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A circular economy approach for lifecycles of products and services

Report on Demonstrations of CEBMs

Deliverable 6.5

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Summary

The implementation of the three Circular Economy Business Models (CEBMs) developed in CIRC4Life, is described in this deliverable. The present document, in conjunction with the on-site demo deliverables (D6.1, D6.2, D6.3, and D6.4) address the tasks described in Description of Action (DoA) for WP6 Demonstrators.

The three CEBMs: Co-creation of products/services; Sustainable consumption; Collaborative recycling/reuse, are demonstrated in two industrial sectors: electronics and farming/agri-foods. Demo 1 includes LED lights, both domestic (ONA; Demo 1a) and industrial (Kosnic, Demo 1b). Demo 2 includes tablets (Indumetal and Recyclia). Demo 3 includes vegetable food (Scilly Organics), and Demo 4 includes the meat supply chain (Alia). For each demonstrator, a description of the activities, from the beginning to the end of the project, is described.

Although the demos have been implementing the developed CEBMs, the activities for each demo and each CEBM have many times been different, as they by necessity have been adapted to different local contexts and to the specific industry sector. The demonstrators have been demonstrated physically in different geographical areas (UK, Spain), as well as in online events (due to the pandemic). It has included a variety of types of activities, such as demonstrating eco-labels on products and engaging customers for feedback, demonstrating eco-shopping in physical stores and in online web shops, return systems of products for reuse and recycling and related incentive schemes, co-creating new products and modular products, and development of leasing models for LED lightings instead of sales of products. The different activities have firstly been part of Living Lab (LL) activities, and then finally demonstrated to a variety of stakeholders. Additionally, the demonstrators have been engaged in awareness campaigns and showcase events in order to disseminate results and further engage stakeholders for circular economy.

In order to validate the implementation of the CEBMs into the different demonstrators, a validation framework with suggested Key Performance Indicators (KPIs) and questions were developed, which have been the basis for the questions posted during demonstration activities to different stakeholder groups. This deliverable includes data from the demonstrators activities for Demo 1 and Demo 4, and partly for Demo 2 and Demo 3, as these demos have their final deliverable in September and do not have all data available for the time being of writing this deliverable.

During the demonstration phase, less physical events took place than planned, due to Covid-19 restrictions. The pandemic situation postponed activities, and also created a need to rethink demo activities overall, and to assess which activities that could be performed as digital events, and created a need to generate ideas for new type of activities, as an alternative to originally planned activities. This of course puts stress on a demonstration project, and a need of adapting to new and challenging situations. In such situation, large scale demonstration proved difficult. However, what was obvious is the continued interest in sustainability actions and engagement shown by the demonstration companies, and the interest of the stakeholders involved, as a part of their way to become a more sustainable company. Overall, all partner has gained insights on what it takes to be more sustainable as a company and on CEBM development and how it would be possible to implement.

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Acronyms and Abbreviations

Abbreviation	Description
CEBM	Circular Economy Business Model
CSR	Corporate Social Responsibility
DoA	Description of Action
EoL	End of Life
NGO	Non-Governmental Organisation
ICT	Information and Communication Technologies
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicators
LCA	Life Cycle Assessment
LL	Living Lab
OIC	Open Innovation Camp
PDS	Product Design Specification
S-LCA	Social Life Cycle Assessment
SDGs	Sustainable Development Goals
UN	United Nations
Q&A	Questions and Answers
WEEE	Waste of Electrical and Electronic Equipment

1 Introduction and WP6 Overview

Already in 1987, the Our Common Future report (Report of the World Commission on Environment and Development: Our Common Future) included a definition for a sustainable development, which read "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Since then, efforts within this area have been developing. But the sustainability challenges we are facing have also grown, and according to IPCC, limiting global warming to 1.5°C requires both that global net human-caused emissions of Carbon Dioxide (CO_2) would need to decrease by about 45% from 2010 levels by 2030 (IPPC, 2018).

As Ban Ki-Moon, former Secretary-General of the United Nations (UN), commented; "there is no plan B, as there is no planet B" (UN News, 2014). The urgency for action has been noted by world leaders and organizations, leading to e.g. the adoption of the 2030 Agenda for Sustainable Development, and its 17 Sustainable Development Goals (SDGs) (UN, 2021), in 2015 (Muff, Kapalka and Dyllick, 2017). The SDGs clearly establish the need for a transition to a more circle economy and resource efficiency to meet the sustainability goals, and with the CIRC4Life project, we aim to contribute positively to the SDGs and to a sustainable future, by developing Circular Economy Business Models (CEBM) and demonstrating them in practice.

This document will report on the progress and results of these demonstrations, in conjunction with deliverables of each demonstrator (D6.1, D6.2, D6.3, and D6.4).

1.1 Overview of WP6 Demonstrators

This deliverable is a report of the demonstration of the new CEBMs developed in the CIRC4Life project. The CEBMs is demonstrated in two industrial sectors: electronics and farming/agri-foods, with the products of LED lights, computer tablets, vegetables, and meat. The demonstration period of the project reached from month 19 to month 41[1]. During that period, the demo owners have practiced and demonstrated the CEBMs to their stakeholders and end-users by a full scale go to market demonstration. The demonstration is conducted through the product lifecycles and supported by the Information and Communication Technologies (ICT) platform developed in the project (see e.g. D4.1 System specification including traceability matrix, and D4.2 Report on information logistic systems development and resulting systems and processes).

The work with demonstrations in Work Package (WP) 6 has been closely linked to the Living Lab (LL) activities in WP7, with has provided a framework for end-user engagement and for involving stakeholder in a collaborative innovation process (see D7.1 Living labs concepts and implementation plan for CIRC4Life-project). For the demonstration, the LL activities have served as testing activities to ensure that the demonstration of the CEBMs for each demonstrator is well prepared and thought through. Figure 1 presents an illustration of the CIRC4Life development process from LL activities (WP7) to Demonstration (WP6).

[1] Although, the timing of the deliverables, after the prolongation of the project, is a bit different for the different demos.

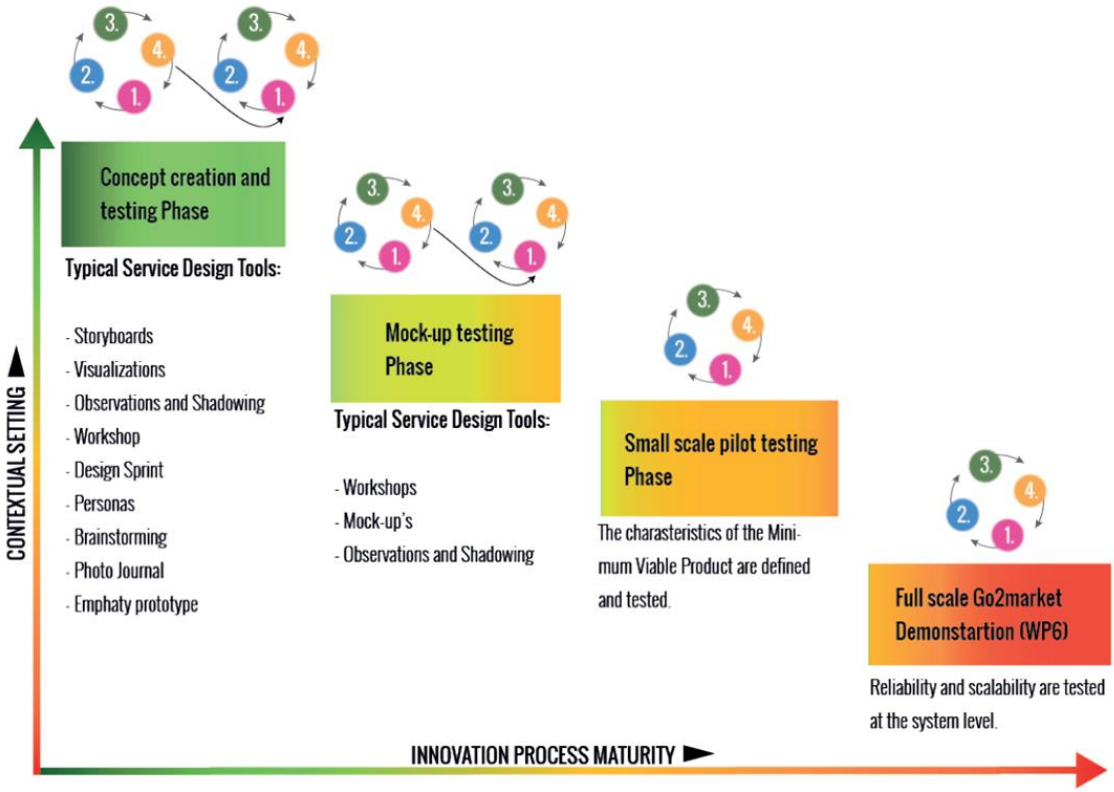


Figure 1: Illustration of the CIRC4Life development process from LL activities (WP7) to demonstration (WP6) (see D7.1)

The demonstration phase of the CIRC4Life project has included demonstration planning (M10 – M25), demonstration activities and showcase events for validation and dissemination of results (M19 – M41), see Figure 2. An important starting event was the first Open Innovation Camp (OIC), see D7.2 Report on implementing living labs and OIC events and recommendations in future circular economy efforts, where LL and demonstration activities were planned, discussed, and revised.

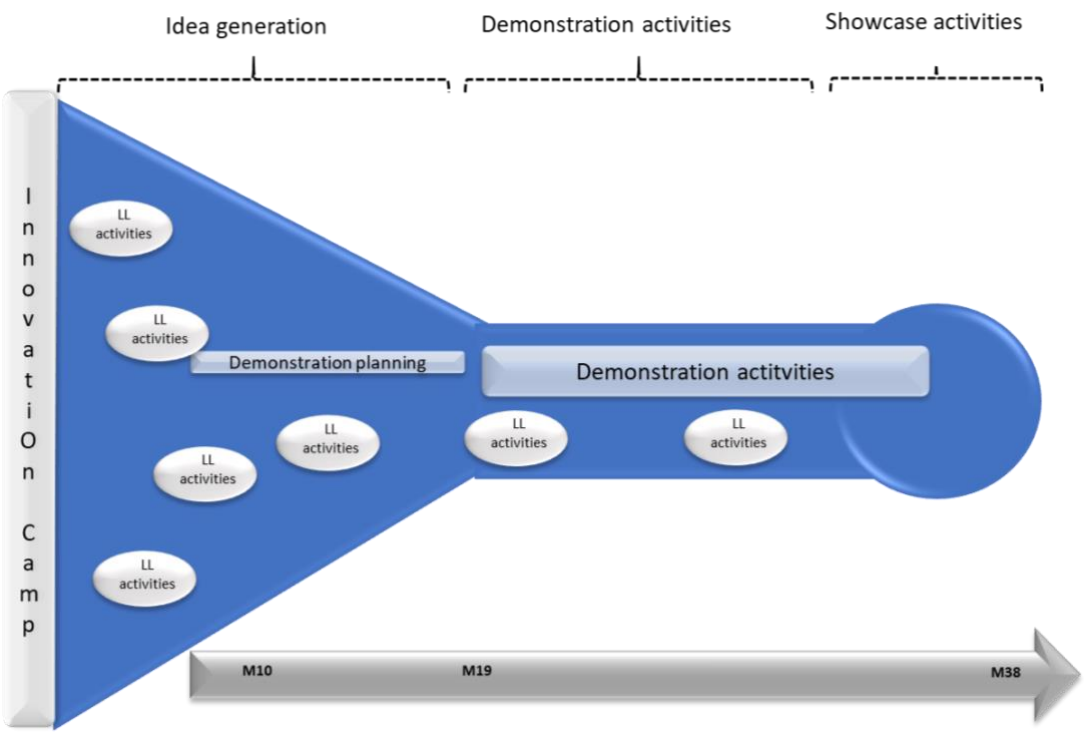


Figure 2: Illustration of the CIRC4Life relation between LL activities and Demonstrators

1.2 Overview of Demonstrations

The three new CEBMs, further described in Chapter 2, are demonstrated in electronics/electrical and farming/agri-food sectors. In electronics/electrical sector, two types of LED lighting products are demonstrated: industrial lighting in workshops, stores and other industrial environment; domestic and contract lighting products used by householders, hotels, offices, etc.; in addition, computer tablets are also demonstrated in the project. For farming/agri-food sectors, the new CEBMs have been demonstrated in the meat supply chain, and for vegetables on a micro farm. Demonstration in the two sectors aims to illustrate that the new CEBMs are not only important for industrial applications but also generally applicable in different industrial areas.

