

C-SERVEES PROJECT: ACTIVATING CIRCULAR SERVICES IN THE ELECTRICAL AND ELECTRONIC SECTOR

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Abstract: C-SERVEES is a European project that aims to boost circular economy in the electrical and electronic sector through the development, validation and transfer of new circular economic business models. The business models are being developed through wide consultation with stakeholders and their viability will be tested through demonstrations involving four target products: washing machines, toner cartridges, televisions and telecom equipment. This paper will present the main findings and progress made in the project to date, including results of the consultation of stakeholders, guidelines for implementation of circularity and a circular economic business reference model tailored to the needs of the electrical and electronic sector (REF-CIRCMODE).

Key words: C-SERVEES, Circular economy, Electrical and electronic sector, WEEE, Business models.

1. Introduction

Waste of electrical and electronic equipment (WEEE) is one of the fastest growing waste streams in the EU, growing at 3-5% per year, with a generation over 12 million tonnes estimated for 2020 [1,2]. WEEE is a complex mixture of valuable materials that can cause major environmental problems if not properly managed. The improvement of WEEE prevention, collection and recovery is essential to boost circular economy and enhance resource efficiency, which require new approaches in the design, manufacturing, use and end of life of EEE.

C-SERVEES [3] is a European project funded under the H2020 programme (2018-2022) that aims to boost a resource-efficient circular economy in the electrical and electronic (E&E) sector through the development, testing, validation and transfer of new circular economic business models (CEBMs). These business models will be based on systemic eco-innovative services that include: (1) eco-leasing of EEE, (2) product customization, (3) improved WEEE management, and (4) ICT services to support the other eco-services (Fig. 1). ICT tools (relying on QR codes) will be developed as the driver of the proposed eco-innovative services to take full advantage of the potential and synergies of two major revolutions of our time: the circular economy and the Industry 4.0.

The project will contribute to transform the E&E sector into circular and 4.0, raising new opportunities for end-users (such as their involvement in design or the access to a product as a service) and for social and solidarity economy (conducted by NGOs that employ people at risk of social exclusion to repair and prepare WEEE for reuse). The techno-economic, environmental and social viability of the new CEBMs will be validated through demonstrations involving four target products: washing machines, toner cartridges, TVs and telecom equipment. These products belong to different EEE categories that together account for 77% of WEEE collected in the EU.

2. Methods

The overall methodological approach in the 4-year C-SERVEES project combines technological innovation, development of circular economy models and services, development of advanced ICT tools for circular value chains, four large-scale demonstrations, development of enabling tools for replicability of proposed solutions, market analysis, business and exploitation plans, and dissemination to maximise the impact of the project.

The CEBMs will be developed through wide consultation with relevant stakeholders and their viability will be tested through demonstrations involving EEE products and their value chains. An important part of the project is therefore gathering information from stakeholders regarding the barriers and opportunities for applying the circular economy principles to the E&E sector. To this end, surveys aimed at different stakeholder groups were prepared and distributed, including designers, retailers, suppliers, manufacturers, WEEE handlers and end users. Over 1,000 responses were collected, which are now being processed to determine the circular economy requirements across the EEE value chain, identifying technical, market and regulatory aspects. These will inform the development of the CEBMs, which in turn will help to develop the demonstration products.

A circular economy business reference model for the E&E sector (REF-CIRCMODE) will be developed based on findings of the surveys and circular economy performance indicators. It will rely on the application of BS 8001 circular economy principles [4], circularity indicators methodology [5] and product service system [6]. Oriented product-specific circularity models for the four target products will be further developed, which will be equally based on characteristics of REF-CIRCMODE but would factor in specificities for each target product.

The project will then deal with the implementation and testing of the CEBMs through four large-scale demonstrations that will address: eco-design of target products, testing of these products and related eco-services in real production sites and WEEE treatment plants, and testing of end-users' acceptance. Finally, life cycle sustainability assessment will be applied over the demonstrations to measure their performance and viability in environmental, economic and social terms, while key enabling tools will be provided for replication and transfer at the EU level: ecodesign guidelines, policy recommendations and framework for circular economy standardization.

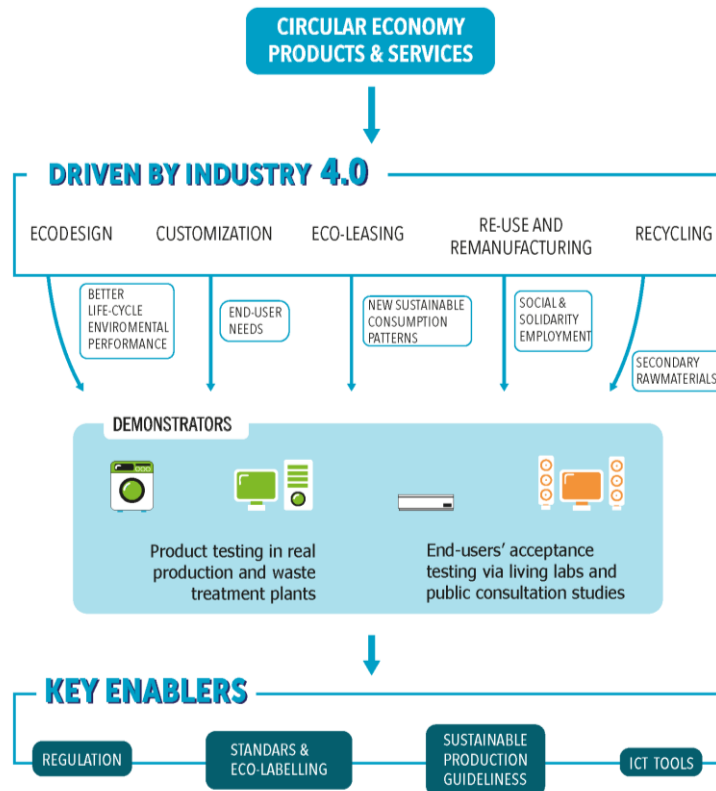


Fig. 1: Schematic overview of the C-SERVEES project.

3. Results

C-SERVEES is close to finalizing its first annuity and the following results will be available in October 2019 for presentation at the ISWA World Congress: (1) results of the consultation with stakeholders, including the barriers and opportunities for circular economy models, which will be collected in guidelines for implementation of circularity; and (2) the circular economic business reference model for the E&E sector (REF-CIRCMODE).

4. Conclusions

Understanding the barriers and opportunities in more detail is critical for developing business models that address the needs of all stakeholders, take on the challenges presented to the sector and grasp the opportunities that are available. The products that are developed cannot influence a change in the economic approach in the sector if they do not fully address the issues raised by stakeholders. C-SERVEES will provide CEBMs tailored to the needs of the E&E sector, starting with a reference model that helps to face some roadblocks already identified, such as: concerns over the profitability of the circular business models; perception that re-use can damage existing markets; data security, privacy, trust and traceability; conflicting regulations; and socio-cultural issues that may hinder acceptance of circular products (like re-used or refurbished products).

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