Implementation Study of the Electronics Recycling Standards: R2 and e-Stewards®

Fact Sheet

The United States Environmental Protection Agency (EPA) conducted a limited study evaluating the implementation of the two third-party certification programs for electronic waste recyclers in the U.S.: the Responsible Recycling Standard for Electronics Recyclers and the e-Stewards Standard for Responsible Recycling and Reuse of Electronic Equipment©. The study suggests that the accreditation, certification and implementation process of the R2 and e-Stewards® standards is working well. Though limited in scope, the study also identifies opportunities for improvement in key areas, including improving stakeholders' knowledge of health and safety risks, understanding of legal requirements, and awareness of hazardous substances in electronics. The study offers suggested strategies for addressing the opportunities for improvement as well as top recommendations to improve the overall effectiveness of implementation.

Background

In the United States, electronics recycling facilities can be certified to standards through two certification programs – the Responsible Recycling (R2) Standard for Electronics Recyclers and the e-Stewards® Standard for Responsible Recycling and Reuse of Electronic Equipment© (e-Stewards®). Both certification programs were developed to set minimum standards for ensuring worker health and safety, proper management of used electronics though the recycling chain to their final destination, and data security. As of December 2015, more than 550 U.S. electronics recycling facilities are certified to one or both of these standards.[1]

Under the 2011 National Strategy for Electronics Stewardship (NSES), which tasks the federal government to lead by example in encouraging the greener design and responsible management of electronics, the EPA committed to study – in collaboration with the GSA and the ANAB – the implementation of these certification programs. The objectives of the study were to assess whether the R2 and e-Stewards Standards ("the Standards") are being implemented transparently and consistently, and are achieving the intended results. The study intentionally does not compare the two standards or draw conclusions about whether one standard is being implemented more successfully than the other. The assessment focused on the implementation processes and procedures shared by both standards, as well as 20 key topic areas that are addressed in both standards, such as training and communication, health and safety requirements, and export issues.

Study Design

To achieve the objectives of the study, the EPA conducted interviews with stakeholders across the electronics recycling system to obtain their perspective on areas of strength and opportunities for improvement; observed audits of recycling facilities to assess the consistency and rigourousness of the audits; analyzed the interview and audit data to develop findings, conclusions, and recommendations and documented them in the final report.

> **Study Design**
> 1. Stakeholder Interviews
> 2. Audit Observations
> 3. Data Analysis
> 4. Final Report

Stakeholder Interviews

EPA interviewed 39 entities that are critical to the implementation of the Standards, including:

- The Standard owners (Sustainable Electronics Recycling International (SERI) for R2 and the Basel Action Network (BAN) for e-Stewards);
- A representative from the ANSI-ASQ National Accreditation Board (ANAB);
- The six Certifying Bodies (CBs) accredited to certify recycling facilities to the Standards;
- A national-level certified recycling facility;

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[1] Total number of certified recyclers as indicated on both the R2 and e-Stewards web sites.

- The Electronics Manufacturers Recycling Management Co. (MRM), which represents a consortium of electronics manufacturers;
- The auditors conducting the nine facility audits that EPA observed; and
- The owners or operators of the nine facilities whose audits were observed.

Audit Observations

Though limited to nine, the audit observations reflected a cross-section of the types of facilities that are certified or are seeking certification in terms of the different types of audits (e.g., Stage 2, surveillance, recertification), facility sizes (ranging from 5-40 employees; single facility vs. multiple facilities across the country), and services offered (reuse, manual disassembly, shredding, data destruction, etc.). Through the audit observations, EPA identified both positive actions being carried out as well as opportunities for improvement across 20 key topic areas addressed in both of the Standards (see text box to the right). Because the study intentionally does not compare one Standard to the other, the 20 topic areas were derived based on all auditable elements present in both the e-Stewards and R2 standards.

Data Analysis

The data from the audits as well as the information provided through the stakeholder interviews were carefully aggregated and reviewed to determine trends, such as frequently mentioned strengths and opportunities for improvement, in the implementation of the Standards. Thus, EPA considered both the combination of the audit findings and the interview responses in identifying patterns of strengths, opportunities for improvement, and other trends.

