SUSTAINABLE RECYCLING INDUSTRIES

ISO 59014: Sustainability and Traceability of Recycled Materials. Pioneering Cases in Asia, South America, Africa and Europe

FEASIBILITY ASSESSMENT OF THE ISO 59014 STANDARD

AUGUST 2025

Schweizerische Eidgenossenschaft
Confédération suisse
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Federal Department of Economic Affairs
Education and Research EAER
State Secretariat for Economic Affairs SECO

Empa
Materials Science and Technology

WORLD RESOURCES FORUM

Authors : Sonia Valdivia (World Resources Forum), Dea Wehrli (Empa, Volutio GmbH and E[co]work), Federico Werner (World Resources Forum), Mathias Schluep (World Resources Forum), Heinz Böni (Ecopartner)

Publication year: 2025

ISBN: 978-3-906177-61-8

Acknowledgment: This document received the contributions of Deepali Sinha (E[co]work), Roger Mori & Cristel Fajardo (CICLO), Mimoun Batou (Argo360), Martin Gasser (Spross) and Daniela Murcia (World Resources Forum).

Layout: Wolfram Egert (atelier-egert.de)

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Table of contents

Acronyms 5
Tables 6
Figures 7
Executive summary 8

1 Introduction 14
1.1 Background and aim 14
1.2 Scope, processes, organizations and actors in ISO 59014 15
1.3 Principles and requirements 17
1.4 Pilots' selection and assessment methodology 22
1.5 Certification pathway 27

2 Feasibility assessment of ISO 59014 implementation at E[co]work 29
2.1 Description of activities and processes 29
2.2 Resources recovery and circular economy in the context of India 31
2.3 Operational requirements: main findings 31
2.4 Organizational requirements: main findings 33
2.5 Traceability requirements: main findings 35
2.6 Overall compliance, challenges and recommendations 36
2.7 Certification potential and benefits 37
2.8 References 38

3 Feasibility assessment of ISO 59014 implementation at CICLO 39
3.1 Description of activities and processes 39
3.2 Resources recovery and circular economy in the context of Peru 41
3.3 Operational requirements: main findings 42
3.4 Organizational requirements: main findings 43
3.5 Traceability requirements: main findings 43
3.6 Overall compliance, challenges and recommendations 43
3.7 Feasibility, certification potential and benefits 45
3.8 References 46

4 Feasibility assessment of ISO 59014 implementation at Argo360 47
4.1 Description of activities and processes 47
4.2 Resources recovery and circular economy in the context of The Netherlands and Ghana 49
4.3 Operational requirements: main findings 50
4.4 Organizational requirements: main findings 51
4.5 Traceability requirements: main findings 52
4.6 Overall compliance, challenges and recommendations 52
4.7 Feasibility, certification potential and benefits 53
4.8 References 54

5 Feasibility assessment of iso 59014 implementation at spross Recyclingwerk Zürich 55
5.1 Description of activities and processes 55
5.2 Resources recovery and circular economy in the context of Switzerland 57
5.3 Operational requirements: main findings 58
5.4 Organizational requirements: main findings 59
5.5 Traceability requirements: main findings 60
5.6 Overall compliance, challenges and recommendations 60
5.7 Feasibility, certification potential and benefits 61
5.8 References 62

6 Results and discussion 63
6.1 Overall compliance and challenges 63
6.2 Feasibility, certification potentials and benefits 67

7 Conclusions and recommendations 69
7.1 Strengths, weaknesses, opportunities, and threats (SWOT) 69
7.2 Example of positioning the ISO 59014 standard in the context of existing WEEE standards 70
7.3 Recommendations for an improved implementation of selected ISO 59014 requirements 70
7.4 Concluding remarks 72

8 Appendix 73
Appendix 1: ISO 59014 requirements 73
Appendix 2: Questionnaire on ISO 59014 compliance assessment and feasibility of completing gaps identified 77

Bibliography 88

Acronyms

CoC	Code of Conduct
CDW	Construction and Demolition Waste
Empa	Swiss Federal Institute for Materials Science and Technology
EPR	Extended Producer Responsibility
ISO	International Organization for Standardization
IWA	International Workshop Agreement (by ISO)
KPIs	Key performance indicators
LCA	Life Cycle Assessment
MEs	Micro-entrepreneurs
NC	Non-compliance
PPE	Personal protective equipment
SAs	Subsistence Activities
SECO	(Swiss) State Secretariat of Economic Affairs
SNV	Swiss Association for Standardization
SERI	Sustainable Electronics International
SRI	Sustainable Recycling Industries
WEEE	Waste Electrical and Electronic Equipment
WRF	World Resources Forum

