Table 7.1 Breakdown of costs of fabrication of single-crystalline (SX) and multicrystalline (MC) solar cells (corresponding to year 1990) [1]

Item	SX	MC
Pure Si	38	38
Ingot formation	115	35
Sawing	77	77
Wafer cost	**230**	**150**
Cell fabrication	80	80
Total components	310	230
Yield	0.95	0.9
Cell cost	**326**	**256**
Module assembling	75	75
Lamination	75	75
Module cost (Euro m^{-2})	**476**	**406**
Efficiency	0.14	0.12
Module cost (Euro Wp^{-1})	**3.40**	**3.38**

Table 7.2 Market share of monocrystalline and multicrystalline solar cells [2]

Year	Cz-Si solar cells		MC-Si solar cells	
	Output [MW]	Market share [%]	Output [MW]	Market share [%]
1996	48.7	55	28.4	32
2000	92.0	32	146.7	51

of improved material quality and material processing has allowed higher efficiencies at a still lower cost, increasing the share of MC in the PV market, well ahead of monocrystalline. Recent evolution of the market can be seen in Table 7.2 [2].

This chapter offers an overview of silicon solar cell and module technology. First, Si properties justifying its use as photovoltaic material are presented. Then, design of Si solar cells is reviewed, highlighting the benefits and limits of different approaches. Manufacturing processes are described, paying special attention to technologies that are currently implemented at the industrial level, mostly based on screen-printing metallization technology. Considerations of ways of improving solar cell technology are also specified. Peculiarities of multicrystalline material are explained in Section 7.6, while other approaches that are already in industrial production are also described briefly. Next, crystalline Si modules are reviewed, pertaining to electrical performance, fabrication sequence and reliability concerns.