The CEWASTE Assurance and Verification System for the Certification of Waste Management Operators with CRM Focused Requirements

Baron, Yifaat[1*], Adeline Maijala[2], Viviana Lopez [1], Esther Thiebaud[3], Arthur Haarman[3], Harri Kaartinen[2], Lucia Herreras[4], Enikö Hajosi[4], Lindsey Wuisan[5], Josef Winkler[6], Karl Gruen[6], Inga Hilbert [1], Sonia Valdivia[7], Shahrzad Manoochehri[7], Otmar Deubzer[8], Norbert Zonneveld[9]

Organization(s):

[1] Oeko-Institut e.V., Freiburg, Germany

[2] SGS FIMKO OY, Espoo, Finland

[3] Sofies EMAC, Zurich, Switzerland

[4] Waste Electrical and Electronical Equipment Forum AISBL, Brussels, Belgium

[5] European Environmental Citizens Organization for Standardization, Brussels, Belgium

[6] Austrian Standards International, Vienna, Austria

[7] World Resources Forum Association, St. Gallen, Switzerland

[8] United Nations University, Tokyo, Japan

[9] European Electronics Recyclers Association, Arnhem, The Netherlands

* Corresponding Author, y.baron@oeko.de, +49 30 761 45295 266

Abstract

Recycling rates of most critical raw materials (CRMs) as defined by the EU are close to zero, while at the same time recycling is considered as one mean to mitigate the criticality. The EU-funded H2020 project CEWASTE (www.cewaste.eu) contributes to improve the recycling rates of CRMs from e-waste and batteries by producing and pilot testing requirements for collection, transport and treatment of products containing sufficiently high concentrations and amounts of critical raw materials.

The project first looked at the current situation of CRMs contained in products, at the feasibility of their recovery from waste and at requirements that already support such recycling in existing standards [1]. On this basis requirements were then developed for actors of the EEE and battery waste management industry [2].

The assurance and verification scheme were developed, to provide the framework for certification of the compliance of the waste management value chain with the CEWASTE requirements. The assurance system specifies the rules and procedures to be followed by various actors involved with the implementation of the scheme. The verification system was developed to support the processes addressed in the assurance scheme, i.e. the auditing of facilities against the CEWASTE requirements, and preparation of operators for these audits.

1 Introduction

The 2017 EU-list of critical raw materials (CRMs) includes 27 materials. Their recycling rates from waste products are, however, low. Since recycling is one approach to mitigate the criticality of CRMs, the CEWASTE project aspires setting up and establishing requirements for a standard and an assurance and verification system for the collection, transport and treatment of products containing CRMs to enable their recycling and to create a level-playing field for the operators along the end-of-life (EoL) chain. At the same time, the requirements shall – besides the recycling of materials listed as CRM – also improve the recycling of other valuable materials.

The assurance and verification scheme were developed, to provide the framework for certification of the compliance of various actors with the CEWASTE requirements and are presented in the next sections.

2 The CEWASTE assurance system

The CEWASTE scheme is a voluntary third-party certification scheme and has been designed with the objective to contribute to the recovery of critical raw materials from key types of waste. It can be placed in a broader perspective where regional policies and legislative frameworks aim at promoting a circular economy and addressing sustainability challenges with a focus on waste streams from electrical and electronic equipment (EEE) and batteries.

A framework for the assurance system has been devised, specifying the rules and procedures to be followed. The assurance system details how the CEWASTE scheme is organised (who makes what decisions) and specifies rules for certification bodies and

auditors involved in the performance and assessment of audits and in the decisions as to when a facility is compliant and can be certified. It also specifies rules as to the eligibility of individuals and/or organisations acting under certain roles in the scheme. For example, individuals acting on behalf of the scheme as auditors, organisations assuming the ownership or part of the management board, etc.). How such rules are to be updated from time to time and maintained is also addressed.