Figure 3 presents an illustration of the CIRC4Life demonstrators and their location. Kosnic (UK), as the industrial LED lights manufacturer, and ONA (Spain) as the domestic/contract LED lights manufacturer, have (i) developed LED lights with the co-creation of products/services model and ensured that the products meet the requirements of the sustainable consumption and collaborative recycling/reuse models, (ii) made the LED lights ready for market deployment, and (iii) developed and implemented new services such as leasing the lights to the end-users. See section 2.4 for more details.

RECYCLIA (Spain), as the intermediate organisation between the electronics/electrical end-users and manufacturers, and INDUMETAL (Spain) as the recycling centre, have worked with relevant partners to implement the collaborative electronics/electrical recycling/reuse model, and, in particular, implemented and demonstrated (i) online recycling system of the End of Life (EoL) for electronics/electrical, (ii) eco-credits rewarding system of recycling electronics/electrical, and (iii) reuse of recycled tablets. See section 2.5 for more details.

Scilly Organics (UK), a small-scale vegetable farm, assisted by IEIA (Instytut Ekologii Terenow Uprzemyslowionych), food ecology and waste management specialists, have worked with stakeholders in the agri-food value chain to implement the CEBMs to (i) demonstrate the sustainable operation of vegetable farms; (ii) sustainable consumption of agri-food; (iii) reduce the food waste and recycle the waste for composts or other options. See section 2.6 for more details.

ALIA (Spain), the agrarian association of meat supply chain and manufacturer of pork/livestock-feed products, have implemented the CEBMs to (i) develop their products, (ii) enable the sustainable operation of livestock farms, (iii) support sustainable consumption of meat products, and (iv) reduce/recycling of bio waste. See section 2.7 for more details.

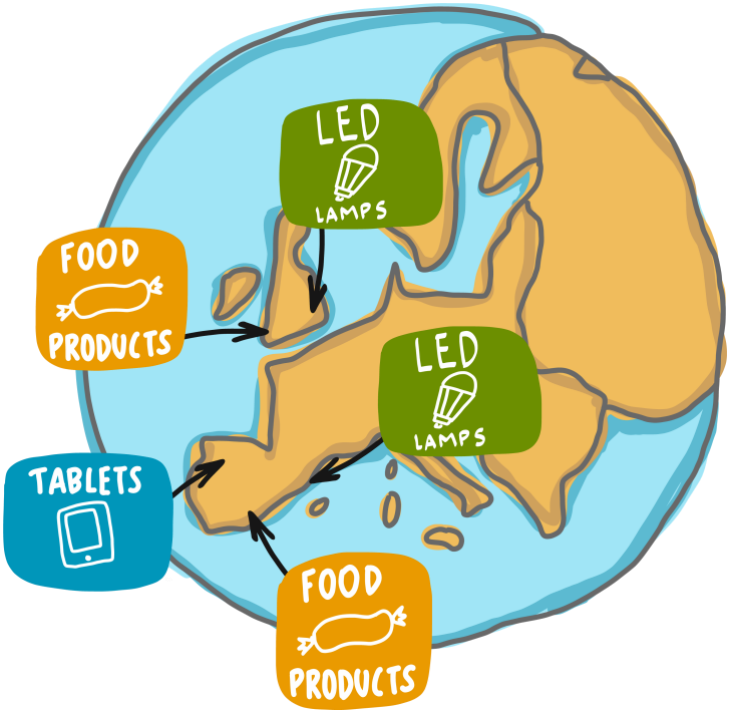


Figure 3: Illustration of the CIRC4Life Demonstrators and their location

1.3 Objectives for WP6 Demonstrators

The aim of WP6 is to integrate the new CEBMs developed in WPs 1-3, including Co-creation of Products/Services model, Collaborative recycling/reuse model and Sustainable Consumption model into the demonstration scenarios. In WP6, the CEBMs will be demonstrated to key actors through the value chain of the electrical and electronic products and farming/agri-foods (vegetable food and meats). This WP will test and validate the three developed CEBMs, in several demonstration scenarios, and prepare for up-scaling to other areas.

1.4 Planning of Demonstrators and Covid-19

As coordinator of WP6 Demonstrators, RISE has followed the development of the three CEBMs to plan for the four demonstrator scenarios including the involvement of e.g. key actors, resources, and scheduling (M10-M19). Due to the pandemic situation, the scheduling proved very difficult in the second half of the project, for the actual demonstration phase, and as a result of that, the project was granted a prolongation of six months. During the second part of the project, WP6 has been managing the demonstrators by supporting the team

members of the four demonstrators to ensure that all demonstrators overcome problems during the demonstration activities and showcase events (M19-end of project). However, due to Covid-19 travel restrictions, RISE team could not participate physically in the demonstration activities as planned in DoA and support directly on site. For this reason, all the demonstration owners have got more online support from both RISE and communication support from MMM.

Consequently, to the Covid-19 situation, the showcases organised by the demo owners was adapted to restrictions and situations in different countries. This meant, that some showcases could take place as small events with few people, whilst others were conducted as hybrid events (online and smaller physical event) or strictly as online events.

1.5 Integration of Elements of the CEBMs and the ICT Tool in Demonstrators

Integration of all elements in the CEBMs and the ICT platform has been done as a framework for the demonstration. The ICT based tools and their associated solutions developed under each CEBM were implemented for demonstration work. A brief description of these required elements from each CEBM are explained below to provide an overview of the designed integration scenario between CEBMs and demonstrators.

CEBM1: Co-creation of Products and Services

- Product Design Specification (PDS): Integration of PDS with eco-constrains, sustainable design and manufacture. This approach demonstrates that sustainable design measures start at the planning and design stages, which can ensure that the environmental and social impacts of products are reduced.
- Online Life Cycle Assessment (LCA) tool and Impact Assessment Tool: Online LCA tool is to implement eco-cost calculation, while Impact Assessment tool is to implement eco-credit calculation. The eco-cost is used to guide consumers buy sustainable products, and the eco-credit is used to encourage citizens' recycling behaviours.
- Eco-point method and the eco-accounting platform: The eco-point method is to account the sustainability of products purchased and recycled, which includes basic items: eco-cost and eco-credit. Eco-accounting platform utilises the information and communication technologies to collect and process the data for the calculation of eco-costs and eco-credits, and then apply the eco-costs and eco-credits obtained into eco-shopping, recycling/reuse, consumer's eco-account, and product sustainability assessment. After testing the concept of Eco-point method with the several end-users, their comments made the consortium change the terms to eco-cost (show the environmental impact, low value means good design) and eco-credit (when a customer returns product for reuse or recycling, which can be used when buying new products or for tree planting) to simplify the concept for the end-user.
- Leasing service for industrial lightings: For the new modular design based on industrial lighting LED luminaire, accordingly, a leasing service is developed, in which a full maintenance cover and flexible payment options are included.
- Co-creation approach: Brings the end-users/consumers closer to the beginning of the product development, which is achieved via co-creation activities, including online data mining, and LLs to gain consumer preferences.

CEBM2: Sustainable Consumption

- An eco-shopping system in order to provide information at the point of sale on the sustainability of the products.
- An eco-account which shows the sustainable behaviour of consumers: The eco-account allows consumers to compare the impact of their consumption and recycling habits.

- A sustainable label to check the eco-cost value of the products: Selling sustainable products is also about marketing. Designing an attractive label which enables consumers to compare the environmental impact of different products, is essential.
- An end-user's smartphone app: for managing the eco-account so the information can be easily checked by consumers; for managing the sustainable decision-making by consumers.

CEBM3: Collaborative Recycling and Reuse

- Intelligent bin: The intelligent bin will be able to connect a user account (i.e. eco-account through the smartphone app) which serves as opener to the intelligent bin to dispose the bags and boxes with wastes.
- Smartphone app: The intelligent bin will be going together with a dedicated smartphone application which will provide a series of functionalities to the citizens (e.g. showing the status of wastes deposit by users on different levels and at various sites like in the bin, in the classification company and being already reused or recycled; showing the wastes history).
- Traceability module: The integrated to the waste collection specified Traceability module provide solutions to the citizens (known by means of the Smartphone app the status of the wastes and the expected time for receiving the incentives), business owners (i.e. waste receivers, indicate the status of the wastes and the incentives to be provided) and incentivisers (process the information from the citizen account and will remove the incentives from their account when they are redeemed).
- Incentive scheme: Incentives can be provided by different stakeholders and will be added to the citizens' accounts after each interaction with the intelligent bin. These incentives will be redeemed in regional distance and in different commerce or by means of municipalities for public services or discounts.

1.6 Stakeholders Involved in Demonstrators

To demonstrate the feasibility of the new CEBMs, in these two industrial areas, need engagement from a significant number of stakeholders in an effective way. Therefore, end-user engagement has been vital in demonstrations and showcases, as well as in the preceding LL activities. Thus, throughout the project, professional and business networks, and engagement from stakeholders in society have been utilised, see planned structure in Figure 1. Different examples of important stakeholder organisations involved are Alia Agrarian Transformation Society consisting of almost 900 members; Make Mothers Matter (MMM), an Non-Governmental Organisation (NGO) with affiliates associations in more than 30 countries and represents more than 6 million mothers; Recyclia (REC), with their network of more than 1,300 companies requesting coverage of recycling Waste of Electrical and Electronic Equipment (WEEE).

Another important part of WP6 Demonstrators is the validation from the stakeholders regarding the integration of CEBMs into the demonstrators. Selection of stakeholder for the demonstration activities and showcases therefore aimed to follow the Quadruple Helix approach framework (Arnkil, Järvensivu, Koski & Piirainen, 2010) which describe university-industry-government-public-environment interactions, which, in the context of CIRC4Life, include the following different stakeholder groups:

1) **Private companies** are responsible for developing, testing, and managing circular economy solutions (including energy/material flows, value creation with other actors) and should engage local public sector and end-users.

2) **Public sector** is responsible for the political and regulation environment which is supporting sustainable behaviour, and penalizing opposite behaviour. Public sector also provides various types of

environments in which circular economy product/service system can be developed and tested with a group of companies and various types of end-users.

3) **Academia and Research Institutions** are a part that helps to identify the challenges, but also the possible solutions within the proposed product/service systems.

4) **End-users** are actively taking part in develop and demonstration activities and provide evidence of the market acceptance.

Figure 4 below presents a general visualisation of CIRC4Life CEBMs, demonstrators, and stakeholder groups.

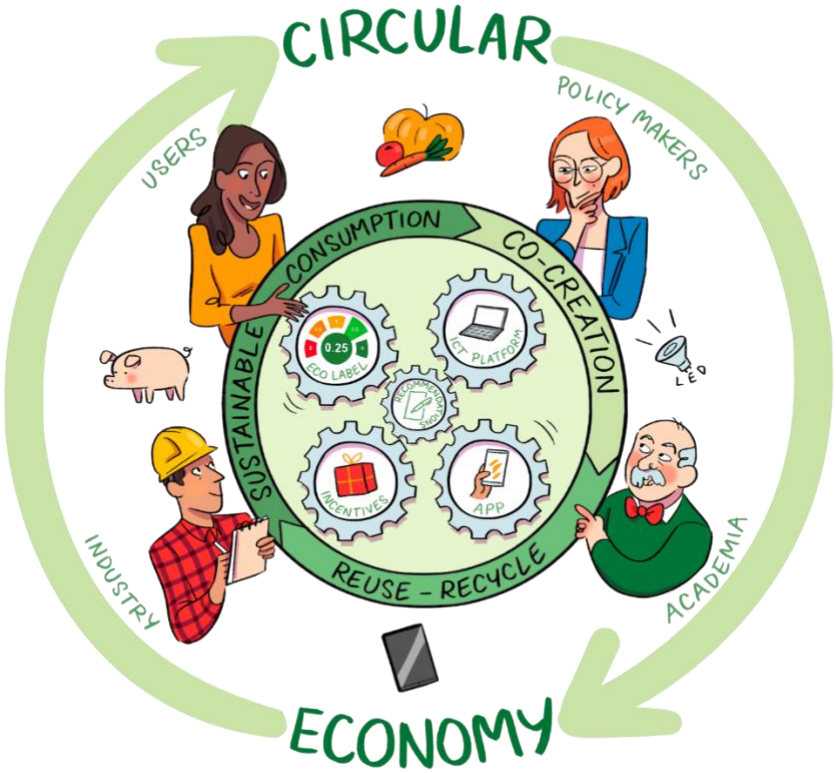


Figure 4: Illustration of the CIRC4Life CEBM, demonstrators, and stakeholders

2 Integration of CEBM into the Demonstrators

Within the CIRC4Life project, three new CEBMs have been developed in WPs 1-3, see Figure 5:

- Co-creation of Products/Services model
- Collaborative Recycling/Reuse model
- Sustainable Consumption model

Figure 5: Illustration of the three CEBMs developed in CIRC4Life

Figure 6 presents the relation between the three CEBMs, developed in WP7 see D7.4 Ecosystemic business models.

