

Science for Environment Policy

Eco-design should consider how users maintain non-electrical products

The lifetime environmental impacts of non-electrical consumer products, such as clothes, could be cut by over 40% if consumers maintained them in a more environmentally friendly manner, new research suggests. The study found the impacts of eco-designed products fell significantly when user guidelines were included in the eco-design.

'Eco-design' is an approach that considers the environmental impacts of a product during its entire life-cycle, from the choice of materials and manufacturing method, through to its eventual means of disposal or reuse. It aims to produce the most [sustainable products and manufacturing processes](#) with the lowest environmental impact. This study believes that communicating maintenance procedures to consumers should form part of the eco-design process.

EU directive [2009/125/EC](#) defines the eco-design of energy-related products (ErPs), such as televisions and light bulbs. It is often assumed that non-ErPs, such as cutlery or clothes, do not use much energy during their usage. However, ErPs are often used to maintain (e.g. wash) non-ErPs. As such, maintaining non-ErPs has important environmental impacts which depend on user behaviours. This study assessed how eco-design could improve the environmental impact of two common non-ErPs: a kitchen knife and a women's jacket.

They first conducted life-cycle analyses (LCA) of non-eco-designed versions of these products. The LCA considered environmental impacts over the products' entire lifespan, including those that arise from how they are maintained. They considered a wide range of environmental impacts, including global warming potential (e.g. CO₂/SO₂ emissions), toxicity and pollution. The analysis suggested that the greatest room for improvement in the knife were in its materials, electricity use during manufacture, and its usage – specifically, how users clean it. If a dishwasher or lots of hot, running water is used, then its environmental impacts are particularly high.

The researchers therefore designed a new knife, using eco-design principles, which needed less steel and could be made with lower-energy processes. To encourage users to hand-clean the knife, they supplied a special cleaning cloth and instructions with it.

The eco-designed knife was estimated to reduce environmental burdens by 93%, compared with the first knife, if it is cleaned by hand all the time. Avoiding the dishwasher and using the cloth instead lowered the knife's energy consumption from 353 to 37 megajoules over its lifetime. Hand washing therefore contributed significantly to the knife's environmental improvements; if its effects are taken out of calculations, the eco-designed knife had improvements of just 44% over the earlier model.

For the jacket, the researchers first assessed the impacts of a lightweight blazer. The LCA indicated that better materials and maintenance would lower its impacts. They thus eco-designed a multi-functional jacket, suitable for all year-round, which had removable parts, such as sleeves and a skirt and avoided the need for several seasonal jackets. It also used more recycled materials. To encourage greener maintenance, its label was printed with 'no ironing' and 'no tumble-drying' symbols.

To compare this multi-seasonal jacket with the light blazer would not be a like-for-like comparison. The researchers therefore compared it with the combined impacts of the blazer and a winter jacket and found it reduced environmental impacts over its lifetime by 53%. The low-energy maintenance of the jacket contributed to 40% of this reduction.

For both products, significant improvements in environmental impact stemmed from [communicating](#) greener maintenance procedures to consumers. The findings highlight the role of the consumer in the environmental impact of products.



16 October 2014
Issue 389
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Source: Sanyé-Mengual, E., Pérez-López, P., González-García, S., *et al.* (2014). Eco-Designing the Use Phase of Products in Sustainable Manufacturing. *Journal of Industrial Ecology*. 18(4): 545–557. DOI:10.1111/jiec.12161.

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To cite this article/service: "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.