

Energy intensity of computer manufacturing: hybrid assessment combining process and economic input-output methods

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Abstract

The total energy and fossil fuels used in producing a desktop computer with 17-inch CRT monitor are estimated at 6,400 megajoules (MJ) or 260 kg respectively. This indicates that computer manufacturing is energy intensive: the ratio of fossil fuel use to product weight is 11, an order of magnitude larger than the factor of 1-2 for many other manufactured goods. This high energy intensity of manufacturing, combined with rapid turnover in computers, results in an annual life cycle energy burden that is surprisingly high: about 2,600 MJ per year, 1.3 times that of a refrigerator. In contrast with many home appliances, life cycle energy use of a computer is dominated by production (81%) as opposed to operation (19%). Extension of usable lifespan (e.g. by reselling or upgrading) is thus a promising approach to mitigating energy impacts, as well as other environmental burdens associated with manufacturing and disposal.

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