqing, the Chief of Division of Foreign Affairs and Training, HRC. It started with the address of Mr. Fan Aihua, Division Chief from Zhejiang Foreign Trade & Economic Cooperation Bureau. Mr. Fan extended his congratulations on the smooth progress and successful conclusion of the training workshop, his heartfelt thanks to all the professors and working staff for their painstaking efforts and his respect to all the participants for the great efforts they made during the training. It was noted in his address that Chinese government had attached great importance to the exchange of politics and culture and cooperation of trade and economy with developing countries, and that Chinese government had strengthened its efforts on the cooperation with African countries especially after the Sino-Africa Cooperation Forum. It was hoped that all the participants could make new contributions to the development of SHP for their own countries and lay a more solid foundation for the cooperation in the field of SHP between China and African countries when they returned to their countries.

Ms. Cheng Xialei, Executive Deputy Director of HRC, on behalf of Mr. Chen Shengshui, Director of HRC, and all the working staff, expressed the congratulations

to all the participants on the successful conclusion of their study in China. It was believed that they would provide better service in the development of SHP for their own countries in the near future and become not only the important bridge connecting countries in the aspect of SHP technology and economic and trade cooperation, but also the disseminator of cultures and friendship. Besides, she thanked the participants for their cooperation during the training course, which, to a large extent, guaranteed the smooth progress of the whole program. To finalize her speech, she kindly said to all, "you would be HRC Alumni forever from this day on and you would be warmly welcome back to HRC anytime."

Then, Mr. Zhu Xiaozhang, Honorary Director of HRC, gave a speech in earnest and sincerity regarding "communication & language barrier" and "foreign economic & trade cooperation", which revealed his original and profound views. The perfect combination of humorous words and sagacious analysis inspired the participants a lot.

Speeches of leaders won rounds of unanimous applause from the audience.

On behalf of all participants, Mr. Oumar, monitor of the class, extended his gratefulness to the Chinese government and Chinese people, the sponsor the Chinese Ministry of Commerce and the

organizer HRC. All the words in his speech represented the heartfelt gratitude of all participants' heart. "During the past 40 days, we have learned a lot about China's advanced technology in SHP and its rich experience in SHP helps raise our theoretical and technical level." ; "We study here and tour around here, and the happy moment of cultural exchange and Sino-African friendship passes without being noticed." ; "We also thank all the leaders, professors and working staff of HRC and Ruidi Hotel for their hospitality and gracious service. Please believe that we will spare no effort to maintain and develop the friendship between Chinese and African people when we return to our countries." ; "The good opportunities of knowledge exchange and technical training provided by Chinese government forcefully guarantee the development and advancement of social economy of African countries." ; "Vive l'amitié sino-africaine (Long Live Sino-African Friendship)! "...

After the closing ceremony, with certificates issued by Chinese Ministry Of Commerce and presents from HRC in hands, and bright smiles in faces, the participants took photos with the professors and leaders. All shared the same dream, which was: hand in hand, do more for the global development of SHP.

Although the training workshop came to its end, the tree of friendship will be evergreen, just as the toasts delivered by Dr. Xu Jincui, Deputy Director of HRC in the farewell party: "HRC is always and will be forever all participants' home in China, the cooperation in the field of hydropower in the future is more than welcome". ■

## 3rd and 4th Training Workshop 2008 on Safety Supervisor of Rural Hydropower System Concluded with Success

The 3rd and 4th training workshop 2008 on safety supervisor of rural hydropower system, as entrusted by Rural Hydropower & Electrification Development Bureau of MWR, wrapped up with full success in late October by HRC nearby the picturesque West Lake. In total, 95 participants from 16 provinces (autonomous regions and municipalities) attended the workshop.

In accordance with the content of the State Council on clearing and standardizing activities regarding professional qualification evaluation, HRC stepped up its efforts in the formulation of training objective and syllabus, the arrangement of training courses, examination and registration. This

training not only helped raise the overall safety awareness and updated safety knowledge for participants, but also equipped all participants with new knowledge in many aspects including formulating emergency preplans. After the training, assessment concerning scheme, implementation, logistics and effect of the training, were conducted in the form of questionnaire by participants, with 84.21% of the forms retrieved and a comprehensive assessment mark of 91.7 scored. In recognition of all the efforts paid by HRC for this training, participants noted in



succession at the closing banquet that they had learned a lot through this training about new safety knowledge and some important safety regulations as well as approaches to analyze and deal with accidents. It was also noted that this kind of training should be promoted to popularize hydropower safety knowledge and to further bring hydropower into full play in the electricity supply nationwide. ■

## SHP Mission of HRC Specialists in Kenya Concluded



Based on relevant agreements, two SHP specialists from HRC, Mr. Lin Xuxin and Mr. Pan Daqing

completed a SHP consultation mission in Kenya from 27 July to 4 Aug 2008. The objective of the mission is the selection of dam site, power houses and determination of water head and installed capacity, assisting Kenyan side with the general layout of the potential sites and determining the type and size of the station complex. During the mission, HRC specialists called on the local government officials,

collected the related hydrological data of the potential SHP sites, reconnoitered three SHP potential sites, made pivot layout and determined the installed capacity of the potential SHP stations.

Under the concerted effects of both sides, the SHP technical service provided by HRC specialists went on rather smoothly and pleasantly. The owners of the projects were very satisfied. ■

## Regulation on Installation and Operation of Electric Leakage Protector in Rural Areas Passed First-round Acceptance



On Dec. 16th, 2008, presided over by the Bureau of Rural Hydropower & Electrification Development, the meeting of examining the standard of Regulation on Installation and Operation of Electric Leakage Protector in Rural Areas was held in HRC, Hangzhou. 13 experts from 12 organizations including Chinese Hydraulic Engineering Society,

Zhejiang University, Zhejiang Provincial Electric Power Company, Sichuan Local Power Bureau, etc. and the editing staff attended the meeting. Academician Wang Yousheng and Professor Han Yan were unanimously agreed to be respectively the chief and deputy chief of the examining team.

During the meeting, the editing staff gave a report about the editing work and the expert panel then carried out detailed discussions about the regulation.

It is universally acknowledged that the regulation is an important standard in the hydropower industry and is of great significance.

The expert panel agreed that the content of the regulation in question is not only rationally and concisely organized, but also generally corresponding to the requirements. Importance is given to the investigation and analysis of the data in the regulation, which help lay a good foundation for the editing work. Based on the current situation, the editing staffs widely adopt new technology in the editing process. The regulation basically meets the requirements of technical standards to be authoritative, scientific, innovative and feasible.

The expert panel unanimously approved the first-round acceptance of the regulation and suggested that the final version be completed soon. ■

## HRC Delegate Attended Forum on New and Renewable Energy

Sponsored by Ministry of Science and Technology of the People's Republic of China, China-Japan-Korea S&T Cooperation Forum on New and Renewable Energy was held in Beijing on July 17th, 2008. It was first proposed by Premier Wen Jiabao in the 8th China-Japan-Korea Leaders' Meeting and won support from the Japanese and Korean leaders. Mr. Zhao Jianda, senior engineer, from the Department of International Cooperation, Science and Technology of HRC, attended the forum.