Tables

Table 1 Structure of the questionnaire to assess compliance with the ISO 59014 standard – Includes an example on subclause 6.1 requirements 24

Table 2 Overview of the number of requirements whose deviation are considered Mayor (M) or minor (m) 25

Table 3 Summary of the feasibility assessment results of compliance with the ISO 59014 standard at E[co]work 36

Table 4 Summary of the feasibility assessment results of compliance with the ISO 59014 standard at CICLO 44

Table 5 Summary of the feasibility assessment results of compliance with the ISO 59014 standard at Argo360 52

Table 6 Summary of the feasibility assessment results of compliance with the ISO 59014 standard at RWZ 61

Figures

Figure 1 The ISO 59000 family of standards 14
Figure 2 The ISO 14000 family of standards – A selection 14
Figure 3 The ISO Technical Committee 323 on Circular Economy including the JWG14 that developed the ISO 59014..... 15
Figure 4 Example of a sequence of activities and processes for recovering secondary materials 16
Figure 5 Companies and countries of origin undergoing the pilots according to the ISO 59014 standard 23
Figure 6 Neodymium magnets and components from a dismantled hard disk at E[co]work..... 30
Figure 7 Processes and activities within the scope of the feasibility assessment at E[co]work 30
Figure 8 Fire safety installation at the facility; dismantling workplace at the facility 32
Figure 9 A dismantling activity with external stakeholders 34
Figure 10 Types of products elaborated by CICLO with processed CDW: (a) recycled aggregates, (b) eco-paving stones and (c) bricks 39
Figure 11 Processes and activities within the scope of the feasibility assessment at CICLO 40
Figure 12 Processing of the construction waste (left) and appearance of the final product 40
Figure 13 Processes and activities within the scope of the feasibility assessment at Argo360 and its supplier Affordable IT Solutions 48
Figure 14 Affordable IT Solutions – commercial details..... 49
Figure 15 Processes and activities within the scope of the feasibility assessment at Spross 56
Figure 16 Recycling concrete granulate 16 – 32 mm (according to SN EN 12620, 1 m3 = 1.6 t) 56
Figure 17 Spross concrete for construction. Norm SN EN 206 57
Figure 18 Examples of wastes fractions that RWZ receives and processes 59
Figure 19 Overall level of compliance by organization (A) and compliance of specific clauses (B-D) 63
Figure 20 Highlights of findings on operational requirements by subclause and organization..... 64
Figure 21 Highlights of findings on organizational requirements by subclause and organization..... 65
Figure 22 Highlights of findings on traceability requirements by subclause and organization..... 66
Figure 23 SWOT of the ISO 59014 standard and the upscaling of its implementation..... 69
Figure 24 Non-compliances levels (in %) per subclause – averages..... 71

Executive summary

Introduction
Despite growing sustainability efforts, the global economy remains largely linear – extracting materials, using them, and discarding waste – leading to resource depletion, pollution, and social inequalities. Standardized approaches to sustainable secondary material recovery have become an urgent need, to ensure that materials re-entering the economy comply with best environmental and social practices while preventing negative impacts across value chains

In 2021, two ISO parenting committees, ISO/TC 323 on Circular Economy and TC207/SC5 on Environmental Management/Life Cycle Assessment, collaborated to create the Joint Working Group 14 to develop the ISO 59014 standard, "Sustainability and traceability of the recovery of secondary materials – Principles, requirements and guidance." This standard is part of the ISO's circular economy standards and environmental management/life cycle assessment standards. This three-year process was convened by the World Resources Forum Association (Switzerland) and B.E.M. Recycling (Mauritius). The ISO 59014 standard, published in 2024, is a significant milestone in waste management as it is the first ISO standard to include aspects of subsistence activities.

This document presents the results of the feasibility assessment of ISO 59014 through four pilots conducted as part of the Swiss Sustainable Recycling Industries (SRI) programme. The pilots represent different activities and processes in the material recovery value chain.

