

## 3.4 Annex IV – Renewable Energy Business Development

The DOE and the SETC signed the Annex IV Agreement, Renewable Energy Business Development, on October 25, 1996. The Chinese Center for Renewable Energy Development (CRED) is implementing or coordinating most of the activities under this Annex that are designed to encourage collaboration between Chinese and American industrial partners. The goals are to promote energy conservation and efficiency business development and to increase the use of renewable energy in China. To date, activities have included assistance on energy policy analysis, exchange of technical information, and business and professional training. These activities focused on relationship building, project identification, and providing access to available project financing.

There have been increasing business activities between American and Chinese firms since the Agreement was signed. Several trade missions have been conducted, both to China and to the U.S., involving leaders from industry and government in both countries. In 1998, the first U.S.-China industrial joint venture agreement on renewable energy was developed between, Oklahoma based, Bergey Windpower Company and Xiangtan Electric Generator Co., to produce and sell 10-kW wind turbines in China. They plan to produce 300 units annually in China to meet the rapidly growing demand and perhaps to supply China's "Brightness Program" for rural electrification, sponsored by the SDPC.

China has taken a variety of steps to encourage renewable energy business development. For example, import duty and taxes have been reduced or eliminated on some products. Since January 1, 1998, import duty was eliminated on wind turbines larger than 300 kW and the import duty on smaller turbines is 12 percent. There is also special tax treatment for projects qualified as "high technology," which would include wind, solar, and other renewable technologies. For industries or joint ventures registered in a "High Technology Development Zone," there is an exemption from income tax (typically 33 percent) for two years and reduced to half for three additional years. In addition, MOST and SDPC issued a special notice "Supporting the Development of Renewable Energy," encouraging domestic banks to give priority to construction of renewable energy projects, allowing 2 percent financing interest discount on loans, and providing other financial incentives [28].

### 3.4.1 Provincial Business Development Studies

Two business development studies have been performed under the sponsorship of the DOE in cooperation with CRED. Data was collected on renewable energy resource potential, local government and industrial interest in renewable technologies, procedures and rules controlling project implementation, and other factors that could influence the deployment of renewable energy either positively or negatively. The first study, conducted in late 1996, covered market potential in six provinces: Gansu, Inner Mongolia, Qinghai, Shandong, Xinjiang, and Zhejiang. The second study, conducted in June 1998, covered four additional provinces, Guangdong, Jiangxi, Jilin, and Yunnan, and addressed the changes that have occurred as a result of the restructuring in the central and regional governments. The resulting reports provided market information that could be useful for American companies considering entering China's renewable energy market.

One of the salient points of these studies related to the influence of tied-aid and subsidized loan programs provided by several European countries. The reports found that U.S. wind companies would have a difficult time competing with European firms on small projects. However, most of the tied-aid is limited to projects smaller than \$30 million and the U.S. Export-Import Bank can provide U.S. companies with loan terms and conditions that match the tied-aid offers from competitors. This matching aid has been em-

ployed on three wind power plant projects, each with ten 550-kW wind turbines built by the California company Zond Energy Systems, but this process is considered by industry to be a slower and more complicated than the European tied-aid approach. Tied-aid may be less important in the future, once larger renewable energy projects are undertaken, commercial or international bank financing and open competition will likely be used.

### **3.4.2 Support for World Bank and other Multilateral Programs**

The DOE, through NREL has supported activities of the United Nations Development Programme, the World Bank, and other multilateral institutions in China. In addition, the DOE has worked with U.S. renewable energy and energy efficiency industries, in their efforts to promote renewable energy and conservation as viable investment opportunities.

The DOE provided technical assistance, economic analysis, and wind resource assessments to the United Nations Development Programme and to the World Bank in support of their initiatives for renewable energy development in China. In one of the supported studies, the World Bank concluded that, "Provided certain policy and institutional constraints are removed, the study indicates that three technologies are ready for efforts aimed at large-scale market development of: grid-connected windfarms; solar PV, especially solar home systems; and bagasse cogeneration" [11]. The DOE and NREL technical assistance helped the World Bank to develop a renewable project, involving more than \$400 million in loans, now underway in China. In addition, the United Nations Development Programme is carrying out a \$26 million renewable energy program.