2.1 Standards for assurance systems of product standards

The development of this system required determining what processes the assurance scheme shall address (auditing, audit assessment and the general scheme rules), how these processes are to be performed and how their implementation is to be supported through various templates and guidance.

As a first step, the various principles addressed in the ISO 17000 series and in the ISEAL Assurance Code of Good Practice were consulted to ensure the assurance scheme would be in line with such frameworks, as a minimum in regard to consistency; rigor, competence, impartiality, transparency and accessibility.

This CEWASTE assurance system and scheme rules were developed according to the guidelines of the standard ISO/IEC 17067:2013 (Conformity assessment — Fundamentals of product certification and guidelines for product certification schemes), taking into consideration clause 6.5.1 which specifies elements to be included in a scheme:

- The scope of the scheme;
- Requirements against which relevant waste operators are to be certified;
- Requirements for certification bodies;
- Methods and procedures to be used by the conformity assessment bodies and in the certification process;
- Aspects related to the certification of conformity such as its content and how it can be used;
- Resources required for operating the scheme;

The requirements for Certifications Bodies (CB) were developed considering the essential requirements of the standard ISO/IEC 17065:2012, which specifies requirements for certification bodies certifying products, processes and services to be operational. ISO/IEC 17000:2004 on Conformity assessment (Vocabulary and general principles) was consulted and where relevant, terms and definitions therefrom were adopted to the CEWASTE scheme rules.

The ISEAL Assurance Code (ISEAL, 2018) specifies normative requirements for implementing an assurance system. The code applies specifically to assurance systems for assessing conformity with sustainability standards and related chain of custody standards. The ISEAL Credibility Principles provide the foundation for the normative sections of the Standard-Setting Code. The following principles are given as guidance for making decisions in unanticipated situations and have been taken into consideration in the system development: sustainability, improvement, relevance, rigour, engagement, impartiality, transparency, accessibility, truthfulness and efficiency.

2.2 The CEWASTE scheme rules

The *assurance system structure* includes various elements (scope, requirements, rules for its management, rules for certification bodies, rules for auditing and conformity assessment, etc.). Methods and procedures to be used by the individuals and organisations involved in the certification process, have been developed to assure the integrity and consistency of the outcome of the conformity assessment process. To ensure the conformity of facilities with the CEWASTE requirements, the assurance system operates on three levels, or processes:

- The CEWASTE certification scheme rules - these provide the general framework for the functioning of the certification scheme, including rules for registered CEWASTE Certification Bodies.
- The auditing process - here rules, templates and guidance's have been established to support the auditing of facilities that have applied for or hold a valid CEWASTE certification.
- The review process - here too, rules, templates and guidance's have been established to support the review of audit results and the certification decisions.

The *objective* of the CEWASTE assurance system is to contribute to an improved recovery of valuable and critical raw materials (CRMs) from key types of waste through traceable and sustainable treatment processes in the entire supply chain of secondary raw materials. This is addressed through assuring the compliance with the CEWASTE standard requirements, which aim on the one side at increasing the amounts of CRMS recovered and on the other side at ensuring that processes

which contribute to the recovery of CRMs shall have a minimum level of sustainability.

The CEWASTE Scheme is *applicable* to the processes of collection, transport and treatment of waste electrical and electronic equipment and waste batteries.

The general *scope* of the CEWASTE scheme is defined in the CEWASTE certification requirements (the requirements against which conformity of operators is assessed). The scope of a specific certification is based on two dimensions:

- the type of facility being certified; and
- the waste fraction being handled.

The *CEWASTE requirements* are referred in the CEWASTE rules as the requirements against which facilities seeking certification are to be certified. Further information on the requirements is available in a separate paper and presentation ["Sound recycling and transboundary movements of WEEE containing critical raw materials - CEWASTE Requirements" – [2]). The CEWASTE rules prescribe an *update* of the requirements and their annexes, as a minimum every eight and every four years respectively. Additional *revisions* are to be initiated in the case that new materials are added to the European Union "Communication on the list of critical raw materials" [3]. Progress and respective changes in legislation or in the technical performance of the processes addressed through the CEWASTE standard are also to be considered for initiating a revision at earlier intervals. The scheme rules also foresee annual meetings of auditors to discuss different views as to the interpretation of requirements and the need for revision of the requirements or of the verification system to ensure a homogenous implementation.

