

HRC's Annual report on foreign affairs in 2009 and work plan for 2010

**Hangzhou Regional Center (Asia-Pacific) for Small
Hydropower (HRC)
National Research Institute for Rural Electrification
(NRIRE)
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During 2009, in line with the overall guidelines of Scientific Outlook on Development, under the correct leadership of Ministry of Water Resources and Nanjing Hydraulic Research Institute (NHRI), all the staff of HRC have made tremendous efforts on their work and have attained substantial achievements in international cooperation. Entrusted by the Ministry of Commerce, HRC has held 3 SHP training workshops successfully, receiving 91 participants from 49 countries in the world. Besides, the international SHP cooperation is further strengthened and a series of hydropower projects successfully implemented, expanding foreign SHP market further.

I. Foreign-aid SHP training workshops

1. SHP Training Workshop

Entrusted by Chinese Ministry of Commerce, 2009 TCDC Training Workshop on Small Hydro Power was held during May 14 and June 24 in Hangzhou. 32 engineers and technicians in the hydropower domain from 18 countries participated in this workshop.

Supplemented with such course as Orientation on doing business with China, this training workshop was quite favored among the participants.

As this workshop coincided with the outbreak of influenza A (H1N1), we adopted resolute measures at the beginning of the workshop and canceled some of activities in crowded public places. The health conditions of every participant, especially those from epidemic areas are paid close attention to; thermometers and daily disinfectants are provided to every participant.



At the closing ceremony

The overall evaluation of this workshop: excellent 78%, good 22% and pass 0%.

2. Training workshop for Small Hydropower Technology (Africa)

Entrusted by Chinese Ministry of Commerce, 2009 TCDC Training Workshop on Small Hydro Power Technology (Africa) was held during October 15 and November 25 in Hangzhou. 33 engineers and technicians in the hydropower domain from 17 African countries participated in this workshop. The preparation work commenced at the beginning of the year. A French-language training course was held every week among the Division of Foreign Affairs and Training. Appropriate translators and interpreters were hired. We had also kept close contact with Chinese embassies and coordinated with the recruiting work. As a result, the number of the participants is quite satisfactory. This workshop differs from others on the following points:

(1) For better communication between the participants and their Chinese counterparts on experiences and techniques, we arranged interpreters in the International Exchange Forum to interpret the national reports of the participants from French to Chinese with a purpose to make it possible the two-way communication between professional

experts of HRC and participants. All the participants made earnest preparations including contacting related departments in their respective countries, verifying materials, etc; one of the participants didn't get rest until 4 o'clock in the morning preparing the materials. Compared with similar forums before, this one provided us with much richer and more detailed information which is very precious. This forum is not only an exchange platform on SHP technology, but also a business conference for cooperation. According to the participants, the exploiting rates for water resources of most of the African countries are on average less than 10% with very few SHP technologies and capitals. It is the earnest aspiration of the participants that HRC would take part in the exploitation of hydropower resources, provide technical service and make investment on SHP projects in Africa. Representative of HRC expressed that HRC was very willing to make contributions to the development of SHP resources in Africa; please do get in touch with us if you need any technical support from us on concrete SHP project.

In the forum, participants expressed their gratitude to the Ministry of Commerce for sponsoring this workshop so that staffs on energy and hydropower from Africa could discuss and share experiences and

achievements with SHP experts in China. Mauritanian participant Mohamed presented 30 Ouguiya (Mauritanian money) to Director Cheng of HRC so as to express his sense of gratitude.

(2) Solar energy. As is known to all, new and renewable energy which is efficient and clean is quite popular in the world today. To develop new and clean energy such as hydropower, wind power and solar power is a key way to cope with energy crisis. Accordingly, the organizer designated Zhejiang CHINT Solar Co., Ltd which produces efficient thin film solar energy, Si battery and subassembly, photovoltaic stations and other applying products as a fresh supplement to the study tours of this training workshop. This visit was quite beneficial to many of the participants. Africa has abundant solar energy resources but doesn't have the access to advanced science and technology to make use of it so far.