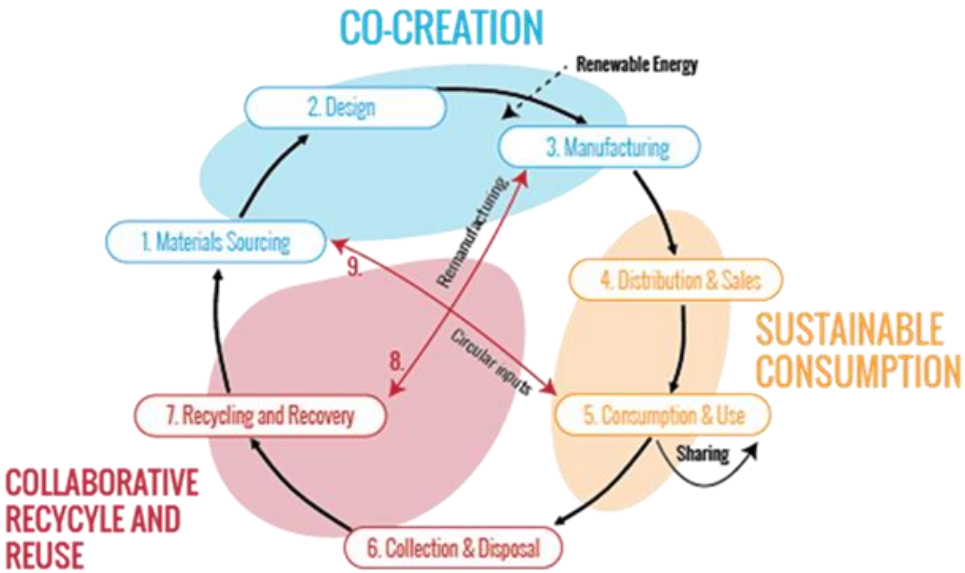


Figure 6: Illustration of the relation between the three CEBMs (see D7.4)

2.1 Co-creation of Products and Services

This CEBM is developed for implementation of co-creation of products and services with sustainable features, throughout the product development process, with the following particular consideration:

- Understand the interactions between consumers and supply chains, with a view to create processes for co-creation of products, and define the processes involved in the product supply chain
- Understanding business interactions between different actors in the product supply chain
- Analyse existing methods of sustainable production, and assess methods to make systems more circular and sustainable
- Analyse the environmental, economic, and social impacts of products and production systems, using existing and new methods of assessment

This business model helps to bring end-users closer to design and production stages, using user-centric methods. Benefiting from co-creation features, sets of sustainable production methods have been implemented and new products and services have been created[2]. The key innovation of this CEBM are:

- the eco-cost and eco-credit method (D1.3 Report on the development of eco-point methods)
- use of online LCA (D1.2 Report on sustainable (environmental, social, and economic) impact analysis), and
- a decision-making and impact assessment tool for value chain actors (D1.2)[3]

2.2 Sustainable Consumption

This CEBM developed methods/approaches to implement the sustainable consumption business model, interacting with the approaches that were developed within the other two CEBMs, co-creation of products/services and collaborative recycling/reuse. Within the WP3, eco-shopping (Task 3.1) and eco-cost account (Task 3.2) have been developed to enable consumers to select sustainable products and stimulate their sustainable consumption behaviours; the results of sustainable consumption awareness campaign (Task 3.3), customer online review data mining (Task 3.4), and consumer survey (Task 3.5) was applied to develop feasible characteristics of eco-shopping and eco-cost approaches, and to contribute the development of eco-cost calculations and recycling/reuse approaches and their supported ICT systems.

By presenting the customer with options and the right methodology to assess the environmental impact of products, this model enables the consumer to make a more sustainable decision. The model also provides a traceability solution to monitor a product's sustainability along the value chain and supports end-users and stakeholders to actively implement the circular economy via awareness raising and knowledge sharing activities[4]. The key innovations of this CEBM are:

- the CIRC4Life consumer app (D3.1 Development of eco-shopping and eco-account tools)
- the eco-label (D6.3 and D6.4)[5]
- the traceability module (D5.2 Development report and documentation for traceability components and tools), and

[2] Text formulated by the CEBM owner as a part of the WP7 work with the internal validation at the consortium meeting in February 2021 and at OIC2 in May 2021.
[3] Ibid.
[4] Ibid.
[5] This was not a task in DoA but was raised as feedback from stakeholders.

- the consumer awareness raising and capacity building activities (D3.2 Informative and awareness campaign for sustainable consumption)[6]

2.3 Collaborative Recycling and Reuse

This CEBM is based on the collaborative recycle and/or reuse of goods and products. To this end, an analysis and definition of systems that enable key players through the value chain to recycle and reuse a diverse number of products have been performed, with a focus on sectors: the electrical and electronic products (Task 2.1) and farming/agri-foods (Task 2.2). In addition, complementary solutions based on eco-credits (Task 2.4) and incentive schemes (Task 2.5) have been developed to enable the definition of the collaborative recycle/reuse business model and its integration in the ICT platform (Task 2.3 and WP4).

This model is based on a user-friendly waste collection system. It includes a system for stakeholders to interact with each other to facilitate the use/reuse of end-of-life products and reduce waste and implements an eco-credit awarding scheme to encourage people to recycle and reuse[7]. The key innovations of the CEBM are:

- the ICT based recycling and reuse system (D2.3 Development of the ICT system for reuse/recycling)
- an eco-credit/eco-cost-based consumer app (D3.1)
- incentive schemes for reducing, reusing (D2.5 Incentive schemes for collaborative reuse/recycling of products), and
- recycling and awareness activities (D2.6 Report on recycling and reusing activities, including feedback from the staff and quantities of collected WEEE)[8]

2.4 Description of Task 6.2 Demonstration of CEBM with Industrial and Domestic LED Light

Demonstrator 1 have applied the CEBMs into the sustainable development of domestic LED lighting products manufactured by ONA and industrial LED lights manufactured by Kosnic, through the product value chain, including product specification, design, manufacture, retail, use, recycle and reuse. Table 1 provides an overview of planned activities from the DoA.

[6] Text formulated by the CEBM owner as a part of the WP7 work with the internal validation at the consortium meeting in February 2021 and at OIC2 in May 2021.
[7] Ibid.
[8] Ibid.

Table 1: Demo activities per CEBM for Demo 1

CEBM 1	• End-user's requirements are addressed at the beginning of the product development, via two methods: (1) applying the big data technique to mine consumer preferences via large volumes of light products' reviews through social media websites; (2) the user-group approach developed will be applied to address the end-users' requirements. • To include user's requirements and eco-constrains into the product design specification (PDS), which will be further evaluated using the LL approach, involving various stakeholders in the value chain of the lighting products. • LCA will be conducted to evaluate the environmental impacts through the product life cycle, and to implement sustainable manufacturing approaches in the production process. • Eco-point method will be used to measure and record the eco-impacts throughout the product development process.
CEBM 2	The eco-information of the lighting products, including eco-points, will be informed to customers via the following means to help consumers select more environmental products: • Customers can access the eco-information with their smart phones by scanning the barcode attached to the product or with computers to get the information online. • The eco-information will be provided in the product brochures for consumers to make decision for purchase. • In ONA's online store, customers can view the product's eco-information, the customers receipt can show the eco-point related to each item purchased, and the eco-points can be recorded into the consumer's eco-account.
CEBM 3	• Customers can recycle their EoL lighting products through intelligent bins, which can read the barcode/RFID attached to the product to get the product's eco-points, then record it to the consumer's eco-cost account. • Re-manufacture/reuse: the EoL product will be sorted at the recycling centre (Indumetal for this project), then the components in working condition will be returned to the manufacturer for making the new lights. • For the industrial lighting product, Kosnic will provide a service to lease the product to the end-users.

2.4.1 Summary of Demonstration Activities for Demo 1a LED Light, ONA

Co-creation

- Development of a modular lamp (Medusa) with industrial scrap material, based input from consumer feedback (via reviews, workshops, surveys).
- Use of data mining technique to address end-user's requirements in the product development. This provided input for the PDS which was used throughout the development process.
- LCA was conducted by NTU and the results were used to understand the environmental impact of the new product and used in the design of the new luminaire Medusa.
- Social Life Cycle Assessment(S-LCA) conducted as a way of measuring the impact of ONAs products on the health, safety and well-being of their workers and the wider impact on the community in which ONA operates. The S-LCA results and further information are displayed at the ONA website.

Sustainable Consumption

- Information about the environmental impact of each lamp available in the online shop, in the form of eco-costs and eco-credits, as a way of informing customers at point of purchase. This way, customer can view the product's eco-information, where 1) eco-costs shows consumers the direct impact on the environment of their purchases, and 2) eco-credits is designed to encourage end-users to recycle lighting products[9].

[9] As ONAs sales is mainly based on their web shop, this approach was deemed most sufficient, compared to using e.g. an electronic label embedded in the light products and at the store shelf (as originally suggested in the DoA).

Collaboratively Recycling/Reuse

- Development of a take-back scheme, which includes both 1) a system for remanufacturing of returned lamps, and 2) a discount system where customers receive a discount on a new purchase based on eco-credits for the lamp.
- The new take-back system provides ONA to reuse components or the whole lamp for remanufacturing, whilst faulty parts are sent to correct recycling activities[10].

2.4.2 ONA Showcase(s)

Despite the Covid-19 situation, ONA managed to hold three small physical showcase events in May 2021 to disseminate the results from the demonstrator and receive feedback from different stakeholders, such as architects, students, hotel management, interior designer, and production responsible. The showcases all had a similar structure, which was repeated three times over one day, with six participants each time (four external and two from ONA), with in total 12 number of external participants, see Figure 7.

Figure 7: Footage from ONA showcase in May 2021

During the showcase event, ONA demonstrated the integration of the CEBMs by:

- Showing a demo video that was created as a means of demonstration and dissemination.
- Presenting Power Point presentations with information e.g. about the use of PDS, LCA and S-LCA.
- Presented the new modular lamp that has been developed, see Figure 8, and that has been made using industrial scrap materials and in co-creation with stakeholders.
- Provided a guided presentation of the webpage including the new eco-cost and eco-credit system
- Presented the new the take-back system.
- Conducted a survey with the participants, based on the validation framework (see Chapter 3).

[10] As such, the returned product is sent to ONA which calculates eco-credits and studies the product to see what parts that can be reused, and what is to be sent to recycling. This approach was deemed most appropriate as it enhances possibilities of reuse, rather than was originally planned as part of the DoA (that the intelligent bin approach will be used for consumers to dispose the EoL lights in to the intelligent bins).

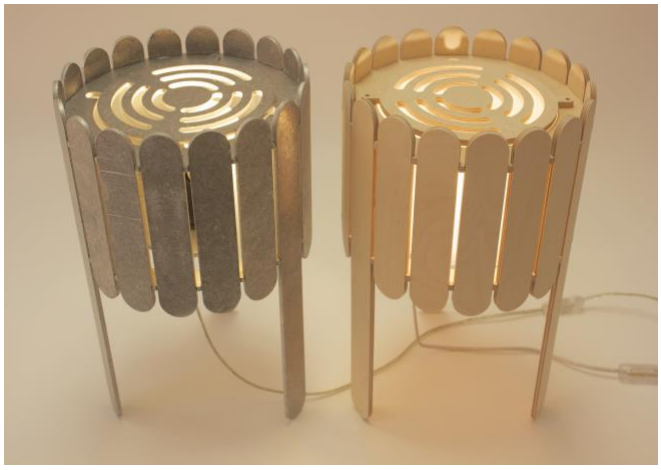


Figure 8: New modular lamps developed by ONA

More information about Demo 1 can be found in D6.1 On-site demonstration of CEBM for industrial and domestic lights.

2.4.3 Summary of Demonstration Activities for Demo 1b Industrial LED Light, Kosnic

Developments as listed below have been shown in LL and demonstration activities to get feedback from different stakeholder groups, like wholesalers, electricians, and businesses through interviews and finally the digital showcase.

