respect to the development of electricity supply systems in many rural and remote areas where grid extension is economically not feasible. Starting from low power installations, PV modules may be gradually added to suitable systems in order to cope with the growing energy demands. In this way electricity supplies can be realised avoiding too high initial investments. In the context of rural electrification and also for the professional energy supply of off-grid electronic devices, the low maintenance characteristic of photovoltaics is regarded as a considerable advantage. The absence of moving parts, the robustness against harsh environment and the lack of fuel supply requirements (exception: hybrid systems) make photovoltaics a well-suited energy supply technique for a vast area of stand-alone energy supplies.

Another positive characteristic of PV is that it may be seen as part of the rapidly growing semiconductor industry/market. This relation facilitates a strong technology transfer from a mature industry to the emerging PV industry. Parallel to this the affinity opens the prospect of new big industries creating considerable business and employment opportunities.

The strong market growth of photovoltaics over the last two decades (Figure 2.2) and the high recognition of this technology could not be understood if there had not been a continuous and strong reduction in PV system and module prices.

Figure 2.3 shows the price-experience curve (learning curve) until 2000. Each doubling of the module shipment resulted on the average in a market price reduction of 20%. It is generally accepted that it is possible to cut down the prices by another factor of two utilising mass production lines based on today's crystalline silicon-wafer technology. Considerable further cost reduction seems feasible since new and most probably least costly PV technologies are already in the state of pilot production (thin-film cells) or under investigation in laboratories: cells based on III/V materials and optical concentration, cells using dyes or organic compounds for energy conversion and so on. Thus, there is a good

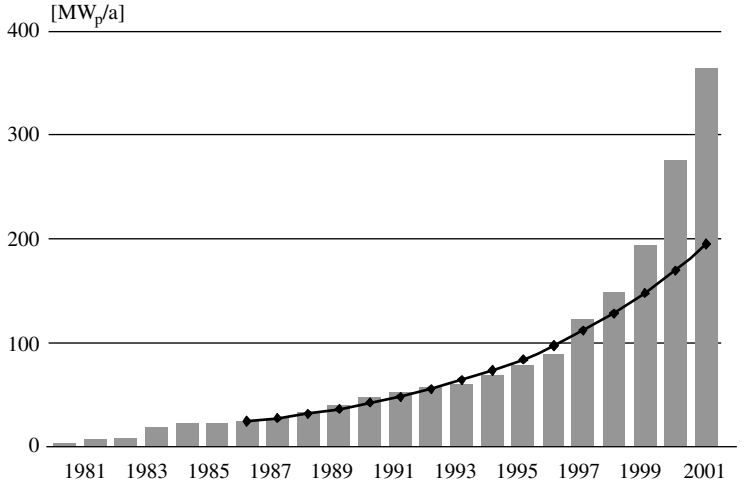

Figure 2.2 Evolution of the global photovoltaic market [2]. Until 1996 the growth rate was approximately 15%/annum. Today's growth rates are in the order of 30%/annum