Participants were quite passionate on solar energy technology; though they might be specialists on hydropower, they starved for knowledge and techniques to cope with current energy crisis. It is a topic of common concern to develop green energy and low-carbon economy; we

are blessed with a shared goal, i.e. to build a cleaner world with more forceful power.



Presenting a gift to HRC

The overall evaluation: excellent 48%, good 48% and pass 4%.

3. Hold Seminar for Small hydropower Technology (Africa)

This extra training seminar entrusted by the Ministry of Commerce was held from Dec 1st to 21st, 2009 in Hangzhou. 26 international participants from 14 countries took part in the workshop.

Participants visited Three Gorges Project which is renowned as the eighth wonder in the world. And they can't help saying, "Chinese people made the largest hydropower station in the world. Nowadays China can produce advanced hydropower equipment which could only be made in western countries in the past. China makes a good showing for all other developing countries. Chinese people are great!" The trip to Three Gorges Project has become unforgettable in their lives. We made small necessary adjustment to the training course according to the nature of the seminar for officials and added CDM, SHP international cooperation and business negotiation which were highly valued by the participants.

This seminar has won unanimously high evaluation from the participants.



On the top of the Three Gorges Dam

The overall evaluation: excellent 81%, good 19% and pass 0%.

Monitor of the workshop Mr Steven commented in his speech at the closing ceremony, “To the ministry of commerce of the People’s Republic of China and HRC please continue with this noble cause. You have demonstrated yet again that you are indeed a true partner in development. ”

Here are some of the comments from other participants: “The training program was excellently structured, organized and beautifully managed by the HRC.”, “Please keep it up. You are doing a great job. I have benefited a lot and will continue consulting you for more information to assist us work better.”, “Chinese technology is equally advanced as the western, and however more appropriate to developing countries. I will be a very good ambassador of Chinese equipment and skills. I will encounter our nation to cooperate closely with China on knowledge transfer. Chinese people are wonderful.”, “-Excellent & Useful workshop; -The special lecture on CDM upon request from participants was very useful and we all are thankful for arranging that lecture in a short time.”, “The training seminar has been well organized and facilitated and is my wish and hope that we will have close ties and cooperation between my country and China in the field of small hydropower development and other renewable energy at large.”

II. International cooperation & exchange

1. Participation in the 5th World Water Forum

On March 16th, the 5th World Water Forum was convened in Gold Horn Exhibition Center in Istanbul, Turkey with 28,000 representatives

participating in the forum. 156 national delegations, among which there were more than 90 ministers, 63 mayors and 148 senators presented.

Vice Director of NRIRE, Mr, Xu Jincai was a member of the experts' delegation of Ministry of Water Resources and presented a paper *A Simulation Analysis of Complementary Power-generating System between Wind and Hydro Power* to the forum.

During the forum, Vice President of NHRI Mr. Li Yun and Mr. Xu Jincai met with officials and experts from Turkish National Bureau of Hydraulic Engineering and PIK Energy Company and held technical discussions and cooperation talks. Turkish National Bureau of Hydraulic Engineering is in charge of the planning, design, construction and operation of all the hydraulic projects; More than 170 hydropower stations have been developed in Turkey with over 1500 under planning. PIK Energy Company has been conducting fruitful cooperation with HRC on techniques and equipment.

2. Representative of HRC attended the 5th Hydropower for Today Forum

On May 11th, the 5th Hydropower for Today Forum sponsored by Ministry of Water Resources and UNIDO and organized by IN-SHP (International Network on Small Hydropower) was convened in Hangzhou. Present in the forum were more than 50 domestic and international representatives from 26 countries and international organizations such as UNIDO, International Hydropower Association as well as more than 120 domestic representatives from provincial or local Department/Bureau of Water Resources, Hydropower Bureau and enterprises and public institutions engaged in planning, design, manufacture and development of SHP. HRC's Director Ms. Cheng Xialei also presented in the forum.

