



Longer Product Lifetimes

Executive Summary

Final Report

February 2011

EXECUTIVE SUMMARY

Introduction

Defra commissioned Environmental Resources Management (ERM) to carry out research into the potential to reduce the UK's environmental impact by extending the life of products and to identify and to assess possible measures or interventions to achieve lifetime extension.

Nine sample products were selected for detailed review: washing machines; mobile phones; toasters; laptops; printers; carpets; commercial flooring; toasters; and t-shirts. However, the work aimed to draw conclusions and to make recommendations for products in general. Thirteen measures or interventions were identified which could extend the life of products. The environmental, economic and social impacts of each of these measures were assessed for one of the sample products.

Chapter 1: The Scoping Report

- Background to this research into extending product lifetimes
- Rationale for Government intervention
- Other policies and initiatives which consider lifetime extension
- A summary of Defra's study on consumer attitudes.
- Description of the selection process of nine example products

Chapter 2: Life Cycle Impact of Nine Products

- Describes in detail the product life cycle assessments (LCAs) of nine products.
- Draws conclusions about the environmental benefits of optimal lifetime extension strategies in general.
- Includes an additional focus on implications on waste arisings.

Chapter 3: Impact Assessment of Potential Measures

- Focuses on practical steps/ measures to extend the life of products.
- Looks at the rationale for introducing measures.
- Presents ERM's approach to evaluating specific measures
- Presents conclusions on the potential environmental, economic and social impacts of
- Explain which measures are likely to be effective in extending the life of particular products.

Annex A	Summary of Literature Review
Annex B	Products and Short listing Process
Annex C	Life Cycle Optimisation (LCO) Model Results
Annex D	Stakeholder Workshops Materials
Annex E	Stocks and Sales Model
Annex F	Development Stage Impact Assessment Spreadsheets

Initiatives on Extended Product Lifetimes

ERM's review of existing policy measures shows that none has extended product lifetimes as their primary objective. Some European Directives such as the Eco Design Directives and the Waste Framework Directive include reference to related elements such as waste minimisation or extended producer responsibility. Defra's product roadmap work covers lifetime extension issues but not in any great detail and WRAP's Love Food Hate Waste campaign aims to extend the lifetime of foodstuffs in the home. However, in general, few policy or government initiatives have within their remit lifetime extension.

Consumer decisions in buying products

Typically, the current business model for consumer products is based on supplying more of these goods and services in order for business to grow and to deliver increased profitability. Products with a short lifetime inherently fit this model best, as consumer wants and needs are satisfied only briefly, and quickly require repeat fulfilment.

In 2010, Brook Lyndhurst carried out research into consumer attitudes towards product lifetimes of a range of consumer products. The findings show that consumers view expected product lifetime as a subjective and variable entity that changes according to the product and person. The work categorised products into three types, according to attitude towards product lifetime:

- workhorse (expect to last until broken);
- up-to-date (expect to last until updated); and
- investment products (last long enough to pay me back).

Consumers are seeking to achieve good value and are generally interested in assessing *how long a product might last*, but only rarely interested in *longer-lasting products*. Consumer demand for longer lasting products is therefore insufficient as a driver for longer product lives.

What can be done to extend product lifetimes?

Extending product lifetimes does not only mean designing products to last longer - it also requires consumers to use products until the end of their lives. Research suggests that around 33% of electronic products are still functioning when they are discarded. Extending product lifetimes therefore requires not only measures targeting changes in product design and manufacturing, but also complementary measures aimed at changing consumer behaviour.

Environmental Rationale for Extending Lifetimes

ERM undertook *Scoping Product Life Cycle Assessment (LCA)* studies for each of the nine products, with the aim of quantifying the environmental benefits of extending their life.

The modelling showed that there is a high likelihood that lifetime extensions results in environmental benefits. Lifetime extension (LE) strategies save the environmental impacts associated with producing more products, even if there is increased environmental impact from refurbishment or upgrading processes. The work looked at scenarios where there was a modest increase in the lifetime of products and therefore any environmental benefits achieved through innovation did not outweigh the benefits of extending the product life.

It is considered that, in general, these product-specific conclusions would be valid for a wider array of products, perhaps with the some exceptions and caveats. These could include electronic products which are subject to product convergence and frequently-used products which display rapid shifts in energy efficiency.

Possible Measures /Interventions

Through stakeholder discussion and feedback, ERM identified a range of measures which could be introduced to extend product lifetime. Possible measures include business-led

voluntary measures, and government-led voluntary and mandatory initiatives. Some of the business-led activities are already being partially undertaken in specific markets or in relation to specific products demonstrating a level of market acceptance.