Mr. Xu Dingming, Deputy

Director of the Office of the National Energy Leading Group of the People's Republic of China, pointed out that the future development of energy would feature cleanness, high efficiency, diversification and sustainability. Mr. Xu Haishen, from the Department of International Cooperation, Science and Technology, MST, noted that it was a shared choice to stress on international cooperation on science and technology and develop vigorously new and renewable energy in an effort to

increase energy supply and reduce consumption and greenhouse gas emission.

Experts present at the forum conducted extensive discussion centering on three topics: policy and management of new and renewable energy; technological exchange and cooperation; and industrialized cooperation. It was pointed out at the meeting that fruitful achievements had been scored in the field of new and renewable energy in China, Japan and Korea, but there was still large room for cooperation. ■

## HRC's Annual Report for 2008 & Working Plan for 2009

- I. Implementation of Two International Training Workshops on SHP
- II. International SHP Cooperative Projects
- III. Hydropower Equipment Export
- IV. Translation & Publications
- V. Foreign Guests Reception & Outbound Missions
- VI. Working Plan for 2009

### I. Implementation of Two International Training Workshops on SHP

globally attended the training. It is also the first time for HRC to have Dominican and Yemeni participants.



#### 1. 2008 Training Workshop on Small Hydropower Technology

2008 Training Workshop on Small Hydropower Technology was implemented from May 15th to June 23rd 2008 in Hangzhou, as entrusted by Chinese Ministry of Commerce.

(1) In terms of its number of participants and countries, it is the ever-largest training workshop HRC has organized since its establishment. Altogether 58 technicians and officials in the field of SHP from 34 countries

(2) A comprehensive teaching plan was scientifically formulated, inclusive of in-class teaching, field visit, presentations on special topics and exchange among participants. The teaching materials covered a great deal of knowledge, technology and experience in the field of small hydropower, such as hydrology, site selection, geology, hydro-energy, conduit system, power house design, SHP economic appraisal, hydro auxiliary equipment and SHP operation and management. In addition, the past experience

in SHP development and some concrete technologies are also introduced. Presentations on special topics comprehend some hot-spot issues typical of China's SHP development, such as the Three Gorges, South-to-North Water Diversion Project, etc. Study tours covered some small hydropower stations and hydroelectric equipment manufacturers and some hydropower experiment bases. All the teaching materials offered in class are derived from long-term practice and research and meet the demands of various countries with different level of SHP development. Besides, the training materials are practice-oriented with moderate difficulty level and favorable in promoting bilateral cooperation in economy and trade.

(3) Upon the request of the participants, a donation called "Together with the Quake-hit Regions" was organized by HRC when the devastating earthquake in Wenchuan, Sichuan province jolted the whole China at the beginning of the training period. The amount collected in the donation by foreign participants and HRC's staff totaled RMB 14085 and US\$ 100. A participant from our neighboring country Pakistan pointed out at the





donation ceremony: “We, Pakistani are greatly saddened at the loss of the precious lives of our Chinese brothers due to the devastating earthquake. The loss of people of China is the loss of people of Pakistan. On this difficult time, we are with China and will stand by China. What we can do, we will do it for you. This amount of assistance is not a big number, but it embodies our feeling of sharing pains with the Chinese people.”

“I’d like to help victims of the disaster to rebuild their communities and their lives. I’m firmly convinced that under the strong leadership of the Chinese government and the great help from all over the world, China will certainly win the battle against the earthquake.” Silvia Petkova from Bulgaria said.

“In 1999, my country Turkey

also suffered from a serious earthquake. So, I know clearly how you feel now. We will spare no efforts in supporting you.”

Staff from Hangzhou Charity Federation, officials from Jiulian community where the training program was carried out, and some leaders of HRC were present at the ceremony. Journalists from Zhejiang TV Station Channel 6 interviewed some of the participants and HRC’s leaders.

## 2. Training Workshop on Small Hydropower Technology for

African countries

2008 Training Workshop on Small Hydropower Technology for African countries was implemented

from Aug. 14th to Sept. 22nd 2008 in Hangzhou, as entrusted by Chinese Ministry of Commerce.

(1) In terms of its number of participants and countries, it is the ever-largest training workshop for African countries HRC has organized since its establishment. Altogether 32 technicians and officials in the field of SHP from 17 African countries attended the training. It is also the first time for HRC to have Comorian and Djiboutian participants.

(2) Specialists in both French language and hydroelectric knowledge were arranged as interpreters in order to guarantee the quality of the training program.

(3) To make sure that all the participants were in good condition during their stay in China, doctors were sent in at the beginning of the training to do the health checkup for every participant. Besides, free consultancy and checkup service were provided on every Friday, which won the praise from the participants.

(4) The activity of “Volunteer as Traffic Order Keeper” highlights





the whole training. On Sept. 9th, several African participants volunteered to help keep the traffic order in the rush hours when they got the news that Hangzhou was then currently in its efforts to establish itself as a national model city. On the evening of that day, the scenario of African participants guiding the traffic at the crossroad outside HRC drew all the attention of passers-by, which added luster to the city in the dusk.

The whole activity lasted two hours and the participants expressed that it was a great honor for them to do something to make Hangzhou a more beautiful city.

In spite of its small scale, it still attracted many media in Hangzhou. Staffs of the media told us that they wanted to make the news an inspiration for Hangzhou citizens as well as an appeal for joining in the civilization build-up of Hangzhou. Well-known media

in Hangzhou, including Hangzhou Daily, Qianjiang Evening News and Today's Morning News, reported the event in detail. In Hangzhou Daily, an article entitled "African Youths as Traffic Guides with Interpreter" elaborated on the event, which invited commendatory feedback from the audience and played a significant role in pushing forward the construction of a model city. In addition, channel 6 of Zhejiang TV also televised the event. In a word, for both Hangzhou citizens and foreign friends, the activity will be a great push for the development of the city. It is also a great achievement of social benefits of our training program apart from technological accomplishments.

## II. International SHP Cooperative Projects

### 1. Mongolia TAISHIR Power Station

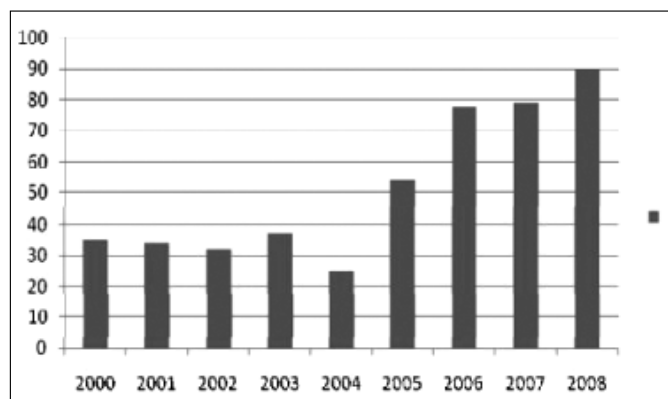
TAISHIR power station is a behind-dam-type station. The total

installed capacity of the 4 units reaches 11000kW(3×3450 kW +1×650kW). The design head for the first three units (3450 kW) is 43.80 m and the fourth one (650kW) 35.20 m. HRC and Beijing CAMCO Corporation are the joint successful bidders for this project, a project with the largest installed capacity in Mongolia. The contract of hydroelectric equipment supply was signed after the bidding in October, 2004. The design of the power station has already been completed. The 4# unit was connected to grid in November 2008, while the 1#, 2#, 3# units have not functioned yet due to climatic reasons.

