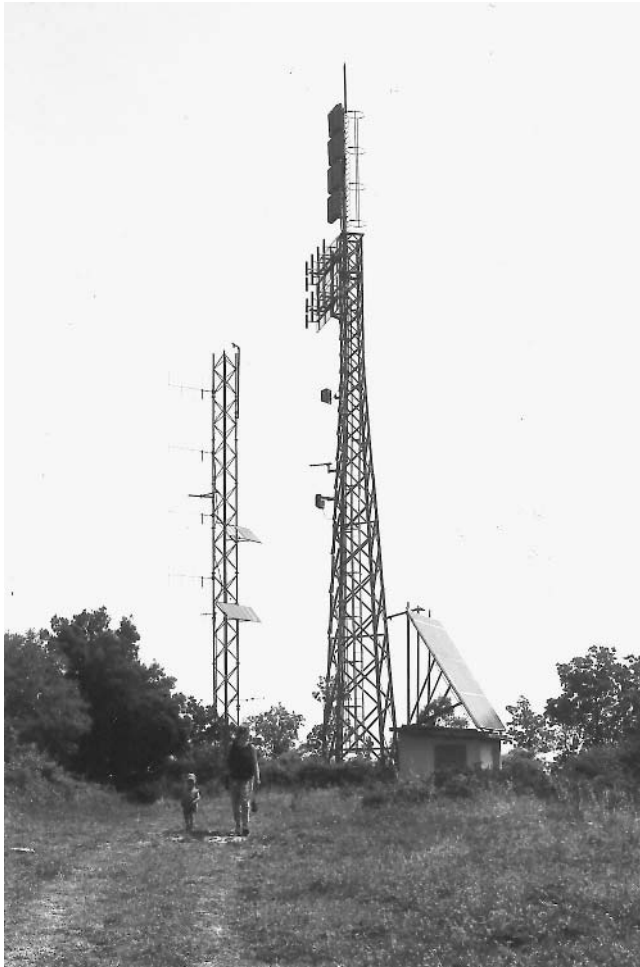


digital radio signal amplifiers that increase the connection reliability of mobile telephones within radio cells and raise the accessibility level throughout the network. In rural areas and in mountainous regions, repeaters often have to be installed and operated at sites remote from the public electricity grid (see Figure 17.9).

Because of seasonal fluctuations in solar radiation in temperate zones, an exclusively photovoltaic power supply leads to very large and thus expensive systems. In order to avoid these disadvantages, the photovoltaic generator may be combined with other power generators. In Figure 17.10 is shown the prototype of a photovoltaic hybrid system, consisting of a PV generator, a battery and a thermoelectric generator used as auxiliary power source. A micro-controlled energy management system ensures fully automatic operation with minimal consumption of fossil fuel and appropriate battery operation management.



**Figure 17.9** PV powered repeater station on a hill in Tuscany, Italy (Source: Fraunhofer ISE, Freiburg)