CIRC4LIFE

ECO-CREDITS METHODOLOGY: HOW TO REWARD REUSE AND RECYCLING

Presented by [...]
[Date]

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776503

Basic information about CIRC4Life

- CIRC4Life is an international collaborative innovation project (May 2018 until April 2021) with the aim to develop and implement a circular economy approach for sustainable products and services through their value and supply chains.
- Coordinator Nottingham Trent University
- Partner organisations

Enviro Data (ENV), Jonathan Michael Smith (JS), Kosnic Lighting Limited (KOS), Centre of Research for Energy Resources and Consumption (CIR), European EPC Competence Center GmbH (EECC), The Institute for Ecology of Industrial Areas (IETU), RISE IVF AB (SWE), Make Mothers Matter (MMM), ONA PRODUCT (ONA), INDUMETAL Recycling (IND), GS1 Germany GMBH (GS1G), Laurea University of Applied Science (LAU), Center for European Policy Studies (CEPS), Institute of Communication and Computer Systems (ICCS), Recyclia (REC), S.A.T. Alia (ALIA)

- Content specific for this module tool produced by

ECO-ACOUNT IN CIRC4LIFE

Consumption behaviour
ECO-COST

Disposal after its end-of-life
ECO-CREDITS

ECO-CREDITS: GENERAL PRINCIPLES

- Eco-credits are obtained when the customer returns a waste to a collection facility.
- Eco-credits are accompanied by a system of incentives (cash or other goods).
- Incentivize costumers to perform a proper sorted disposal of a product after its lifetime.
- Incentives follow the general principles of the circular economy, avoiding an increase in the consumption.

ECO-CREDITS: METHODOLOGY. A SINGLE (BUT MULTIPLE) EQUATION

General approach

$$Eco - credits = \underbrace{A \cdot \sum_{i=1}^{n} a_i \, rarity_i}_{1} + \underbrace{B \cdot \text{EoL state}}_{2} + \underbrace{\text{C} \cdot lifetime\ factor}_{3}$$

1. Represents the **physical value** of the materials found in the product.
2. End of **Life state** of a product: if is reusable or reparable or only recyclable.
3. Adequacy of the used time compared to the expected **lifespan**.

"A" "B" and "C" could be fixed by policymakers, municipalities or alternative "incentive providers" in order to give a high relevance to each term

ECO-CREDITS: METHODOLOGY. A SINGLE (BUT MULTIPLE) EQUATION

Eco-credit calculation methodology is applicable to all kinds of products. Examples: WEEE and food waste.

Applied to (W)EEE

$$Eco-credits = \underbrace{A \cdot \sum_{i=1}^{n} a_i \, rarity_i + B \cdot \text{EoL state}}_{} + \text{Eco} - \text{points} \cdot lifetime\ factor$$

-**Rarity depends on the materials and the weight** (different for each WEEE)

-**What happens when we reuse or recycle?**

For recycling purposes, not every material can be recycled. For each raw material a [0..1] coefficient, **ai**, was added for considering recyclable materials. **ai** value will be 0 for non recycling, 1 for easily recycling and 0.5 for materials that could be recycled but mixed with others or by means of intermediate operations.

For reusing purposes (when the WEEE is working or can be used with small reparations), **ai** will be always 1 in order to incentivize the reusing (we are avoiding the extraction and manufacturing of new components).

ECO-CREDITS: METHODOLOGY. A SINGLE (BUT MULTIPLE) EQUATION

Applied to (W)EEE

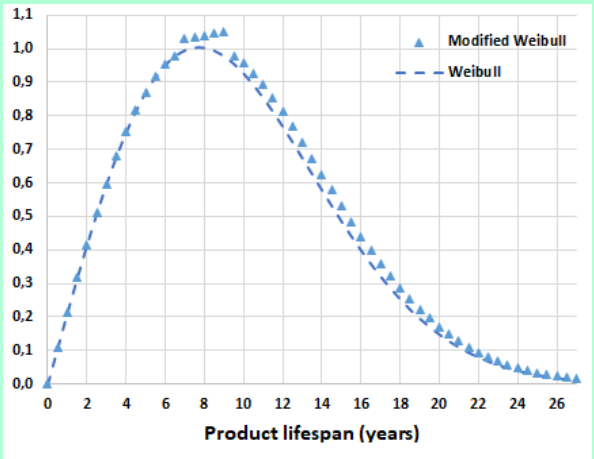
$$Eco - credits = A \cdot \sum_{i=1}^{n} a_i \, rarity_i + B \cdot \text{EoL state} + \text{Eco} - \text{points} \cdot lifetime\ factor$$

-Is the (W)EEE working?

Reuse is always preferred over recycling. The state of a product is going to determine is reusability. EoL will be 1 if the device works perfectly (reuse), 0.5 if it is not working but can be easily repaired, 0 if it is not possible to fix the product (recycle)

Penalizing early and late returnings

Use a Weibull distribution modified so the maximum lifetime factor is at 125% value of the lifespan.



ECO-CREDITS: METHODOLOGY. A SINGLE (BUT MULTIPLE) EQUATION

Applied to organic urban fraction residues

$$Eco - credits = A \cdot \sum_{i=1}^{n} a_i \, rarity_i + B \cdot \text{EoL state} + C \cdot lifetime\ factor$$

$$Eco - credits = D \cdot m_{food\ or\ urban\ biowaste} \cdot Chemical\ exergy_{calories\ or\ HHV}$$

- The terms referring to the EoL state and the lifetime factor should be removed from the equation because they cannot be applied to organic waste.
- Thermodynamic rarity of organic matter can be calculated directly by means of its chemical exergy. For organic urban fraction residues, its higher heating value (HHV) has been chosen as general term representing its thermodynamic value.

THANKS

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