The CEWASTE project and the voluntary certification scheme focus on the End-of-Life waste management of products, consisting of the following value chain actors: collection and logistics facilities, pre-treatment and recycling facilities.

The scheme currently refers to a scheme owner a management board and its members, and a technical advisory board and its members. For each of these, the rules detail the roles and responsibilities. The scheme details how it is to be maintained and implemented, and how and by whom decisions are to be made.

Requirements are included as to the *registration of Certifications Bodies* and the maintenance of the registration. It is also described how the scope of registration of a CB is to be determined and revised and how to proceed in the case that that the conditions of registration are no longer fulfilled, and the CB is to be suspended and withdrawn.

The eligibility of *auditors* and what skills they must have in order to be accepted to the pool of auditors is detailed. This is given in general for auditing of the CEWASTE requirements whereas specific conditions may apply for the auditing of some waste fractions (e.g., batteries).

The CEWASTE rules describe the certification process in detail, referring to the application for certification, its performance (audit) and assessment and the decision as to conformity and certification. The process is presented in Figure 1. Details are also given as to the process of changing the scope of an existing certification (extension or reduction) and grounds for certification withdrawal.
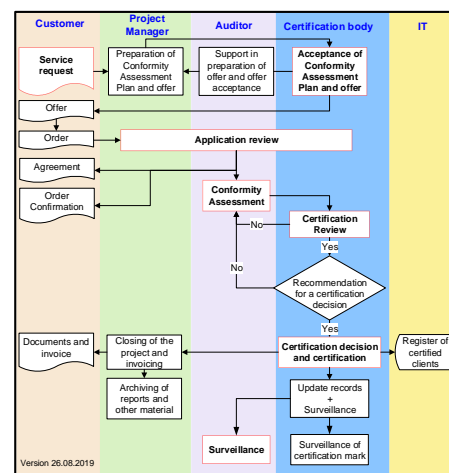
Figure 1: **CEWASTE certification process flowchart**

3 The CEWASTE verification system

In parallel to the assurance scheme, a verification system has been developed to support the processes addressed in the scheme rules. To support the auditing of facilities against the CEWASTE requirements, auditing templates and tools (check-list) have been developed to be used during audits. These are further accompanied by an Assurance manual for operators of the EEE and battery waste management sectors (providing guidance as to how to demonstrate compliance with the scheme requirements) and a Verification manual for auditors (providing additional background about the requirements to harmonize the assessment process).

To develop the verification system, existing verification systems of E-waste management facilities and raw material certification systems were analysed (e.g., WEEELABEX, SWICO, etc.). Such systems partly inspired the approaches adapted for verification of the CEWASTE requirements, particularly in relation to

CENELEC requirements included in the CEWASTE standard. Experience of auditors was also taken into consideration for deciding on specific aspects of the tools developed in this system.

The verification system includes templates and tools that have been designed to support the various procedures developed as part of the assurance system. Each of these is relevant at different phases of the certification process and addresses the various aspects of relevance at that stage. In general, certification includes a few stages as illustrated in Figure 2.
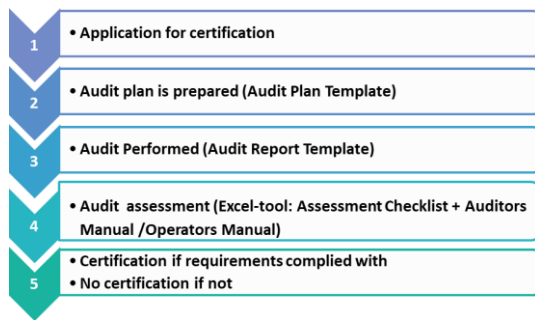
Figure 1: CEWASTE certification process flowchart

The CEWASTE *Audit Plan* template is to be used by auditors to plan the certification audit and makes clear for the operator which staff members are to be present in different stages of the audit and what facilities and activities are to be reviewed for conformity throughout the audit.