Co-creation

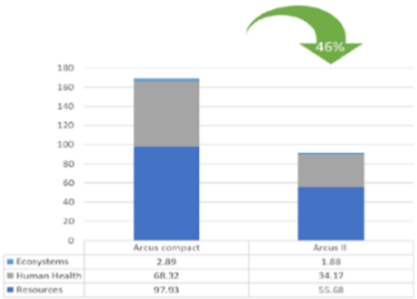
- Development of a new modular lamp LED industrial lamp based on feedback from workshops, and surveys in the early stages of product development.
- Use of PDS throughout the development process, including revisions where needed, based on input from stakeholders.
- LCA was conducted by NTU and results provided input for the luminaire to have significantly reduced environmental impact.

Sustainable Consumption

- Development of an LCA Comparison Descriptor with LCA information for customers in Kosnic proposal to customers, including eco-cost information. This is designed in a way that is deemed most relevant in Kosnic's business to business context, see Figure 9[11] through wholesalers, not directly to the end-users.

[11] In the DoA, it is described that: 1) customers will be able to access eco-information with their smart phones by scanning the barcode /…/ 2) that eco-information will be provided in the product brochures and that 3) traceability and interoperability methods will be applied. However, due to the Kosnic products route to market (through wholesalers and not direct to the end-user), it proved more efficient and convenient to customers to provide them with LCA based information though project proposals adapted to include LCA information and eco-costs to these potential customers. This way, the awareness raising feature is deemed higher, then through originally planned activities (i.e. using e.g. barcodes).

Existing Eco-Cost per Lamp	Area	Quantity	Existing Lamp Type	Existing Lamp Wattage	Existing Lamp Rated Life	Eco-Cost on Resources	Eco-Cost on Eco-System	Eco-Cost on Human Health	Total Eco-Cost of Existing Fitting	Total Eco-Cost on Resources	Total Eco-Cost on Eco-System	Total Eco-Cost on Human Health
169	Warehouse	100	Arcus-Compact	100	40,000	97.93	2.89	68.32	16900	9793	289	6,832
Replacement Eco-Cost per Lamp	**Area**	**Quantity**	**Replacement LED Fitting Type**	**Replacement LED Fitting Wattage**	**Replacement LED uselife**	**Eco-Cost on Resources**	**Eco-Cost on Eco-System**	**Eco-Cost on Human Health**	**Total Eco-Cost of Replacement Fitting**	**Total Eco-Cost on Resources**	**Total Eco-Cost on Eco-System**	**Total Eco-Cost on Human Health**
92	Warehouse	100	Arcus II	100	40,000	55.68	1.88	34.17	9200	5568	188	3,417
Eco-Cost Savings									**7700**	**4225**	**101**	**3,415**



Risk on depletion of oil, fossil fuel saved over life of LED
43.14%

Damage to species saved over life of LED
34.95%

Chance of getting human disease reduced over life of LED
49.99%

Environmental improvement over life of LED
46%

Figure 9: LCA based information in the Kosnic product proposal for customers

Collaborative Recycling/Reuse

- Through a co-creation process, developed a leasing service system, in which Kosnic has a holistic perspective throughout the service life of the product. The leasing service provides the opportunity for customers to lease products (new products and reused products), and for Kosnic to take-back the products when it reaches the EoL. At that point, reuse (secondary leasing) or remanufacturing through the new modular design will be possible, or finally recycling, see Figure 10.

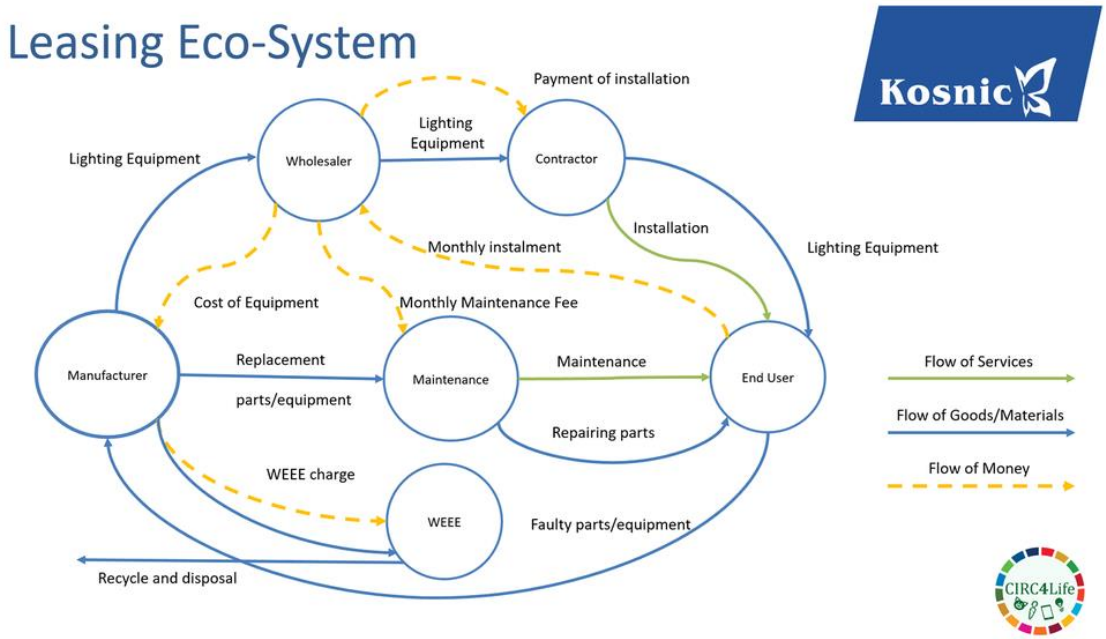


Figure 10: Visualization of Kosnic's new leasing service system

2.4.4 KOSNIC Showcase(s)

Due to the pandemic, Kosnic hold a digital showcase in May 2021, showing developed videos from the development process, and from installation of the new modular lamp. Additionally, this was mixed with presentations. To get the participants feedback, Kosnic used the tool Howspace, see Figure 11 for presenting results and for voting on the questions. Participating at the showcase was both wholesalers, contractors, academics, and industry association, in line with Kosnic's aim to present the results to their main stakeholders. In total, 14 number of people attended the showcase.

During the showcase event, Kosnic demonstrated the integration of the CEBMs by:

- Presenting video excerpts of interviews with key stakeholders and co-creation LL activities.
- Power Point presentation of the new modular lamp that has been co-created and developed.
- Showing videos in modular lamp installation.
- Presenting videos with information e.g. about the use of PDS, LCA and S-LCA.
- Power point presentation of the new leasing service system.
- Conducted a survey with the participants, based on the validation framework (see Chapter 3).
- Conducted a Questions and Answers (Q&A) session.

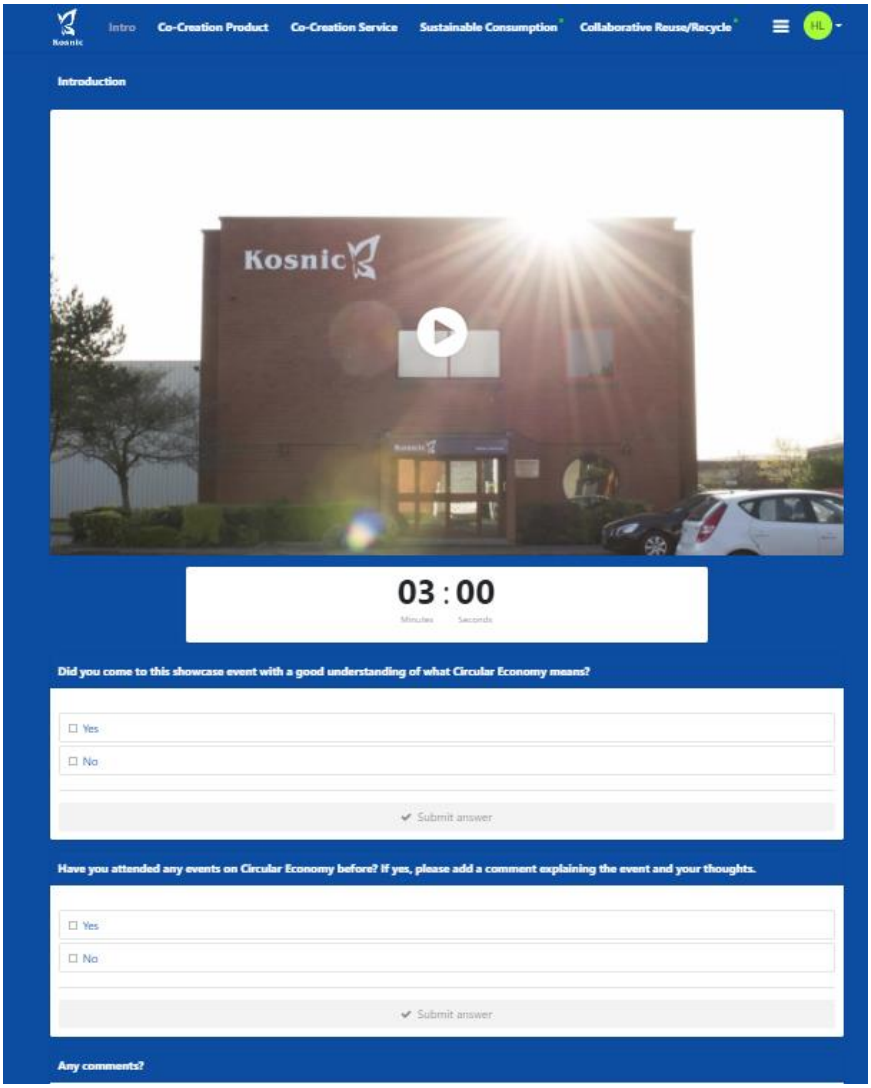


Figure 11: Footage from Kosnic showcase in May 2021

More information about Demo 1 can be found in D6.1 On-site demonstration of CEBM for industrial and domestic lights.

2.5 Summary of Description of Task 6.3 Demonstration of CEBM with Tablets, Indumetal/Recyclia

Demonstrator 2 have focused on recycling and reuse of tablets, as well as end-user awareness and mining consumers' preference of the products. Table 2 provides an overview of planned activities from the DoA.

Table 2: Demo activities per CEBM for Demo 2

CEBM 1	Big data technology will be applied to mine consumer's views via a large volume of online reviews of the tablets through the social media and producers' Websites. Based on the information gathered, the consumers' requirements will be analysed, with the major concerns on the tablets' environmental impacts. The analysis results will be open to tablet manufacturers for them to improve their products, and for public awareness.
CEBM 2	Consumers can view the eco-points obtained from recycling activities, via the eco-account in the app using their smartphones. With the eco-points obtained, consumers can track their daily impacts/footprints, to encourage them to use the environmental products and hence improve their awareness of sustainability.
CEBM 3	• Consumers can recycle the EoL tablets using the intelligent bins installed at the collection points, which will read the RFID/NFC chips embedded in the tablets and get the eco-points. • The eco-points will be recorded into the consumers' eco-accounts, which show the consumers' impacts on the environment with regards to their recycling/reusing activities. • The collected tablets will be classified in 'reusable' or 'recyclable'. To do so, the tablets will be sent to an electronic repair centre, where they will be technically classified according to the working conditions. • The tablets which are classified in 'reusable' will be reused in schools for teaching or sold as the second-hand products. The primary schools in Basque Country (Spain) will be selected for the training of the use of tablets. • The tablets identified as 'recyclable' will be sent to IND for dismantling and recycling, purifying streams for metals, plastics, and pre-concentrates of key materials

2.5.1 Summary of Demonstration Activities for Demo 2 Tablets, Indumetal/Recyclia

The deliverable for Demo 2 is due in September, therefore, this description includes activities conducted so far.

Co-creation[12]

- To obtain a large volume of consumer's view on recycling, reuse of WEEE and eco information, a survey was conducted which provided information about knowledge and preferences from consumers about WEEE.
- Development of tree planting option as part of incentive scheme for reuse/recycling after end-user feedback.

Sustainable Consumption & Collaborative Recycling/Reuse

- Use of intelligent bins in several places including primary schools, to increase the collection ratio of small electronic devices for reuse or recycling together with the CIRC4Life app with the eco account

[12] In DoA it is described that: Big data technology will be applied to mine consumer's views via a large volume of online reviews of the tablets through the social media and producers' websites. However, due to GDPR, this task was solved by a survey question in one of the surveys performed by CIRC4Life. Results in D3.4 Report on surveys.

that incentives the consumers when recycling an electronic device. Figure 12 show the CIRC4Life app and Figure 13 the intelligent bin.

