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WORKSHOP

AGREEMENT

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Design Circular Framework Setting - Composite recovery design solutions in the automotive industry

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European foreword

This CEN Workshop Agreement (CWA 17806:2021) has been developed in accordance with the CEN-CENELEC Guide 29 "CEN/CENELEC Workshop Agreements – A rapid prototyping to standardization" and with the relevant provisions of CEN/CENELEC Internal Regulations – Part 2. It was approved by a Workshop of representatives of interested parties on 2021-01-12, the constitution of which was supported by CEN following the public call for participation made on 2020-11-24. However, this CEN Workshop Agreement does not necessarily include all relevant stakeholders.

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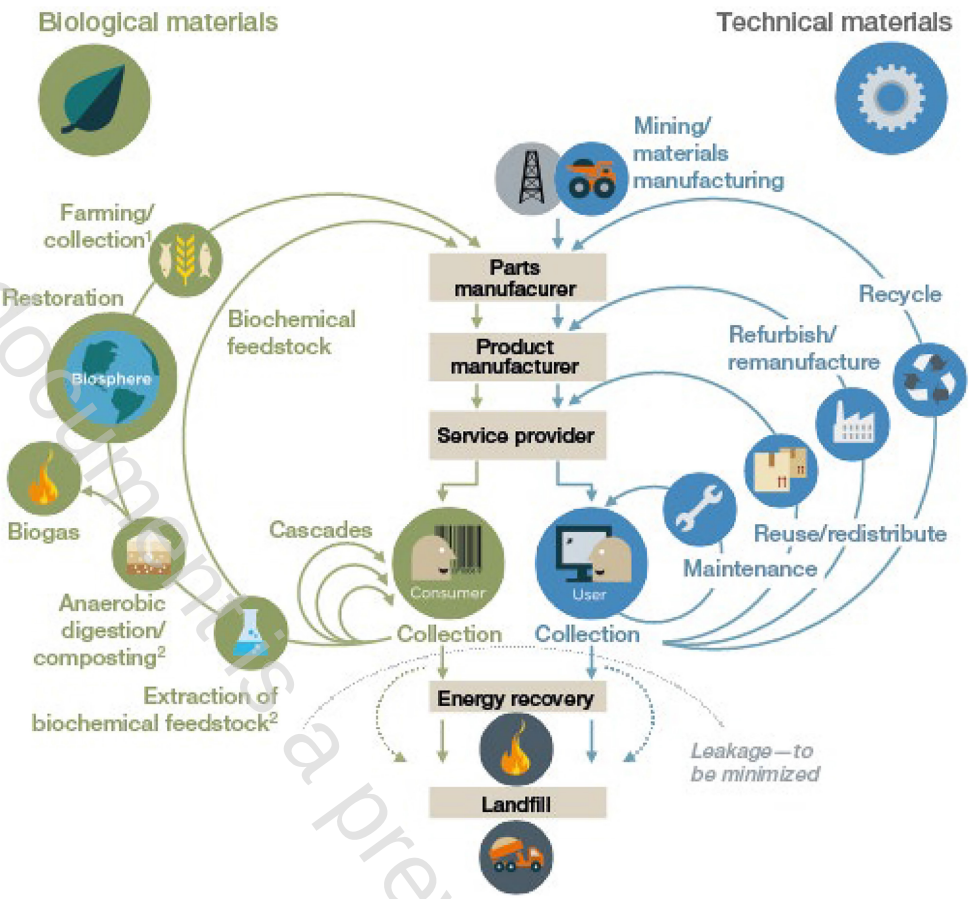
Introduction

The concept of circular economy looks beyond the current linear industrial models of “take, make, and dispose”, and instead aims to redefine products and services to design waste out, while also minimizing negative impacts of a linear economy. With scarce resources and an ever-increasing global population, the idea behind circular economy principles is to build long-term resilience, generate business and economic opportunities, and provide environmental and societal benefits.

