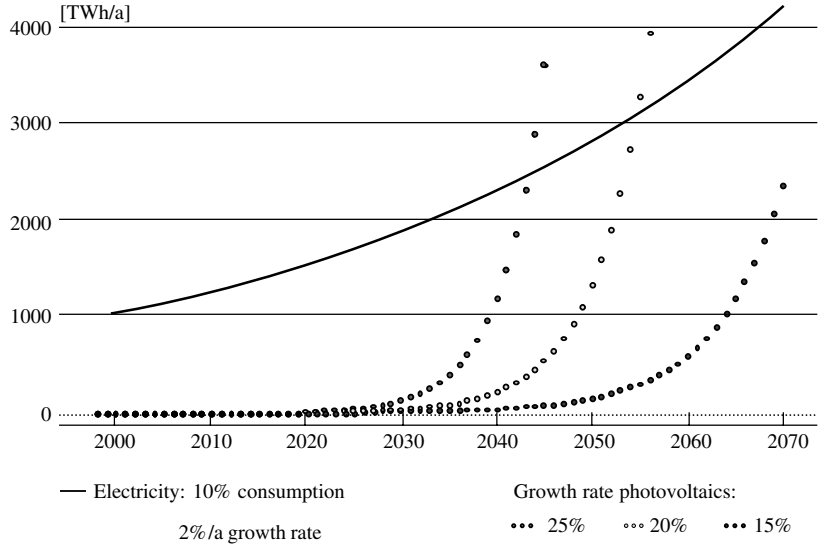

Figure 2.6 Scenarios of global photovoltaic electricity production under the assumption of constant growth rates of 25%/annum, 20%/annum and 15%/annum. The solid curve represents 10% of the global electricity demand assuming a constant growth rate of 2%/annum. A linear scale is used for the energy axis. Thus, although growing exponentially, the energy production by means of photovoltaics is not visible on the scale used until the year 2020

may become a major player only in the second half of our century. Since the man-made climatic problems call for a fast and forceful solution that is both environmentally benign and socially acceptable, high and continuously high growth rates for photovoltaics are extremely advisable.

The liberalisation of the energy market has led to new and innovative concepts, especially in the electricity sector. One of these is the distributed generation scheme – kilowatt to several megawatt installations instead of central units in the gigawatt range. Its main advantages are dispersed on-site heat and power cogeneration, electrical stabilisation of grids especially at the low voltage level, distributed reserves in the case of supply problems and partly favourable investment situations. PV electricity generation is well adapted to the distributed generation scheme (Figure 2.7). This is especially the case if peak-load conditions in the grids are considered that are strongly correlated with solar insolation: cooling and climatisation units. Also, the extreme modularity of photovoltaics turns out to be advantageous for distributed generation. Distributed peak power production will be most probably the first energy market application for optical concentrator PV power stations.

If performed on a continental or even intercontinental level, the highly dispersed application of photovoltaics will also lead to a strong levelling out of its stochastic local power generation characteristics. The remaining slowly varying time pattern of the lumped electricity production (diurnal, seasonal variations) can be compensated (of course, at extra costs) by the control of complementary electricity sources or in the long run by means of storage technologies.