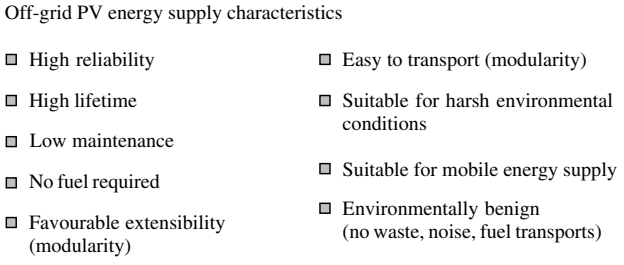


**Figure 2.9** Characteristics of off-grid photovoltaic energy supply systems

Figure 2.9 summarises some of the salient features of photovoltaics for off-grid electricity supply. The main disadvantage of PV systems is the comparatively high initial investments. Diesel systems on the other hand produce relatively low initial investments but high running costs especially due to fuel requirements.

Off-grid electricity supply systems generally need energy storages. In the case of diesels these are the fuel tanks, and in PV systems electrochemical batteries are applied. Especially because of this fact, solar electric systems are not maintenance-free (though their behaviour with respect to maintenance and wear is generally significantly more favourable than it is for diesel systems). For reliable operation, the storage battery has to be exchanged at regular intervals. Figure 2.10 indicates clearly that at present it is not the PV module but the system electronics (including installation) and the storage devices that constitute the main lifetime cost factors. Thus research and development in the fields of system technology and solar batteries would be highly supportive for an accelerated introduction of PV off-grid systems worldwide.

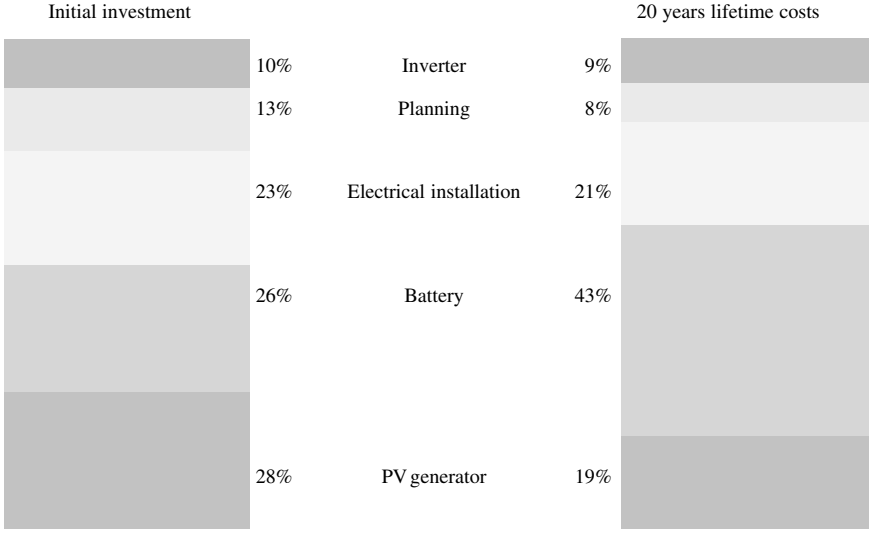


**Figure 2.10** Initial versus lifetime costs of small professional autonomous photovoltaic systems – a typical example. System data: PV 1.3 $kW_p$, battery 35 kWh, battery lifetime 5.4 a, loss of load probability 0.1%, system site Mexico