20 Key Topic Areas Analyzed in the Study

1. System requirements
2. System planning
3. Training and communication
4. Operational control
5. Health and safety
6. Reuse
7. Data security/data destruction
8. Management of Focus Materials (FMs) and Hazardous Electronic Waste (HEW) and Problematic Components and Materials (PCMs)
9. Emergency preparedness & response
10. Materials recovery and disposition
11. Export restrictions for Focus Materials (R2) and Hazardous Electronic Waste (e-Stewards)
12. Site closure & insurance
13. Downstream accountability
14. Monitoring and measurement
15. Tracking
16. Evaluation of compliance
17. Nonconformity, corrective & preventive action
18. Control of records
19. Internal audit
20. Management review

Study Limitations

Any conclusions drawn by the study should be understood within the study's limitations and scope, including:

- The study's findings are based on the 39 stakeholder interviews EPA conducted and the nine audits EPA observed. The audits reflect a small percentage of all certified electronics recycling facilities and of all auditors at work in the electronics recycling industry in the U.S.
- Interviews and audit observations were conducted from March 2013 through May 2015, and thus the findings represent only activity during that period.
- EPA did not ask direct questions while observing the CB auditors conduct the facility audits. Findings based on the observed audits are limited to what could be observed rather than discussed with the CB auditors.
- Facilities agreed to let EPA observe the audits. For the nine audits EPA observed, the CBs contacted their clients (facilities) in advance, and those facilities all agreed to allow EPA to observe their audits. It can be surmised that the clients had confidence in a positive outcome of the audit in order to agree to let EPA observe the audit.

- EPA observed audits performed by only five of the six Certifying Bodies during the study. As of the writing of this report, those five Certifying Bodies are collectively responsible for auditing over 98% of the facilities that are certified to one or both of the Standards.
- Audits observed were for facilities obtaining Stage 2 certification, surveillance, or re-certification audits; no Stage 1 (readiness review) audits were observed. Stage 1 audits primarily consist of reviewing facility documents in preparation for a Stage 2 audit, where certification may first be achieved.

Summary of Findings

Key Strengths

Interview and audit findings suggest that the Standards have brought better order; better management; an increased awareness of the environmental, health, and safety (EHS) risks associated with electronics recycling; and an improved awareness of regulatory requirements and best practices to the electronics recycling industry. The roles of the various stakeholders responsible for implementing the certification programs, including ANAB, the standard owners, the CBs, the auditors, and the facilities, are clearly defined. Top areas of strength observed to be well audited include ensuring facilities' environmental, health, and safety management systems are consistent with the Standards and are kept up to-date; and thorough auditing of the data security/data destruction requirements of the Standards. The roll-out of the new versions of both standards in 2013 went smoothly.

Key Opportunities for Improvement

Opportunities to improve the implementation of the Standards were identified in a few key areas, including health and safety risks, management, and best practices; awareness and understanding of all applicable federal, state, and local legal requirements (particularly export requirements for cathode ray tubes (CRTs); and knowledge of hazardous substances in electronics). One central theme that emerged from the study was that the knowledge base must continue to grow and new or improved tools are needed for all stakeholders (e.g., for auditors to effectively audit, for facilities to operationalize improvements in these areas, for regulators to inform the regulated community) to support effective implementation of the Standards.

Suggested Strategies for Improvement & Top Recommendations

The study offers specific strategies for addressing the opportunities for improvement identified in each of the 20 topic areas assessed in the study, which are included in Section 2 of the report and are compiled in Appendix A. Through an analysis of patterns and trends, EPA also developed top recommendations to address the root causes of many of the opportunities for improvement that were identified in the study.

The top recommendations are:

> ***Top Recommendations***
> - Provide additional training and guidance materials to grow the knowledge base for all stakeholders.
> - Provide regular updates to the Standards.
> - Increase audit time to allow for more thorough audits.
> - Explore and address perceived conflict-of-interest issues.