- Development of a business model on the recycling and reuse of tablets by incentivising end-users, raising awareness, and getting consumer's preferences on reused / refurbished WEEE. Figure 14 show an example of the communication material developed for Demo2 collection of WEEE.
- Awareness raising of the end-users, and students from primary schools towards an environmental sustainability and circular economy.

During the demonstration phase the intelligent bins have been placed in different locations like schools and cultural centre to show the possibility to recycle and reuse of small electronic devices. In addition, training activities have been performed in three different primary schools, allowing students to participate directly in the practical collection process with the bin, as well as attending practical dismantling sessions of electronic tablets.

Figure 12: The CIRC4Life consumer app

Figure 13: Intelligent Bin for collecting WEEE

Figure 14: Example of communication materials developed for Demo 2

2.5.2 Indumetal/Recyclia Showcase(s)

This demonstrator has not carried out a showcase yet, but it is foreseen to be performed in September 2021. During this showcase event, IND/REC will demonstrate the integration of the CEBMs by showing examples of the following actions:

Co-creation

- Tree planting incentive as an example of co-creation activity[13].

Sustainable Consumption

- Promoting the sustainable consumption through the eco-credits.
- How consumers can check their eco-credits obtained after their recycling activities because of the consumer behaviour.

[13] Not originally planned as part of DoA but included as a result of feedback received from end-users in different surveys and other actions.

Collaborative Recycling/Reuse

- Consumers' actions.
- Recording of eco-credits.
- Classification/Assessment of collected wastes.
- Recycling and reuse processes by Indumetal.
- Training in the schools.

As mentioned previously, additionally multiple demonstration activities have already been carried out, e.g. awareness activities, in several primary schools and a tree planting event in a school for dissemination of the demonstrator.

More information about Demo 2 can be found in D6.2 On-site demonstration of CEBM for tablets (due September 2021, M41).

2.6 Summary of Description of Task 6.4 Demonstration of CEBM with Vegetable Food

Demonstrator 3 have applied the CEBMs into a micro farm, Scilly Organics run by Jonathan Smith (JS), in the production process of vegetables. A campaign to raise consumers' awareness in sustainable food consumption and reducing food waste will also be conducted. Table 3 provides an overview of planned activities from the DoA.

Table 3: Demo activities per CEBM for Demo 3

CEBM 1	• Demonstrate a 'before and after' model of a transition towards a CEBM for vegetable production and retail, supported by data from Sustainable Impact Analysis in Task 1.2. • LCA will be conducted to evaluate the environmental impacts through the product life cycle. • Analysis of existing practices of organic food production, and the possibilities of implementation of sustainable vegetable production (after changes). • Using the new Decision Making Tool, created in Task 1.2, demonstrate how it enables businesses to reduce the impacts of their products and business, by identifying areas to reduce impacts and make informed decisions on routes to reducing impacts from products and processes • Analyse the financial impacts of changes before and after the 'sustainable production' CEBM is implemented in vegetable production. • Demonstrate how supply chain length can be reduced through different retail options and how consumers can have closer connections to farms, through innovative and new business models, such as Community.
CEBM 2	• Use dedicated co-creation focus groups to undertake a detailed analysis of the needs and desires of different actors in vegetable supply chains to demonstrate the key purchase decisions of key groups, including consumers, producers, and other actors • Using the outcomes of the co-creation focus groups, develop new markets for vegetables produced under this new business model. • Demonstrate the impacts to consumers - including on health, of sustainable consumption of low-impact vegetables. Also demonstrate the benefits.

CEBM 3	• Demonstrate (1) the current waste streams created from vegetable production, and assess how the waste products could be treated more sustainably and (2) how organic waste by products (such as crop waste, manure, straw, etc.) can be turned in to fertility and/or energy sources on farm. • Analysis of existing practices of sustainable use of current waste streams, and possibilities of implementation of sustainable use of current waste streams. • Recognition of good practice examples of sustainable use of current waste streams • Ensure mechanisms exist to recycle all material items from farms, reducing the amount of waste going to landfill. Quantify the impacts of materials not going through recycling streams. • Demonstrate how positive waste measures can impact the consumers' Eco-Points and Eco-Credits, further driving incentives to reduce, reuse and recycle. • Develop a Brokerage system to provide opportunities to connect the producers and potential users of vegetable food waste. • Demonstrate the impacts of different packaging materials, especially on waste management.

2.6.1 Summary of Demonstration Activities for Demo 3 Micro Farming, Scilly Organics

The deliverable for Demo 3 is due in September, therefore, this description includes activities conducted so far. Several of the tasks in the DoA for Demo 3 are planned to be included in activities planned for the upcoming months, including the ongoing work with a farmer's handbook for circular economy, the finalisation of the packaging trial and related interviews, and a desktop study on sustainable practices and waste management.

Co-creation

- Co-creation activities with e.g. pub owners on the topic of organic food, waste management etc.
- Co-creation activities conducted for developing and for testing new products asked for by customers, e.g. organic apple juice from excess fruit.
- Use of ecolabel based on LCA that indicates the environmental impact of the product and Carbon Footprint label showing CO_2 impact from products, see Figure 15, as a way of communicating environmental impact to customers.
- Customer survey on e.g. eco-labelling and packaging material.
- Carbon Consultancy for farmers and growers.
- Development of video for communicating circular practices at farm level, and ongoing development of handbook.
- The Carbon Farm Calculator used for calculating the farms impact and making informed decisions[14].

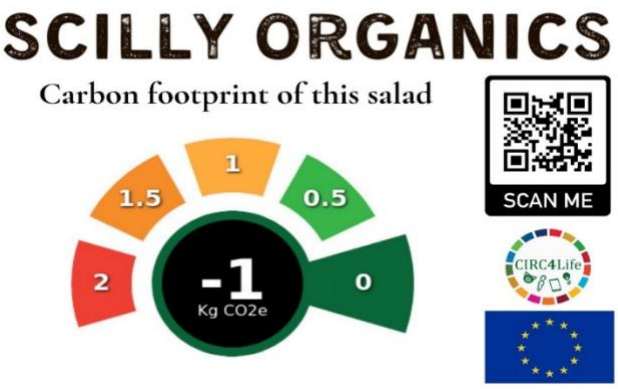


Figure 15: Carbon Footprint label demonstrated on salads at Scilly Organics farm

[14] The Carbon Farm Calculator were deemed appropriate to achieve the goal set up in DoA to enable businesses, in this case small farms, to reduce the impacts of their products and businesses.

Sustainable Consumption

- Conducted testing of different options of new biodegradable packaging for salads, together with fellow farmers in the farmers network, see Figure 16.
- Use of LCA and S-LCA as input for e.g. communication material, farm process improvements.

Figure 16: Picture of packaging options tested together with fellow farmers

Collaborative Recycling/Reuse

- Improving waste sorting & plastic recycling at the farm, including support to a local pub in waste reduction and management, and demonstrating to consumers how behavioural changes (e.g. via purchase of products with more sustainable packaging) influence waste management.
- Improvements in soil health and organic matter at the farm.
- Discussions with local politicians on the Islands' waste management systems and possible improvements.

In the project, a brokerage tool was developed. However, after assessing the possibility of efficiently using such tool for a small-scale farm, it was identified that other ways of resource reduction and sustainable practices would be more relevant. It may however be more appropriate for larger scale farms.

2.6.2 Scilly Organics Showcase(s)

Scilly Organics arranged a digital showcase to disseminate the results from the implemented CEBMs and to receive feedback from different stakeholders. The feedback questions during the event were specially developed to be possible to answer during the interactive event. A total number of 41 signed up and 26 people participated in the showcase, and it included farmers, growers, researchers, policy makers, and circular economy professionals.

During the showcase event, Scilly Organics demonstrated the integration of the CEBMs by:

- Showing a demo video that was created as a means of demonstration and dissemination.
- Presenting Power Point presentations with information e.g. about
    - Conducted surveys with customers
    - Eco-labelling and Carbon Footprint label
    - New products and services (carbon consultancy)
    - The need for co-creation processes
    - Environmental and social impacts
    - Soil health and organic matter

  - The handbook on circular economy learnings and advice for farmers (draft version available)
  - Waste and packaging
- Asked participants for input on circular economy related questions with the participants.
- Conducted a Q&A session.

A physical showcase will also be conducted in July, as restrictions in the UK lighten. During the physical showcase, a tour of the farm will take place, and questions will be asked of participants such as their understanding of eco-labels, views on the new apple juice product, and views on new packaging being used. As such, the digital and the physical showcases will complement each other and reach different types of stakeholders.

More information about Demo 3 will be found in D6.3 On-site demonstration of CEBM for vegetable food (due September 2021, M41).

2.7 Summary of Description of Task 6.5 Demonstration of CEBM with Meet Supply Chain

Demonstrator 4 have applied the CEBMs into the meat supply chain, with pork products as a demonstration case. This has been conducted by ALIA with their members including pig supplier farms, slaughterhouse, port product manufactures, and retailer. Alia have also collected bio waste for recycling in an intelligent bin and a normal container. Table 4 provides an overview of planned activities from the DoA.

Table 4: Demo activities per CEBM for Demo 4

CEBM 1	• The end-user's requirements are addressed at the beginning of the product development, via two methods: (a) ALIA will apply the big data technique to mine consumers' preferences via considerable meat products' reports conducted by the consumer associations; (b) the user-group approach will be utilised, e.g. via online customer feedback service. • An equivalent document to PDS will be developed, including eco-constrains extracted from consumers' requirements assessment that will determine the product development process. • The document will be further evaluated using the LL approach, which will involve various stakeholders in the value chain of the meat industry. • LCA will be conducted to evaluate the environmental impacts through the meat product's life cycle. • Eco-point method will be implemented to measure and record the products eco-impacts throughout the product development process.
CEBM 2	• Consumers can also use the Web tool developed to view the eco-information of different products online, in order to select sustainable products. • ALIA's shop of meat products produced will demonstrate: (1) the products on the shelves is attached with traceability tools showing the product eco-information, and the customer scan the traceability tool with their mobile phone to gain the product's eco-information; (2) when the customer check-out, the receipt will show both cash payment information and the eco-point information related to each item purchased, and (3) the eco-point information will be recorded to the consumer's eco-account.
CEBM 3	DoA tasks after amendment • End-users (consumers) can recycle their biowaste using the intelligent bins and will get the eco-credits via scanning the labels stuck to the waste bag. • The eco-credits will be recorded to the end-user's eco-accounts, to show their positive achievement in reducing the environmental impacts with regards to end-users' recycling/reusing activities. • The developed ICT platform will facilitate recycling and awarding processes in near-real time

2.7.1 Summary of Demonstration Activities for Demo 4 Meat Supply Chain, Alia

Co-creation

- In order to address end-user's requirements from the beginning of the product development process, participatory activities in the framework of LL activities have been conducted (e.g. workshops, surveys and testing activities) and data analysis regarding consumer preferences.
- Development of two co-created new meat products.
- Development of a PDS that set the basis and the scope of the two meat products to be developed in a sustainable way, used as a reference document during the whole project.
- LCA and S-LCA used to evaluate the environmental and social impacts through the product life cycle.

Sustainable Consumption

- Encouraged sustainable consumption by showing the eco-costs and sustainable information of the new products.
- Established an eco-shopping system for customers to check the sustainability of the products at the retailer.
- A system to track and monitor the sustainability aspects of products in order to provide the information along the value chain information to consumers.
- Awareness campaigns to communicate to stakeholders about the eco-information of the products, based on the eco-point methodology developed in the project, see Figure 17.
- Co-creation workshop to e.g. define of the best ways to communicate information to consumers and development of an eco-label, see Figure 18.

Figure 17: Example of communication materials developed for the sustainable consumption promotion

Figure 18: Eco-label testing in 'Gastrovin' food fair (Murcia)

Collaboratively Recycling/Reuse

- Collaborative recycling using eco-credits as incentives for citizens to foster bio-waste recycling.
- Use of intelligent bins and bio-waste bins for bio-waste collection and management.
- Eco-credits recorded to the end-users' eco-accounts, to show their positive achievement in reducing the environmental impacts with regards to end-users' recycling/reusing activities.
- Use of the project developed ICT platform to facilitate recycling and awarding processes in near-real time.
- Continuous workshops and meetings to engage the whole supply chain.

For a more complete list of activities, see D6.4 On-site demonstration of CEBM for meat supply chain (due September 2021, M41).

2.7.2 Alia Showcase(s)

During May 2021, ALIA organized two showcase events, see Figure 19, to communicate project results and obtained relevant feedback from different actors, including academia, policy makers, citizenships, and the private sector.