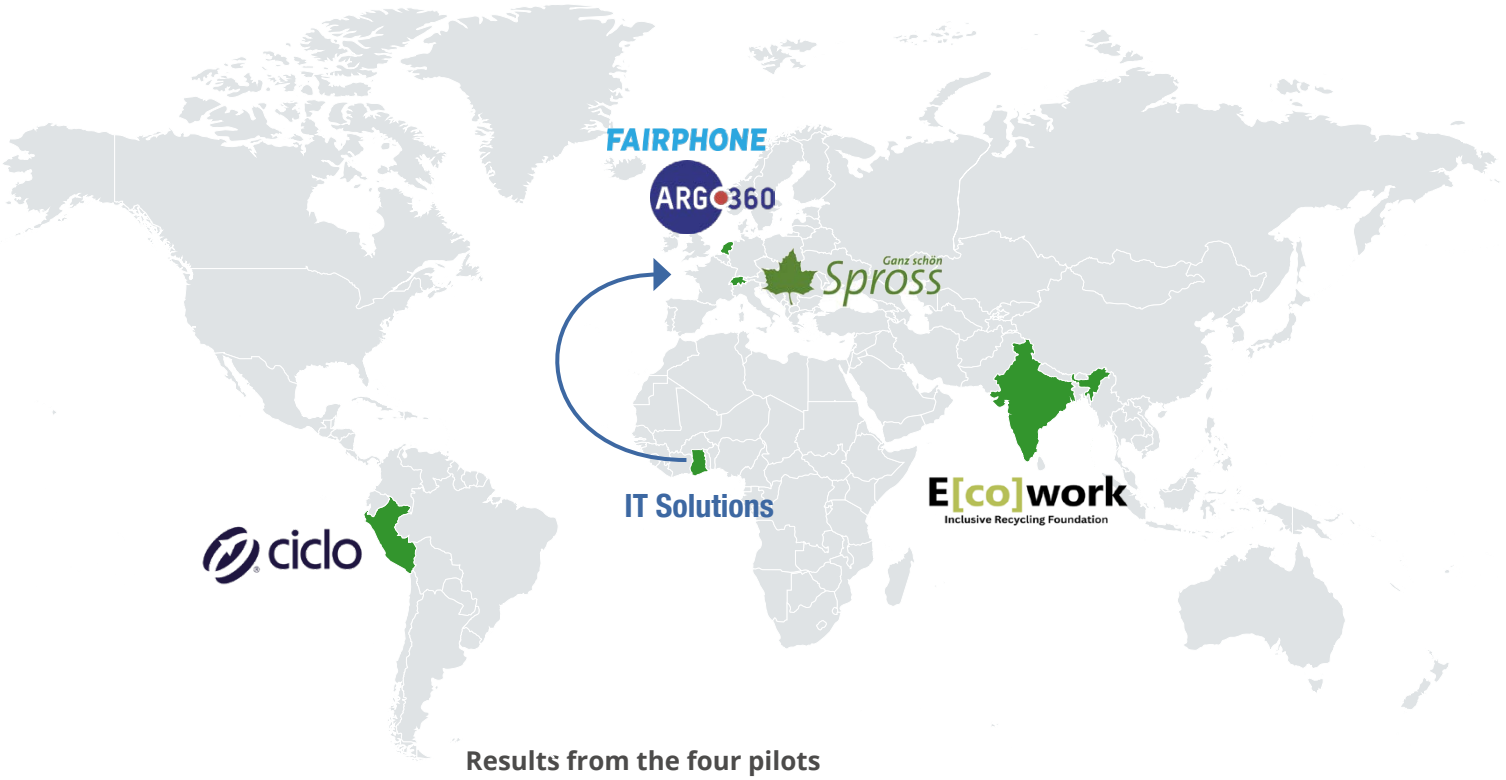
Scope and content of the ISO 59014 standard
The ISO 59014 standard provides principles, requirements, and guidance for organizations to foster sustainability and traceability in activities and processes for the recovery of secondary materials. For organizations aiming to engage with individuals involved in subsistence activities, this document provides additional guidance to ensure their safe working conditions and continuous improvement of their well-being, livelihoods, and professional practices. The standard features seventy-five (75) requirements, that build on eight principles and are articulated along the three clauses of the ISO 59014 standard.

