Environmental benefits of recycling alkaline batteries

UK study of mixed battery recycling

A life cycle assessment (LCA) funded by the UK Department for Environment Food and Rural Affairs in 2006 investigated the environmental impacts and financial costs of implementing the *EU Directive on Batteries and Accumulators.* The environmental and financial implications were estimated for the collection and recycling of mixed household batteries (primary and rechargeable). The overall conclusion of the study was that *'… increasing recycling of batteries is beneficial for the environment, due to the recovery of metals and avoidance of virgin metal production'*[1].

US study of alkaline battery recycling

An LCA conducted for the National Electrical Manufacturers Association (NEMA) in the US in 2011 considered the recovery of alkaline batteries only[2]. A number of scenarios for collection and recycling were modelled. The authors concluded that several of the modelled scenarios were beneficial compared to landfill while others generated a net environmental burden.

The results also varied depending on which environmental impact is considered. For example, recycling tends to produce a net environmental **burden** for global warming potential and energy consumption, and a net environmental **benefit** for human health and ecosystem quality.

An important conclusion of the study is that the results are highly sensitive to the technology used to process the batteries and the amount of recovered material. Recycling may generate a net environmental benefit if designed appropriately, for example by recovering more than just zinc for its metal value (ideally the process would recover steel, zinc and manganese for metal value).

On the basis of the LCA, The Corporation for Battery Recycling (CBR), whose members at the time included Duracell, Energizer, Panasonic and Spectrum Brands, decided in 2012 to establish a national recycling program for primary batteries in the US:

> *'The Dry Battery Section of … [NEMA] is engaged in developing an industry led voluntary primary battery collection and recycling program covering the whole of the US. This objective is based on a Life Cycle Analysis (LCA) report which showed that it may be possible for a carefully designed program to be a net positive for the environment compared to disposal to landfill with other domestic garbage'.*[3]

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[1] Fisher, K., et al. (2006). *Battery waste management life cycle assessment*. London, Report by Environmental Resources Management for UK Department for Environment Food and Rural Affairs (DEFRA), p. 3.

[2] Olivetti, E., et al. (2011). *Life cycle impacts of alkaline batteries with a focus on end-of-life*, Report by MIT for NEMA, www.epbaeurope.net/documents/NEMA_alkalinelca2011.pdf

[3] The Corporation for Battery Recycling (2012). *Request for proposal for stewardship organization*. Rosslyn, VA, USA, p. 3.