

Solutions

2.1 Raw material extraction and processing; manufacturing and packaging; use and operation; disposal at end of life.

2.2 Allocating numbers to pollutant effects requires value judgements.

2.3 Refilling/returning glass bottles for the same use.

3.1 Aluminium extraction from ore is extremely energy-intensive – electrolysis of molten alumina; recycling needs only remelting, a fraction of that energy; so overall energy and CO₂ fall despite collection and transport; and less bauxite quarrying – less environmental damage.

3.2 A single-stage LCA is selective/abbreviated; it omits manufacture, raw materials and use, where the burdens may differ greatly; selective LCAs can be misused to support pre-determined advertising conclusions, so the claim is unjustified as stated.

3.3 Reuse – washing and refilling bottles avoids the energy of remelting and keeps the original product whole; recycling – crushed glass (cullet) melts at a lower temperature than raw materials, saving energy, and copes with bottles that break or are not returnable.