

# DFID

## **EU-CHINA SMALL HYDRO WORKSHOP AND TECHNOLOGY GUIDE**

R7172

Final Report  
*June 1999*

ITP Ref: 98608  
June 1999

# DFID

**Project title: EU-China small hydro workshop and technology guide**

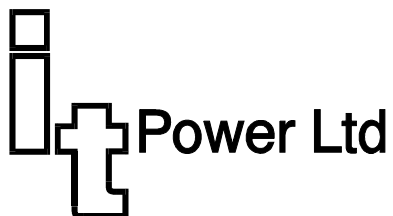
**Subsector: Energy**

**Theme: Energy efficiency**

**Project No. R7172**

**Reporting Period 1/10/98 - 31/3/99**

**IT Power Reference ITP/98608**



The Warren, Bramshill Rd  
Eversley, Hants, RG27 0PR, UK  
Tel: +44 118 973 0073  
Fax: +44 118 973 0820  
Email: [itpower@itpower.co.uk](mailto:itpower@itpower.co.uk)

**ITP Ref: 98608**

**June 1999**

**EU-China small hydro workshop and technology guide**

# I.T. Power Ltd

## Final Report

covering the period from 1/10/98 - 30/4/99

### **1. OBJECTIVES OF THE PROJECT**

The overall aim of the project was to enhance the level of practical co-operation between the SHP industries of Europe and China so as to promote 'better quality and lower costs' in responding to the market needs of small hydro projects.

The project had the following principle objectives:-

- to exchange information on state-of-art technologies and innovative developments in the field of small hydropower in Europe and China through the publication of an Industry Guide for each region.
- to provide a forum for exchanging ideas and experiences in SHP development through the staging of a joint EU-China workshop in Hangzhou, China
- to discuss and recommend a joint strategy for accelerating the uptake of SHP systems worldwide
- to establish a permanent networking relationship between key Chinese and European SHP organisations, and to raise the international profile of the International Network on Small Hydropower (IN-SHP) to enable it more effectively to promote the concept of SHP world-wide (particularly developing countries).

### **2. WORK CARRIED OUT IN THIS PERIOD**

The key activities undertaken in this period are summarised as follows:

#### **2.1 Industry Guide**

- Circulation of industry questionnaire within EU and China.
- Collating responses and compiling Guide content.
- Writing the introductory sections
- Chasing up of late-comers
- Negotiating and letting the printing contract.
- Printing 500 copies of the Guide
- Distribution of the Guide to conference delegates and contributors to the Guide.

#### **2.2 EU-China Workshop**

- Inviting key-note speakers for Day 1 of the conference.
- Designing and printing conference registration leaflets
- Circulating conference registration leaflets within EU and China.
- Compiling abstracts from proposed speakers and selecting papers.

- Deciding on allocation of travel grants for developing country and EU delegates.
- Procuring written papers from the chosen presenters.
- Administration of registrations and sending out conference and travel details.
- Administration of travel grants.
- Detailed liaison on conference content and logistics with IN-SHP.
- Preparation of IT Power papers for the conference
- Final preparations in China and compiling the conference proceedings
- Co-organisation and attendance of the conference and study tour.
- Conference conclusions and evaluation.