Such an economy is based on a few simple principles, as shown in Figure 1. First, at its core, a circular economy aims to design out waste. Waste does not exist products are designed and optimized for a cycle of disassembly and reuse. These tight component and product cycles define the circular economy and set it apart from disposal and even recycling, where large amounts of embedded energy and labour are lost. Second, circularity introduces a strict differentiation between consumable and durable components of a product. Unlike today, consumables in the circular economy are largely made of biological ingredients or ‘nutrients’ that are at least non-toxic and possibly even beneficial, and can safely be returned to the biosphere, either directly or in a cascade of consecutive uses. Durables such as engines or computers, on the other hand, are made of technical nutrients unsuitable for the biosphere, such as metals and most plastics. These are designed from the start for reuse, and products subject to rapid technological advance are designed for upgrade. Third, the energy required to fuel this cycle should be renewable by nature, again to decrease resource dependence and increase systems resilience (to oil shocks, for example)[1)].

[1)] World Economic Forum. Web: http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/from-linear-to-circular-accelerating-a-proven-concept/#view/fn-12



Key

1 Hunting and fishing

2 Can take both postharvest and postconsumer waste as an input

Figure 1 — The circular economy–an industrial system that is restorative by design

[SOURCE: Ellen MacArthur Foundation circular economy team drawing from Braungart and McDonough and Cradle to Cradle (C2C)]

The two Towards the Circular Economy reports published by the Ellen MacArthur Foundation provide ample evidence that circularity has started to make inroads into the linear economy and has moved beyond proof of concept. Several businesses are already thriving on it. Innovative products and contracts designed for the circular economy are already available in a variety of forms-from innovative designs of daily materials and products (e.g., biodegradable food packaging and easy-to-disassemble office printers) to pay-per-use contracts (for tyres for instance). Demonstrably, these examples have in common that they have focused on optimizing total systems performance rather than that of a single component.

In this context, the waste hierarchy of the Waste Framework Directive (2008/98/EC) matches with the circular design strategies set for the “Design for the Circularity” by Ellen MacArthur Foundation. The strategies are reuse, repair, remanufacture and recycling.

The European Commission adopted an ambitious Circular Economy Package, which includes measures that will help stimulate Europe's transition towards a circular economy, boost global competitiveness, foster sustainable economic growth, and generate new jobs.

Since 1 January 2015, manufacturers must reuse 95 % of ELVs: 85 % of the materials they are made of and the remaining 10 % for energy generation (Directive 2000/53/EC). In this context, the main

difficulties lie in the separation of the different components (metal, glasses, cables, etc.) that make up the parts and the removal of odours and contaminants to produce high quality granulate suitable for reuse.

Therefore, the aim of this document is to define a circular design approach with the aim of delivering long-lasting and modular products in the automotive industry that will be easy to upgrade, refurbish and reuse, to be aligned with Europe's new regulations and to start building this mentioned transition.

1 Scope

This document tries to set design requirements that make composite products and materials in the automotive sector more easily repairable and longer lasting. Besides, it will ensure that the materials and components of a product can be more easily re-used, refurbished, and recycled, and finally, it will ensure that products are free of hazardous or problematic substances, which can hamper re-use or recycling efforts. In this sense, in this context, the most important addressed are customer perspective, health and environmental impacts and benefits and technical requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15344:2007, *Plastics — Recycled Plastics — Characterisation of Polyethylene (PE) recyclates (prEN 15344 under development)*

EN 15346:2014, *Plastics — Recycled plastics — Characterization of poly (vinyl chloride) (PVC) recyclates*

EN 45553:2020, *General methods for assessment of the ability to remanufacturing energy-related products*

BS 8887-2:2009, *Design for manufacture, assembly, disassembly, and end-of-life processing — Terms and definitions*

BS 8001:2017, *Framework for implementing the principles of the circular economy in organizations — Guide*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
business model
an organization chosen system of decisions and activities that determines how it creates, delivers, and captures value over time

3.2
circular economy
a circular economy entails decoupling economic activity from the consumption of finite resource and designing waste and pollution out of the system. It aims to keep products and materials in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life

[SOURCE: Ellen Macarthur Foundation and the UKs Waste Resources Action Program]