Principles	
1	Respect, consider and respond to the interests and concerns of its interested parties
2	Consider and take responsibility for environmental and social aspects along the value chain
3	When engaging with individuals in SAs, improve their wellbeing and livelihoods
4	Enable safe, healthy and equitable working conditions
5	Prevent or mitigate adverse environmental impacts
6	Conserve resources
7	Consider the entire life cycle of a resource to avoid negative environmental and social burdens
8	Enable the circular flow of resources

Requirements
Clause 6: Operational requirements. This covers collection, sorting, recovery, and preparation for recycling of secondary materials by organizations in circular value chains while ensuring efficient and safe management of secondary materials and maximizing their value.
Clause 7: Organizational requirements. This aims to establish clear roles, responsibilities and competences and skills for managing secondary materials, integrate sustainability and circularity into decision-making, enable systematic documentation, and ensure engagement with stakeholders. These requirements ensure safe, efficient, and compliant handling of materials.
Clause 8: Traceability requirements. This aims to ensure that secondary materials can be traced throughout their journey in the value chain, from collection to recovery and preparation for recycling.

Organizations selected for the pilots

Four organizations managing different activities and processes in the materials' recovery value chain were selected for conducting the feasibility assessment of ISO 59014. Two of these organizations produce recyclates for the building sector from demolition waste, while the other two process electronic waste. The organizations are diverse in geographical location, originating from Peru, India, The Netherlands/Ghana, and Switzerland. The companies are described in its respective section of this document.



