operate completely autonomously, the supply reliability is decisive, whereas this issue is of secondary importance for a household supply in which a back-up generator is included anyway.

The operation behaviour of the photovoltaic system is characterised and evaluated with the help of a suitable computation procedure. It is particularly important to know the system's operation behaviour with regard to the supply reliability and the effective use of the photovoltaically generated electricity.

The optimal tilt angle for the solar generator depends on the specific conditions under which the system is operated. A clear distinction must be made between grid-connected and stand-alone systems. Grid-connected systems are generally optimised to achieve the maximum possible annual yield. As all of the energy output from the solar generator is used either by direct consumption or by being fed into the public electricity grid, the system yield has the same dependence on the orientation and tilt angle as the solar radiation incident on the solar generator (Figure 17.35).

The optimum tilt angle of about 30° is smaller than the average solar zenith (equal to 90° latitude), as the major share of the solar radiation is incident during the warmer six months for the Central European climate.

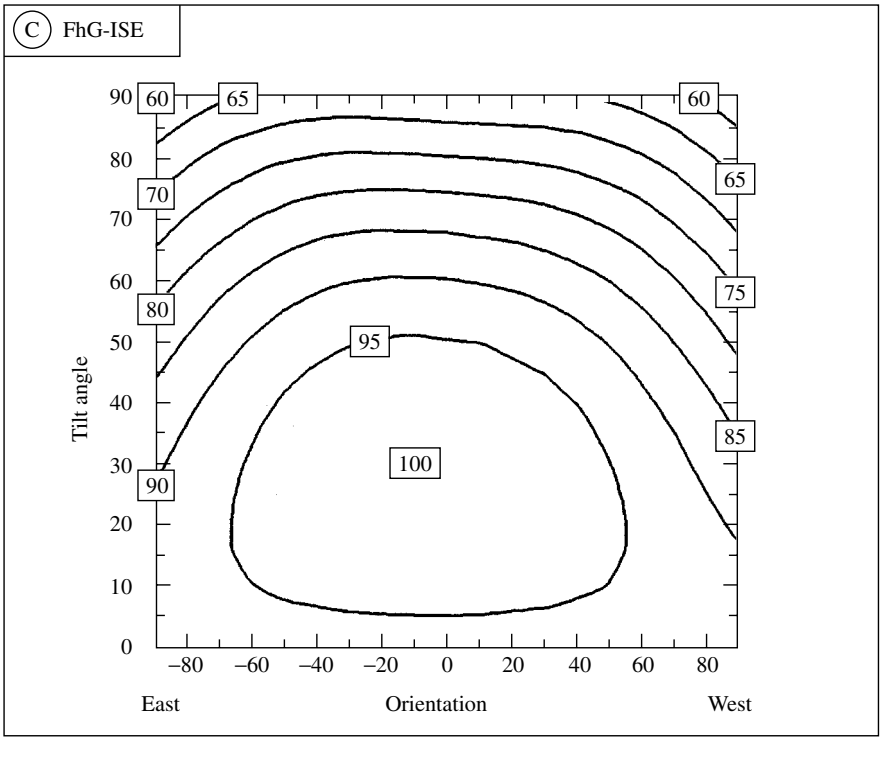

Figure 17.35 Dependence of the annually used solar energy from a grid-connected system dependent on the orientation and tilt angle (percentage values relative to the maximum used solar energy; orientation 0 = south, for the northern hemisphere)