



Figure 18.3 A Comparison of the different definitions of battery capacity and the corresponding definitions of state of charge

Within this chapter the following definitions according to Figure 18.3 and [5] will be used.

The rated or nominal capacity is defined as the 10-h discharge capacity C_{10} . This is the basis for the SOC determination. The rated or nominal capacity does not change during the life of a battery whereas the measured capacity changes with time. The state of charge with respect to the measured capacity is called relative state of charge (SOC_r). The practical capacity C_p is always lesser than the measured capacity. The state of charge definition related to the practical capacity is the practical state of charge (SOC_p). SOC_p is 100% if a solar-full state of charge is obtained.

In [5], a complete review of the different definitions for the capacity, state of charge and full state of charge is given. Further on, definitions of open-circuit voltage and state of health are included, because some state-of-charge meters and algorithms use these definitions as well.

18.3 TYPICAL OPERATION CONDITIONS OF BATTERIES IN PV APPLICATIONS

To understand the requirements of storage systems for autonomous power supply systems, an analysis of the typical operating conditions is necessary. The operating conditions vary very much according to the location and application of the system, the load patterns, the installed power generators and the operation strategy.

The most important parameters for the classification of the operating conditions are the charge and discharge currents, the state-of-charge profile and the temperature.

18.3.1 An Example of an Energy Flow Analysis

Photovoltaic stand-alone systems may be roughly separated into two groups. There are systems consisting of the PV modules that charge the batteries. A charge controller prevents