### 2. Vietnam Taian Power Station

Taian power station in Vietnam a diversion type station composed of 2units with a total installed capacity of 82000kW(2×41000kW) and design head of 186 m. The design contract was signed between Vietnam Taian Hydropower Com., Ltd and HRC's Planning & Design Institute for Medium & Small Hydro Power in February, 2007. The project, a key state project approved by Vietnamese Ministry of Construction, is situated in Hejiang province in Vietnam. Currently, the sourcing of main hydroelectric equipment

Increase of HRC's international participants since 2000





Abundant hydropower resources in Kenya still to be exploited

of the project is completed and the construction planning is under way. It is scheduled to be connected to grid in 2009.

### 3. Vietnam Menghong Power Station

Menghong power station is a diversion type station composed of 2 units with a total installed capacity of 3200kW(2×1600kW) and design head of 110 m. The design contract was signed between Vietnam Shav Hydropower Com., Ltd and HRC's Planning & Design Institute for Medium & Small Hydro Power in January, 2008 with the general contractor being Zhejiang Hydropower Construction & Installation Com., Ltd. The project, a key state project approved by Vietnamese Ministry of Construction, is situated in Laojie province in Vietnam. Currently, the sourcing of main hydroelectric equipment of the project is completed and the construction planning is under way. It is scheduled to be connected to grid in 2010.

### 4. West Lake Power Station in Jinhua

Cooperation on the rehabilitation of West Lake power station in Jinhua, Zhejiang province, is carried out between California Energy Committee and HRC. The Sino-US cooperative project started

in November 2007 and is scheduled to be completed in 2009.

5. In July, 2008, two specialists with HRC were dispatched to Kenya to assist with the site selection at planned GIKIRA and CHINGGA power stations with satisfactory results achieved.

6. Ms. Cheng Xiaolei, executive deputy director of HRC and Mr. Pan Daqing, chief of Division of Foreign Affairs & Training, attended the luncheon on Oct. 15th in Beijing at the invitation of Pakistani president and held talks on topics regarding SHP training,



consultancy, design and equipment supply with Pakistani side. HRC will dispatch experts to offer consultancy service in 2009.

### III Hydropower Equipment Export

As from 2005, HRC began to export small-sized complete sets of hydroelectric equipment to Turkey, Vietnam and Philippines. The year 2007 witnessed a rapid expansion of its export business with the main markets being in Turkey, Peru and

even Africa. The present 13 and 2 export projects of complete sets of small hydropower equipment respectively to Turkey and Peru are contracted with an amount of about US\$ 30 million.

The supply contract of complete sets of 2 horizontal mixed-flow units (4500kW) for the KEKLICEK power station in Turkey was signed in July 2007. The supply includes 2 turbines, governors, excitation, valves and computer monitoring system, which is developed by HRC itself and named SDJK. Within the supply period of 6 months required by the purchaser, the equipment reached Turkey port in April and our engineers were sent for supervision on the on-site erection in May.

On Aug. 28th, 2008, the project passed acceptance organized by the local government. The output, noise and vibration of 2 hydroelectric generating sets are all satisfactory and it has already been put into commissioning.

Three contracts with a total contracted amount of about US\$ 8 million was signed in December 2007 for supplying complete sets of hydro equipment to Turkey, namely YALNIZCA(3×5000kW), PINAR(3×10000kW) and KARTALKAYA (3×2700kW). So far, the equipment of YALNIZCA II has been supplied and the rest equipment will be supplied by the end of 2008. Our personnel was sent to Turkey in late December. The equipment of KARTALKAYA reached the site in November and personnel will

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be dispatched there according to the progress of civil works. The equipment of PINAR II has been supplied and the rest equipment will be supplied before Spring Festival. Personnel for on-site service will also be sent there before Spring Festival.

Another contract of hydroelectric equipment supply was signed with Turkish Akcay HES Elektrik Uretim A.S Corporation, with three complete sets included (2×10MW and 1×5000kW). Draft tubes of stage I and distributors of stage II were respectively shipped in mid October and December and the rest equipment will be supplied before Spring Festival.

In June, 2008, 6 hydroelectric

equipment supply contracts were signed with Turkish AKFEN Investment Corporation, inclusive of OTLUCA I (3 × 12.296MW) , OTLUCA II (3 × 1936kW), BOGUNTU (3 × 1107kW), SARACBENDI (4 × 5918kW), YUVARLAKCAY (2 × 1655kW) and CAMLICA III (3 × 9052kW). After technical negotiation, it has been put into operation and the first equipment will be supplied in mid March 2009.

Gira II (1 × 1950kW) in Peru has been in adjustment period and is scheduled to be put into operation soon. The equipment of Sandia (1 × 1200kW) in Peru has reached the site and is to be installed.

In June, 2008, another contract

with Gikira (2 × 500kW) in Kenya was signed. The equipment is originally planned to be supplied in December, but it has been delayed due to the global financial crisis. In July, two experts with HRC were dispatched to Kenya for on-site investigation and consultation service with satisfactory results scored. Kenya, a place rich in small hydropower resources, will be a potential market. With the recovery of the global economy, Africa will be a great business area for HRC in the near future.

### IV Translation & Publications

#### 1. Three publications

N0.	Works	Author or translator	Note
1	CDM Development of SHP	Chen Xing	
2	Investment Policy Analysis of SHP in China	Cao Lijun	
3	Status Quo and Problems of Small Hydro Development in Asia-Pacific Region	Pan Daqing	Chinese to English

#### 2. In all 17 papers issued both at home and abroad

N0.	Title of Academic Papers	Magazine/Conference	Serial Number	Category	Author
1	Big Plans for Small Hydro	Water Power & Dam Construction, UK, May, 2008	ISSN 0306-400X	Foreign Academic Journal	Pan Daqing
2	Innovate Small Hydropower Technology Based on Indian Experience	China Rural Water and Hydropower, N0.1, Jan., 2008	ISSN1007-2284	Domestic Chinese Core Journal	Zhao Jianda
3	A Simulated Analysis of Complementary Power Generation of Hydro & Solar Energy	China Rural Water and Hydropower, N0.7 2008	ISSN1007-2284	Domestic Chinese Core Journal	Xu Jincai, Dong Dafu, Zhang Wei
4	Economic Analysis and Implementing Approaches of Rural Electrification in Foreign Countries	SHP, N0.2, Apr., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Zhu Xiaozhang
5	Typical Case Study of Environment Design for Small Hydropower in Europe	SHP, N0.2, Apr., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Zhao Jianda, Li Zhiwu, Wu Hao