During the showcase events, Alia demonstrated the integration of the CEBMs by:

- Presenting videos developed during the whole demo activities including e.g. the eco shopping process and the eco-label.
- Presentation on circular economy and how Alia have implemented several elements from the CIRC4Life developed CEBM to become more circular.
- Presentation of the development of the new sustainable products and Eco-label.
- Conducting a survey to get the insights of the participants containing open questions based on the validation framework, see Chapter 3 and 4.

Figure 19: Alia showcase event in Lorca

The showcase in the University of Murcia involved people physically on site and online, with in total of 19 participants including professors and students. The showcase in Lorca involved 15 participants and was also held to a limited audience on site complemented with possibility to participate online. The Lorca showcase was aimed at communicating the results to citizens and industry workers.

More information about Demo 4 can be found in D6.4 On-site demonstration of CEBM for meat supply chain (due in September 2021, M41).

2.8 Summary of Demonstration Activities

As shown in above summaries, the main activities for each demo and each CEBM have many times been different, as they by necessity have been adapted to different local contexts and to the specific industry sector. The demos have been demonstrated physically in different geographical areas (UK, Spain), as well as in online events (due to the pandemic). It has included a variety of types of activities, such as demonstrating eco-labels on products and acting customers for feedback, demonstrating eco-shopping in physical stores and in online web shops, return systems of products for reuse and recycling and related incentive schemes, co-creating new products and modular products, and development of leasing models instead of sales of products. The different activities have first been part of LL activities, and then finally demonstrated to a variety of stakeholders. Additionally, the demonstrators have been engaged in awareness campaigns and showcase events in order to disseminate results and further engage stakeholders for circular economy.

Figure 20: Summary of the key parts demonstrated by the Demonstrators for the three CEBMs (real time visualization from the second OIC)

Figure 20 visualises the key information demonstrated by the demonstrators for the three CEBMs; Co-creation of Products/Services, Sustainable Consumption, and Collaborative Recycling/Reuse, based on the material presented at the second OIC in May 2021.

3 Framework for Validation of Demonstrators

3.1 Excerpt from the DoA

Task 6.1 Integration/validation of the CEBMs and plan for their implementation in demonstration cases (M10-M41), Leader: RISE/Partners Involved: All

This WP will build scenarios for the different product groups and define necessary actors for a functional value chain. The demonstration scenarios should involve the key actors for a functional value chain and since all products are consumer products, the scenarios must reflect the consumer's perspective properly. Consumer organizations for the product groups in the different countries will be important actors for up-scaling of the demonstrations. The demonstration cases reflecting all three CEBMs developed in the project and will include the consumer's perspective for both sectors: the electrical and electronic products and farming/agri-foods. The demonstration cases will also involve different type of consumers, private persons, industry, and governmental organizations. This task will build the scenarios for the different demonstrators and manage the demonstrations of the CEBMs.

Validation. The framework for demonstration will tested using real cases of the industrial partners who are going to conduct the four demonstrators. Any errors, conflicts or problems detected during test will be resolved at this stage, which will ensure the success of demonstration. User groups identified by the LLs will be involved in the testing. M25-M29 (Leader: RISE and partners: LAU, NTU, ICCS, ENV, EECC, GS1, JS, KOS, ONA, ALIA, REC, IND, CIRCE).

3.2 Validation in CIRC4Life

The framework for demonstration in CIRC4Life will be tested using real cases of the industrial partners who are going to conduct the four demonstrators. In order to test and validate the demonstrators, a set of key performance indicators (KPIs) has been identified. These KPIs are based on the *Circular economy indicators* part of the European Commission, Environment, Eco-innovation action plan (European Commission, Eco-innovation, 2020). These indicators are divided in three parts: 1) sustainable resource management, 2) societal behaviour, and 3) business operations. For CIRC4Life, KPIs for *societal behaviour* is deemed most relevant in order to have an end-user perspective in the validation. Additionally, the ISO standard ISO 9241-11:2018 Ergonomics of human-system interaction (ISO 9241-11:2018) has provided guidance for development of KPIs.

3.2.1 ISO 9241-11:2018 Ergonomics of Human-System Interaction

The ISO standard ISO 9241-11:2018 Ergonomics of human-system interaction provides a framework for understanding the concept of *usability*. According to the standard, "the objective of designing and evaluating systems, products and services for usability is to enable users to achieve goals *effectively*, *efficiently* and with *satisfaction*". In this context, effectiveness is to be understood as "accuracy and completeness with which users achieve goals", efficiency as "resources used in relation to the results achieved" and satisfaction as "extent to which the user's physical, cognitive and emotional responses that result from the use of a system, product or service meet the user's needs and expectations", see Figure 21. With regards to efficiency, 'resources' can include time, human effort, money and material (ISO 9241-11:2018).

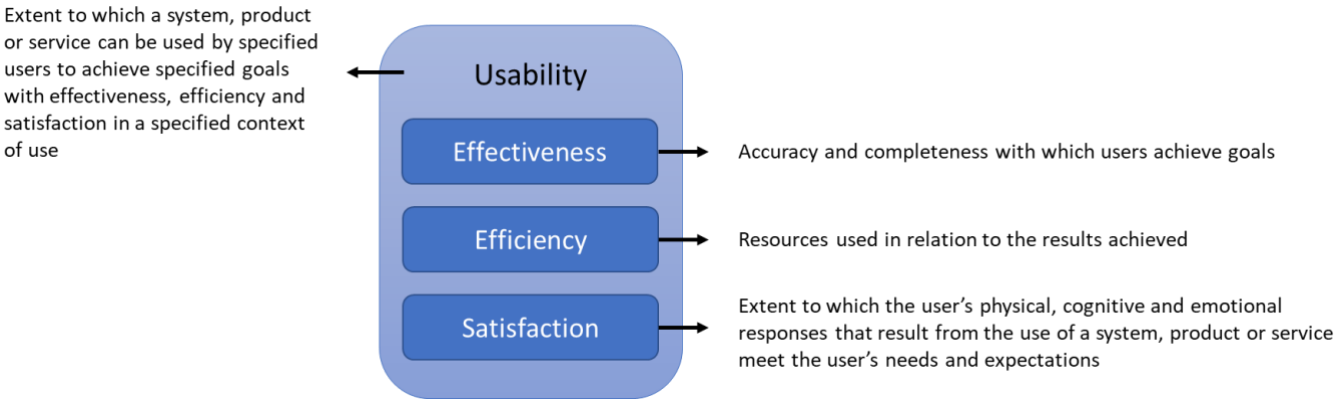


Figure 21: Usability, effectiveness, efficiency, and satisfaction according to ISO 9241-11:2018

The standard proposes the concept of usability to be relevant when designing or evaluating interactions with a system, product, or service for the purpose of, for example, development and procurement. In CIRC4Life, usability is perceived as an appropriate concept, as systems, or *demonstrations*, that are considered effective, efficient and are to satisfaction of the user, are expected to provide good grounds for realizing the environmental and sustainable benefits of the demonstrations.

4 Validation and KPIs for Demonstrators

A validation framework and proposed KPIs have been developed for each demo case (/case company), both for demonstration activities and showcases. However, due to the pandemic, there has been changes during demonstration period. The original plan was to have several physical events during a longer period and showcase events for a final validation and dissemination of the demonstrators. Instead, most demonstration activities have been smaller events with restrictions on number of people attending, or in most cases demonstration activities has been transformed into digital events. Therefore, not all planned activities have been carried out as planned for example participation in trade fares where larger amount of user feedback was expected (Kosnic case). Also, nearly all showcase events have been digital, except for some smaller events, which means that the KPIs have been revised during the demonstration phase for a possible validation.

In general, material used for validation has been collected during demonstration activities (e.g. via surveys or interviews), showcase events (physical or digital).

The first day of the second OIC was used as a part of the internal validation (OIC Validation framework developed by LAU), see D.7.2. The project partners evaluated and discussed the overall success of the demonstrators of the CIRC4Life project, and the utilization of the CIRC4Life tools, innovations, and insight for the future and what to disseminate to other businesses.

4.1 ONA (Task 6.2, Demo 1a)

ONA's plan for demonstration and showcase was physical events, however, due to the pandemic, the events had to be kept very small. These small events to gain feedback from stakeholder and disseminate results was possible to organise, although this meant less feedback. Even if there were less stakeholders, ONA managed to include their key stakeholders, such as architects, interior designer, hotel management, production responsible, and academia. The showcase event took place in May 2021.

During the showcase event, participants were asked to answer a number of questions, based on proposed KPIs in the validation framework, see Appendix A. Below follows some of the collected feedback:

- Implement a system similar to the energy labels.
- A better explanation about the eco-costs to know the total amount, when making the purchase.
- Participants consider the method of eco-costs and eco-credits something innovative that could work and could promote sustainability awareness in society.
- Eco-cost /eco credit scheme remains confusing, considering that they do not know the maximum and minimum eco-cost scores or how these have been calculated.
- Make the eco information more visible in the web shop.
- Explain more clearly the recycling system and the reward to the customer for the returning of the product. Valuing the value of what is going to be recycled.
- The product LCA needs a clearer and simpler explanation so that it can be understood "resources," "ecosystems" and "health" need to be explained in a clear way.
- The idea seems very innovative although it needs to be simplified, e.g. more images and less text.

The new lamp developed by ONA within the project, is available through the web shop, where also eco information about the products can be found. Through the web shop, it will be possible to contact ONA for help and use of the take-back scheme. During the demonstration period a LL activity was performed to test the web shop and take-back by the CIRC4Life partner, LAU, as a part of WP7, and to validate the developed functions.
During the showcase event the participants could test all the functions. But as a consequence of the pandemic, the medium / high range lighting sector, which is where the "MEDUSA" product is found, is suffering a

considerable decrease in sales. So, although the lamp has been available in the web shop for a few months, there have been no sales. Therefore, no validation interviews with customers could be conducted. As the LED light is long life product, the take-back system is expected to be of more relevance in the future. Even if the system is in place, so far, no end-users' have needed to utilise it.

4.2 Kosnic (Task 6.2, Demo 1b)

During the demonstration planning phase, Kosnic arranged to attend two different trade fairs, in order to gain feedback from stakeholders and disseminate results, e.g. regarding the new modular lamp developed with the use of e.g. LCA results and present the developed leasing model for industrial LED light. Also, attendance to the trade fairs was planned as opportunities to physically meet new and existing stakeholders, and potentially new customers for the new LED light and of the leasing model. Materials and activities were developed to be executed. Unfortunately, due to the Covid-19 situation, these trade fairs were cancelled. This development postponed activities, but also created a need to rethink demo activities overall. Therefore, Kosnic e.g. executed an installation of the new modular LED light in their own facilities and conducted an interview study with relevant stakeholders in order to gain their feedback regarding the Kosnic demo activities of the project. As part of this situational adaptation to the pandemic, Kosnics' showcase was executed as a digital event, using Microsoft Teams and Howspace to demonstrate how they implemented the three new CEBM. This event took place in May 2021, with a total of 14 number of participants (7 externals: wholesalers, contractors, academics, and industry association; and 7 internal).

The validation framework and proposed KPIs, see Appendix A, served as a basis for the questions asked to stakeholders during interviews and showcase.

The interview study included five respondents (lightning consultancy, electricians, wholesalers). From the interviews, it was indicated that:

- The modular design was viewed positively, as it e.g. facilitates repair.
- Sustainability is scored high, but there is a balance with costs, where some hight costs might be possible if end-users or companies see the additional value of the sustainability features (e.g. energy performance).
- To attract attention to, and convince stakeholders of, new values (e.g. sustainability features) or business models (such as leasing) takes time.
- A leasing service is deemed interesting and relevant system instead of e.g. upfront cost of purchase.
- A leasing service also bring the additional value of closer relationships between stakeholders in the business eco-system.

During the showcase event, participants were asked to answer a number of questions (with answers in sub bullet points):

Co-creation of Product

- How satisfied are you with the final modular design shown and its possibilities?
    - Most participants were satisfied 4.6, on a scale 1-5
- Do you believe that the co-creation processes outlined in the video, such as LL workshops, can help to provide extra value within new product development?
    - All answered yes
- If so, on a scale of 1-5, how much value to you think processes like this can add to product design?
    - 4.3
- Do you believe that the new modular product shown is a more sustainable product based on the described development processes (such as stakeholder co-creation and LCA studies)?

