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## **SHP Worldwide**

### ***ENERGEX 2008 congress will be held, 06-10 July 2008, Vienna/Austria***

ENERGEX will take place in Vienna from 6th – 10th July 2008 and is to become a high-profile, global platform on energy issues. The motto of next year's congress is "Energy for Human Development and the Protection of the Environment".

ENERGEX has been set up by the International Energy Foundation (IEF), an association of scientists and energy experts. The foundation calls for a worldwide collaboration on a scientific level in the field of energy and climate change. The aim is a better production and supply of energy with respect to climate protection and sustainability.

ENERGEX 2008, an expected 2000 participants will discuss aspects of global energy production and distribution. The organisational committee as well as the scientific committee of the congress are made up of renowned scientists from India, China and Europe – among them Prof. Josef Spitzer and Prof. Thomas B. Johansson, as well as representatives from international organisations such as the IEA, UNIDO, OPEC, IIASA and IAEA.

ENERGEX serves as a platform for international experts with diverse economical, political or technological background. It focuses on the question of how energy can globally stimulate human and social development. The congress is being endorsed by UNIDO, UNEP, the European Commission as well as IIASA.

Source: IN-SHP

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### ***Hydraulic Machinery Symposium Oct. 2008 Brazil***

IAHR 24th Symposium on Hydraulic Machinery and Systems will be held during Oct. 27-31, Foz do Iguassu, Brazil.

IAHR 2008 will be 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.

Source: Small- hydro Atlas

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

12-13 June 2008, Bled, Slovenia Hidroenergia 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. With more than 17 800 small hydropower schemes and a total of installed capacity 12 333 MW in EU-27, the Small hydropower sector plays an important part in meeting today's urgent need for clean energy. The straightforward concept of generating electricity from the energy of water turning the blades of a turbine has been developed and refined so that hydro schemes are able to immediately respond to fluctuations in electricity demand. 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 Hidroenergia 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

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### ***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 Alternative 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 (PIIB) 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.

Source: HRC

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## **SHP in China**

### ***China has combed out 3415 illegal rural hydropower stations of various types for the past 5 years***

---On April 18th, 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%, 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 shall 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.

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## HRC News

### *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 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.

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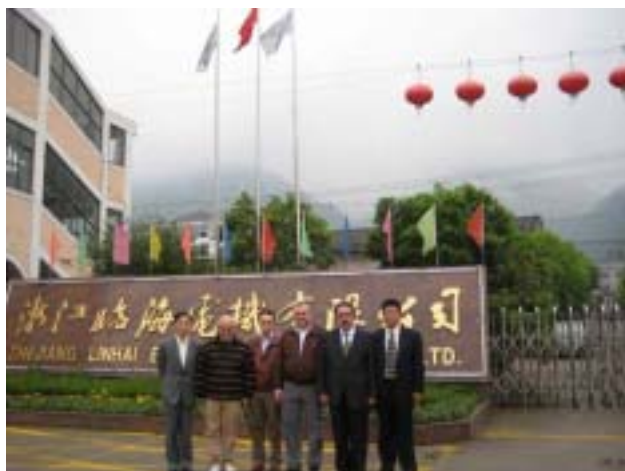
### *Philippines Guests Visited HRC*

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

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### *Turkish Customer Visited HRC*

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



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### ***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 agrees that this project brings both economic and social benefits and has a bright prospect for application.

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### ***Second workshop on SHP CDM project capacity building kicked off 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 Generation Committee of CHES. 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.



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### ***HRC Ready for the disaster relief & reconstruction***

---After the earthquake in Wenchuan of Sichuan province on 12 May, HRC staff have been active in donation for earthquake relief and sending their love and condolence to the quake-affected people.

HRC is ready for the disaster relief and reconstruction efforts in the quake-affected areas.