- ***Provide additional training and guidance materials to grow the knowledge base.*** Growing the base of knowledge for all stakeholders, including auditors and facilities, is important for ensuring the Standards are implemented properly. In total, 85% of all interviewees – including 100% of Certifying Bodies and 91% of auditors – indicated that more robust training programs are needed in order to strengthen knowledge of health and safety risks, legal requirements – particularly related to exports and management of CRTs - and best operational practices in many of the 20 topic areas.

- ***Provide regular updates to the Standards to ensure they continue to evolve alongside this rapidly changing industry.*** E-Stewards and R2 are both relatively new standards and their recent updates went smoothly. Updating and revising the Standards on regular, well-publicized timetables is important to address areas that could benefit from clarification in a Standard or lessons learned from prior audits. Support for more systematic, well-publicized plans and/or timetables for subsequent updates was indicated in 69% of all

interviews, including 73% of stakeholder interviews conducted before the 2013 Standards revisions and 100% of stakeholder interviews conducted after the revisions. Scheduled and publicized plans to update the Standards will allow stakeholders to fully contribute and participate in the continual improvement in a fair and transparent manner.

- *Increase audit time to allow for more thorough auditing of the Standards.* Inadequate audit time was mentioned in 56% of all interviews as a limiting factor, particularly for integrated audits where R2 and e-Stewards are being audited at the same time as other standards, such as RIOS and ISO 14001. In interviews where the adequacy of the amount of time allowed for audits was questioned specifically, 75% of interviewees indicated a desire for increased audit times, as did five of the nine facilities audited. Audit time for ISO 14001-based standards is specified in "IAF MD 5: Duration of QMS and EMS Audits." To better reflect the complexity of electronics recycling operations, there is a need to fine-tune the formulas found in the R2 Code of Practices and e-Stewards Appendix C to 'right-size' audit time. Many facilities can have multi-faceted downstream material flows, export situations, regulatory status, reuse practices, and other variables that pose challenges to the most efficient auditors to adequately review materials and follow audit trails in the allotted time. Moreover, many audits cover multiple standards simultaneously. Increasing audit time would allow auditors to more closely examine health and safety monitoring, measurement, record-keeping, and communication issues in order to give facilities critical feedback on their health and safety systems.

- *Explore and address perceived conflict of interest issues to enhance overall rigorousness of the audits.* Study participants expressed a concern that there is a perceived conflict of interest between CBs wishing to retain their clients (who are the recycling facilities) and the recycling facilities themselves; that is, the CB auditors may not be as stringent or thorough in their audits in an effort to retain a competitive business relationship. When asked specifically whether they feel that the perception of a conflict of interest exists, 63% of stakeholders interviewed said that they did. Exploring ways in which the key players in the system – Certifying Bodies, recycling facilities, the Standards owners, and ANAB – could potentially address these perceptions of conflict of interest, such as implementing new or different funding mechanisms, could enhance the implementation of the Standards.

In practice, many stakeholders will continue to influence and shape the development of responsible recycling in the U.S. As such, EPA encourages all organizations that have a role to play in shaping the standards and certification process to consider the suggested strategies for improvement and top recommendations in the study.

This broader group of stakeholders includes:
- The Standard owners (SERI for R2 and the Basel Action Network (BAN) for e-Stewards);
- ANAB;
- The Certifying Bodies;
- Industry trade associations;
- EPA and other federal agencies, including the Occupational Safety and Health Administration, the National Institute for Occupational Safety and Health, and the Department of Transportation;
- State regulators;
- Original equipment manufacturers;
- Academic researchers;
- Non-governmental organizations; and
- Private sector electronics recyling/reuse companies and facilities.

EPA remains committed to continuing the dialogue started by this study and supporting the continual improvement of the implementation of the electronics recycling Standards, and will provide assistance and support to stakeholders in discussing and implementing the recommendations outlined in the final report.

Find the final report at Implementation Study of the Electronics Recycling Standards: R2 and e-Stewards® site.