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N0.	Title of Academic Papers	Magazine/Conference	Serial Number	Category	Author
6	Pondering the Speaking Right of China's International Trade of Small Hydro	SHP, N0.3, Jun., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Zhu Xiaozhang
7	TC Turbine Operator with Function of Step-closure	SHP, N0.3, Jun., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Xu Wei, Li Yongguo
8	Analysis of the First Regional Micro Hydropower Capacity Development and Investment in Rural Electricity Access in Sub-Saharan Africa	SHP, N0.5, Oct., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Shen Xuequn, Goufo Yemtsa
9	Discussion on Relevant Settlement Issues on the Premise of Main Materials Supplied by the Owner	SHP, N0.5, Oct., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Shi Rongqing
10	Scientific Outlook on Development Established to Promote the Healthy Development of Rural Hydropower	SHP, N0.6, Dec., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Cheng Xialei
11	Limitation of Selection TFW Pressure Regulation Valve in Low-head Hydropower Station	SHP, N0.6, Dec., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Yao Zhaoming
12	Defect and Analysis of Technical Water Supply System in Huangshanxi Primary Hydropower Station	SHP, N0.6, Dec., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Yao Zhaoming, Jiang Xinchun
13	Practice of Crack Prevention through Temperature Control in Taierzhuang Pumping Station	SHP, N0.6, Dec., 2008	ISSN1007-7642	Domestic Chinese Ordinary Journal	Shi Rongqing
14	Typical Case Study on Harmonious Coexistence between Small Hydropower Station and Environment-Rino Hydropower Station in Italy	China Water Power & Electrification, No.12, Dec., 2007	ISSN1673-2243	Domestic Chinese Ordinary Journal	Li Zhiwu, Zhao Jianda, Wu Hao
15	Status Quo & Analysis of CDM Development for Rural Hydropower	China Water Power & Electrification, No.4, 2008	ISSN1673-8241	Domestic Chinese Ordinary Journal	Chen Xing
16	Role of Programmed CDM in Rebuilding Hydropower Stations after Disaster	China Water Power & Electrification, No.9, 2008	ISSN1673-8241	Domestic Chinese Ordinary Journal	Chen Xing
17	Status Quo & Thought on Science and Technology Journal of Water Conservancy Project and Core Journal	The 6th Symposium on National Core Journal & its Internationalization and Networking held from Sept.5th to 10th, 2008		Published in Domestic Academic Conference	Zhao Jianda, Wu Hao

## Documents and Report

### V Foreign Guests Reception & Outbound Missions

Foreign Guests Hosted by HRC in 2008 (altogether 18 batches with 133 guests)

No.	Time	Country/ Organization	Guest	Objectives & results
1	1/8-12	HRC's local agent in Turkey	2	The two sides held talks on three axial-flow power station projects and visited several equipment manufacturers and stations designed by HRC. The Turkish side is satisfied with our production capacity and technological strength, laying a good foundation for further cooperation.
2	1/14	LLC Engineering Corporation, U.S.A	3	The two sides respectively detailed its background and business scope, exploring the potential of cooperation. Besides, the two sides exchanged notes on America's inclined-jet unit research project. It laid a good foundation for further cooperation between the two sides.
3	2/19	Turkey	2	The two sides held talks on the construction of a mixed-flow power station in Turkey. The Turkish side spoke highly of HRC's international reputation and its achievements as well as expressed their desire to further cooperate with Chinese side.
4	4/8-10	Vietnam & Germany	2	Visited HRC and some power stations, held talks with Hangzhou Yatai Hydro Equipment Completing Com., Ltd. on equipment supply and aspired for further cooperation.
5	4/21	Philippines corporation "Clean and Green Energy Solutions"	3	Visited several equipment manufacturers and power stations designed by HRC and held talks on some projects. The Philippine side is satisfied with our production capacity and technological strength, laying a good foundation for further cooperation.
6	4/14-18	FILYOS, Turkey	4	The two sides conducted in-depth exchange on the design and supply of hydro equipment of Hangzhou Yatai Hydro Equipment Completing Com., Ltd., laying a good foundation for further cooperation.
7	5/15-6/23	Participants from 34 countries globally	58	Attended the training workshop on small hydropower technology, which was sponsored by Chinese Ministry of Commerce and implemented by HRC.
8	7/8-12	Commercial Councilor, Pakistani Embassy in Beijing	1	Visited HRC and some power stations, exploring possibility of further cooperation between China and Pakistan.
9	8/14-9/22	Participants from 17 African countries	32	Attended the training workshop on small hydropower technology for African countries, which was sponsored by Chinese Ministry of Commerce and implemented by HRC
10	9/10	America International Resource Corporation	2	Discussed about cooperation in the field of CDM
11	10/7-11	FILYOS, Turkey	5	Progress check on equipment production
12	10/7-29	PIK enerji corporation, Turkey	1	Visited equipment manufacturers and discussed about equipment export
13	10/12-15	FILYOS, Turkey	4	Held talks on cooperation of new projects
14	10/26-29	Turkey	2	Held talks on cooperation of new projects

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No.	Time	Country/ Organization	Guest	Objectives & results
15	10/7-10	Philippines	2	Discussed about hydro equipment export
16	10/30	The World Bank	1	The two sides held talks on topics regarding training cooperation between HRC and some Vietnam organization, compilation of list of SHP equipment manufacturers of China and some other issues.
17	12/8-10	Turkey	7	Discussed about cooperation in the field of SHP
18	12/24-29	Turkey	2	HRC's Turkish customer on PINAR project came for production inspection.

### HRC's Outbound Missions in 2008 (altogether 12 groups with 22 people)

No.	Time	Delegate	Country	Tasks & achievements
1	3/17-19	1	Pakistan	Attended the international conference about "Hydel Power Development in Pakistan" and delivered a speech entitled "SHP Training, R & D and Private Investment".
2	4/2-11	1	Uganda	Attended the follow-up training seminar of "Management of Hydropower Development 2007".
3	4/1-4/29	1	Holland	Attended the training for backbone staff and managing personnel.
4	5/25-31	3	America	Attended the software training in Joss Data corporation in order to better carry out "948" project. The training got the participants to know about the principles of generation by the software. It also offered field investigation in California.
5	5/5-8/5	3	Turkey	Offered technological and installation guide for Keklicek power station in Turkey and discussed about the issue of equipment supply.
6	5/23-6/19	2	Turkey	Held talks on the construction of six power stations in Turkey and the supply of hydroequipment by Chinese side, with six new contracts signed.
7	6/29-7/7	1	Spain	Attended Zaragoza Expo 2008.
8	7/12-28	3	Turkey	Held talks on the cooperation of the construction of Bayramhacili and other projects as well as purchase of hydroequipment from China.
9	7/19-9/14	1	Turkey	Carried out the on-site installation supervision of KEKLICEK power station.
10	7/27-8/5	2	Kenya	Offered technological consultation on the cooperation of the construction of several planned hydropower sites.
11	10/3-11/5	1	Sweden	Attended an advanced international training program "Management of Hydro Power Development and Use 2008" sponsored by the Swedish International Development Cooperation Agency.
12	11/11-12/5	3	Turkey	Held talks on the construction of Garzan-I power station in Turkey and purchase of hydro equipment from China.

### VI Working Plan for 2009

1. To implement another two training workshops on SHP based on the past experience and try to make new contributions to China's foreign-aid training programs.

2. To implement the training workshop on SHP for ASEAN countries.

3. To translate the textbook Small hydropower (From English to French version).

4. To edit and publish HRC brief in three languages, namely Chinese, English and French.

5. To implement well the cooperative projects in SHP design, hydro equipment supply and consultation with Turkey, Vietnam, Peru, Mongolia, Pakistan and some other countries.

6. To finish the revision and publication work of Rural Hydropower and Electrification in

China (English version).