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### ***Boundless Love——Donation by International SHP Participants***

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

In all 58 participants from 34 countries attended the Training Workshop of Small Hydropower Technology. Despite that they are from various regions, with different colors, 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" are frequently uttered by our participants when they speak of the earthquake disaster in the Sichuan Province of China. Speeches, though short and simple, are 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 and \$ 100 in total. Money donated is limited, but the love disseminated is priceless. Join the love relay and help those affected people by the disaster.

Staff from the Hangzhou Charity Federation, officials from the Jiulian Community where the training program is being held, and some leaders of HRC are present at this ceremony. Journalists from the Zhejiang TV Station Channel 6 interviews some of the participants and HRC leader.

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### ***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 and from so many countries since HRC's establishment in 1981.

In his speech at the closing ceremony on 23rd June by Mr. Mu, the division chief of the Executive Bureau of Economic Cooperation of 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 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) is further strengthened.

Gomez who comes from Dominica commented: firstly I want to express my sincere gratitude and appreciation to the government and people to 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 there were so many participants in this training workshop. Nevertheless, 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 Hang Zhou.

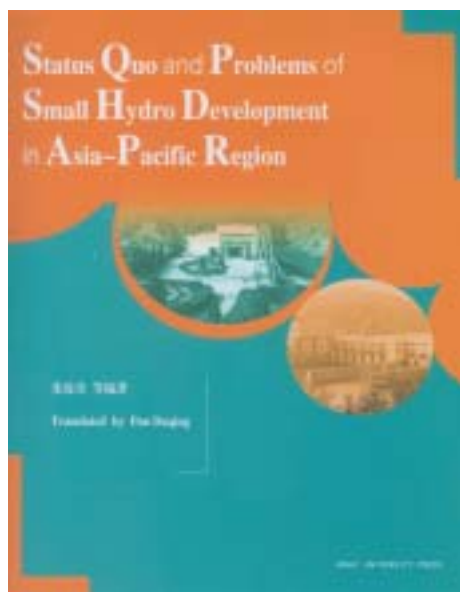
Nevertheless, the training organizer of HRC will spare no effort to observe, reflect, analyze and take necessary measures based on the recommendations by the participants, as there is still much room for improvement in implementing the training program in future.





## New Publication

HRC's book 《Status Quo and Problems of Small Hydro Development in Asia –Pacific Region》 has been translated into English and been published in March this year. The geographical scope of the book focused on the developing countries of Asia-Pacific region, but also covering some developed countries and developing countries worldwide. Here is the comprehensive conclusion of the book.



### ***Comprehensive Conclusions of Status Quo and Problems of Small Hydro Development in Asia –Pacific Region***

#### **1 Resource and Development**

Research shows that the SHP resource in the world is abundant. Due to different specifications of statistics and varied computation methods for the ‘exploitable’, the total figure is hard to obtain. Yet, according to the standard from most countries, the world exploitable small hydropower potential (<10MW) is around 120-144 mil kW (that of China included is estimated to be 70 million kW). The statistics of 2003 show that current exploited SHP is 29~37 million kW only (The current exploited SHP 28.48 million by 2002 in China is based on that <50 MW, which could not directly be added), roughly 20~26% of the total exploitable. That is the average figure globally and each country differs greatly with another. The SHP installed capacity in operation in most developing countries is below 100 MW. There are only 27 countries each with total SHP installed capacity over 100 MW (in which developed countries 20 and

developing ones 7). This situation illustrates that the SHP exploitation in developing countries has not been satisfactory so far.

## **2 Effect and Position of SHP**

——Proportion of SHP in the whole hydropower globally is around 5~6%. Each country differs with another. In China it is about 30~40% (according to different specifications of statistics). It is around 10% in European countries on average and only 1~3% or even less than 1% in many developing countries.

——The proportion of SHP in the whole electric power industry is averaged around 1% in the world. Each country also differs with another. In China it is 6~7% and in many developing countries far less than 1%.

