

CHINA

RENEWABLE ENERGY IN REMOTE SETTLEMENTS OF INNER MONGOLIA

The high cost of central electricity supply in remote settlements is often a barrier to providing these areas with energy. Solar PV and wind power systems are viable solutions for providing clean, renewable and reliable electricity to remote areas. GTZ's experience with renewable energy systems in Inner Mongolia demonstrates their extensive economic and social benefits.

Until recently, coal, cow dung, yak butter, and their own muscle power were the only sources of energy available to the populations of remote provinces of China. In Inner Mongolia, for example, 360,000 families in some 1,500 villages live without electricity. Reliable sources of energy are an important element in improving social and economic development in remote settlements.

The local generation of power from renewable wind and solar resources was to provide new energy resources and opportunities to remote settlements while simultaneously avoiding the negative social and environmental impacts of non-renewable energy generation. Wind and solar power systems offer a sustainable solution, as they can be employed on a decentralised basis, are environmentally low-impact, and economically feasible as compared to large-scale energy infrastructure. The objective of this Sino-German technical cooperation project was to meet these needs through a multifaceted programme of information sharing, training, industrial cooperation, demonstration of supply systems, and technology dissemination.

In the initial phases of the project, extensive testing was undertaken to ensure the adequacy of wind and solar resources. The Hua De New Technology Company was founded in 1993 with project assis-



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tance, the product of industrial cooperation between German and Chinese companies. As a private sector company, this entity played a key role in the development and dissemination of technologies and services. The project facilitated extensive cooperation between German and Chinese companies and the provision and exchange of engineering data. Training seminars were held in China, and Chinese engineers were trained in Germany. Training efforts have covered the technical aspects of wind and solar system production and maintenance, as well as the management and administration of renewable energy supplies. From the beginning, the project has



recognised that successful renewable energy systems depend on more than light and wind: they require sufficient local capacity to be managed and maintained.

The focus on local design and production has had several benefits. After a few months of pilot testing of household systems, four of the ten European inverters failed under local conditions. In contrast, all of the inverters produced locally by the Hua De Company as replacements have operated since 1995 without failure. Local manufacture has also been economically effective. Cost reductions of 35% have been achieved through producing electronic components locally (and may decrease further through mass production).

Since 1990, the Hua De New Technology Company alone installed four hundred systems in Inner Mongolia. Thirty engineers have been trained in building and servicing plants, and most system components were produced locally. Combined wind/solar plants generate electricity for 17 villages, and solar PV systems supply power to over 500 individual households.

The benefits of these systems can be seen on many levels. The flourishing renewable power industry itself is stimulating the local economy, and the availability of electricity is stimulating other small-scale enterprises such as restaurants, shops, and craft businesses. Power supplies are benefiting agricultural production in the form of electric mills and irrigation systems. Households benefit from light in the evening and during long winters, and from increased links to the outside world through radio and television.

Interestingly, the use of renewable energy sources has improved nutrition, an area not usually associated with electricity supply. In parts of Inner Mongolia, yak butter serves as both a fuel and an important source of caloric intake. Alternative, renewable energy sources that decrease the reliance on yak butter for fuel has therefore increased the sustainability of the food supply. Local schools, for example, no longer have to choose between light for reading and feeding their students and teachers.



With increasing technological advances worldwide, and the growing recognition that these advances must be matched with institutional support and capacity building on the local level, renewable energy has become a realistic option for providing electricity to remote settlements 'off the grid'. Solar and wind power systems

are also a viable supplementary power option for larger settlements in order to decrease the negative impacts from air pollution on peri-urban agricultural