Product Lifetimes And The Environment
2017 - Conference Proceedings
C. Bakker and R. Mugge (Eds.)

DOI: 10.3233/978-1-61499-820-4-387

Do ecolabels extend product service times? An analysis of the product group specific criteria of the European Union and Nordic ecolabels

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Keywords
Ecolabel
Product Service Time Extension
Durability
Reparability

Abstract
Ecolabels are an established means of guiding consumer choices towards product and service options with better environmental performance. The life cycle approach based award criteria of ISO Type I product-specific ecolabels aim to steer the product into the market in an environmentally less harmful direction. In this paper, we present an analysis of Product Group Specific Criteria Documents of two ISO Type I Ecolabelling Schemes: the Nordic Ecolabel and the EU Ecolabel. The examination of the product group specific criteria documents indicates that requirements on durability, upgradability and reparability can well be set, and are already included in ecolabel requirements. While durability is already present the criteria for a variety of different product groups, upgradability and reparability are currently required for fewer products, such as computers and televisions mentioned above. Future revisions of product-specific criteria set present an opportunity to apply circular economy relevant requirements on upgradability and reparability in a broader suite of product groups. Further research on product life spans of ecolabelled products is needed.

Introduction

The current model of consumption and production, where items are produced from extracted natural resources, used for a short time and thrown away, cannot be sustained in the long run. Product life spans have decreased steadily and simultaneously material flows through society have been increasing (Bakker et al. 2014). By minimising matter and energy flow in the system, environmental deterioration can be minimised without restricting economic growth or social or technical progress (Stahel, 1982 in Lieder and Rashid 2016:37). The Circular Economy discourse has been developing in recent years as a response to resource scarcity and the limitations of the Earth's carrying capacity. It proposes a model for minimising the use of virgin materials for economic activity (Skou Andersen (2007), p.133), and for maintaining the value of natural resources contained in consumable items (e.g., Ghisellini et al. 2016 and Franklin-Johnson et al. 2016).

The conceptual starting point introduced by Pearce and Turner (1990) is that a Circular Economy, as opposed to an open-ended economy, aims to minimise residues from economic activity. Value is created by increasing the amount of time during which a resource provides value (Franklin-Johnson et al. 2016:592). In addition to designing for material circulation, the physical and use life time of products plays an important role in reducing the material throughput in society and is a factor in Circular Economy. Recent circular economy literature refers to longer lasting or durable products (Allwood et al. 2011, in Lieder and Rashid 2016:44) resource longevity (Franklin-Johnson et al. 2016), and multiple life cycles products, implemented through e.g., remanufacturing and reuse (Asif et al. 2015:1265).

Durability, reparability, and upgradability of products are considered as factors that extend a product's service time (Ellen MacArthur Foundation, EC 2015). Reparability is understood as "product design that allows maintaining the product function, including easy access to parts, fault diagnostics, part inter-changeability, identification of components and leads as well as information on repair (Ellen MacArthur Foundation Circular Economy Toolkit). Upgradability is defined as the ability of a product to continue being useful by improving the quality, value, and effectiveness or performance (Bocken et al. (2016):311). Multi-functionality is seen as product features by which the product serves several uses, which is a factor that can increase the use of a product during its lifetime. This paper analyses the existence of these factors on ecolabel requirements.

Ecolabels can act as a market pull for sustainable products (e.g. Cordella & Hidalgo 2016: 65) and thereby evidently

have the potential to steer the market towards greener products. So-called ISO Type I ecolabels set a standard for environmentally preferable products, which are identified by considering the environmental impacts throughout the product life cycle (ISO14024:1999). Each product group is associated with a set of requirements for an eco-label applicant, to differentiate between the better performing products. The criteria are revised periodically which creates a stepwise push towards sustainability.

The aim of this research is to analyse how the Product-Group-Specific Criteria of the Nordic Swan Ecolabel and the EU Ecolabel promote Extended Product Service Times. The following publicly available documents were analysed for this research: (a) 46 Product Group specific Criteria Documents of the Nordic Swan Ecolabel; and (b) 29 Product group specific criteria documents of the EU Ecolabel Flower.

Results

Table 1 below shows the extent to which the EU Ecolabel and the Nordic Swan include award criteria requirements on durability, reparability, upgradability and multi-functionality.

The EU Ecolabel has requirements on durability and reparability. The product groups that generally have requirements on durability also have requirements on reparability. The criteria for Flushing Toilets, Water Based Heaters, Imaging Equipment, Computers, Televisions, Furniture and Mattresses have an obligatory warranty or guarantee period, which ranges from 2 to 10 years depending on the product group. Other durability requirements include product quality and durability testing and parameters, mechanical resistance criteria and durability parameters.

Many of the EU Ecolabel product group include requirements for design for reparability and availability of spare parts. The product group criteria require design that allows a professional engineer or service personnel to change parts with tools that are normally available for them. In addition to the technology product groups, the EU Ecolabel product group on mattresses includes a requirement (nr. 13) whereby the "manufacturer shall demonstrate that the mattress can be dismantled for the following purposes: undertaking repairs and replacement of worn-out parts, upgrading older or obsolete parts". The criteria on televisions and computers, as well as mattresses combine reparability and upgradability into one requirement. No other EU Ecolabel product groups have requirements on upgradability.