The CEWASTE *Audit Report* template is to be used by the auditor to document the audit and the assessment of conformity.

The *Audit Assessment tools* have been developed in excel format in relation to the "Assessment of Conformity" of facilities, i.e. their auditing. They integrate the CEWASTE requirements that are of relevance for the conformity assessment, namely, those on management and QHSE and those of relevance for collection and logistics and for treatment facilities. For each requirement, questions (for the auditor checklist) and explanatory texts (for the auditor and the operator manuals) have been included. The excel format allows both operators and auditors to "filter out" requirements that are not relevant for their facilities, for example based on waste stream fraction or based on value chain stage. This is possible through using the filtering option in the applicability columns (Operators; Type of Waste).

It is also possible to use the filter options to navigate to a specific requirement. The tool has been devised so that the requirement clause numbering and titles as well as the requirement text appear alongside the explanatory information that consists of the manual and thus it allows the user both to check the specifics of the

requirement as well as to better understand its meaning or implementation and compliance aspects.

The tool has also been designed with different sheets so that requirements are allocated into two groups:

- Management – here requirements that deal with the management system of a facility and that address quality, health, safety and environmental aspects are located;
- Technical – here requirements are located that are related to the collection and transport of waste and that deal with pre-treatment, treatment and depollution.

The *tool for auditors* includes a checklist and a manual, which are merged to allow the auditor higher convenience in the use of the tool. The checklist has been developed to support the auditing and includes questions for each of the CEWASTE requirements. The auditor manual provides explanatory information and considerations of the assessment of conformity. Both can support the auditor during an audit through the provision of guidance information and clarification as to what level of performance is considered compliance and in what cases a major or minor non-conformity is to be identified. However, they are also useful for the preparation of audits and the final stage of assessing and deciding on the conformity of the requirements and the eligibility of the operator's facilities for certification.

The project team has consulted with the writers of the Handbook for Auditing the EN 50625 standard, which has been developed for the SWICO and the SENSerecycling Certification schemes [4]. The handbook has been used in the consideration of questions and explanatory information that is provided for some of the requirements in the checklist and the manuals.

The *assurance manual or operator tool* has been developed for operators that would like to certify their facilities (in whole or in part) against the CEWASTE requirements. It can also be used by operators that would like to gain a better understanding as to these requirements to consider certification in the future. Here, explanatory text and information are given for each requirement from the perspective of conformity of a facility. Aspects that the operator is to consider in preparing its facilities for certification and for the audit are detailed. This may refer to the type of documentation that is eligible as evidence of conformity in some cases, threshold levels in relation to measurable requirements, aspects that need to be addressed in management plans, etc.

The excel tools also contain general information as to the CEWASTE scheme and requirements, such as the structure of the requirements in focus of the audit, diagrams on the flow of CRM equipment, components and

materials in relation to the CEWASTE requirements. A summary sheet provides the auditor with an overview of the non-conformities identified during the audit and thus assists in the final assessment and decision.

4 Outlook

The current version of the templates and tools is a work in progress. The CEWASTE requirements and the tools and templates are still to undergo a pilot stage, where their usability shall be tested in the course of performing pilot audits in several countries. Consultation with stakeholders is also planned, in line with the ISEAL Assurance Code of Good Practice. Thus a last revision is still planned for both the CEWASTE scheme rules and the templates and tools that have been developed with it.

For further information c.f. the papers and presentations of Otmar Deubzer, United Nations University SCYCLE, et al. ("Products, Technologies, and Normative Requirements for Recycling of Valuable and Critical Raw Materials") and of Sonia Valdivia, World Resources Forum, et al. ("Sound recycling and transboundary movements of WEEE containing critical raw materials - CEWASTE Requirements").

5 Literature

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