    - All answered yes
- If so, on a scale of 1-5, how much value to you think processes like this can add to product design?
    - 4.2

Co-creation of Service

- How satisfied are you with the final leasing service and its possibilities?
    - 3.8, on a scale 1-5
- Do you believe that co-creation processes, such as LL workshops outlined in the video, can help to provide extra value when trying to develop a new business model, such as the leasing service model shown?
    - Most answered yes (9) and 2 Not sure
- Do you think the option of a leasing service, and the potential to eliminate big upfront fees to update lighting, would appeal to building owners?
    - Most answered yes (9) and 1 Maybe
- Hypothetically, if you were looking to update your buildings lighting, how strongly would you consider the leasing service that has been shown?
    - 3.5, on a scale 1-5
- How satisfied are you with the proposed contract structure shown and its options for flexibility?
    - 3.6, on a scale 1-5

Sustainable Consumption

- How important is the idea of sustainability to you?
    - 4.6, on a scale 1-5
- Does environmental impact of a product influence your buying decisions?
    - All answered yes (10)
- How likely would you be to purchase more sustainable products, even though they might be more expensive?
    - 4, on a scale 1-5
- What would your limit on price increase be? 10%? 20%?
    - 10% (3 answers), 20% (2 answers)
- Do you believe that the eco-information, or sustainability of a product, could be decisive at the point of purchase if it were made available to the consumer as shown in the video?
    - All answered yes (11)

Collaborative Reuse/Recycle

- Given the option, would you rather have the option to repair a light fitting instead of having to replace it?
    - Most answered yes (10) and 1 Not sure
- How important is ease of reuse/recyclability to you?
    - 4.7, on a scale 1-5
- Do you think that the measures that have been implemented within the modular product shown to encourage reuse and recyclability could be successful? And how successful do you think this could be on a scale of 1-5?
    - All answer yes, 4.1, on a scale 1-5
- Do you think that the leasing service eco-system proposed will help to incentivise effective reuse and recyclability of lighting products? And how successful do you think this could be on a scale of 1-5?
    - Most answered yes (9) and 1 Not sure, 4 on a scale 1-5
- Would you be willing to accept a refurbished lighting product?
    - Most answered yes (9) and 1 Maybe depending on the circumstances, like warranty.

4.3 Indumetal / Recyclia (Task 6.3, Demo 2)

Demonstration phase for IND/REC were planned to include at least three locations of the intelligent bin and a longer time period at each location. However, it was not possible due to the pandemic and the challenges this created with e.g. engaging local actors during a challenging social situation. Even so, IND/REC still manged to perform most of the planned tasks, although with less stakeholder involved on each occasion. However, it was not possible to place the intelligent bin at all planned locations. The number of activities in schools have been reduced, but the once performed have given good feedback and the tree planting activity was successful.

The demonstration activities have given partial answers/results so far, and more details will be compiled in D6.2 (due in September 2021, M41):

- Collected WEEE-in container located in Romo cultural Centre: 16.0 kg
- Collected WEEE in container located in the schools:
    - Romo Eskola, 46.8 kg
    - Baroja high school: 13.3 Kg
- Number of downloads of the app: 357.

The demonstration activities are still ongoing until the end of the project or at least September (M41), and more results are to be expected when the container is established for a longer period in a location.

4.4 Scilly Organics (Task 6.4, Demo 3)

During the demonstration phase, less physical events took place than planned, due to Covid-19 restrictions and the effects that this had on Scilly Organics, as a micro farm, dependent heavily on its locals but foremost its tourists. Therefore, the project prolongation of six months provides Scilly Organics the opportunity to conduct more demo activities during summer 2021 (tourist season). This also includes an additional and physical showcase, to complement the digital showcase that took place in May 2021.

When developed, the validation framework and its proposed KPIs and related questions, were discussed with Scilly Organics, as described in Appendix A. These questions are based on the tasks described in the DoA and are best validated onsite at the farm and with the products in range. Therefore, the upcoming demo activities at Scilly Organics is expected to provide valuable input for validating this demo e.g. feedback on the new juice product, finalisation of the packaging trial.

To receive input from stakeholders regarding sustainable vegetable production, a survey was conducted, for results see D6.3 (due September 2021, M41). It was directed towards Scilly Organics customers, to engage with them on sustainable practices, as well as to assess their understanding of the Carbon Footprint label and the Eco-cost label. The survey was originally designed to be taken by customers who visited Scilly Organics stall. Both labels were supposed to be tested at the stall, the first label (Carbon Footprint) during the first two weeks of testing in September, following by the second label (Eco-Cost) for two weeks. Due to Covid-19, it was only possible to do the testing online with visitors/customers who previously visited the stall. Fortunately, many of these customers are known to the business, so they could be engaged via email. 36 respondents answered regarding the Carbon Footprint label and only 1 regarding the Eco-cost label. Therefore, only results regarding the Carbon Footprint label was deemed usable. Questions in the survey corresponded to questions related to Co-creation and Sustainable consumption and Waste reduction, reuse, and recycling in production, although not with the exact formulations from the originally proposed KPIs. The survey showed that:

- about 86% of respondents understood the meaning of the Carbon footprint label.

- about 89% of respondents declared they were likely or very likely would be influenced by the footprint of the salad when buying it.
- about 78% of respondents considered the type of packaging material an important purchasing factor, and for about 22% of respondents this would be somewhat important.
- about 47% of respondents declared they would pay an additional fee of 20p to buy a compostable bag instead of a regular one and about 42% said they probably would.
- about 67% of respondents declared they always or usually pay attention to the social impacts of products when buying them.

4.4.1 Special Feedback Questions for Scilly Organic's Digital Showcase

Feedback questions from the KPI document was not deemed useable for the digital showcase in Demo 3. Therefore, separate questions were developed to receive feedback from these participants, including:

- Did you come to this webinar with a good understanding of what Circular Economy means? (Yes/No)
- How important is it to you that food is produced sustainably? (Scale 1-5)
- How closely do you engage with the farmers or growers of the food you buy? (Scale 1-5)
- Do you understand the difference between compostable and biodegradable plastics? (and/or...) Do you understand the difference between oil-based and plant-based plastics? (Yes /No)
- How would you rank the following in the waste and recycling hierarchy? Recycling, reusing, reducing, rethinking

Overall, the answers were very positive but due to technical problems during the event the answers were not saved and is at this moment not possible to retrieve.

4.5 Alia (Task 6.5, Demo 4)

Alia have performed several smaller events during the demonstration phase (M19 and onwards) of the projects to receive feedback on the different parts of the implemented CEBM's. Alia have also used surveys to get feedback from a larger group of stakeholders. The surveys were developed based on the KPIs in the validation framework, see Appendix A.

Co-Creation

A total of 83 physical replies after tasting the product were compiled, with a clear result about the satisfaction of end-users with the co-created product. The results of the survey regarding the co-creation part follow as next:

- Regarding the degree satisfaction with the products, it was obtained a punctuation of 4.5 above 5.
- Regarding the acceptance of the products as one with an added value, it was obtained a punctuation of 4.38 above 5. In addition, 31% of participants answered with a 4 and 53% with a 5, so it can be considered that the 84% accepted the products as a product with an added value.
- Regarding the acceptance of the products as more sustainable, it was obtained a punctuation of 4.43 above 5. In addition, 33.8% of participants answered with a 4 and 54.2% with a 5, so it can be considered that the 88% accepted the products as more sustainable than the traditional one. During the showcase events, in which the products were explained and showed to the people, the 24 surveys collected showed the same punctuation about the products being more sustainable than the traditional ones (4.43/5).

- Regarding the question about whether they would continue buying the sustainable version of the product, 75% responded that would continue buying the sustainable version of the products. However, just the 2.4% (two respondents) said No, the rest said that they did not totally know.

In addition, during the showcase events the products were explained and showed to the participants and they were asked about the about the statement 'The co-created product is more sustainable than the traditional one'. The 24 survey replies that where collected showed the same punctuation about the products being more sustainable than the traditional ones (4.43/5) as also shown in earlier surveys. 9 respondents with 4 and 12 with a 5. So, 87,5% accepted the product as more sustainable than the traditional ones**.**

Sustainable Consumption

During the whole project implementation, it has been clear that the awareness campaigns are key for the development of the demo. Therefore, materials have been developed in order to promote the eco-shopping and to explain in brief the sustainable practices implemented by ALIA during the project which made the products more sustainable than the average.

In order to validate the business model, 83 physical surveys were answered and submitted about sustainable consumption. The results follow as next:

- No of participants of total no of participants that find the eco-information/eco-points useable during the shopping process (before the concept was improved): average score 3.98/5. 71.8% saying 4 or 5. Real testing activities, once the concept was improved: almost 100% answered positively (28 participants).
- No of participants of total no of participants that find the eco-information/eco-points important at point of purchase (before the concept was improved): 3.96/5. 83 respondents. 71,8% saying 4 or 5. Real testing activities: almost 100% answered positively (28 participants).
- No of participants of total no of participants that will continue buying the sustainable version of the product (already included in CEBM1): 83 respondents: 75% saying yes. 2% no. 23% I do not know.

The results show a great acceptance on the concept, especially the about the eco-label potential, while remarking that there is still room for improvement. If implemented at large scale, it would allow consumers to compare the sustainability of the products with traditional products in the same range and in a general view. However, at a market where the sustainable products are not standardized, consumers may not care about sustainability aspects, as comparison then becomes difficult.

Collaborative Recycling

For the CEBM Collaborative Recycling the demonstration results are still pending due prolonging of these activities until September. More results will be available in D6.4 (due September 2021, M41).

Some general results from the two initiatives are available; Containers in Lorca (use of normal container) and Abarán (use of intelligent bin), shows that the initiative has been useful to study the best ways for biowaste collections. The test in Lorca, which have been in place during a couple of months shows that the use of the container has not decreased. The quality of the biowaste obtained has been high, so it has not been necessary to process it in the waste treatment plant. The biowaste has gone directly to the composting plant.

4.6 Validation Activities at the Second OIC and Reflections

Some parts of the validation of demonstrators and their implementation of developed CEBMs was done internally, with consortium partners taking part in the validation. This was done during the second OIC – an

online event, due to the pandemic - arranged by LAU, and by using a validation framework suitable for an online event, developed by LAU. For detailed results regarding the internal validation of the Demonstrators, see D7.2 (due in September 2021).

Overall, the results of the internal validation were positive (for results and details see D7.2). However, one must bear in mind that the validation activity at the OIC was made by internal experts, which can create biases in the overall results. Also, not all demo activities had been finalised at the time for the OIC, as three deliverables are due in September. As such, data on KPIs was not included in the OIC, rather it included the overall activities and learnings.

5 Discussion

When the corona pandemic exploded, the everyday lives of people all over the world was influenced. Restrictions hindered physical activities. People were afraid to be infected, and people that were infected could get mild symptoms, could need intensive care, and many people also died. Many businesses were also under heavy financial constraints. At that time, conducting physical events based on user engagement, interaction, and *usability* (see Validation Framework in Chapter 3) felt highly unlikely. Even so, there was still an unwavering wish to make the best possible solution for the project and for the demonstration of the CEBMs in the different demonstrators. The demonstration owners and the CIRC4Life project partners jointly engaged in discussions and idea generation to find ways to cope with the situation, and ways to transform planned activities into activities that would work in an unsure and unstable situation. This mean that some activities deemed to be possible to conduct as online events, and in other cases activities had to change into other types of activities or involving other participants. This transformation was also a time-consuming process, affected by the unsure situation in each of the countries where CIRC4Life partners live and act.

Under these circumstances, to still have demonstrations of the three CEBMs in four different demonstrators, can be considered a very positive outcome. Yes, there has been negative impacts on the demonstration activities, with e.g. cancelled events, less interaction with stakeholders, less customers of new products and services, and therefore also difficulties or reaching large scale demonstrations, and difficulties of generating a satisfactory level of validation data. Even so, the demonstrators have managed to develop and execute a wide range of activities for the different CEBMs, and managed to demonstrate e.g. the use of eco-labels on products and engaging customers for feedback, demonstrating eco-shopping in physical stores and in online web shops, return systems of products for reuse and recycling and related incentive schemes, co-creating new products and modular products, and development of leasing models for LED lightings instead of sales of products, and awareness campaigns and showcase events in order to disseminate results and further engage stakeholders for circular economy. As such, the majority of tasks described in WP6 in the DoA have been executed, and where there have been deviations, the goal of the planned task has often been possible to execute with some adjustments in methods.