——In regard with the contribution of SHP to the rural electrification, in most of the countries in the world it is realized through the extension of state grids. Although the international media all deem it not economic and rational for the large grid to reach the hilly remote areas, the actual development over the past two decades demonstrates that the change in this regard is limited. The level of rural electrification in many developing countries is not low. The average level in Asian countries accounts for 67.3% and 90% or even higher in some countries such as Malaysia, Thailand, the Philippines and Brunei. However, both their SHP production and supply area are quite limited. The only exception is China. For the past two decades, 653 Chinese counties have realized SHP based rural electrification, representing one third of the total counties in the country. Such unique experience of a country has not yet been well disseminated internationally so far. Why? It is worth deliberating. How to purposefully strengthen the international exchange and cooperation should be one of the important tasks for Chinese professionals engaged in international SHP cooperation to study deeply and offer consultation and suggestions (Preliminary analysis has been made in chapters 3, 4 and 5 of this book).

## **3 The Status Quo of SHP Incentive Policy and Its Effectiveness**

1) Macro policy environment. Since the 1980's, international macro policy environment has been very favorable for SHP development. The world oil crisis at the end of the 1970's resulted in the large-scale quest of the world energy sector for "alternative energy" to replace the conventional energy. Among the numerous new and renewable energies, SHP is the most viable one and being favored. After the 1990's, environmental issues internationally were highly paid attention to. Such international agreements as the *United Nations Framework Convention on Climate Change* (UNFCCC) and *Kyoto Protocol* led to the further affirmation of importance for the "green energy" SHP. Over the past 20 years, the world media has widely and actively encouraged the exploitation of SHP. The international organizations, conferences and various events have been vibrant, appreciating the role that SHP plays to rural electrification and rural economic development, particularly in the developing countries. The macro environment, however, may not necessarily have direct influence to some developing countries. The specific conditions, policy and measures in each country are the decisive factors to the actual development.

2) There have been a lot of stimulating policies in developing countries, but without ideal result. Over the past 20 years, numerous developing countries have

issued a series of incentive policies, with many similarities and some differences. Several achievements have been scored, but the set targets have not been hit in most of the cases. Each country differs with another and reasons complicated, hard to sum up. Some inferences are made in combination with the study of the subject:

——SHP itself is not quite competitive;

——Although the macro social, economic and environmental benefit of SHP is very good, under the condition of overall market-oriented economy, it could hardly bring about direct benefit to the investors.

——How to quantity the macro benefit is not yet solved, which affects the evaluation of SHP economic benefit in a large degree;

——SHP involves many different sectors including water, power, environment, agriculture and etc. It is often unrealistic to implement the stimulating policy from a single sector. If various contradictions are not coordinated directly by the top level administration, many of the stimulating policies may remain a mere formality, unable to operate and to score anything.

——Although many international organizations and mass media support the development of SHP, those international organizations with real power and doing real financing like the World Bank put strict and harsh requirement to the endorsement of financial assistance to SHP development, with complicated procedures. Many developing countries heavily reply upon them, but few get the assistance.

——Financial crisis and political turmoil more or less hinder the exploitation of SHP.

#### **4 SHP Benefit Issues**

The theoretical research of some benefit issues is mature and much in agreement in China and elsewhere in the world. For example, there is a lot of research findings or even norms set forth on the micro economy benefit of certain concrete project and this book is not intended to explore repeatedly. For some issues such as macro social benefit and ecological benefit, only qualitative conclusions have been made both at home and abroad, due to the fact that the quantitative computation issue has not yet been solved. It is a big theme how to include and calculate the macro social, economic and ecological benefit for a concrete project so as to increase SHP's capability to compete with the traditional large and medium power projects. Due to the limitation of human resource, this part is not elaborated at present. Based on the concrete situation, this book explores the actual evaluations on various SHP benefits of and impact to developing SHP both in China and other countries. Comparisons have been made and the main conclusions are as follows:

1) In most of the developing countries, the SHP economic (financial) benefit is generally not ideal, mainly due to the lower selling price or off-take tariff to the grid, in comparison with the high initial cost of the engineering. It could hardly sustain without governmental subsidy (like price subsidy and investment subsidy). That is one of the fundamental reasons for the slow SHP development. In China, the situation has been constantly changing for the past decades, with the change of macro economic environment, supply and demand of electric power, the adaptation of new mechanism and settlement of stimulating policy etc. Several crises of SHP development have occurred owing to the low electricity price and low benefit. With

the “electricity hunger” which has emerged in the recent years in China, the SHP off-take tariff has been raised considerably (e.g. 0.4~0.5 RMB Yuan per kWh) in many areas and benefit increased, leading to the new drive of SHP exploitation.