7. To make continuous efforts in the writing and translation of website articles, papers and annual report.

8. To translate into English Electro-mechanical equipment guideline for small hydropower installation.

9. To deal with day-to-day work, including reception, foreign affairs, information exchange and so on. ■

## Address at the Inaugural Ceremony of SHP Special Committee of China Society of Hydroelectric Engineering

Mr. Hu Siyi, Vice minister of Ministry of Water Resources, delivered on Dec. 15th, 2008

Dear Committee Members, distinguished guests:

Good morning!

It is especially of great importance to hold the inauguration of the SHP Special Committee of China Society of Hydroelectric Engineering today, at the important 30th anniversary of China's reform and opening-up and against the backdrop of the activity of "study and practice the Scientific Outlook on Development" carried out in the nationwide water sector to promote the development and reform of water resources undertaking. I hereby would like to avail myself of this opportunity, on behalf of the Chinese Ministry of Water Resources, to express my warm congratulations on the establishment of SHP Special Committee and to extend my greetings to all the participants here.

Hydro-energy resources is a clean and renewable energy, rural hydropower constitutes an important part of the rural infrastructure and people's livelihood water resources. With the support of the state policies, governments at various levels together with the masses have carried forward the spirit of self-reliance and hard struggle and vigorously exploited the abundant local hydropower resources. In total, over 40,000 rural hydropower stations have been erected nationwide with a total installed capacity of over 50 million kW and an annual generation of over 150 billion kWh, which had accumulatively solved the electricity problem for 0.3 billion rural people not accessible to electricity, Electricity supply in 1/3 of China's counties

mainly relies on rural hydropower. Recent years have seen the construction of 653 rural hydropower based primary electrified counties and 409 rural hydropower based electrified counties. The development of rural hydropower of those old revolutionary, minority nationality, remote and poverty-stricken areas in the central and western regions has speeded up the development of the social-economy as well as brought a dramatic change in people's life and mental attitude. The pilot project and its expansion of "Replacing Firewood with SHP" since 2003 have made great headway. Leaders of the State Council evaluated highly of the project, which not only scores economic, social and ecological benefits, but also is an effective way to solve the issues of the "agriculture, farmers and rural areas". It is worthy to mention that rural hydropower, which features decentralized and "small, quick, flexible", has played an unique role in recovering power supply, guaranteeing the grid safety, effectively reducing the damage and promoting the diversification of regional power supply after the unexpected low temperature, rainy snowing and freezing disaster and May 12th Wenchuan seism in upper half of this year.

Standing at the new start of history, the rural hydropower is now embracing a precious opportunity for its development. First of all, the Central Committee of CPC and the State Council both attach great importance to the rural hydropower development and regard it as part of the important rural infrastructure.

At the third plenum of 17th Central Committee of Communist Party of China which just closed up, it is required that we should step up efforts to enhance infrastructure construction, increase power supply in rural areas and improve people's living as well as productive and living conditions. Secondly, in order to apply the Scientific Outlook on Development and promote the sustainable social and economic development, the central government has geared up energy-saving, emission-reduction, optimization of energy supply structure and the development of clean and renewable energy. In addition, to counteract the international financial crisis, the state has issued a series of policies to expand domestic consumption and considerably increase the input in the water sector. For implementing the strategies of the Central Committee and the State Council, the Ministry of Water Resources has made it major work to develop livelihood related water engineering including rural hydropower development. It is required to increase investment in rural hydropower development, and fully implement *Planning of the Project of Replacing Firewood with SHP from 2009 to 2015*, continue to promote the construction of the hydropower based rural electrification.

In recent years, China's rural hydropower development witnesses an unprecedented progress. However, it still faced many contradictions and problems caused by the profound change of construction and management environment.



In some places, due to the weak management, delayed planning and lack of corresponding laws and regulations, problems of different degrees still exist, such as the seizure of hydropower resources, disordered development, environment degradation and deviation from farmers' benefits, drawing great concern of the society. There are also other problems impacting the sustainable development of rural hydropower, like the management system, investment mechanism, integration to grid, pricing, taxation and technological innovation. Nowadays, ecological and environmental protection has been a factor that constrains the rural hydropower development. Therefore, it is required that we step up efforts in environmental protection while developing the rural hydropower and to coordinate well the relationship between hydropower development and environmental protection, minimize the negative impacts and maintain the sound condition of the rivers.

Confronted with both new opportunity and challenge, it is necessary to insist on taking the Scientific Outlook on Development as our guidance and give overall consideration to farmers' benefits, local development, environmental protection and ecological construction, taking the road of scientific, orderly and sustainable development. We should strengthen hydropower resources management, implementing the system of paid utilization of hydropower resources and its marketing allocation. Moreover, we should reinforce safety supervision strictly, follow the capital construction procedures and tighten the engineering quality management. We should increase the investment in rural hydropower development, accelerate the project of "Replacing Firewood with SHP" and the construction of hydropower based rural electrification. It is also required

to enforce the legal construction, for providing legal protection for rural hydropower development; promote the technological advancement, improve the system of technical standards and popularize the advanced technology and management experience, push the modernization of rural hydropower.

Academic society is the bridge and connection between the government as well as the Party and the massive technical professionals. The SHP Special Committee gathers the technical and management elites in the rural hydropower sector, which takes non-replicable professional advantage over other institutions and organizations. It will play a vital role in the rural hydropower development, especially in policy research, technical advancement, experience exchange and personnel training. I would like to take this opportunity to give some advices and requirements to the committee:

First, be a good consultant. SHP Special Committee's work should put importance round central tasks and serve for overall situation, in combination closely with people's livelihood water work. Consolidate the research of key issues with impact on overall situation and important issues of social broad concern in accordance with the new changes and characteristics of rural hydropower development. Be a good consultant for the scientific development of small hydropower.

Second, attach importance to technical innovation. Rural hydropower has wide coverage, strong specialization and complicated technology. The committee is required to meet the technological need of rural hydropower development, gather experts' wisdom, act as the scientific and technological platform, follow the advanced scientific and technological achievements both at home and abroad. Let the technical innovation support and lead the healthy and sustainable development

of the rural hydropower.

Third, strengthen personnel training. In conformity with new requirements of rural hydropower development, a variety of personnel trainings should be conducted to help the whole rural hydropower staff know timely about the developing trend and the state of arts in this field, trace and enter the frontier of the science and technology. In addition, you should also actively engage in holding academic seminars and high-level technical exchange activity, substantially enhancing the extensity and intensity of members' participation in those activities.

Fourth, enhance cooperation and exchange. We should bring the characteristics of cross-industry, cross-region, cross-sector and interdisciplinary as well as technological and talent advantages of the committee into full play. Besides, we should establish wide contact with governments, enterprises, institutes, universities and related associations to conduct exchange and cooperation. It is likewise important to broaden channel to exchange and cooperate with our foreign counterparts to adopt the advanced technology and experience from foreign countries and at the same time introduce China's experience in SHP development to the foreign countries, push China's SHP technical products with its own intellectual property right to go global.

Last but not least, under the guidance of the Scientific Outlook on Development and the leadership of China Society of Hydroelectric Engineering and the Ministry of Water Resources, SHP Special Committee is hoped to fully explore the wisdom and expertise of all the committee members, boldly innovate and practise, and make positive contributions to China's rural hydropower development.