Results from the four pilots

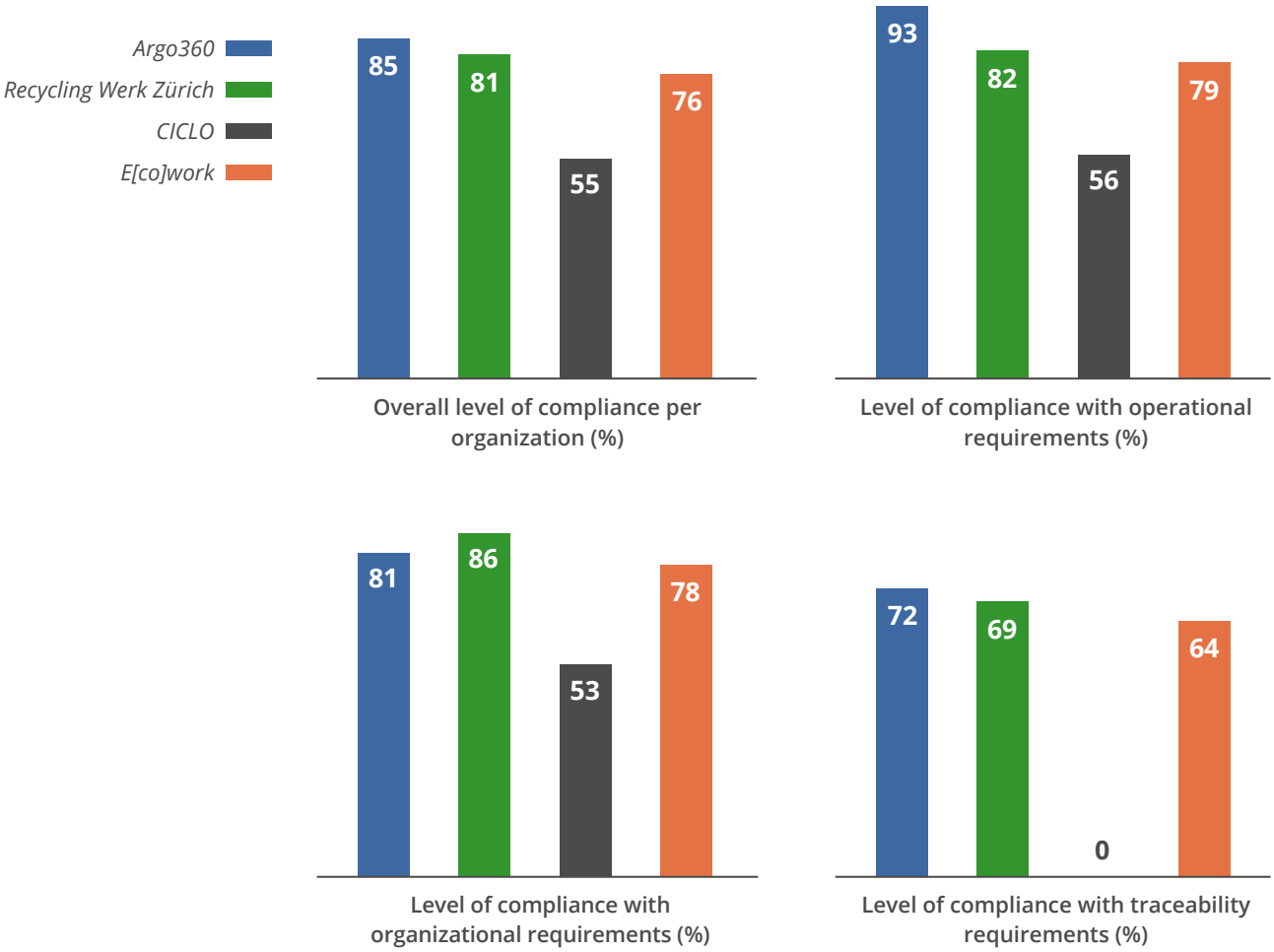
Level of compliance

Overall the level of compliance in the four organizations range from 55% to 85%, with most significant development being made at the operational level. Companies with more years of operations, and greater financial, human and technical resources, such as Argo360 and Spross, show higher levels of compliance compared to the smaller organizations, such as E[co]work) and CICLO. Their more mature culture of compliance and continuous improvement with more years of operation makes them better prepared to integrate standards, such as ISO 59014. Small businesses may face barriers such as insufficient personnel and limited cash flow.

Management systems of growing organizations, such as CICLO and E[co]work, are still undergoing consolidations and modifications, making development more challenging.

Concluding remarks

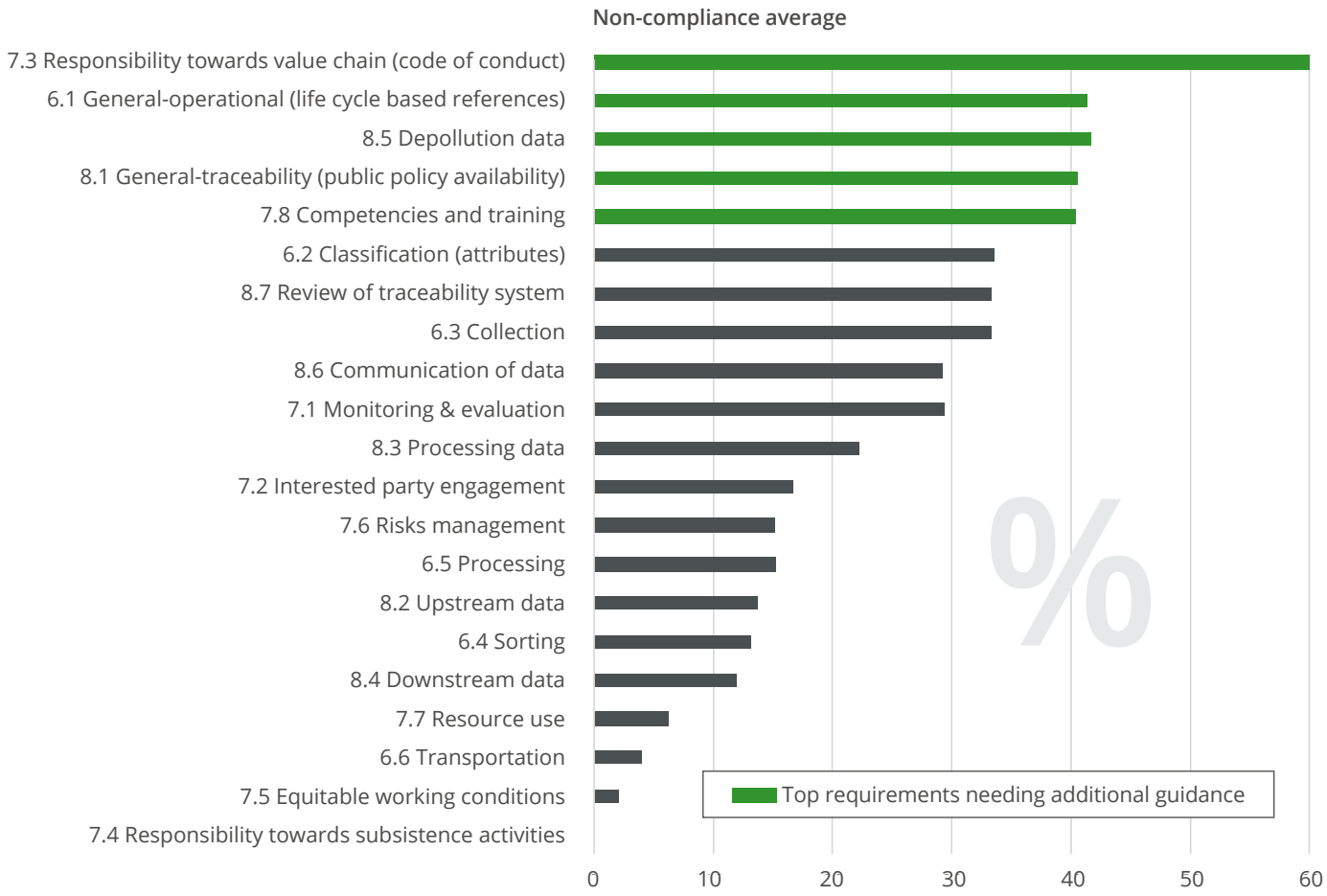
ISO 59014 is a crucial framework for recycling, promoting environmental and social sustainability and traceability. It supports responsible practices throughout the value chain and is particularly beneficial for individuals involved in subsistence activities. Four pilot projects have demonstrated that implementing ISO 59014 leads to operational improvements, increased recognition of recyclers' contributions to the circular economy, enhanced traceability, and stronger compliance with ESG criteria. It proves particularly beneficial for organizations when engaging individuals involved in subsistence activities. Upscaling the implementation of ISO 59014 is essential for achieving environmental and social benefits, contributing to resource efficiency and improving the well-being of all actors in the recycling value chain.



