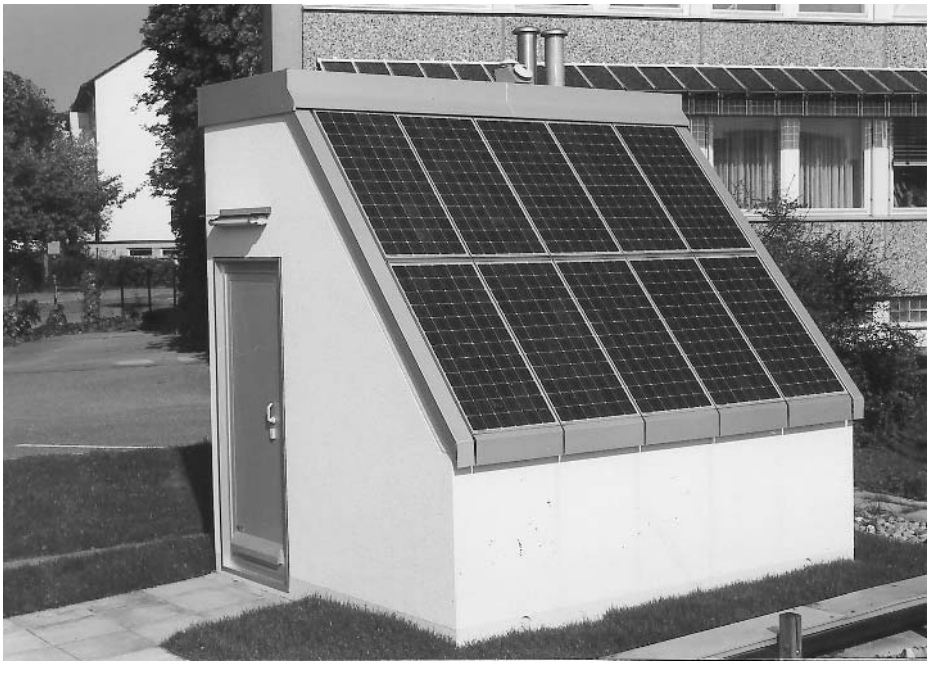

Figure 17.10 Prototype of a hybrid system (photovoltaics and thermoelectric converter) to power a remote repeater station (*Source*: Fraunhofer ISE, Freiburg)

17.2.2.2 PV powered battery-charging stations

Experience with locally centralised battery-charging stations (Figure 17.11) worldwide is by far not as convincing as it is with solar home systems. Normally there is no deep discharge protection (DDP) of the battery foreseen, which besides other effects causes sulphatation of the electrodes and thus an early end of the lifetime of the battery. Using the batteries in a full cycling process means that not the corrosion coefficient but the cycle capability determines the lifetime. Therefore, battery lifetime tends to be very short, only some hundred cycles, especially with locally produced car batteries [14].

Another aspect, which is often neglected with battery-charging station, is that people have to carry a dangerous freight over a quite long distance. In industrialised countries no one would expect this of somebody, even if the means of transport were more comfortable as they are in rural areas of developing countries. The hazard of accidents when transporting batteries, the high risk of wrong connection afterwards and the very poor charge and discharge protection regimes sum up to an unsatisfying operation of this kind of electricity service.

17.2.2.3 Photovoltaic hybrid systems

If higher power is needed or if conventional household appliances and industrial equipment are to be used, a system voltage of 230 or 110 V alternating current is desirable. To increase the reliability of off-grid power supply systems and to reduce the investment