I wish it a great success. Thank you! ■

## Small Hydropower, Big Strategy

Report at the 2008 Annual Meeting of Chinese Hydraulic Engineering Society, by Mr. Tian Zhongxing, Director of Rural Hydropower & Electrification Development Bureau, MWR, Oct 2008.

### Foreword

China is a country rich in small hydropower, with its hydropower potential ranking the first in the world. Under comrade Deng Xiaoping's proposal and with the support from the Party committees and governments at all levels, the rapidly developed rural hydropower has played a vital role, since China's reform and opening-up, in solving the problem of rural electricity consumption as well as promoting the poverty alleviation of peasants and the economic and social development of rural areas. Later into the new period, SHP-based rural hydropower won extensive praise from all social sectors for its exceptional role in ecological construction, environmental protection and energy-saving and emission-reduction project in mountainous areas. Especially in the low temperature raining snow and disaster in southern part and Wenchuan earthquake of the first half year of 2008, rural hydropower gave full play to its advantage as distributed energy, thus playing an important part in safeguarding the grid safety and disaster resistance and mitigation.

### 1. History of small hydropower development in China

Prior to the reform and opening up, China's small hydropower featured slow development pace, small scale and scattered independent power supply with the installed capacity less than 7,000,000kW. After the reform and

opening up, water departments at all levels engaged themselves in the building of small hydropower in combination with river treatment and electricity construction. The state also encouraged the building of small hydropower by the local governments and farmers. In 1982, comrade Deng Xiaoping noted during his inspection tour in Sichuan that "in the development of small hydropower, should the central government and the State Council submit a policy, both the masses and the country would be benefited. That is invigoration, or rather mind emancipation." It started up the path of rural electrification with Chinese characteristics. Up to now, China has become a well-deserved kingdom of small hydropower. China's success in realizing rural electrification by means of developing small hydropower has drawn the world's attention. In addition, China's technology and experience in developing small hydropower has been widely popularized in many developing countries with great success. To some extent, progress of SHP development since the reform and opening up is the epitome of rapid economic and social development in China.

#### 1.1 Reform and opening up hastened parturition and pushed the development of rural hydropower

China's hydropower generation began with small hydropower. At the beginning of last century, China's first small hydropower station Shilongba station was constructed in Kunming,

Yunan. But due to financial, technological and institutional constraints, by the end of the 1970's, China's SHP didn't develop fast. Besides, owing to shortage of power, the state grid couldn't afford to be extended to the rural areas so that hundreds of millions of people in the rural areas lived without electricity.

Demand for power increased after the reform and opening up. After the 3rd Plenary Session of the 11th CPC Central Committee, the Party shifted to focus its efforts on economic construction. The restoration of production and the surge of consumption capacity brought the problem of weak power infrastructure into light. Electricity limitation in urban areas and blackouts in rural areas severely crippled the improvement of people's living standards and the development of the national economy. At that time, the state financial standing and the technology level was far from meeting the ever-increasing power demand. It was the objective reality that required that the state must do something to change the power development model, fully mobilize the initiatives of all sides and speed up the power development and popularization.

Construction of pilot counties of rural electrification of primary level started. In 1982, during his investigation and study at the grass-roots, comrade Deng Xiaoping spoke positively of the approach of "develop small hydropower self-reliantly and solve the local electricity problem", which started

up the path of realizing rural electrification through developing small hydropower. By means of policy support, financial subsidy and technological training, the state built pilot counties of primary rural electrification and encouraged the local governments and farmers to develop small hydropower to solve electricity problem and start up a path of rural electrification with Chinese characteristics.

After 30 years of unremitting efforts, by the end of 2007, China had built more than 45,000 small hydropower stations with a total installed capacity of about 50 million kW and annual generation of 150 billion kWh, accounting for 1/3 of the total hydropower nationwide. 1/2 of the territory, 1/3 of the counties and over 300 million people of the country had access to electricity through developing SHP. Rural hydropower, which was developed in the rural areas and in return served agriculture, countryside and peasants, was spoken highly positively by the CPC Central Committee and the State Council and meanwhile fully recognized by the local Party committees and governments at all levels. In addition, it not only gained the vigorous support from the masses, but also won extensive praise from the United Nations and the whole world.

### **1.2 Rural hydropower faces challenges**

From the end of the 1900s, the state began to deepen its reform in investment and power system and started its rural power grid refurbishment project, actively promoting the policies of “self-construction, self-management and self-consumption”, “electricity for electricity” and “SHP should have its own supply area”.

At the same time, private capital flooded into the field of small hydropower development,

bringing about the craze for SHP development. The involvement of private capital facilitated the transformation from hydraulic energy resources to electricity commodity. But due to policy and management blemishes, a series of problems came up. First, seizure of resources; second, illegal construction, which jeopardized the public security; third, deviation from the direction of supporting agriculture, which went against the interests of farmers; fourth, severe impact on the ecological environment. The above-mentioned problems served as a reminder that we should gradually perfect the policies of rural hydropower, strengthen the management, adhere to the direction of serving agriculture and pay attention to environmental protection while exploiting resources. In a word, rural hydropower development is facing tough challenges.

## **2. Small hydropower plays a big role**

### **2.1 Raising the level of rural electrification**

From 1983 onwards, the State Council decided to construct rural hydropower-based primary electrification counties. From the “Seventh Five-year Plan” period to the “Ninth Five-year Plan” period, altogether 653 rural counties of primary electrification were set up, among which over 82% were in the central and western regions and 80% were remote and poor areas. During the “Tenth Five-year Plan” period, another 400 counties of primary electrification were erected with an average increase in installed capacity of 3,000 kW as well as annual generation of 100 million kWh for each county. Still another 400 counties of the “Eleventh Five-year Plan” are under going.

After 30 years of painstaking efforts, there are currently 1500

counties or cities with small hydropower stations, among which 600 counties mainly get electricity supply through small hydropower, over 200 counties have a complete set of SHP grid and more than 3000 counties have self-supply area. As for the 400 counties of primary electrification during the “Tenth Five-year Plan” period, the annual power consumption per capita and annual power consumption for daily life per household reaches respectively up to 644kWh and 547kWh, an increase of 85.6% and 72% compared to that of the late “Ninth Five-year Plan” period.

### **2.2 Pushing the economic and social development in the rural areas**

Water resource is a competitive resource for the mountainous areas. Party committees and governments at all levels give prominence to the exploitation of water resource and development of rural hydropower so as to spur the local economic and social development and increase the revenues. In counties rich in water resource, the tax revenues obtained from rural hydropower accounts for a large proportion in its total fiscal revenues. Some counties, like Rucheng and Guidong counties in Hunan province and Ruyuan and Yangshan counties in Guangdong province, obtain half of its fiscal revenues from rural hydropower.

Counties with rural hydropower are mostly located in those remote and poor minority regions. Through the development of rural hydropower, thousands of rivers are treated and reservoir storage capacity of 258.1 billion cubic meters is formed. The irrigation area is increased by 25 million Mu (15Mu=1 hectare), which improve both the flood control and draught resistance capacity. Guidong county is a poverty-stricken county in Hunan province. After developing the local hydropower under shareholding

system, the rural collective economy grew quickly with a salient increase in the per capita income of farmers. At present, the average per capita net income of farmers there exceeds 3000 Yuan (RMB), an increase by more than 5 folds compared to that of the year of 1999. In some villages, elders over 60 years can get a pension subsidy. The revenue from the development of hydropower also provides funds for the education, medical care, social security and other public welfares.