2) The macro social, economic and ecological benefit has only been recognized at the theoretical level or by the mass media in many developing countries. In reality, it has not been turned into the initiatives for developing SHP by the local governments, let alone by the international funding agencies or private funds. The reason of large scale and rapid development of SHP in China in the past decades lies in the fact to a large extent that the macro benefit has been substantially recognized by both the central and local governments, connecting such benefit with the “government benefit” or “benefit of official track record”, playing a key role in mobilizing the SHP initiatives for the local governments to promote SHP exploitation. Together with the timely adjustment and coordination of the incentive policies by the central government, SHP development has been thus greatly stimulated. That is one of the important “Chinese features”.

3) SHP’s impact to the environment is less compared to the conventional energy and even the large hydropower. The international study shows that in terms of land occupation there are different direct land demands for different sources of energy development. The hydropower stations with reservoir occupy the most land, the fossil fuel power stations less, the hydropower stations with run-off river type the least. Further more, the emission of CO<sub>2</sub> from the hydropower stations with run-off river type is also the least among all the sources of energy (for details please refer to chapter 4). The conclusions are the exploitation of SHP stations with run-off river type will be much favored in the coming years when there is severe shortage of land and urgent need for resolving the pollution issue. Nevertheless, both small and large hydropower have been reconfirmed and recognized by the world community as the renewable energy. We should treat them comprehensively and objectively.

4) It is controversial in developing countries to use the seasonal energy from SHP and “substitute firewood with electricity” for environmental protection. Some countries do not believe that such implementation has a big role to play. Some countries are theoretically in favor, but have confronted many difficulties in practice. They would demonstrate in a small scale and limited manner. Since the 1980’s, China has been implementing this activity effectively. Based on the experience of over 20 years practice, the ecological protection project of “SHP replacing firewood” was formally launched in China in 2003. According to the plan, 28.30 mil rural households will benefit from the campaign by the year 2015, saving 140 million ton of firewood and protecting 340 million m<sup>3</sup> forest. That is a pioneering work and probably a measure of enormous scale for environmental protection with Chinese features, unique in the world (for details please refer to chapter 4).

## **5 Private Participation in SHP Investment**

Since the 1980’s, the international community has shown keen interest in “deregulation” and “privatization” in the international power sector including hydropower sector. At a time it became fashionable to attract the private investors to the SHP development, and more flourishing in the 90’s. Some developing countries issued incentive policies, encouraging the private developers to SHP. However, in

recent years, the development has not been as expected. Experts in both developed and developing countries have made analysis and comments, appealing that measures be taken for improvement by the related international organizations and countries. The situation in China is different. Private participation in SHP development has been escalating in the recent years. The private investment in SHP has been springing up like mushrooms after rain as a result of nationwide power shortage. To conclude, the main reasons are: Private enterprises has been booming and anxious to seek their capital way out; the electricity price has been increased due to the severe shortage of electricity and the payback from SHP investment remains stable; policies and measures have been preferential; the admission to market has been loosen and the market has become the paradise for investment (for details please refer to chapter 5).

## **6 Promising Prospect**

Over the 20 years development of SHP in the world, although there are some problems especially its development in the developing countries are not as expected, the macro situation is favorable for the development of the renewable energy including SHP. Meanwhile, the rural development in each country leads to the increase of the demand of decentralized power source. Therefore, their development plan and policy are positive to SHP exploitation. What is important is to find out the main obstacles, analyze the causes, adjust the policies timely, coordinate and resolve the contradictions. The global SHP will be further developed in a positive direction and become a not negligible force in the world energy especially in the world rural energy development.

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