This forum focused on the role of small hydropower to improve people's well-being, and displayed China's achievements on SHP and rural electrification, promoted proved experiences and practices in improving the well-being of people by developing SHP. It also brought out the role of demonstrating policy guidance, standardization, and cost reduction, quality management, building rural local electricity market and communicating developing orientations for international SHP technology, products, policies and environmental protection. This forum

provided a good platform to promote the world's small hydropower development in terms of cooperation and development.

Chen Lei, Minister of Water Resources attended the forum and delivered a keynote speech. He gave a comprehensive introduction to the functions and experiences of SHP on rural lighting, replacing fuel wood with SHP electricity and rural electrification. He stressed the unique role of SHP in improving people's well-being and promoting sustainable economic and social development. He also introduced systematically China's small hydropower development approaches, objectives and measures and how to vigorously promote the international exchange of small hydropower and cooperation.

3. One HRC staff participated in the international training program Management of Hydropower Development & Use 2009-264.

The international training program Management of Hydropower Development & Use 2009-264 sponsored by Swedish International Development Cooperation Agency (SIDA) and organized by Vattenfall Power Consultant AB and SWECO Design and Consultancy Company was held during September 5th and October 2nd in Swedish capital of

Stockholm. After application by HRC and with approval from Department of International Cooperation, Science and Technology, Ministry of Water Resources, Mr. Chen Xing from Division of International Cooperation and Science and Technology, HRC, was selected by SIDA to participate in this training program and gave an action plan named Analysis of Rural Electrification Development.

29 participants from 21 countries participated in this training program, among which 3 were from China. The program covered such domains as energy, grid, hydropower development, environmental protection as well as special topics like CDM, concerns over AIDS and protection of wildlife, etc. A visit was paid to a hydropower station which was under construction.

4. HRC assisted in organizing a study tour for Global Water Partnership (GWP) China Secretariat

On August 27th, HRC assisted the participants of International Symposium of Ecological Literature and Environmental Education

sponsored by Global Water Partnership (GWP) China Secretariat in organizing a study tour around Hangzhou.

Accompanied by Division Chief of Foreign Affairs and Training Mr. Pan Daqing, 19 participants paid a visit to the Administrative Committee of Hangzhou West Lake Scenic Zone. Engineer Chen of the committee introduced the history of West Lake and protections of the lake in the past dynasties, especially the measures for environmental protection and the achievements made by Hangzhou government since the implementation of Reform and Opening up. All the participants from both home and abroad were intensely attracted by the precious historical profiles and numerous strikingly fine pictures.

After that, participants went to the Changqiao River Inlet for on-site inspection although it was very hot with a temperature of 38°C and they asked lots of questions on the issues such as the quality of West Lake water and the West Lake Diversion Project.

On the same day, the closing ceremony of International Symposium of Ecological Literature and Environmental Education was held in HRC

5. HRC representative attended Advanced Technological Training Workshop for Hydrology and Water Science organized by NHRI From Oct. 18 to Nov. 16, Vice Director of NRIRE Mr. Huang Jianping participated in the Advanced Technological Training Workshop for Hydrology and Water Science organized by NHRI. He received over 20 days' multi-disciplinary training in George Mason University, Virginia, US. More than 20 experts and professors from America's governmental offices, scientific research institutes and universities gave wonderful academic reports which marked the latest research programs, achievements and trends on the domains of climate change, hydrology and water resources, information technology and water management, etc. The reports offered abundant fresh points of view, research orientations, new information and new knowledge and expertise.

The United States highly stresses scientific and technological innovation. The government fully supports researches on sophisticated technology with abundant input which makes it possible for the scientists to concentrate on their study without distraction. Innovation is highly valued during the research so that new and modern science and

technologies could be applied in the fields of climate change, remote techniques and comprehensive management over drainage area, etc.

