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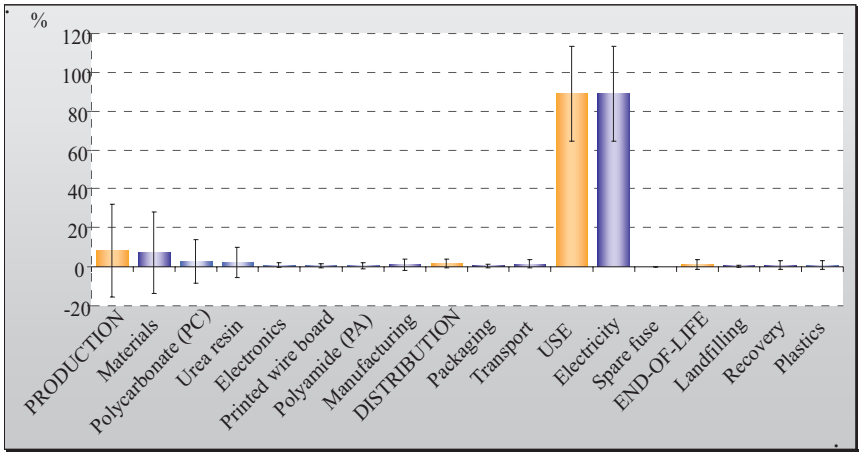
Eco-design of the time delay switch of triac 2262.1

Company	Asea Brown Boveri S.A., Low Voltage Products, Niessen Factory - Oiartzun (Spain)
Industrial sector	Manufacture of other electrical equipment ISIC Rev 4 nº 2790 (*International Standard Industrial Classification of all Economic Activities*)
Environmental considerations	Increasing public awareness about environmental matters, particularly energy saving & efficiency and climate change, the need to remain competitive in a global market and the appearance of the of the ErP (Energy-related Products) Eco-Design Directive 2009/125 EC (former EuP - Energy-using Products Directive (2005/32/EC), led the company ABB Niessen to become involved in this eco-design project.
Company background	ABB Niessen decided to take part through this case study in an eco-design pilot project addressed to the electrical and electronic sector, which was supported by Ihobe. This project was carried out between May and September 2008 and it concluded with the publication of an Electrical and Electronic Eco-design Guide by Ihobe in April 2010. The product assessed and eco-designed was the time delay switch of triac 2262.1. It is a 230 V ~ / 50 Hz switch for controlling bulbs (40-500 W), halogens with conventional transformer (40-400 VA), small power motors 40-100 VA, etc. Its main technical characteristics are the following: 55.6 g total weight, energy consumption of 7,25 W, orientation lamp (red LED), time delay range from 10 sec to 10 min, calibrated fuse F-3,15H, protection against wrong connexion and temperature range 0 to 40ºC.
Summary of actions	To identify the main environmental aspects of the product, an environmental assessment - streamlined LCA - was carried out considering the whole product lifecycle (manufacturing, distribution, use and end-of-life) using the software tool EuPmanager®, nowadays updated to a free cost version named EuPeco-profiler® under the LiMaS project (www.limas-eup.eu). This software tool uses the MEEuP methodology developed by VHK for the European Commission for assessing Energy-using Products. The graph below shows the environmental profile of the complete life cycle of the product assuming a product lifetime of 20 years. As can be observed, 8% of its overall environmental impact corresponds to the manufacturing stage, 2% to distribution, 89% to actual use and 1% to the end-of-life stage. A more detailed analysis reveals the most significant aspects and thus the priority processes and materials for improvement efforts.



Time delay switch of triac 2262.1

Summary of actions (cont.)

After identifying the most significant aspects of the product and considering the main company's motivations, there were identified and evaluated potential eco-design strategies for improving the product. Not all the strategies initially drawn up were implemented in the final improved design, as some proved unviable due to technical and/or economical reasons.

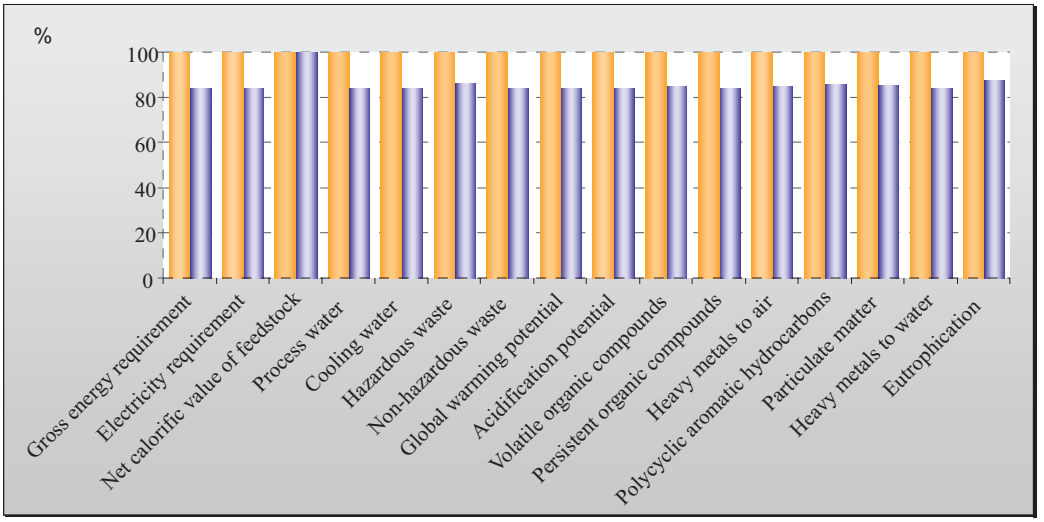
The eco-design measures finally applied are summarised below:

Use of cleaner materials
Lead-free solder was used for components soldering to the printed circuit board.
A printed circuit board without halogenated flame retardants was selected.
Recycled PC (polycarbonate) was used in the internal parts of the mechanism.

Lower energy consumption
Replacement of the capacitor of the power supply: the linear power supply was redesigned and availability of alternative components with a lower energy consumption was checked. Finally, the 330 nF capacitor of the power supply was replaced by new one of 270 nF. This resulted in electricity savings of 16,2% during the use of the product (10.3 kWh per year).

Balances

The graph below shows the improvements in percentage terms achieved in each of the 16 environmental impact indicators considered, after the implementation of the eco-design measures described above. The average environmental improvement achieved in the new model of time delay switch is 14.4%. A 16.2% reduction in energy consumption during the useful lifetime was achieved. The new design implies energy savings of 10.3 kWh per annum (approx. 1,4 €/year) compared with the previous model.



Conclusions

The main benefits achieved in this eco-design project were the following:

Improvements in the product:
- 14.4% reduction in overall environmental impact
- 16.2% reduction in energy consumption during the useful lifetime
- Use of cleaner materials in the product

Improvements in the company:
- Implementation of a practical tool for environmental assessment
- Alignment with the future requirements of the ErP Directive (2009/125/EC)
- A greater capability for innovation through eco-design
- Market position improvement

NOTE: This case study seeks only to illustrate a pollution prevention example and should not be taken as a general recommendation.

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