### 3. RESULTS

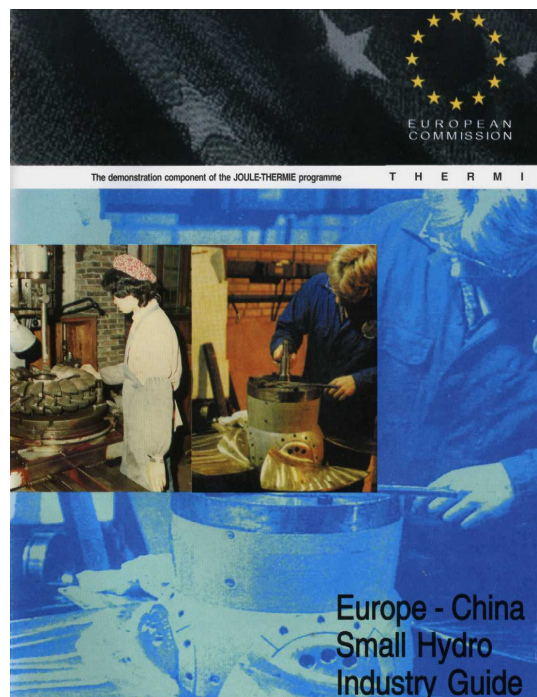
#### 3.1 Project Deliverables

The principle project deliverables were stated as:

- an Industry Guide containing product summaries of small hydro hardware and services available from Europe and China.
- a 3-day Workshop to be held in Hangzhou, China, for manufacturers and developers from the EU, China and SE Asia
- a Workshop Report summarising the measures that the SHP industries of China and Europe believe can accelerate the global implementation of SHP systems.

#### 3.2 Industry Guide

- A copy of the Europe China Small Hydro Industry Guide is attached with this report. It has been produced as an A4 black and white printed publication, with European and Chinese contributions combined in a single volume.
- The Guide presents summaries of the technology and capabilities available from 37 European and 24 Chinese enterprises active in Small-Scale Hydro Power (SHP). The Guide covers both equipment manufacturers and specialist consultants, providing brief company summaries in a standard format followed by selected details of products or projects. All entries were contributed voluntarily by the participating organisations and two A4 pages were made available (free of charge) for each company.
- The Guide is introduced by two overview papers, covering the status of small hydro in Europe and China, followed by a table summarising the scope of services available from each organisation.



### 3.3 EU-China Workshop

#### 3.3.1 Overview

- The 3-day conference was held at IN-SHP headquarters in Hangzhou from April 19th-21st 1999.
- The conference gathered nearly 150 delegates from China, Europe and countries of southern Asia, encompassing manufacturers, developers, researchers, and consultants, plus high level representation from the Chinese Government. Hardware suppliers from UK, Germany, Finland, Denmark, Ireland, France and Switzerland were represented.
- The conference announcement and registration leaflet is attached as Annex A, summarising the background, objectives and key-note presentations for the conference.



#### 3.3.2 Content

The conference programme is included as Annex B. A number of impromptu presentations were made by delegates during the conference, not recorded in the programme, and a range of smaller group meetings were organised on request to cover specific topics.

#### 3.3.3 Exhibition

An exhibition ran in parallel within the same venue at IN-SHP headquarters, attended by 5 Chinese companies and Wasserkraft Volk of Germany. Product literature was freely distributed by other delegates.

#### 3.3.4 Study Tour

A 2-day study tour was organised to Jinhua Province, 4 hours drive West of Hangzhou, attended by 28 delegates. The group visited:

- **The Yangpushan Power Station**  
3 x 200kW and 3 x 400kW vertical Kaplan turbines at 4.2m head.
- **The Jinhua Hydraulic Machinery Works**  
manufacturers of Francis, Pelton and Propeller turbines
- **The Tching Lang Power Station and Dam**  
3 x 1800kW Francis turbines operating off 22m head.

- **The Jinhua Electrical Machinery Factory**  
manufacturers of synchronous and induction generators up to 8MW.
- **Central Jinhua Power Station**  
4 x 1MW turbines at 2.8m head, run-of-river with the barrage formed by a rubber weir.



