Table 6.6 Typical recycling data

Material	Recycled fraction in current supply[1] (%)	Embodied energy, virgin material (MJ/kg)	Embodied energy, recycled material (MJ/kg)	Ratio of recycled to virgin energies (%)
Aluminum	36	210	26	12
Steel	42	26.5	7.3	27
Copper	42	58	13.5	23
Lead	72	27	7.4	27
PET	21	85	39	46
PP	5	74	50	67
Glass	24	10.5	8.2	78
Paper	72	45	20	44

Notes. *Data for recycled fraction are from USGS Circular 1221 (2002); USGS (2007). Other data sources are listed under the table headings in Section 6.7, "Further reading." See the data sheets of Chapter 15 for more data.*

Material and process step: aluminum alloy connecting rod	Energy	Units
Embodied energy (Ch.15)	210	MJ/kg
Embodied energy, recycling (Ch. 15)	25	MJ/kg

The estimated energy recovered by recycling is

$$210 - 25 = 185 \text{ MJ/kg}$$

Thus the energy "credit" from recycling the machined metal is

$$1.8 \times 184 = 331 \text{ MJ}$$

This reduces the total energy demand of the machined-from-solid connecting rod to 722 MJ, barely more than that of the cast connecting rod.

6.4 Energy and CO_2 footprints of energy, transport, and use

Energy is used to transport the materials and products from where they are made to where they are used. The products themselves use energy during their life—some use a great deal. This energy is provided predominantly by fossil fuels (oil, gas, coal)