Nordic Ecolabelling is designed to ensure that products are of good quality (E.g. White Goods criteria: 4). Criteria for most non-disposable products include requirements for durability and quality, many with a specified obligatory warranty/guarantee period. As shown by table I, the Nordic Swan Ecolabel includes durability requirements in many product groups belonging to different product category type. Reparability is a requirement mainly in electronic devices and household goods. Upgradability is mentioned in only one product group – Computers vs 7.3. It includes in its definition that a Nordic Ecolabelled computer is "easy to upgrade, dismantle or recycle" (Nordic Ecolabelling of Computers: 4).

Product design that allows for easy dismantling, repair and upgrade through the availability of replacement parts is at the centre of service life time extension. Related requirements are reflected in several of the Nordic Swan Ecolabel criteria, in particular for electronic devices and household goods. In addition, product service time is reflected in several disposable products, making reference to the use or operating time of the product (e.g., candles, sanitary products and primary batteries). The rechargeable Batteries product group is interpreted as including a requirement on multi-functionality as it requires that the charger can be used for a minimum of two battery sizes.

Discussion

Ecolabels include many different types of criteria for products that can increase the product service times. This way ecolabels can be a suitable tool for influencing the current trend where product life spans are decreasing. To counter this trend, physical life spans of products need to increase. Product service time can be extended if the product is by ecolabel requirements assured to be durable, repairable or upgradable or has maximised use intensity through multi-functionality.

The ecolabelling schemes include criteria that promote durability of the product. These are characterised through quality requirements as well as requirements on

Aspect	Product Group Nordic Swan	Product Group EU Ecolabel
Durability	Furniture and Fitments, Windows and Doors, Durable/ Resistant Wood for Outdoor Use Floor Covering, Construction and Façade Panels, Closed Toilet Systems, Suppliers for Microfibre based cleaning, Toys, Outdoor Furniture, Boilers for Solid Biofuels, Stoves, Textiles, Hides, Skins and Leather, Rechargeable Batteries, White Goods, Compost Bins, Imaging Equipment, TVs and Projectors, Office and Hobby Supplies.	Flushing Toilets and Urinals; Sanitary Tapware; Water Based heaters, Imaging Equipment, Computers, Televisions, Furniture, Mattresses, Textiles and Footwear.
Reparability	White Goods, Furniture and Fittings, Compost Bins, Closed Toilet Systems, Boilers for Solid Biofuels, Imaging Equipment, TVs and Projectors and Computers.	Flushing Toilets and Urinals; Sanitary Tapware; Heat Pumps; Water-based heaters; Imaging equipment; Computers; Televisions; Furniture and Mattresses.
Upgradability	Computers	Computers; Televisions; Mattresses
Multi-functionality	Rechargeable Batteries	

Table 1 Extension of Product Service Time in Ecolabelling Requirements.

warranties and guarantees. To assure that the product is in use for as long as possible and value is kept in the system, requirements on upgradeability and reparability are important. Multi-functionality would reduce the idle time of a product. However, it is shown here that only in one product group studied there was a requirement indicating multi-functionality.

The concept of "longevity" includes the longer use of a product by a consumer, which is promoted by the currently prevalent ecolabel requirements. However, it builds in also the duration of a product's refurbished use (Franklin-Johnson et al. (2016:596). To date requirements for repair and upgrade are not prevalent in the body of criteria documents studied for this paper. Nevertheless, there are product groups, such as imaging equipment (Nordic Swan) that include obligations that enhance reparability. The Nordic Swan's product group on Remanufactured Toner Cartridges includes a system of take-back as a requirement. Extending these kinds of requirements to other product groups with a view to increase the resource use time within a product system, are a means to enhance product life times.

Ecolabelling schemes are designed in a way that they drive a market based change towards more sustainable consumption and production patterns. It is the role of ecolabelling to point out the best-performing products within a product category. An assurance that the product is durable, reparable and upgradable fits well in this role. These product features also play a role in influencing the volumes of consumption, especially in product groups where throughput cycles are relatively fast and where the disposal depends on the poor quality and short life time of a product. However, as ecolabelling is only suited for product groups for which differences in environmental performance can be distinguished there are products that are not suitable for ecolabelling (Thidell 2009: 42-43).

The underlying motivation in the transition to circular economy is to create more value from fewer resources. One approach to value creation is increasing the amount of time during which a resource provides value (Franklin-Johnson, 2016). In addition to increasing the requirements on longer life spans of products, various models of value creation in using more durable ecolabelled products in a circular economy should be researched. This could include, for example, creating ecolabel criteria for sharing economy services.

This research has presented the requirements that aim to extend product life times, found in the award criteria documents of two ecolabelling schemes. A future research that would strengthen this analysis would be to quantify the expected and actual use times and physical life times of ecolabelled products, in comparison to products without an ecolabel.

Conclusions

Product design that allows for easy dismantling, repair, upgrade and through the availability of replacement parts is at the centre of service life time extension. Related requirements are reflected in several of the Nordic Swan Ecolabel and EU Ecolabel product-specific criteria sets, in particular for electronic devices and household goods. In this article, it is suggested that ecolabels, through setting strict criteria for product design, contents and functioning, and for condensed consumer oriented information, are well placed to drive the uptake of products and services aligned with the objectives of Circular Economy. The examination of the product group specific criteria documents indicates that requirements on durability, upgradability and reparability can well be set, and are already included in ecolabel requirements. While durability is already present the criteria for a variety of different product groups, upgradability and reparability are currently required for fewer products, such as computers and televisions mentioned above. Future revisions of product-specific criteria sets present an opportunity to apply circular economy relevant requirements on upgradability and reparability in a broader suite of product groups.

Acknowledgments

This research was undertaken as part of the project "Nordic Swan, Circular Economy and Product Environmental Footprint" funded by the Nordic Council of Ministers.

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