*Standardised Francis and Pelton casings at the Jinhua Hydraulic Machinery Factory*

#### **4. IMPLICATIONS OF THE RESULTS OR FINDINGS FOR ACHIEVING THE OBJECTIVES OF THE PROJECT**

The key conclusions of the conference regarding Europe-China collaboration on small hydro are summarised as follows:

- The conference was a joint initiative with DFID of the Thermie programme of the European Commission. Mr Henri Pauwels of DGXVII confirmed that the EU is keen to foster closer links with China in promoting European technology in the fast-expanding energy sector. He announced that an agreement had recently been signed allowing Chinese organisations to be involved in research programmes of the EU.
- The Ministry of Water Resources confirmed that China is seeking foreign investment to achieve its targets of 1000 MW of SHP per year. In the coming decade, the Chinese market will be bigger than the rest of the world put together. As many as 80 million rural Chinese still do not have access to electricity and SHP is seen as a key solution for improving the economic growth rate in China's vast rural areas, many of which have rich hydraulic resources.
- However, presentations from international developers noted that although the Electric Power Law of 1996 committed that "the State will encourage and introduce foreign financial sources to invest in exploiting electricity sources", there remain a number of challenges facing foreign investors in dealing with the Chinese system which has not yet fully evolved its legal and commercial sectors to support business from outside the country.

- Although China is unlikely to procure European turbines, since it is not short of turbine manufacturers (supplying at amazingly low prices), there was nevertheless great enthusiasm from over 50 Chinese companies represented to explore collaborative possibilities with European firms. Their requests were based around the desire to improve the quality and range of their products, to access markets beyond their own country, and to add credibility to their operations through linking with a European ‘name’.
- A principal technical focus of the conference was in the field of control system technology and remote operation of systems. Due to lack of automation, many SHP stations in China have to maintain an operating staff of 10-20 persons, which is a heavy financial burden for a mini-hydro plant. Chinese mini-hydro systems are increasingly developed by a local community of shareholders, who are seeking the most cost-effective systems to install. The high requirement for manual operators is now acting as a major barrier to new economic projects.
- The first foreign control systems are now being demonstrated, but none yet from EU suppliers. EU companies will need to move quickly in order not to be at a competitive disadvantage against firms from USA and Canada in this huge market. IT Power organised a group meeting in order to present UK control system technology to Chinese manufacturers.
- There remain among EU companies a number of real and perceived barriers to doing business in China, since the language, culture, and business practices are very different from those in Europe. For example, typical questions were:
  - how can one identify and trust a Chinese business partner ?
  - what are the legal and business constraints on a foreign company ?
  - how can ownership of the design be protected ?
  - how can payments for imported technology be guaranteed ?
  - will the Chinese accept higher technical and quality assurance standards from Europe?
- There was a shortage of developers and investors at the conference (since it was primarily a technical gathering) and there was strong interest among the Chinese delegates for there to be a follow-up workshop focused more on the financing opportunities for small hydro in China and S.Asia. this might be held in a European financial centre.
- The size of the market opportunity is not in doubt, only the questions of how to access the market while being confident in the long-term business potential. There is a need for SHP companies across Europe to know how to enter and collaborate in the Chinese SHP market, and to be informed of the problems and opportunities.

## 5. PRIORITY TASKS FOR FOLLOW-UP

- 100 copies of the Industry Guide are now being distributed to UK and European SHP industry and other key decision-makers in this field. A further 200 copies are being circulated within China and other developing nations by the International Network on Small Hydro. The Guide will also be available on request from the internet sites of IT Power, IEE Kassel, and IN-SHP.
- A paper summarising the conclusions of the conference and summarising the status of SHP in China will be presented at the European Small Hydro Conference *Hidroenergia 99* in Vienna, October 99. A copy of the paper is attached in Annex D.

- UNIDO, who provided support in the organisation of the conference, expressed a willingness to co-sponsor a follow-on workshop in Europe to cover the financing and investment aspects of SHP in less-developed countries.
- The project team have agreed to maintain this successful EU-China collaboration and to prepare project proposals in the future to develop more concrete links and, in particular, to initiate technology transfer projects. One priority area was identified as being control system technology.

## 6. SUMMARY OF FINANCIAL EXPENDITURE

<b>COST CATEGORY</b>	<b>£</b>
LABOUR	8561.32
OVERHEADS	14317.80
TRAVEL GRANTS	15500.00
PRINTING, MATERIALS AND CONFERENCE EXPENSES	5192.29
TRAVEL & SUBSISTENCE	6355.57
<b>TOTAL</b>	<b>49926.98</b>

NOTE:

This project is cost-shared with the EU-Thermie programme. The costs in the table above relate only to the DFID contribution to the project.