Both E[co]work and CICLO demonstrate commendable commitment, with E[co]work achieving a high level of compliance and CICLO showing promising progress supported by motivated leadership and personnel. Motivation is essential for the successful implementation of ISO standards, as it directly affects engagement, consistency, and long-term commitment across all levels of an organization. Motivation helps maintain energy and focus throughout the journey towards continuous improvement, fostering a culture of accountability and teamwork, which may involve changing standard behaviours in local cultures.

Deviations or Non-Compliances (NC) identified

Overall, the areas that showed a higher number of deviations (or gaps) during the assessment are illustrated in the following figure which would benefit from further guidance as outlined in the recommendations section.



Challenges

Organizations expressed facing several challenges for implementing the ISO 59014 standard, including:

a. *Market and regulatory constraints.* Despite the positive environmental impact of secondary materials (lower CO_2 emissions compared to natural resources) and their reduced prices compared to primary materials (based on an average taken from the organizations' price lists), the market for recycled materials remains small. The lack of policies or legal frameworks supporting the uptake of these materials are factors limiting the increased use of secondary materials. Furthermore, small markets often experience inconsistent supply and quality of recyclable materials which hinder efficient processing and profitability.

b. *Interconnectivity and efficiency issues of complementing standards (implemented at the same time).* For larger organizations with existing sustainability standards, interconnectivity and efficiency issues are particularly relevant, as the decision on which standards to implement depends on the target audience, the benefits, and the resources available.

c. *Limited human resources (e.g. competencies and skills).* Skills gaps and workforce development are also significant challenges, as upscaling often requires staff with specialized skills in areas like process optimization, environmental management, or recycling operations.

d. *Limited financial resources.* Implementing a standard involves financial costs, which can be challenging for smaller organizations to manage.

e. *Data management infrastructures.* The implementation of a traceability system presents technical challenges, as it requires investment in equipment and workforce development. The system must integrate data from every stage of resource processing and internal operations, necessitating a shift towards a data-driven organizational mindset.

Feasibility and certification potential

The interviewed CEOs of the organizations that underwent the feasibility assessment, expressed that the identified deviations could be resolved in in one to two years. Based on this, achieving ISO 59014 certification is considered feasible in the mid-term (2-3 years).

Benefits

The benefits drawn for the organizations that underwent the feasibility assessment fall into two categories: improved internal aspects and the positioning of the organizations in relation to their external stakeholders.