6. Bilateral negotiations for cooperation have been held by HRC with Vietnam, Nigeria and Thailand

(1) On August 25, Dr. Nguyen Tung Phong, Director of Training and International Cooperation Center of Vietnam Academy for Water Resources, Dr. Nguyen Vu Viet, Director of Institute for Hydro Power and Renewable Energy (IHR), and Mr. Nguyen Thanh Tung, Chief of Training and International Cooperation-IHR visited HRC. Leaders of HRC—Director Ms. Cheng Xialei, Vice Directors Mr. Xu Jincan and Mr. Huang Jianping, Chief and Vice Chief of New-Tech R&D Center for M/S Hydropower Mr. Dong Dafu and Mr. Lin Ning, Chief of Foreign Affairs and Training Division Mr. Pan Daqing, Chief Engineer Lu Jianping of Planning & Design Institute for Medium & Small Hydro participated in the meeting. Both sides conducted down-to-earth discussions over the development of low water head SHP station, cooperation on the SHP automatic technology, containerized hydropower technology and international SHP training, etc. A memorandum of understanding was signed over these items.

Director of Training and International Cooperation Center Dr. Nguyen Tung Phong participated in the SHP training workshop held by HRC in 1994. He recalled and highly appreciated the achievements and contributions made by HRC on global SHP development, international SHP training entrusted to HRC by the Chinese government, the R&D and exportation of SHP equipment.

On August 24, accompanied by Vice Chief of New-Tech R&D Center for M/S Hydropower Mr Lin Ning, the three members of this delegation visited Jinlun Group Corporation and containerized mini hydropower station in Jinhua City.

(2) On October 14th, Director of Nigerian National Agency for Science & Engineering Infrastructure Prof. O.O.Adewoye and his delegation visited HRC. Director of HRC Ms. Cheng Xialei and Nigerian delegates had a friendly talk over such domains as SHP equipment manufacturing, project development, project design and consulting and human resources training in Nigeria. An MOU was formed over the cooperation and

division of efforts for the next stage.

(3) From November 29 to December 2, 2009, a 3-person delegation headed by Mr. Prapath Premmani from TGC Group of Companies, Co., Ltd in Thailand (briefed as TGC) paid a visit to HRC to hold friendly talks with leaders and experts of HRC. Director of HRC Ms. Cheng and foreign guests gave introductions to the SHP developing conditions of China and Thailand respectively and expressed their strong willingness for future cooperation on hydropower domain and other renewable energies. On the basis of mutual understanding and trust, both sides reached some common understandings which are made into an MOU.

7. A Vietnamese delegation from Ministry of Industry and Trade, Ministry of Finance and four state-owned banks of Vietnam visited HRC. A 13-person delegation from Ministry of Industry and Trade, Ministry of Finance and four state-owned banks of Vietnam arrived in Hangzhou on August 3, 2009 and concluded a 9-day visit and exchange with considerate arrangements of HRC. On August 11, the delegation left Hangzhou with full success.

Ministry of Industry and Trade (MoIT) is the coordinator at national level for implementing ODA-financed projects relevant to rural electrification and renewable energy in Vietnam. To strengthen the capacity of all-level participators in the implementation of SHP projects, the Vietnamese delegation was organized by MoIT with a purpose to learn Chinese achievements and experience regarding SHP development. During their 9-day stay in Hangzhou, delegates discussed and exchanged extensively with professionals from HRC, Zhejiang Hydropower Development Management Center and Zhejiang Design Institute of Water Conservancy and Hydro-electric Power on SHP technical & economic appraisal, the safeguard frameworks (environment, resettlement) and monitoring, Chinese and international standards about SHP (current and trends), SHP equipment status (quality, price), brief to SHP development in China, SHP equipment in China, the government management regulations for SHP, etc.

A visit to Zhejiang Fuchunjiang Hydropower Equipment Co., Ltd. was also arranged to demonstrate manufacturing capacity of hydropower equipment and the supports from Chinese government on clean energy.