According to the summarised results, the CIRC4Life demonstration can be considered successful in implementing the three CEBMs, especially when it comes to new product and service development. Due to difficulties of physical interaction with stakeholder within the pandemic, validation according to the suggested framework and KPIs were difficult to execute fully. Also, this deliverable includes the activities and results for Demo 1 and partly for Demo 2, Demo 3, and Demo 4, as these have due dates in September, and/or activities are still ongoing and will be fully executed in September. Therefore, conclusive results for validation will be available in respective demo deliverables.

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Appendix A: Validation framework

The content in the tables below is the proposed KPIs for all demonstration owners divided into the three CEBMs. The target value for each demonstrator and CEBM is based on type of event, type of company, and location, e.g trade far, OIC2 (physical event), local stores, B2B or B2C.

6.1 ONA (task 6.2, demo 1a)

KPIs for ONA, per CEBM, based on tasks described in the DoA.

6.1.1 Co-creation and Sustainable Production

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Satisfaction	Degree of satisfaction of customers of the new product	Scale 1-5	No of replies: 10 3(4)-5 = satisfied user	How satisfied are you with the product? Please rate between 1-5[15]
• CEBM • Effectiveness • Satisfaction	No of customers of total no of customers that believe the co-creation product development (through e.g. the product design specification (PDS)) has provided added value	%	No of replies: 10	Do you believe that this co-created product gives you additional value compared to a traditional product (PDS)? Yes/no
• CEBM • Effectiveness • Satisfaction	No of customers of total no of customers that accept the new product as a more sustainable product	%	No of replies: 10	Do you believe that this product is a more sustainable product? Yes/no

[15] [15] If nothing else is stated, the term “Please rate between 1-5” is relevant for all example questions

6.1.2 Sustainable consumption during sale and use

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Effectiveness • Satisfaction	Degree of customers that believe the eco-information/eco-points was usable during the shopping process	Scale 1-5	No of replies: 10 3(4)-5 = satisfied user	Was the eco-information/eco-points useable/easy to understand during the shopping process?
• CEBM • Effectiveness • Satisfaction	No of participants of total no of participants that believed the eco-information/eco-points was decisive at point of purchase	%	No of replies: 10	Was the eco-information/eco-points decisive at point of purchase? Yes/No
• CEBM • Efficiency • Satisfaction	Degree of participants that believe the eco-shopping process was efficient and well-functioning	Scale 1-5	No of replies: 10 3(4)-5 = satisfied user	Was the eco-shopping process efficient and well-functioning?

6.1.3 Collaborative recycling/reuse

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Efficiency • Satisfaction	Degree of satisfaction of customers of reusing/recycling the lamp	Scale 1-5	No of replies: 10 3(4)-5 = satisfied user	How satisfied are you with the take-back service?
• CEBM	Take-back system	Scale 1-5		

6.2 Kosnic (task 6.2, demo 1b)

KPIs for Kosnic, per CEBM, based on tasks described in the DoA.

6.2.1 Co-creation and sustainable production

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Satisfaction	Degree of satisfaction of business customers of the new product	Scale 1-5	No of replies: 2 3(4)-5 = satisfied user	How satisfied are you with the product? Please rate between 1-5[16]
• CEBM • Effectiveness	No of participants of total no of survey participants that believe the co-creation product development (through e.g. the product design specification (PDS)) has provided added value	%	No of replies: 40	Do you believe that this co-created product gives you additional value compared to a traditional product? Yes/No
• CEBM • Effectiveness	No of participants of total no of survey participants that believe that the new product is a more sustainable product based on the described development	%	No of replies: 40	Do you believe that this product is a more sustainable product? Yes/No

[16] If nothing else is stated, the term “Please rate between 1-5” is relevant for all example questions

6.2.2 Sustainable consumption during sale and use

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Effectiveness • Satisfaction	Degree of business customers that believe the eco-information was decisive at point of purchase	Scale 1-5	No of replies: 2 3(4)-5 = satisfied user	Was the eco-information decisive at point of purchase?

6.2.3 Collaborative recycling/reuse

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Effectiveness	No of participants of total no of survey participants that consider the leasing model as a viable option	%	No of replies: 40	Do you consider the leasing model a viable option for you? Yes/No
• CEBM • Satisfaction	No of participants of total no of survey participants that believe the leasing service contract fulfils their expectations	%	No of replies: 40	Do you consider the leasing service contract to fulfils your expectations? Yes/no

6.3 Indumetal/Recyclia (task 6.3, demo 2)

KPIs for IND/REC, per CEBM, based on tasks described in the DoA.

6.3.1 Co-creation

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• *To be decided (TBD)*	Evaluation of survey data End-users' interest in buying reused tablets	*TBD*	*TBD*	Would you buy a remanufactured tablet?
To be decided (TBD)	Evaluation of survey data business/schools' interest in buying reused tablets	*TBD*	*TBD*	Would you buy a remanufactured tablet?

6.3.2 Collaborative reuse/recycling

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Effectiveness • Satisfaction	No of user of total no of users that are satisfied with the app	Scale 1-5	No of replies: 40 3(4)-5 = satisfied user	How satisfied are you with the app as a tool? Please rate between 1-5[17]
• CEBM • Efficiency	No of user of total no of users that are satisfied with the app	Scale 1-5	No of replies: 40 3(4)-5 = satisfied user	How easy is the app to use? Please rate between 1-5[18]
• CEBM • Efficiency • Satisfaction	No of user of total no of users that are satisfied with the bin	Scale 1-5	No of replies: 40 3(4)-5 = satisfied user	How satisfied are you with the bin and how it functions?

[17]If nothing else is stated, the term "Please rate between 1-5" is relevant for all example questions
[18]If nothing else is stated, the term "Please rate between 1-5" is relevant for all example questions

• CEBM • Satisfaction	No of user of total no of users that believe that they would or probably would use the bin again	%	No of replies: 40	Would you use the app and the bin again (e.g. for similar or other electronic products)? Yes/No
• CEBM • Effectiveness • Efficiency	No of kg collected WEEE	%	No of kg WEEEs: X	-
• CEBM • Effectiveness • Efficiency	No of tablets "accurately" categorized as "reusable" or "recyclable" by the system of total no of tablets collected based on the information provided by the users	%	No of products: 40	-
• CEBM • Effectiveness • Efficiency	No of tablets etc. deemed "reusable" or "recyclable" of total no of tablets collected	%	No of products: 40	-
• CEBM • Effectiveness • Efficiency	No of incentives used of total number of users	%	No of incentives:	-

6.3.3 Sustainable Consumption

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM	No of user downloads of app	No	Number: 40	-
• CEBM • Effectiveness	No of users registering their personal details and profile in app	No	Number: 40	-
• CEBM • Effectiveness • Satisfaction	Degree of satisfied users with the incentive scheme of total no of users, eco-cost and eco credits	Scale 1-5	Number: 40 3(4)-5 = satisfied user	How satisfied are you with incentives?

6.4 Scilly Organics (task 6.4, demo 3)

KPIs for Scilly Organics, per CEBM, based on tasks described in the DoA.

6.4.1 Co-creation and sustainable consumption

Demonstration (showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Effectiveness	Degree of customers that find the eco-label useable during the shopping process	Scale 1-5	No of replies: 25 3(4)-5 = satisfied user	Was the eco-label useable/easy to understand?
• CEBM • Effectiveness • Satisfaction	No of customers of total no of customers that find the eco-label decisive at point of purchase	%	No of replies: 25	Was the eco-label decisive at point of purchase? Yes/No

6.4.2 Sustainable production

Demonstration (showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Satisfaction	Degree of satisfaction of customers of the new products (cider, juice etc.)	Scale 1-5	No of replies: 25 3(4)-5 = satisfied user	How satisfied are you with the (new) products?
• CEBM • Effectiveness	No of customers of total no of customers that believe the new product is a more sustainable product	%	No of replies: 25	Do you believe that this product is a sustainable product? Yes/No
• CEBM • Effectiveness • Efficiency	No of downloads of the Farm Carbon Calculator	%	No of downloads of the Farm Carbon Calculator: X	
• CEBM • Effectiveness	Degree of satisfied businesses of using the Farm Carbon	Scale 1-5	No of replies: 5	How satisfied are you with the

• Satisfaction	Calculator per total no of businesses		3(4)-5 = satisfied user	Farm Carbon Calculator?
• CEBM • Efficiency • Satisfaction	Degree of satisfied businesses that find the eco-information/eco-points useable during the shopping process per total no of businesses	Scale	No of replies: 5 3(4)-5 = satisfied user	Was the Farm Carbon Calculator useable/easy to understand during process?

6.4.3 Waste reduction, reuse, and recycling in production

Demonstration (incl. showcase) focused KPIs				
Type of KPI	**Description of KPI**	**Unit of measurement**	**Target value**	**Example question**
• CEBM • Satisfaction	Degree of satisfaction of customers of the new packaging (salad)	Scale 1-5	No of replies: 25 3(4)-5 = satisfied user	How satisfied are you with the new packaging? Please rate between 1-5[19]
• CEBM • Effectiveness • Satisfaction	No of customers of total no of customers that believe that the new packaging has provided added value	%	No of replies: 25	Do you believe that this package gives you additional value compared to a conventional packaging? Yes/No
• CEBM • Effectiveness	No of customers of total no of customers that believe the new packaging is a more sustainable packaging	%	No of replies: 25	Do you believe that this packaging is a more sustainable product? Yes/No

[19]If nothing else is stated, the term “Please rate between 1-5” is relevant for all example questions

6.5 Alia (task 6.5, demo 4)

KPIs for Alia, per CEBM, based on tasks described in the DoA.

6.5.1 Co-creation

Type of KPI	Description of KPI	Unit of measurement	Target value	Example question
• CEBM 1 • Satisfaction	Degree of satisfaction of customers of the new product	Scale 1-5	No of replies: 50 3(4)-5 = satisfied user	How satisfied are you with the product? Please rate between 1-5
• CEBM • Effectiveness • Satisfaction	No of participants of total no of participants that accept the product development (through the product design specification (PDS)) as a valid co-creation of a sustainable product	%	No of replies: 50 3(4)-5 = satisfied user Target more than 70%	Do you believe that this co-created product gives you additional value compared to a traditional product (PDS)? Please rate between 1-5
• CEBM • Effectiveness • Satisfaction	No of participants of total no of participants that accept the new product as a more sustainable product	%	No of replies: 50 3(4)-5 = satisfied user Target more than 70%?	Do you believe that this product is a more sustainable product? Please rate between 1-5

6.5.2 Sustainable Consumption

Type of KPI	Description of KPI	Unit of measurement	Target value	Example question
• CEBM • Effectiveness • Efficiency • Satisfaction	No of participants of total no of participants that find the eco-information/eco-points useable during the shopping process	%	No of replies: 50 3(4)-5 = satisfied user Target more than 70%?	Was the eco-information/eco-points useable/easy to understand during the shopping process?
• CEBM • Effectiveness • Satisfaction	No of participants of total no of participants that find the eco-information/eco-points important at point of purchase	%	No of replies: 50 3(4)-5 = satisfied user Target More than 70%?	Was the eco-information/eco-points vital at point of purchase? Please rate between 1-5
• CEBM • Effectiveness • Efficiency • Satisfaction	No of participants of total no of participants that find the eco-shopping process efficient and well-functioning	%	No of replies: 50 3(4)-5 = satisfied user Target more than 70%?	Was the eco-shopping process efficient and well-functioning? Please rate between 1-5
• CEBM • Effectiveness • Efficiency • Satisfaction • Loyalty	No of participants of total no of participants that will continue buying the sustainable version of the product	%	More than 70%?	Would you continue buying the sustainable version instead of the traditional one?

• CEBM • Effectiveness • Efficiency • Satisfaction	Quantity of sustainable products bought in comparison with traditional ones.	Number of sustainable products / numbers of traditional products.		

6.5.3 Collaborative recycling

Type of KPI	Description of KPI	Unit of measurement	Target value	Example question
• CEBM • Effectiveness • Efficiency • Satisfaction	No of user of total no of users that are satisfied with the bin	%	No of replies: 50 3(4)-5 = satisfied user	How satisfied are you with the bin and how it functions? Please rate between 1-5
• CEBM • Effectiveness • Efficiency • Satisfaction	No of user of total no of users that are satisfied with the app	%	No of replies: 50 3(4)-5 = satisfied user	How satisfied are you with the usability of the app?
• CEBM • Satisfaction	No of user of total no of users that will or probably will continue using the bin	%	No of replies: 50 3(4)-5 = satisfied user	Do you plan to continue using the app and the bin? Yes/No
• CEBM • Satisfaction	Numbers of users which would continue using the bin. Not considering the app in this part.			