### **2.3 Improving farmers' productive and living standards**

Small hydropower featuring local exploitation, local grid formation and power supply for large areas helps solve the problem of electricity for those remote, dispersed and poor areas. Through developing small hydropower, the rural collective economy is consolidated and rural welfare undertakings are promoted. Moreover, the access to water and electricity in enclosed hilly villages together with accessible transportation and improvement of kitchen bring tremendous changes to farmers' mental outlook.

### **2.4 Ensuring emergent power supply**

Small hydropower station is able to "black start", and has the feature of "locally exploited and supplying electricity to nearby places" to form SHP grid, most of which are able to operate isolatedly. When the main power network is broken and out of operation due to disasters, small hydropower stations will take its advantage of distributed power supply so as to resume the supply as soon as possible and safeguard the grid safety, thus effectively mitigating the loss caused by disasters. In the first half of 2008, in face of the two unexpected natural disasters, small hydropower has played a big role.

(1) Medium and small

hydropower props up a bright sky in the snow and ice disaster

According to incomplete statistics, in the snow and ice disaster in January and February of 2008, power supply was ensured in over 200 counties and 2000 villages and towns during the Spring Festival and the period of main power network restoration by means of small hydropower. Besides, it played a crucial role in guaranteeing the smooth operation of Jingjiu, Yingxia, Yuhuan and Xiangqian railways.

- Guarantee the smooth operation of railways

Due to paralysis of the main power grid under disasters in the Tongren region of Guizhou province, Xiangqian and Yuhuai railway were out of operation. Under the leadership of the local government, the local power network consisting of 3 small hydropower stations implemented the "black-start", thus resuming the power supply within half an hour for the Dalong section of Xiangqian railway, which not only enabled the normal operation of the railway, but also provided electric source for the start operation of Dalong thermal power station.

- Safeguard the urban stability

Under the circumstance of disfunction of the State Grid and Southern Grid, electricity supply was not interrupted in the city proper and its 5 affiliated counties of Huaihua City, Hunan province by means of local SHP, and all townships and 80% villages in the SHP-supply area have resumed normal supply of electricity before the Spring Festival.

- Ensure the power supply for the rural areas

By means of small hydropower, 13 towns inclusive of Dabujiang, Longxingshi and Yangtang of Yongjiang county, Zhuzhou, Hunan province, resumed the power supply for all the towns and the nearby 100 villages without any electricity supply from outside

channel. Among the 76 towns with power supplied before the Spring Festival, 51 towns obtained electricity from small hydropower stations and 25 towns recovered electricity supply through connecting to the grid.

- Guarantee the operation of distribution network

From the late January to the early March, due to damage of main passage of the West to East Electricity Transmission project, the T-connected Guibei grid in Guangxi became disconnected operation. However, due to power insufficiency for lack of coal, more than 20 counties in Guibei ran with the help of power supply from small hydropower stations until the early March when the main power grid was resumed.

- Ensure the emergent standby

Nainbadu and Shuangxikou town in Zhejiang province are located in the mountainous area. On 30th, Jan., the two towns were fully black-out. As the main power grid couldn't be restored within short time, upon receiving the notice of temporary power supply, staff of Xiaogangling and Laofoyan stations did their utmost in spite of harsh weather and difficulties in fixing up the damaged route and setting up the temporary power supply route. On 5th Feb., the two towns resumed power supply until the main power grid was resumed on 21st Feb.

(2) Small hydropower lights up thousands of households after the earthquake

After the May 12th earthquake, the main power grid in some heavily-hit regions suffered power loss so that people were suffering from darkness together with severe personnel and property losses. It definitely would take a long time to resume the power supply in the quake-hit regions, because the landslide blocked the transmission lines. Under such circumstance, the

local people resumed power supply for many regions within short time by restoring the small hydropower stations and its distribution network, providing effective assistance for the disaster relief work.

- Through emergent repair of Xiazhuang station nearby the county properz(12,750kW), power was supplied for the relief-work headquarter, hospitals and telecommunication since May 15th under isolated operation.

- Qingchagou station(800kW) and Jingzhou station(320kW) were restored in no time under assistance of the Armed Police staffs and resumed power supply for the relief-work headquarter, hospitals, water supply companies and telecommunication under isolated operation. From May 12th to June 1st, 12 stations were restored in succession in Mao county, resuming power supply for 60% of the towns and villages.

- Lixian station and Hongye II cascade station were restored after the earthquake and resumed power supply without delay.

- Small hydropower guaranteed power for several towns in Pengzhou. Longcao hydropower station resumed power supply for daily life after restoration on May 25th, and the entire power supply was resumed at the beginning of June.

### **2.5 Promoting energy-saving and emission-reduction**

With small scale, storage capacity and little impact on the environment, small hydropower is a recognized green renewable energy.

Small hydropower replaces fossil fuel energy and is effective in reducing the discharge of pollutants. In 2007, the total power generation by rural hydropower reaches 150 billion kWh, accounting by the standard coal consumption of thermal power plants 334g/kWh, effect of SO<sub>2</sub> emission 5.7g/kWh and CO<sub>2</sub> emission 1,050g/kWh, in

the whole country, it is equivalent to a reduction of 50 million tons of standard coal, 860,000 tons of sulfur dioxide and 160 million tons of carbon dioxide discharge.

In the process of rural electrification, the project of "SHP replacing fuel wood" plays a vital role in improving people's livelihood and protecting the forest vegetation. Especially since 2003, the kick-off of the pilot project of "small hydropower replacing fuel wood" provided the farmers with cheap electricity, thus changing the traditional way of cutting woods for fuel, preserving the vegetation, enhancing the project of "return farmland to forest", avoiding water loss and soil erosion and regaining the green hills and water. Pilot project scored great success in 2003 and 2004, over 200,000 farmers use hydropower for fuel. 300,000 Mu farmland is returned to forest and 1,560,000 Mu forest is preserved. Currently, the extension of pilot project is in full swing.

### **2.6 Small hydropower in China pushes the development of global small hydropower**

The development of rural hydropower in China effectively realizes the balanced development among economy, population and resources in poor areas and is highly evaluated by the whole world. The international SHP organization, consisting of 62 countries and regions, more than 130 governmental and international organizations, is headquartered in Hangzhou, China. It is the first international organization set up in China under the legal framework of the United Nations law. The development of small hydropower in China will have significant influence on that of global dimension.

### **3. Withhold the principle of serving agriculture, countryside and peasants,**

### **firmly promoting the reform and development of rural hydropower**

In June of 2006, Premier Wen Jiabao gave special instruction. He is quoted as saying that the development of small hydropower should go hand in hand with preservation of farmers' interests, local development, environmental protection and ecological construction in a scientific, orderly and sustainable way. It has been clearly pointed out in the No.1 documents of the central government for several years that we should consolidate the administration of rural hydro energy resources and environmental protection, promote the construction of rural electrification, expand the scale and execution scope of "small hydropower replacing fuel project", step up input and loan support for the development of rural hydropower and further conduct rural grid refurbishment. It is clearly put forward in the report of the 17th CPC National Congress that we should accelerate the social building focusing on improving people's livelihood, building up ecological civilization and forming the basic industry structure, growth and consumption patterns of conservation of energy resources and environmental protection. Recently, the "Three Fix Schemes" by the State Council clearly define the responsibilities of the Ministry of Water Resources, namely conducting hydro energy resources investigation, guiding the development of hydro energy resources in rural areas and guiding the work of hydropower based rural electrification and the "small hydropower replacing fuel wood" project.

