

Thinking Life Cycle in a Circular Economy

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Abstract

On the face of it the circular economy is a noble concept. The idea is to do more with less and consume less raw materials than we do currently, but also with a view to anticipating that society will increasingly demand more materials and more products, particularly as the developing world aspires to make quality-of-life improvements. So the notion of recycling or, even better, the development of a sharing society, seems attractive.

The implication is that by designing something that is recyclable we will avoid the need for virgin raw materials. However, in order to fully understand the benefits of any changes, for example in materials selection, or a product redesign, it is necessary to consider the wider implications of the new development. For example, in eco design is the aim to reduce greenhouse gas emissions over the lifetime of the product? Is the aim to use less water or reduce the extraction of raw materials from the Earth? Is the aim to improve the quality of life for the majority of people associated with the product? How can these aspects be assessed in the context of sustainability or a circular economy?

This presentation will recommend that all new developments should be assessed upon a life-cycle basis. The main reason for this is that with all good intentions there are occasions when new developments in design, manufacturing or product development can lead to unintended consequences. The speaker will examine how material selection, and product design should embrace not only the end of life scenarios, where higher levels of recycling may be desirable, but all aspects of environmental, social and economic impacts across the life cycle. These need to be considered collectively in order to make informed and soundly based decisions on the preferred options.

The two challenges in this approach are data availability and in deciding the most appropriate, and fair methodology which reflect the most likely consequences of a decision. Several methods have been proposed, and standards and guidance exist but the range of options can be confusing and sometimes these have been driven by political or market preferences.

Clearly the concept of the circular economy needs to embrace life cycle thinking in order for it to be effective in delivering real improvements. One of the key aspects which must be understood is the social value of the product. A poorly designed product, which does not deliver the necessary social value will most likely fail and be replaced or disposed of before the value of the investment of raw materials is fully utilised.

Examples of where life cycle and sustainability assessment has been used to determine outcomes and inform decisions with a more holistic view will be presented.