

**Asia-Pacific Environmental Innovation Strategies (APEIS)
Research on Innovative and Strategic Policy Options (RISPO)
Good Practices Inventory**

**Setting up Renewable Energy Service Companies (RESCOs) for
Maintenance and Operation of Village Renewable Energy Systems**

Summary of the Practice

Keywords: Renewable Energy, Village Power, Service Company

Strategy: Innovative financing for renewable energy development

Environmental areas: Climate change

Critical instruments: Economic instruments, Technologies

Country: People's Republic of China

Location: Bulunkou Xiang, Xnijiang Province, P.R.China

Participants: National Development and Reform Commission, Bulunkou Xiang District RESCO

Duration: from 2002 to present

Funding: Initial Investment of U.S.\$585,570 from UNDP/Global Environment Facility project of "Capacity Building of Rapid Commercialisation of Renewable Energy Development in China"; Power cost collection from end-users of 7,905 yuan (about U.S.\$960) from March 2003 to June 2003

Background:

The renewable village power system is a very important means of solving the residential power supply problem in remote areas. In the last decade, the Chinese government made a commitment to supply electricity to remote areas by various technical means. Through power grid extension and the establishment of localized grids, China has achieved a remarkable electrification rate of 95 percent in 2001. Even so, the challenge of rural electrification remains a high government priority. In 2001, there were still over 40 million people in China that were lacking access to modern energy services. These communities are typically located far from existing grids, mainly in the western regions. However, most of the communities are located in regions that benefit from the country's best wind and solar resources. As such, the Chinese government has encouraged the development of electrical power for remote areas that is supplied by renewable energy resources including solar photovoltaic (PV) technology applications and wind/PV/small hydro/diesel hybrid power generation systems.

By the end of 2001, a total of 85 sets of renewable energy village power systems were built, with a capacity of 1.5 kilowatts. Since 2002, the National Development and Reform Commission (formerly the State Development Planning Commission) implemented a program called Electricity Facility Construction in Non-Electrification Townships in Western Provinces of China. By the end of 2003, an additional 699 renewable power systems in villages were built, with a capacity of 18.5 megawatts. Thus, the total capacity of renewable energy village power is about 20 megawatts at present.

Most of the village power systems are in normal operation now, but for systems built before 2002, about 20 percent are not, primarily due to inadequate management. Over 90 percent of village power systems in China were built with funds from national finance and international projects. Although they provided the initial investment, neither the funds to support the operation and maintenance of the systems, nor the person to oversee operations existed. Without a funding source, even a small problem in the facility can disable the system. The newly built 699 systems will have similar problems. Funded with the initial investment by national finance, these systems are in operation for up to a year. After the guarantee period of three years, the issues faced by the Chinese central government and local governments is how to make sure that these systems can remain operational, and where the money to operate and maintain the systems will come from.

In view of the operational issues of renewable energy systems in villages and the experiences of energy service companies (ESCOs), which have been set up in China for 10 years, the concept of renewable energy service companies (RESCOs) has been proposed since 2002.

Objectives:

- To set up RESCOs in rural areas for the maintenance of renewable power systems in villages, in order to keep the operation of these systems sustainable, by means of commercialisation and market rule

Description of the activity:

The local government holds title to village power systems that are supported by governmental funds or international project funds. However, the local government will hire RESCOs to be in charge of the operation and management of the village power system. RESCOs can get money from various sources, including the collection of power tariffs, subsidies from local government, etc.

The UNDP/GEF project of Capacity Building of rapid Development of Renewable Energy Commercialisation in China, supported the set-up of several renewable power systems in villages for demonstration from 1999 to 2001. The Bulunkou project, in Xinjiang province, was one of them. Apart from providing financial support, the UNDP project also supported the set-up of a RESCO for the maintenance and operation of the village power system. This RESCO is the first one that was set up specifically to provide services for the village power system's maintenance and operation.

In Bulunkou Xiang, five wind turbine/PV/diesel hybrid village power systems were installed in 2002, with a capacity of 60 kilowatts, 8 kilowatts, and 120 kVA, respectively. The UNDP/GEF project provided U.S.\$585,570 for the initial investment, used mainly for the procurement of facilities. The local government provided 1.6 million yuan (U.S.\$194,000) for the construction of basic infrastructure.

A RESCO was registered in the beginning of 2003, and has been in charge of the operation of the system since March 2003. The power price collected from the farmers, government buildings, and business buildings is 1.2, 1.5, and 2 yuan per kilowatt-hour, respectively (U.S.\$0.15, 0.18, 0.24 per kilowatt-hour). Power consumption has been increasing steadily. From March to June 2003, the amount of electric consumption was 5000 kilowatt-hours, and 7950 yuan (U.S.\$962) was collected during this period.

The RESCO has seven staff at present, including one director, one technical engineer, one software engineer, and five technical staff who are in charge of the technical management of five sub-systems. As the average salary level in western rural areas is quite low, the money collected could cover the salaries (about total U.S.\$250 per month). The power consumption could increase to 160 kilowatt-hours per day, meaning the power tariff collected will be about 8300 yuan (about U.S.\$1,000) per month. Although the power tariff collected may cover the salaries and minor maintenance, it is not sufficient for larger efforts such as changing a battery.

Critical Instruments

Overview

Through the collection of power fees from end-users of renewable power systems in villages, the RESCO can use part of the money to keep up normal operations as well as increase the utilizing efficiency of the system.

Economic instruments

In order to reach self-sustainability, the RESCO should be paid for its services. In some cases, the payments to the RESCO were low, because the renewable power system was backed by a national project intended for poverty alleviation. Thus, it is suggested that the Chinese government should pay the cost of system maintenance, including the replacement of necessary parts. While normal operating

costs will be covered by power fees, the RESCO should get a rational service fee. The owner of the systems may decide on a RESCO through a bidding process, or simply by comparing their service costs and service contents. Therefore, RESCO selection and operation is all based on market rules.

Technologies

The RESCO is generally replete with experience in the fields of sale, installation, operations, and the maintenance and repair of facilities and systems. With the assistance and service of a RESCO, users of renewable systems such as farmers and herdsman, can use the power of renewable systems easily and without worry. Thus, the risk of using renewable systems is reduced. Furthermore, when the operation of renewable systems is conducted by a professional RESCO, the renewable systems can be operated with high efficiency, and users benefit from the optimal use of the systems.

Impacts

The RESCO provides a special kind of guarantee for the utilization of renewable energy, namely to increase the efficiency of renewable systems and to protect the benefits of owners of the systems. It handles the management, operation, and maintenance of renewable systems in remote villages, as in the national project on Electricity Facility Construction in Non-Electrification Townships in Western Provinces of China. The Chinese government is considering the investment of more capital to install renewable power systems for all villages that are without access to a power grid. It is estimated that the total investment will be several times the investment of the national project mentioned above.

Lessons Learned

This is the first RESCO that provides the service for a project invested in by the Chinese government . As it is an experiment in its early stages, its effectiveness and lessons are not evident at present.

Potential for Application

The RESCO is one of the better options for the management, operation, and maintenance of renewable energy systems, especially for integrated renewable power systems in remote areas. In China, there will be a large market potential for RESCO. Simply through the national project on Electricity Facility Construction in Non-Electrification Townships in Western Provinces of China, about 800 renewable systems need such services after 2005. Furthermore, the Chinese government is considering the promotion of a similar program, to supply power to villages that are without access to a power grid, numbering in the range of 122,000 in 1999.

The application of RESCOs comes without any special requirements. So, it is easy to emulate the RESCO mode in other developing countries, when providing support for the application of integrated renewable systems in remote villages.

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