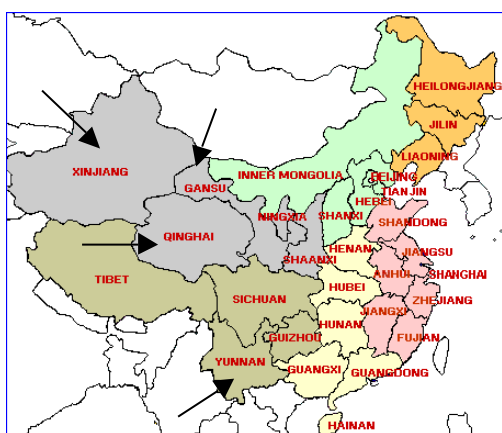


# PHOTOVOLTAIC HYBRID PLANTS FOR VILLAGE ELECTRIFICATION IN CHINESE PROVINCES

KfW/MoF 2002 - 2007

In the framework of the Sino-German Financial Cooperation PROJEKT-CONSULT GMBH together with its local partner BEIJING JIKEDIAN RENEWABLE ENERGY DEVELOPMENT CENTER was put in charge of implementing projects of village electrification in the Chinese Provinces of Yunnan, Xinjiang, Qinghai and Gansu by the means of photovoltaic hybrid plants together with local project executing agencies by the Chinese MINISTRY OF FINANCE and the German KfW ENTWICKLUNGSBANK.



first four projects within this program in Yunnan, Xinjiang, Qinghai and Gansu Provinces PROJECT CONSULT GMBH together with its local consultant partner BEIJING JIKEDIAN RENEWABLE ENERGY DEVELOPMENT CENTER (JKD) was put in charge of the implementation of these projects.

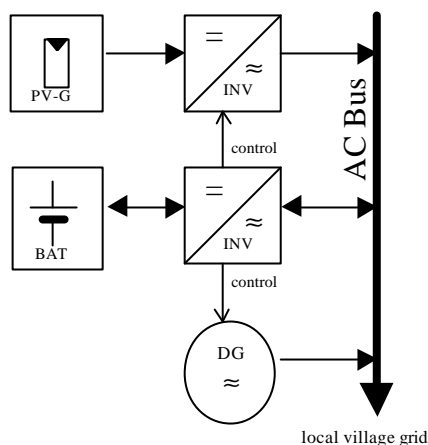
## The technology

In order to take profit of the abundant solar energy resources, the power supply for selected villages is based on photovoltaic (PV) technology: In a central power station electricity is generated by a PV array and distributed in a local village grid.

## Rural Village Electrification

According to national statistics, out of 565,269 villages in overall China 21,560 villages are not electrified and are not scheduled to be connected to the grid in the near future. Although illustrating efforts and progress made in offering electricity services for the population on a national level (only 3.8% villages are not electrified), these figures translate into more than 7 million rural households specially in the western provinces of China that do not have access to electricity services.

In the framework of the Sino-German Financial Cooperation the Chinese MINISTRY OF FINANCE (MoF) and the German KfW ENTWICKLUNGSBANK decided to contribute to the Chinese "Brightness Program" with the "Solar Energy Program" by the means of photovoltaic hybrid (PVH) plants for remote villages. For the implementation of the



As a buffer for night time use of electricity and to pass cloudy days, energy is also stored in a battery bank composed of stationary lead-acid batteries with a charge controller. For reasons of efficient and reasonable supply security specifically during

seasons with low solar radiation (e.g. during winter or rainy season), a diesel genset is installed for villages with more than 30 households. This will allow to limit the investment for the photovoltaic hybrid (PVH) plants.

### **Implementation of the project**

Early 2002 PROJEKT-CONSULT GMBH together with Beijing JKD was contracted for consulting services for the projects in Xinjiang and Yunnan provinces to be completed by early 2005. After being contracted in June 2003 for implementation of the third project of the program in Qinghai Province PROJEKT-CONSULT GMBH together with Beijing JKD was also contracted for implementation of the fourth project of the program in Gansu Province in April 2004.

In order to smoothly carry out implementation of the project, the Consultant is in charge basically of the following tasks:

- Village planning (selection of suited villages, load demand, basic design of the systems etc.);
- Elaboration of tender documents in cooperation with the local service companies and the tendering Chinese window company;
- Participation in bid evaluation and negotiations of the Chinese Partners with the identified System integrator;

- Supervision and acceptance procedures of installed village power systems.

The identified System Integrator is responsible for delivery and installation of the PVH plants to and in the individual villages. In addition a local construction company is responsible for grid construction to be completed before installation of the PVH plants.

Within a first batch, in Yunnan province 17 villages and in Xinjiang Uygur Autonomous Region 9 villages were equipped with PVH village systems during 2004. More villages will be equipped with PVH village systems by a second batch based on the results of the first batch.

### **Operation and maintenance**

While with Chinese and German contributions the initial investment will be covered, complete operation and maintenance (O&M) services have to be financed by the individual customers by electricity tariffs. In order to carry out properly financial and technical services, commercial service companies will guarantee O&M as well as fee collection for proper income and sustainable operation.



PROJEKT-CONSULT GmbH  
Lärchenstr. 12, D-61118 Bad Vilbel  
Tel: +49-6101-5097-0  
Fax: +49-6101-5097-29  
Email: [pc@projekt-consult.de](mailto:pc@projekt-consult.de)  
[www.projekt-consult.de](http://www.projekt-consult.de)