## 7. NAME AND SIGNATURE OF AUTHOR OF THIS PROGRESS REPORT

Oliver Paish  
Project Manager

Signed: \_\_\_\_\_



<b>OUTPUT TO PURPOSE SUMMARY REPORT</b>				
<b>Title:</b> <i>EU-China small hydro workshop and technology guide</i> <b>Country:</b> <i>China</i>			<b>MISCODE:</b>	
<b>Report No.</b> <i>R7172</i>	<i>ITP/98608</i>	<b>Date:</b> <i>June 1999</i>	<b>Project start date:</b> <i>01/04/98</i> <b>Project end date:</b> <i>31/03/99</i>	<b>Stage of project:</b> <i>End of project</i>
<b>Project Framework</b>				
<b>Goal statement:</b> · To develop the use of renewable sources of energy.				
<b>Purpose statement:</b> · To enable higher quality and lower costs in small hydro manufacture, installation and management.				
<b>Outputs:</b>	<b>Objectively Verifiable Indicators:</b>	<b>Progress:</b>	<b>Recommendation/ actions:</b>	<b>Rating:</b>
<ul style="list-style-type: none"> <li>• Exchange of information on state-of-art small hydro methods and technologies through an EU-China technology guide and joint workshop.</li> <li>• Establishment of a plan of action and permanent networking relationships</li> </ul>	<ul style="list-style-type: none"> <li>• Printed Industry Guide</li> <li>• Attendance and contributions at the joint Workshop</li> <li>• Workshop proceedings</li> <li>• Final report and publicising of results</li> </ul>	<ul style="list-style-type: none"> <li>• Circulation of industry questionnaire.</li> <li>• Collating responses and compiling Guide.</li> <li>• Writing the introductory sections</li> <li>• Negotiating and letting the printing contract.</li> <li>• Inviting key-note speakers.</li> <li>• Designing and printing conference leaflets</li> <li>• Compiling abstracts and selecting papers.</li> <li>• Allocation of travel grants</li> <li>• Procuring written papers</li> <li>• Administration of registrations and travel grants.</li> <li>• Detailed liaison with IN-SHP.</li> <li>• Final preparations and conference proceedings</li> <li>• Co-organisation of conference and study tour.</li> <li>• Conference conclusions and evaluation.</li> </ul>	<ul style="list-style-type: none"> <li>• Project completed successfully</li> <li>• Industry Guides to be widely circulated.</li> <li>• Paper to be presented at EU small hydro conference, October 99.</li> <li>• Internet sites of project partners to be updated.</li> </ul>	
<b>Purpose:</b> To enable higher quality and lower costs in small hydro manufacture, installation and management.	<ul style="list-style-type: none"> <li>• New or improved products and approaches</li> <li>• Joint ventures and marketing agreements</li> <li>• Lower project costs</li> </ul>	<ul style="list-style-type: none"> <li>• Enthusiasm from over 50 Chinese companies attending the conference to explore collaborative possibilities with European firms. Their requests were based around the desire to improve the quality and range of their products, to access markets beyond their own country, and to add credibility to their operations through linking with a European 'name'.</li> </ul>	<ul style="list-style-type: none"> <li>• Europe-China technology transfer projects, with an immediate need for control systems of European quality.</li> <li>• Follow-on workshop focused on financing and investment in China for SHP projects.</li> </ul>	

## **Annex A**

- Conference Announcement and Registration Leaflet

## **Annex B**

- Conference Programme

## **Annex C**

- List of Delegates – European
- List of Delegates – Chinese
- List of Delegates – International

## Annex D

- Paper for the European Small Hydro Conference *Hydroenergia 99*, Vienna, October 1999 :-

“Accelerating Technical Cooperation and Market Development between the SHP industries of the EU and China”