Rural hydropower is an important content of "water development for people's livelihood" and a great strategy

related to the improvement of productive and living conditions of mass people in the hilly areas, and construction of harmonious society as well as building of new countryside. In accordance with the requirements of water development for people's livelihood by the central government and Ministry of Water Resources, we should study and put into practice of the scientific outlook on development and well perform the following work earnestly in the future:

### **3.1 Enhance the hydro-energy resource management**

China is rich in hydro-energy resources with exploitable SHP potential of 128 million kW, among which 37% has been exploited. Small hydropower resource in China covers 30 provinces (autonomous regions and municipalities) and over 1600 counties, mainly in the central and western areas, which is coincidence with the distribution of poor population and water and soil loss areas. In accordance with the requirements of scientific outlook on development, we should consolidate the planning and management of rural hydro-energy resources, actively promote the paid utilization of hydro-energy resources and its marketing allocation, realize the limited, orderly and paid development of hydro-energy resources and gradually establish the management system and mechanism of hydro-energy resources in rural areas in accordance with the requirements of socialist market economy.

### **3.2 Firmly guarantee the public security**

We should firmly guarantee the public security through formulating policies and regulations, strengthening the planning and administration work, standardizing the development process of rural hydro-energy resources, guiding social capital in the development of small hydropower in a fair,

safe, orderly, environmental-friendly, technology-oriented way and reinforcing rural hydropower industry management centering on safety supervision to ensure the public security.

### **3.3 Stick to the principle of serving the farmers**

The origination and development of rural hydropower should be attributed to the efforts of farmers. So is the fruit. In line with Premier Wen's instructions, we should rationally utilize the regulatory measures related to finance, tax, power price, etc. and formulate laws and regulations beneficial for the farmers, with the aim of developing the local hydro-energy resources, improving the ecological environment and benefiting the local farmers. In addition, we should actively strive for the public financial input, guide the local sector to increase input and encourage the participation of various social entities in the rural hydropower for eventual formation of a sound development model of mutual promotion of SHP development with farmers' income raising, local development, environmental improvement and river treatment.

### **3.4 Expand the scale of the project "small hydropower replacing fuel wood"**

In accordance with the No.1 document of the central government in the continuous several years, the Ministry of Water Resource has completed the compilation of the *《National Small Hydropower Replacing Fuel-wood engineering Project plan from 2009 to 2015》* and will get it approved soon. We will actively coordinate and pay close attention to its prompt approval and implementation as soon as possible. The institutional system of the small project of the small hydropower replacing fuel-wood project needs further improvement and farmers' right in using electricity from the

fuel-wood replacement project and obligation in preserving the forest vegetation should be clarified. A long-term mechanism of "state subsidy, market operation, farmers' involvement and social supervision" should be established.

### **3.5 Develop distributed energy**

Local development and nearby supply of electricity of SHP should be supported. It should be proposed that small hydropower should be included in the emergent power supply system. In the various stages of power system planning, construction and operation, we should take into full account the special advantage of distributed power source small hydropower in emergent power supply, and give full play to its roles in safeguarding grid safety and disaster mitigation.

### **3.6 Promote the advancement of the rural hydropower technology**

With the rapid development of distributed energy technology and expansion of information, energy storage and bio-energy technology, rural hydropower will usher in a new era of technological upgrade. The replacement of new high efficiency turbines and generators for out-of date hydro-generator units will increase output by more than 10%. The secondary electric equipment of hydropower plants constructed 10 years ago needs upgrading. More unmanned and remote controlled hydropower stations will be erected. New types of distributed power distribution equipment and highly efficient power storage devices will enable more distribution grid to be capable of isolated operation. The green energy system composed of hydropower, wind, solar energy and bio-energy is expected to form. The advancement in technology and equipment will enable rural hydropower to play a bigger role in serving the agriculture, countryside and peasants and promoting the development of renewable energy. ■

## HRC's SHP Training Programs in 2009

No	Name of the Training	Date	Participants	Fee
1	2009 Training Workshop on Small Hydropower (to be held in English)	14 May —24 Jun	From developing countries	Fellowships will be provided, including international airfares, boarding, lodging, local transportation in China, pocket money and etc.
2	2009 Training Workshop on Small Hydropower for Africa (to be held in French)	15 Oct —25 Nov	African francophone	The interested applicants may contact, directly or through their governmental organization, the Commercial Office of the Chinese Embassy for approval.

“2009 Training Workshop on Small Hydropower” are to be held under the list of foreign aid by the Chinese government to developing countries. Entrusted by the Ministry of Commerce, the National Research Institute for Rural Electrification (HRC) will undertake the mission.

In order to disseminate SHP technology, HRC has already hosted with success 51 training courses for about 1000 participants from over 100 countries.

**1. Course Contents:** Procedures of SHP development, feasibility study, hydrology, civil works, financing SHP, turbo-generator, electric design, automation, economic evaluation, equipment selection, operation & maintenance, SHP macro policies, etc.

**2. Training Methods:** Lectures, discussions, field trips & seminar.

**3. Methods for Evaluation:** The participants will be asked to have some tests & present country report at the end of the course. A certificate will be issued to the qualified participants.

**4. Participant's Qualifications and Requirements for Admission:**

(1) Recommended by the governmental organizations concerned.

(2) The applicants should be under 50 years old.

(3) At least two years working experience in the electric power sector.

(4) Be in good health with no infectious diseases or handicapped.

(5) Be proficient to listen, speak, read and write in English.

(6) Prepare a review paper or report in both PPT and Word form on SHP development of the participants' country so as to exchange among the participants.

(7) Not to bring family members to the training course.

(8) To observe the laws, rules and regulations of P. R. China and respect the Chinese customs during the training.

**5. Training Expenses:** The Chinese government will bear the international airfares, the expenses of training, boarding and lodging, local transportation, and pocket money of RMB 80 Yuan per person per day during the training period.

**6. Application and Admission:**

(1) The applicants should be nominated by their governmental organizations. The nominated participants are requested to fill up the Participant's Information, and submit with valid Health Certificates provided by authorized physicians or hospitals to the Economic and

Commercial Counselor's Office of the Chinese Embassy (ECCOCE) for examination, recommendation and endorsement;

(2) After checking by the Economic and Commercial Counselor's Office of the Chinese Embassy, Admission Notices will be issued to the accepted participants by the ECCOCE through the related government departments of the participants. With the Admission Notices, the participants are requested to go through all necessary formalities for entering China and bring all the documents like Admission Notice, Participant's Information, Health certificates to China on the registration date.

**7. Liaison Address:**

(1) Economic and Commercial Office of Chinese Embassy (ECCOCE)

(2) Attn: Mr. Pan or Ms. Shen  
National Research Institute  
for Rural Electrification

122 Xueyuan Road,  
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