



Figure 21.6 Effect of selected parameters on Fresnel module price (1990\$) [4]. Copyright © 2002. Electric Power Research Institute. EPRI TR-101255. Engineering and Economic Evaluation of Central-Station Photovoltaic Power Plants. Reprinted with Permission

risk in the choice of inputs. Figure 21.6 shows the effect of different values of certain materials, equipment, and financial costs on module required price. Cost components are plotted on the abscissa as a percentage of their base case value, which means that the slope of the lines represents a relative sensitivity of module price to the parameter change (absolute values at the extremes are also shown for reference). The output of the STAMPP model identified the Fresnel lens and the molded box as the two largest material costs, at 31% and 17% of material costs, respectively. Silicon wafers, at 5%, were another significant cost. Sensitivities to a fairly wide range of these costs are shown, with the extreme variation in module price being less than 6%. By way of comparison, the price of the most expensive cell-processing equipment, sputtering, had a much smaller impact on module cost. This is a typical result in such studies, resulting from the depreciation of the equipment over several years. Cost of money, represented by return on equity (ROE), has about the same impact as wafer cost. Process yield for each workstation is a parameter in STAMPP. For cell manufacturing, the yield at cell test is critical, and the base case cell yield for the study was 80%. Figure 21.6 shows cell yield to have a large impact relative to some other parameters.

The total capital cost of the Fresnel lens plant in Table 21.5 reflects the accounting system of the study sponsor, EPRI. The \$1.62/W_p cost of the PV modules includes shipping and installation, and is 50% of the total system capital cost. The installed array-structure cost brings the total collector cost to about 73.5% of the system cost. The power conditioning and balance-of-plant costs add another 5.5%, leaving about 20% of the cost