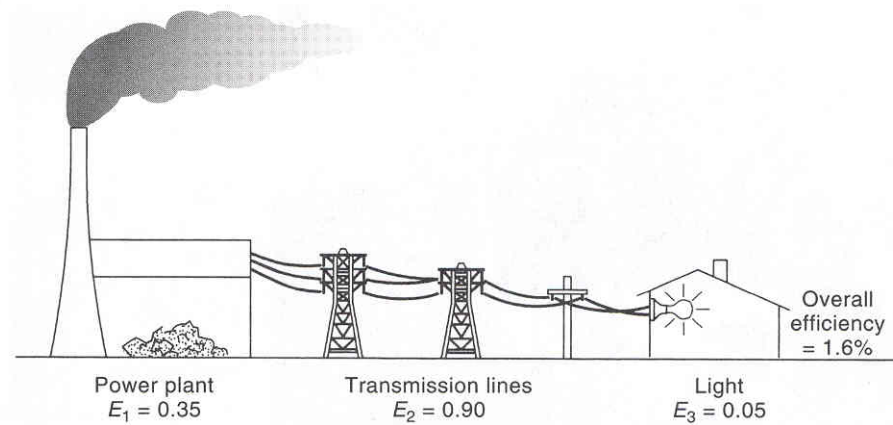


Table 3.1 EFFICIENCIES OF SOME ENERGY CONVERSION DEVICES AND SYSTEMS

Device	Efficiency
Electric generators (mechanical → electrical)	70–99%
Electric motor (electrical → mechanical)	50–95%
Gas furnace (chemical → thermal)	70–95%
Wind turbine (mechanical → electrical)	35–50%
Fossil-fuel power plant (chemical → thermal → mechanical → electrical)	30–40%
Nuclear power plant (nuclear → thermal → mechanical → electrical)	30–35%
Automobile engine (chemical → thermal → mechanical)	20–30%
Fluorescent lamp (electrical → light)	20%
Incandescent lamp (electrical → light)	5%
Solar cell (light → electrical)	5–28%



Overall efficiency
for
chemical energy
to light energy conversion

$$= E_1 \times E_2 \times E_3 = 0.35 \times 0.90 \times 0.05 = 0.016$$

FIGURE 3.4

Calculation of the overall efficiency for a multistep process involves multiplying the efficiencies of the individual steps.