8. Participation in XVIII CONIMERA in Peru

Upon invitation by the organizing committee, Mr. Dong Dafu, Mr. Lin Ning and Mr. Xu Wei from Hangzhou Yatai Hydro Equipment Completing Co., Ltd. (briefed as Hangzhou Yatai), a sub company of Hangzhou Regional Center (Asia-Pacific) for Small Hydro Power (HRC) attended the XVIII National Congress on Mechanical and Electrical Engineering (briefed as CONIMERA) held in Lima, Peru from September 28 to October 1, 2009. Deputy manager Mr. Lin Ning gave a speech with the topic of SHP Equipment Manufacture in China and the Contribution HRC has made to SHP Development in the congress. Meanwhile, as one of the sponsors, Hangzhou Yatai exposed its expertise and capability for SHP (small hydropower) development on the Fair organized simultaneously.

CONIMERA, held bi-annually, is a great venue for engineers, electromechanical equipment manufacturers, technical developers and providers etc. in Peru. This year marks the 18th CONIMERA which mainly concentrated on energy and sustainable development, and which covers hydropower, wind energy, solar power etc., and also invited participation of equipment or technical service providers from abroad

including Germany, Canada, Switzerland and China. During their stay in Lima, meetings with more than 10 customers were arranged by Consorcio Proyec, the representatives of HRC, and two contracts are expected to be signed in the near future.

9. SHP International Standards

With a purpose to promote the standardization of SHP in China, HRC undertook the translation and publishing work of *Electro-mechanical Equipment Guidelines for Small Hydroelectric Installations* and has finished the draft standards in 2009. HRC has also undertaken the translation and examination of three standards entrusted by Chinese Hydraulic Engineering Society, namely *Specifications for the Design of Small Hydroelectric Power Stations*, *The Guideline for Concrete Diaphragm Wall Construction* and *Specification on Automation Design of Small Hydropower Station*, thus paving the way for the internationalization of Chinese standards.

10. Participation in “Lighting Africa” Project

As specially invited experts by IN-SHP, two senior engineers of HRC Zhou Weiming and Rao Dayi paid an investigation tour to Sierra Leone

and Liberia from Nov 25 to Dec 9 with an aim to conduct on-site topography survey, flow measure and load investigation of the supply district. After returning back to China, they compiled a report and conducted some designing work, including the developing modes and overall layout, the choice of installed capacity and electromechanical equipment, power supply modes and investment estimate, etc. This report would be important evidence for UNIDO to assist in the development of the stations.

11. Participation in the renewable energy project of UNESCO

Entrusted by UNESCO, HRC has undertaken a Research Project on Arabian Renewable Energy Framework which contains the development and consultancy of two SHP projects. From Dec.26th, Vice Director of NRIRE Mr. Huang Jianping and senior engineer Mr. Rao Dayi went to Sudan to conduct a 10-day SHP project consultancy. During their stay in Sudan, the experts investigated and collected materials for the water transfer project of Jebel Aulia reservoir which was yet to be developed and they held discussions with Sudanese partners. The two SHP projects belonged to canal development type with mass flow and super-low water head, thus being quite unique. The transfer project of Jebel Aulia

Reservoir is a large hydraulic project with a purpose to transfer water from the White Nile River to the western desert area of Khartoum so as to improve the living and producing conditions of the people there. The distribution distance of the project is 60 miles with a distributing flow of 230 m³/s. HRC will complete the preliminary investigation with local consulting agencies thus laying foundation for the Sudan side to attract investment.

12. International Exchange for SHP Information

We have finished revising and publishing of *Rural Hydropower and Electrification in China (2nd Version in English)*. *The SHP NEWS in 2009 (English Version)* will soon be published. The first China SHP Forum which will be co-hosted by the SHP Special Committee of China Society for Hydropower Engineering, the Special Committee for Hydroelectric Power of Chinese Hydraulic Engineering Society is under preparation. Up till now, the collection of the papers for the forum has been completed and about 50 papers among more than 70 papers collected would be published as an album on the 2nd edition of SHP in 2010.

The domestic and international influence of our website is expanding, rendering it an important platform for international publicity and for HRC staffs to be better informed about HRC. The English website of HRC has published about 50 pieces of news, thus promoting the global influence of HRC on hydropower domain and spreading China's SHP.

In 2009, HRC has conducted 10 scientific research programs, among which 8 has been approved and 2 are ready to be approved; 7 projects have been conducted as scheduled and the promulgation and revision of 25 national and industrial standards have been undertaken.