Improved internal aspects:

- *Better decision-making and strategic planning.* Enables more informed, strategic decisions through structured, standardized approaches.
- *Systematic analysis and continuous improvement.* Identifies areas for improvement and facilitates process evaluation and adoption of new technologies.
- *Enhanced product quality and value creation.* Expands product quality attributes and fosters better understanding of value creation and improved environmental and social impacts.
- *Enhanced operational efficiency.* Improves collection, dismantling, and preparation for reuse, increasing efficiency in recovering secondary materials.
- *Improved regulatory compliance and environmental risk management.* Enhances compliance with regulations and mitigates environmental risks.
- *Greater transparency and traceability.* Enhances transparency in material flows, supports verification of claimed data, and enables regular monitoring of quality parameters and processing adjustments.
- *Improved stakeholder communication and reporting.* Enhances communication of environmental performance indicators and strengthens community engagement.
- *Improved infrastructure for data management.* This also enhances needed competencies.
- *More robust training framework.* Supports systematic identification of skill gaps and regular assessment of training outcomes.

Improved positioning in relation to external stakeholders:

- *Increased visibility and reinforced credibility by public authorities, customers and financial organizations.* Enhances the reputation of the organization and customer trust in secondary materials' sustainability and potentially expands access to financial resources.
- *Reduced client audits.* Serves as proof of first-class business practices, potentially reducing the need for client audits.
- *Expanded availability of traced secondary materials.* Increases availability of sustainable and traceable secondary materials.
- *Demonstrated feasibility in small organizations and less industrialized countries.* Sustained compliance levels and motivations to resolve deviations.

SWOT and recommendations for future implementation

Overview of strengths, weaknesses, opportunities, and threats (SWOT).
The SWOT diagram developed supports the understanding of future trends in the implementation and upscaling of ISO 59014 and its potential positioning. The figure below summarizes the main strengths, weaknesses, opportunities, and threats for upscaling the ISO 59014 standard, based on input from CEOs, experts, and feasibility assessments. Strengths and weaknesses are within the control of implementers, who should leverage strengths and address weaknesses. Opportunities and threats arise from external factors, so organizations are advised to monitor these conditions closely for timely responses.

Recommendations for improved implementation of ISO 59014 requirements
Based on the areas that showed the most significant gaps during the assessment, recommendations to support effective implementation of ISO 59014 have been developed and are outlined in the following bullet points:

- For codes of conduct (clause 7.3), organizations should follow the standard's clear guidance, share the code among value chain actors, and consult existing examples.
- Life cycle-based studies are essential for defining recovery pathways and achieving optimal environmental and social outcomes. Published Life Cycle Assessment (LCA) studies and Environmental Product Declaration (EPD) libraries can guide decision-making.
- Social impact research should start with stakeholder identification and partnership building to enhance alignment and compliance.
- For traceability and depollution data (clause 8), organizations should develop robust data management systems, provide targeted training, collaborate with experts, and integrate traceability into existing policies to ensure transparency and legal compliance.

Keywords:
Secondary materials, sustainable recycling, traceability, inclusive recycling, subsistence activities, informal sector, ISO standard, ISO 59014

1 Introduction

1.1 Background and aim

Despite growing sustainability efforts, the global economy remains largely linear – extracting materials, using them, and discarding waste – leading to resource depletion, pollution, and social inequalities.

Standardized approaches to sustainable secondary material recovery have become an urgent need, to ensure that materials re-entering the economy comply with best environmental and social practices while preventing negative impacts across value chains.

Supported by the Swiss funded Sustainable Recycling Industries (SRI) program, two ISO parenting committees (the ISO/TC 323 on Circular Economy and TC207/SC5 on Environmental Management / Life Cycle Assessment) joined efforts in 2021 and established the Joint Working Group 14 (JWG 14) to develop the ISO 59014 standard "Sustainability and traceability of the recovery of secondary materials – Principles, requirements and guidance" as part of the series of circular economy standards of ISO (see Figure 1) and complementing the set of environmental management / life cycle assessment standards (see Figure 2).

