

1. Solar Station Bughat, Tehsil Dukki, Loralai, Balochistan

This 40 KWp solar-station was partially installed by Directorate General of New & Renewable Energy Resources (DGNRER), Ministry of Petroleum and Natural Resources in 1989, but never become fully functional. The solar-station was handed over to Water and Power Development Authority (WAPDA) after rollback of DGNRER. While still non-functional, it was then handed-over to Pakistan Council of Renewable Energy Technologies (PCRET) in 2002. Most of the solar panels were found in good condition, but the batteries had become useless due to aging effect and non-utilization. After detailed survey and discussions with local residents, it was established that the central distribution-system (common system) is not viable to be functional, due to peculiar social set-up of the tribal community. It was decided to distribute the solar panels to individual families, who would buy the batteries, invertors and balance of the system on their own.

PCRET provided the technical assistance and training to the end-users for setting-up and utilization of stand-alone PV systems. About fifty individual PV systems ranging from 300 to 1,000 watts were installed on the mud homes, including a 2 kW system on the mosque and madarsa.

2. Baiker, Tehsil Phalough, Dera Bugti, Balochistan

This solar station was also installed by the Directorate General of Energy Resources, Ministry of Petroleum & Natural Resources, in 1987, and handed-over to WAPDA and then to PCRET, in 2002. The system was of 5 KWp capacity; it was used to provide power to village mosque, school, and dispensary and to two houses. Again the solar station was out of function for 3-4 years, due to aging of batteries & faults in the inverter. PCRET made it functional by replacement of the 15 KWhr battery-bank and 1 KW inverter, while another inverter of 2 kW and 22 kwhr batteries are being added, on site.

3. Installation of Wind/Solar/Diesel Hybrid Systems

Presently, for the first time in the country Wind/Solar/Diesel hybrid systems have also been installed for rural electrification. The funding was available from the New Zealand Official Development Assistance (NZODA), through , New Zealand, while PCRET provided the assistance from the Govt. of Pakistan's side for importing the equipments, training of end-users and the installation of the systems. The two sites were chosen, based on the suitability of social and geographical locations; one was the village Chib Kalamati, located at about 30 Km northwest of Gawadar and the another one was Durgai a village in Zardaloo valley, district Sibbi, 50 Km north east of Quetta. In January 2001, monitoring towers were installed at both sites to collect the reliable wind & solar energy data, to be used in appropriate designing of the systems. The data was recorded for about one year.

4. Solar/Diesel Hybrid System, Gawadar, Balochistan

Based on the metrological data, a combination of solar and diesel-generator system was chosen for the village Chib Kalamati. A control room, battery room, generator room and the office were set-up. Two branches of under-ground wiring of 1,000 meter and 800 meter in length were laid

down to provide the power to the twenty houses, including a school and a mosque. The system was installed in June 2003 and comprised 4 KW solar panels, with a backup of 10 KW diesel-generator and a 10 KW inverter with 95 KWhr battery-bank.

5. Wind/Solar/Diesel Hybrid System, Durgai, Sibbi, Balochistan

Durgai is a village, located in Zardaloo valley, surrounded by the mountains, just behind Ziarat, but administratively located in district Sibbi. Fortunately, the area is rich in water springs and, due to specific topography of the land, it has a tremendous amount of wind throughout the year. Not surprisingly, the main power-generation source here was chosen to be wind. The system was installed in September 2003, comprising 7.5 kilowatts wind-turbine, 500 watts solar panels, with a back-up of 10 KW diesel-generator and 125 KWhr battery-bank. Due to the area being mountainous, overhead power-distribution lines were installed. The power was provided to about 20 houses, including the mosque, school and dispensary. The specific feature of the above two systems is that the systems were handed over to the local community, who would be responsible for the subsequent repair and maintenance, and long-term battery replacement. This would be accomplished by charging the electricity bills from the end-users by their own local organization.