21 papers by HRC staff were published in 2009 (See attached Table 3).

III. Hydropower equipment export

Due to the influence of the global financial crisis in 2009, the implementation of hydropower projects was delayed, commercial negotiations became more difficult, but after the hard negotiation, HRC signed 3 trade contracts with Turkey, with a total amount of about 7.54 million U.S. dollars.

The signed contracts were implemented successfully in 2009, the three projects Akcay, Yalnizca and Pinar in Turkey started at the beginning of 2009, Keklicek and Sandia projects have been stationed in site respectively in May and June. With the hard work of project teams and strong backup, all these 5 projects have been successful. The 2 projects in Peru have also been put into commercial operation successfully.



Akcay SHP Station in Turkey

In 2010, according to the plan, at least six Turkish projects will be completed.

IV. Overseas Hydropower Engineering Design

In 2009, HRC took charge of the documenting for the complete hydropower set of electromechanical equipment for Upper Baiune Hydropower Station in Papua New Guinea, the electromechanical

engineering design for Guangjiang Hydropower Station, as well as the 220V substation project of Than An Hydropower Station in Vietnam.

Projects under execution: Engineering design of Than An Hydropower Station in Vietnam, engineering design of Menghon Hydropower Station in Vietnam, preliminary design appraisal and power tender design for Shav Station in Vietnam.

V. Foreign Guests Reception and Outbound Missions

1. Foreign guests hosted by HRC in 2009, altogether 21 batches with 80 guests.(see attached Table 1)
2. HRC's outbound missions in 2009, altogether 12 groups with 21 peoples (See attached Table 2).

VI. Work plan for 2010

1 Chinese government increases investment in personnel training for Africa and ASEAN nations, it is an opportunity for HRC to actively bid to organize the foreign aid workshops on small hydropower sponsored by the Ministry of Commerce, so as to cultivate more professional and

technical personnel for the international small hydropower industry to make our greater contribution.

2 Intensifying international cooperation and exchange and conduct researches on the foreign institutional mechanisms for rural electrification, eco-friendly hydropower development management and technology and enforce the standard internationalization work, as appropriate.

3 We will expand actively foreign small hydropower design, consultation and equipment market, enlarge step by step the hydropower market of North-America, South America and African countries and strive for more international cooperation projects in 2010.

4 Plan to hold small hydropower equipment exposition in Macedonia in March.

5 Send a delegation to Zambia and other countries to explore small hydropower cooperation including training.

Table 1 Foreign Guests Hosted by HRC in 2009

NO	Time	Country/Organization	Delegates	Objectives & results
1	2/23	President's energy consultant Doctor MAJIDULLA, Roving ambassador Mr. AHMAD, President of Energy Research Council Dr ALTAF and etc	4	Held talks over the development of SHP in Pakistan. The Pakistani side highly praised HRC's work to promote the development of SHP in developing countries via SHP training workshop and technology services. Dr. MAJIDULLA also brought some details of some reconstruction or new project for experts in HRC.
2	3/31	General Manager of PIK ENERJI and representatives of ENERMET, Turkey,	5	The two sides held talks on the process in cooperation on Turkish energy market and development project of renewable resources of energy (hydropower, wind power and solar power), which paved the way for further cooperation.
3	4/2	Director of international relationship division, Economic and Trade Office, Nordland County, Norway	1	Leaders of HRC introduced our work and the development of small hydropower in Zhejiang; Mr. Per Eidsvik introduced the development of SHP in Norway and expressed his wish for the cooperation in field of SHP with HRC in order to contribute more for global small hydropower development.
4	4/24	Serbia, general manager of ELINS DOO, etc	3	Leaders of HRC introduced HRC. The Serbian side praised HRC's contribution to promote global SHP and achievements in foreign aid training workshops. Both sides detailed several potential projects in Serbia and some SHP equipment supply issues and discussed cooperation mode. The Serbian side