### **3.4.3 Business Development Mechanisms and Incentives**

The U.S. Export-Import Bank has offered China a \$100 million renewable energy credit facility. The amount of available financing was initially \$50 million in secured loans. This was later expanded to \$100 million and can be used for U.S. goods and services for a full range of renewable energy projects and for development of energy efficient technologies. Projects eligible for the loans include: wind, solar, waste fired cogeneration, geothermal technologies, bagasse fired plants, energy efficient building modifications, electric motor upgrade to more efficient designs, and other clean energy technologies. Applicants may apply for either direct loans or for loan guarantees. Repayment terms, debt coverage, and interest rates will be the best possible, within the guidelines of the Organization for Economic Cooperation and Development (OECD).

### **3.4.4 Training on Project Development and Financing**

Four people from the CRED participated in a series of training programs sponsored by NREL in the U.S. from June through September 1998. These training activities were designed to support capacity building in China through institutional participation in the programs for advanced development of project siting analysis capability, use of realistic economic analytical methods in project evaluation and development, and to transfer of U.S. experience in renewable energy policy development to China to encourage and accelerate similar efforts there. The training activities consisted of: (1) training in Geographical Information System (GIS) software support and analysis in partnership with Environmental Systems Research Institute, Inc. in Boulder, Colorado (ESRI), (2) life cycle cost analysis, and (3) U.S. renewable energy policy development and analysis to support commercialization of renewable technologies in the U.S.

In April 1999, SPCC organized and DOE conducted a workshop on "How to accelerate China's windpower development" described in detail in Section 3.2.6 of this report. The U.S. firm, Princeton Energy Resources

International, conducted the three-day workshop titled, “Wind Energy Business Development and Policy Analysis,” for 70 people selected by SPCC from their offices in Beijing, from regional power bureaus, provincial planning commissions, and private companies in the wind business. The goal of the training was to provide the participants with knowledge on key business aspects of developing large-scale wind plants, by drawing on the experience in the U.S. of installing more than 2,000 MW of wind plants. Topics discussed included: renewable energy financial incentives, wind power plant economic analysis, project financing and contracting, and factors affecting costs, in an effort to accelerate the development and deployment of renewable energy technologies, especially wind, in China.

Another training program supported by the DOE, allowed participation of five key people from the SPCC, electric power institutes, provincial power bureaus, and region planning commissions to participate in the annual Wind Energy Applications Training Symposiums in 1996 and 1997. The American Wind Energy Association organized these two-week training programs with funding from the DOE and other U.S. government agencies. The intensive symposium covered all aspects of wind installation development, financing, and operation in a full range of grid-connected and off-grid applications.

### **3.4.5 PV Industry Survey and Opportunities Report**

During September and October 1998, U.S.-based, Sherring Energy Associates conducted a 40-day mission to more than 11 cities in seven provinces in China. The mission was designed to investigate first hand, the status of the PV industry, applications, and markets in China and to evaluate business opportunities for U.S. companies in China. Assistance to the mission was provided by the CRED. A report was generated, titled “CHINA PV Business and Application Evaluation,” which is to be published by NREL in 1999.

The China PV report provides profiles and contact information for more than 20 PV companies operating in China in module and balance-of-system component manufacturing, system integration, and application development. An assessment is provided of the current status of the PV industry and market development in China, the current barriers to sustainable growth of PV markets, and recommendations for pursuing business in China. The report also provides some information on other domestic and international projects being developed in China using PV technology.

The study concludes that China’s solar photovoltaic production industry is growing rapidly, but is facing significant technical challenges. Specific conclusions are that: (1) There is a ready cash market for tens of thousands of solar home systems annually, (2) there are needs for improved equipment to mass produce cells, unified product specifications, and quality control standards for cells and other system components including charge controllers, (3) emphasis on “least cost” is resulting in low quality products, and (4) needs for demonstration programs to gain knowledge and experience at the provincial level.

### **3.4.6 PV Background Report**

The CRED has prepared a report titled “Commercialization of Solar PV Systems in China,” which is scheduled for publication as a bilingual report in 1999. The report provides a detailed overview of the various market sectors and applications for PV in China, including a historical overview of PV development in China. The report and study complement the PV industry survey report that was discussed in section 3.4.5. The report also provides specific information on companies in China which have qualified for participation in the rural electrification projects which will be supported by the World Bank.