The following measures were assessed (at an introductory level) for their economic, social and environmental impacts. For each measure, a sample product was selected in order to be able to quantify (where possible) the impacts. For each measure, the impacts were assessed in three scenarios: 2010; 2030 (business as usual); and 2030 (introduction of the measure). A stock and sales forecasting model was developed to show how the volumes of products manufactured and retailed (and associated revenues) may be affected by longer product lives. The introduction of any of the measures is deemed to result in fewer products being manufactured and retailed compared to a 'business as usual' scenario.

Box 1 Possible Measures to Extend Product Lifetime

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1. Manufacturers voluntarily improve product design to increase product durability.
 2. Manufacturers voluntarily introduce Product Service System (PSS) or leasing business models.
 3. Manufacturers or retailers voluntarily offer enhanced aftercare and maintenance services by selling products that include an aftercare service in the product price (eg, the retail price includes refurbishment or maintenance as standard).
 4. Manufacturers or retailers voluntarily offer a deposit scheme on products, in order to collect them after use, refurbish them, and bring them to a second market.
 5. Government develops and funds a consumer awareness campaign on product longevity, aiming to change consumer choice at point of sale and/ or consumer behaviour during product use.
 6. Government provides grants for industry players to work in partnership to find ways to increase product lifetime (eg, developing consistent product declaration on product lifetime, designing products with increased optimal life, carrying out product reuse, remanufacture, repair or maintenance.).
 7. Government introduces Enhanced Capital Allowances (ECAs) or tax breaks for products that meet product standards as defined in the 'green procurement' standards (see measure 11).
 8. Government provides VAT incentives for durable goods (eg reduced rates of VAT for products which are designed/ guaranteed to last for an optimum product lifetime).
 9. Government introduces industry standards for product longevity which industry can *voluntarily* sign up to.
 10. Government introduces *compulsory* industry standards for product longevity.
 11. Government introduces a mandatory green public procurement specification on product longevity.
 12. Manufacturers or importers are subject to individual producer responsibility requirements that legally require companies to take back their *own* products at end of life.
 13. Manufacturers of product voluntarily extend warranties on products.
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Environmental, Economic and Social Impacts

The assessment of the 13 measures/approaches to extend product lifetime shows the following.

- All measures lead to **environmental savings**, but these tend to be relatively small overall, since the assumed market shift to longer life products is comparatively small in most instances. For all measures, the environmental savings are largely due to a decrease in product manufacturing volumes.
- Overall, the **economic impact** of the measures is mixed in terms of their effect on the UK economy. Most of the changes are fairly small in proportionate terms, of the order of up to 10% either up or down. The effect on manufacturing is broadly negative, R&D is lightly affected and impacts on distribution and retail mixed. However the impacts on repair, refurbishment, maintenance and second hand market are positive.
- In terms of **household/consumer expenditure**, for some measures the impacts is positive or has no substantial impact. Wider societal impacts are negligible or small impacts.

Appropriateness and Effectiveness of Measures

The appropriateness and effectiveness of a measure is related to a range of product features including: consumer classification (up-to-date, investment and workhorse); type of end user; relative purchase price; location of the design/production base; whether the product uses energy or resources during use; stability of the product in design terms; frequency of care required; frequency of use and ease of reuse. ERM considers that the implementation of any measure will face specific challenges but an overriding challenge is the lack of consumer demand for longer life products.

Conclusions

- If the geographical focus of environmental, economic and social impacts is limited to the UK, it seems appropriate to tackle those products which are manufactured, used and disposed of in the UK first. However, ERM recommends that the UK needs to account more effectively for the embedded carbon in the products it imports, ie to consider global impacts.
- Government support, VAT incentives, Green Public Procurement and ECAs will help to bring about a level of change to the market.
- Deposits/product buy back, leasing business models and mandatory durability standards as types of measure may have some success in bringing about change if applied to appropriate products.
- It would make sense to focus on extending the life of any products which are discarded prematurely and which are in working order –ie through product retention and reuse.
- Where consumer demand exists for longer life products, these products this should be a focus for future work. Further research could be conducted to pinpoint which kind of products this would apply to.
- To counterbalance the reduced economic activity in UK manufacturing of new products, it would seem reasonable to focus on measures stimulating economic activity, ie in UK repair and refurbishment, and optimising product lifetime.

- The Extended Warranties measure appears to show significant opportunity for shifting the market without the need to rely on consumer demand for longer lasting products. Further work should be conducted to consider the feasibility of extending warranties.
- Further work could be carried out to understand what influences or motivates individuals' 'classifications' of products and what can be done to encourage customers to consider their products as 'investment' or 'workhorse' products.
- Further work should be carried out to establish the most appropriate and effective means of increasing consumer awareness of the issue.