				expressed their wishes to cooperate with HRC in SHP, such as to import equipment from China and to send participants to attend SHP training.
5	7/1-6	Turkey Kulak company	1	Visited some equipment manufacturers to prepare for the later phase of the project.
6	7/11-20	Turkey Akfen HEPP Investments Company	3	Examined the production process of 6 equipments of AKFEN, and witnessed the experiment.
7	8/3-11	A group of delegation from Ministry of Industry and Commerce, Ministry of Finance , and 4 big National Banks in Vietnam	13	Came to learn China's achievements and experiences in SHP development, visited Zhejiang Fuchunjiang Hydropower Equipment Co., Ltd etc, and comprehended the production capacity of China's hydropower equipment and Chinese government's support for clean energy.
8	8/24-26	Delegates from Vietnam Academy for Water Resources	3	Visited HRC, Both sides conducted down-to-earth discussions over development of low head SHP station, cooperation on the SHP automatic technology, containerized hydropower technology and international SHP training, etc. A MOU was signed over these items. HRC also arranged visit to Jinlun Group Corporation and containerized mini hydropower station in Jinhua City for the three delegates.
9	8/27	20 delegates from Beijing University and GWP	20	Visited Westlake water resource committee, discussed issues about water treatment.
10	9/1	Teacher of Cape Peninsular University of Technology South African	1	The visitor is HRC training workshop's participant, he expressed his strong aspiration to co-operate with HRC to develop SHP in South Africa, He promised to collect materials for the potential SHP sites and he would

				select two sites for SHP demonstration stations which would be jointly developed by South Africa and HRC.
11	9/5	Turkey ELTES MUHENDISLIK	1	Business trip.
12	9/6-9/11	Turkey Balsuyu Company	1	Hydropower project equipment inspection
13	9/6-9/12	Turkey PIK ENERJI company	2	Business trip.
14	9/13	Turkey Ram Kaji Paudel Company	3	Hydropower project equipment inspection
15	9/16	Turkey PIK ENERJI Company	3	Business trip
16	10/14	Nigerian National Agency For Science & Engineering Infrastructure	2	Two sides held talk in SHP equipment manufacturing, project development, project design and consulting and human resources training in Nigeria. The Nigerian side expressed their aspiration to co-operate with HRC in the field of Hydropower in an all-round manner. An MOU was formed over the cooperation and division of efforts for the next stage.
17	10/16-23	Turkey PIK ENERJI Company		Negotiated a new project.
18	10/20	Indonesia Kencana group	5	Visited HRC, looking for potential opportunities for cooperation.
19	10/29	Nepal Executive Director of HULAS Steel Industries and delegate from local representative office of HULAS in Shanghai	2	Business trip.
20	11/16	Sudan, Hydropower expert Mr. Hassan	1	Mr. Hassan made a detailed introduction about the distribution of abundant water resources in Sudan, and discussed a lot about the

				developing mode and technical scheme with the leaders and experts of HRC.
21	11/2 9-12 /2	TGC Delegation from Thailand	3	Held talks over the cooperation in the field of small hydropower and other renewable energies.

Table 2 HRC's Outbound Missions in 2009

NO	TIME	Delegate	Country	Objectives & results
1	3/15-2 3	1	Turkey	Attended 5 th World Water Forum
2	4/17-2 1	2	Nepal	Visited and participated a bid for local power station called Bhairabkund Khola (2×1500kW)
3	5/16-7/ 23	2	Turkey	For the cooperation on Keklicek and other hydropower projects. Discussed about hydro equipment export.
4	6/13-6/ 21	2	Turkey	Held talks over Bayramhacili project and other projects, and discussed the purchase of hydro equipment from China.
5	6/13-6/ 28 6/13-7/ 12 6/13-7/ 25	3	Turkey Macedo nia	Pre-negotiation for hydro power station project. Discussed the purchase of hydro equipment from China.
6	6/27-9/ 25	1	Turkey	To give installation instructions for implementation of the SHP project.
7	9/5-10/ 3	1	Sweden	Participated in advanced hydropower management training in 2009
8	9/27-1 0/2	3	Peru	Upon invitation by the organizing committee, Mr. Dong Dafu, Mr. Lin Ning and Mr. Xu Wei from Hangzhou Yatai Hydro Equipment Completing Co., Ltd. (briefed as Hangzhou Yatai), a sub company of Hangzhou Regional Center (Asia-Pacific) for Small Hydro Power (HRC) attended the XVIII National Congress on Mechanical and Electrical Engineering

