



Sustainable Product Design and Reuse

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1 Design Framework

How to adapt products during their lifetime in a way that prolongs the use of the product? That's the circular concept and equally the aim of Use It Wisely. Product design influences the possibilities for upgrades, reuse and therefore the productive lifetime of a product. Hence, sustainable, adaptive product design is part of the research executed in the UIW project. The result: the Design Framework.

The design process needs to shift focus to the entire lifespan i.e. the entire use period of a product. Equally, is it no longer sufficient to only avoid environmental impact at the end of the product's life, a shift is made to a holistic view: the entire lifecycle of a product becomes relevant. To act more sustainably, repair, re-use and remanufacturing of products and materials have to become part of design requirements. Therefore, a closed loop system through smart product design has the following goals: 100% Re-use, 100% closed loop system, 0% use of virgin materials, 0% waste, 0% energy consumption.

It is now possible to compare products and designs amongst each other based on, not always aligning, goals for sustainable and circular product use. The extent to which a design meets requirements for repair, upgrades and re-use is expressed in a single score. Hence, the design framework is a very practical tool to ensure lifelong adaptation of products. Easy use and transparent scoring creates the possibility to explain the benefits of a particular product design to the end user.

2 C-LCA

Life-long adaptation of products is considered to be the most sustainable way to prevent waste. This is the logic behind assessing design re-use and remanufacturing possibilities.

DESIGN FRAMEWORK		DESIGN FOR	PROCESS
Gispén	BASE BRANCHE REQUIREMENTS	Material	Reversed Logistics
		Disassembly	
		Logistics	
		Maintenance & Upgrade	Manufacturing
		Re-use	

Design Framework

However, what is the actual benefit in terms of environmental impact? This question has been resolved with research conducted during the Use-It-Wisely project through the development of a Circular Life Cycle Assessment (hereinafter C-LCA). The result: a tool that measures the environmental impact of initial production and all adjustments during the lifetime of a piece of furniture. This may then be compared to linear production and use for similar products.

Once all information is entered into the tool the database calculates the environmental impact of a particular piece of furniture expressed in CO₂ or in costs. For example, linear use of a desk versus a re-made desk can be calculated in CO₂. The comparison supports the end user and Gispén in making sustainable choices.

The C-LCA tool creates the possibility to act responsibly and to be accountable for the choices we make in adapting furniture throughout its lifetime. Transparency with regard to our own actions and at the same time make the choices comprehensible for the end user. That's the biggest added value of the C-LCA and therefore the research completed by Use-It-Wisely researchers.



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