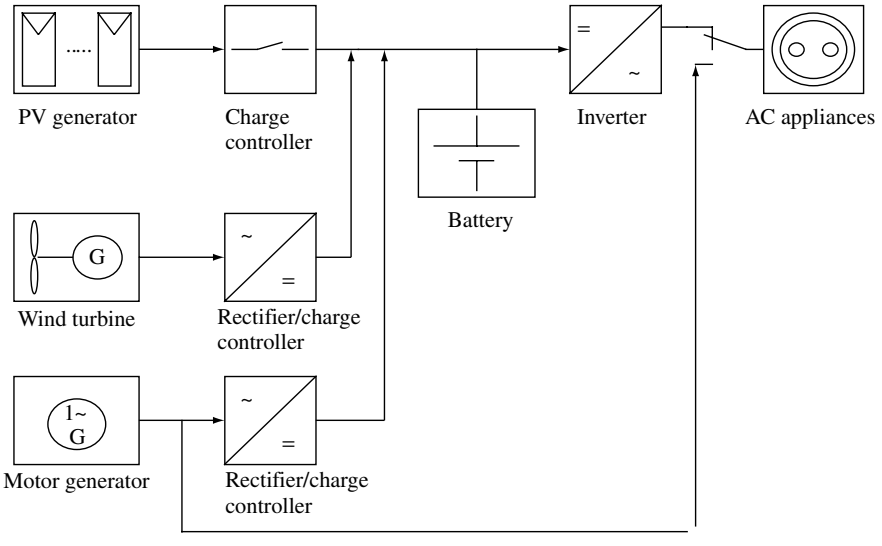

Figure 17.13 "DC coupling" of different electricity generators. Example from the Rotwandhaus, a mountain lodge in the Bavarian Alps

of adapted charge controllers for each generator, however, may lead to systems with relatively high installation costs, which will further increase with the number of the power generators installed.

The other possibility for hybrid system design is the so-called AC-coupled system (Figure 17.14).

The heart of an AC coupled system is a bi-directional inverter. The photovoltaic modules and all the generators are connected to an AC bus bar via suitable inverters. Thus, primarily the AC consumers are supplied with electricity and only the surplus of power is fed back to the storage batteries. Power management is done by only one electronic device, the bi-directional inverter. This may lead to a simplified system concept. The inverter now must be able to work in different modes (charging or discharging the battery), it has to build the local AC-grid in frequency and voltage and it has to be synchronised to any other synchronous electric generator in the system. Because of these high requirements of the inverter, there are only very few bi-directional inverters available on the market, some of which still have prototype character.

17.2.2.4 Village power supply systems

While Solar Home Systems for the decentralised power supply of rural households are considered to be a standard system ready for the market, and while the suitability of PV hybrid systems to power single houses has been proven in various pilot and demonstration programs all over the world, this positive experience is up to now not available for central power stations to supply remote villages with off-grid PV power. Nevertheless, the research and development in rural electrification are increasingly directed towards these systems. The main reason is that with a central system, installation and operation