				(briefed as CONIMERA) held in Lima, Peru from September 28 to October 1, 2009.
9	10/16-11/16	1	USA	Vice Director of NRIRE Mr. Huang Jianping participated in the Advanced Technological Training Workshop for Hydrology and Water Science organized by NHRI.
10	11/3-11/12	1	Turkey	Exchanges and cooperation in the implementation of projects. Discussed purchase issues.
11	11/25-12/9	2	Sierra Leone and Liberia	As specially invited experts by IN-SHP, two senior engineers of HRC Zhou Weiming and Rao Dayi paid an investigation tour with an aim to conduct on-site topography survey, flow measure and load investigation of the supply district.
12	12/27-1/5	2	Sudan	Entrusted by UNESCO, HRC has undertaken a Research Project on Arabian Renewable Energy Framework which contains the development and consultancy of two SHP projects. Vice Director of NRIRE Mr. Huang Jianping and senior engineer Mr. Rao Dayi went to Sudan to conduct a 10-day SHP project consultancy.

Table 3 Papers issued both at home and abroad in 2009

N O.	Title of Academic Papers	Magazine/Conference	Serial Number	Category	Author
1	Analysis on the Simulation of Complementary Power-generating System between Wind Power and Hydropower	PROCEEDINGS Bridging Divides for Water. 5 TH WORLD WATER FORUM. Istanbul, Turkey. March 16-22,2009		International academic conference	Xu Jincui、 Lin Ning、 Dong Dafu、 Zhang Wei

2	On the SHP Mission in Kenya	UK 《Water Power & Dam Construction》 September 2009	ISSN 0306-400X	Foreign academic journals	Pan Daqing、 Lin Xuxin
3	Research on sustainable development of Small Hydropower in China	《China Rural Water and Hydropower》 2009, NO.4	ISSN1007-2284	Domestic Chinese core journals	Cheng Xialei、 Zhu Xiaozhang
4	Research on the ecological environmental impact China's small hydropower development	《China Rural Water and Hydropower》 2009, NO.4	ISSN1007-2284	Domestic Chinese core journals	Chen Xing
5	Research and practice on intelligent control technology of hydropower development	《China Rural Water and Hydropower》 2009, NO.10	ISSN1007-2284	Domestic Chinese core journals	Xu Jincai、 Dong Dafu、 Xiong Jie
6	Small hydropower in Europe in predicament strive for new opportunities	《China Rural Water and Hydropower》 2009, NO.11	ISSN1007-2284	Domestic Chinese core journals	Zhao Jianda
7	Environmental impact assessment guidelines for loan approval for small hydropower project in EBRD	《Small Hydro Power》 2009, NO.1	ISSN 1007-7642	Domestic Chinese Ordinary Journal	Zhao Jianda
8	Intelligent control and management technology for rural hydropower development	《Small Hydro Power》 2009, NO.1	ISSN 1007-7642	Domestic Chinese Ordinary Journal	Xu Jincai、 Dong Dafu、 Xiong Jie

9	Technology development of very low head small hydropower station	《Small Hydro Power》 2009, NO.2	ISSN10 07-7642	Domestic Chinese Ordinary Journal	Cheng Xialei Zhao Jianda
10	A simplified flooding calculation in design of consolidation and danger release of small reservoir	《Small Hydro Power》 2009, NO.4	ISSN10 07-7642	Domestic Chinese Ordinary Journal	Rao Dayi
11	Exercising duty on management of hydro-energy resources development and well performing supervision on safety of rural hydropower	《Small Hydro Power》 2009, NO.4	ISSN 1007-76 42	Domestic Chinese Ordinary Journal	Xu Jincai、 Zhang Wenyu
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