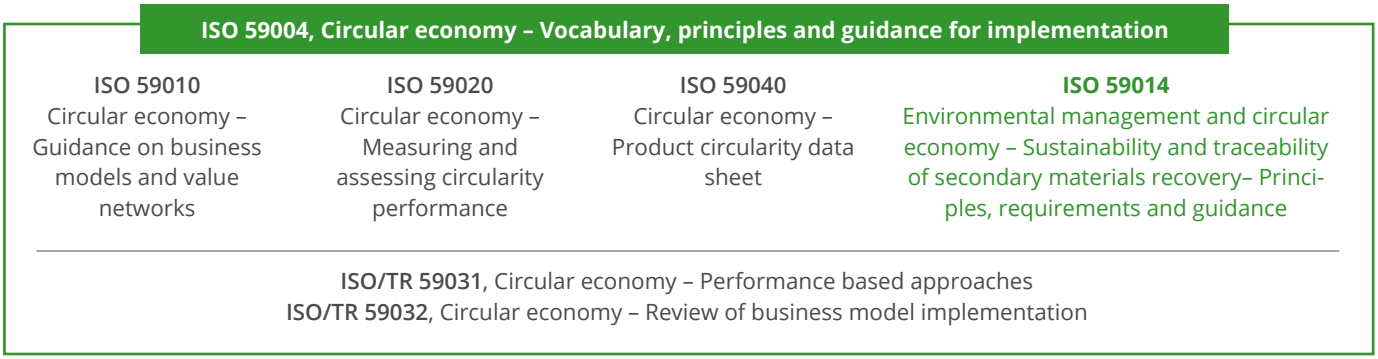


Figure 1: The ISO 59000 family of standards

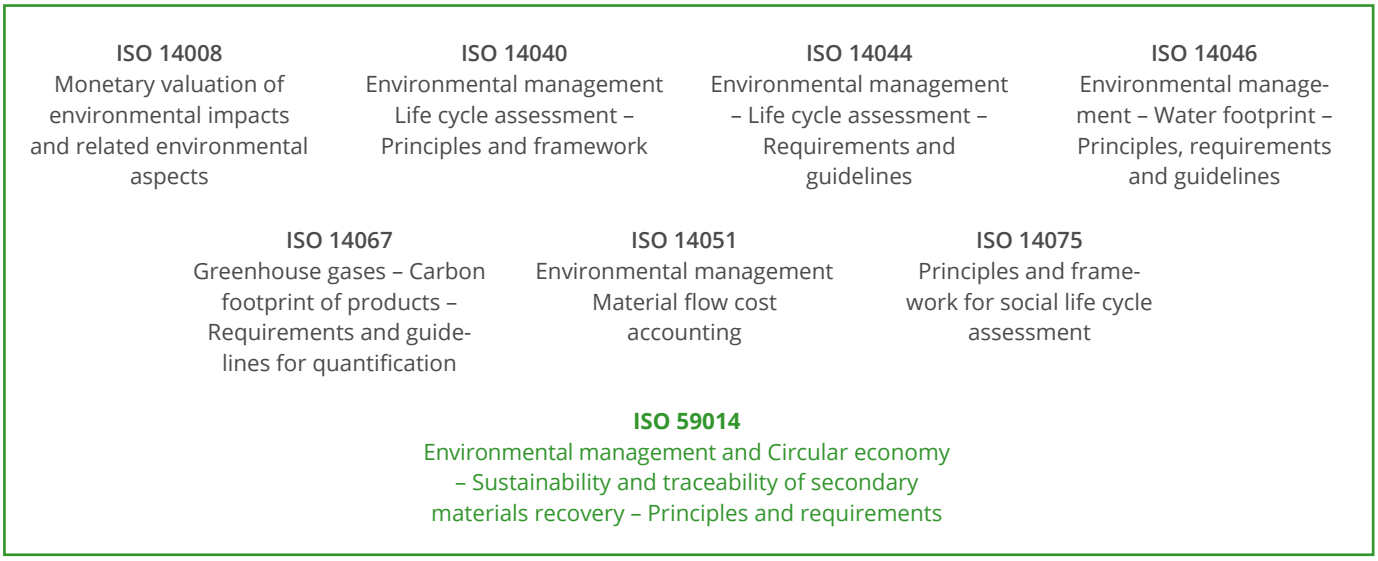


Figure 2: The ISO 14000 family of standards – A selection of standards

The ISO 59014 standard was published in October 2024 marking a significant milestone in the waste management field. For the first time in history, ISO has included aspects of subsistence activities in waste management within an international standard.

In line with its vision and commitment of supporting the deployment of sustainable and responsible practices when recovering resources, the Sustainable Recycling Industries (SRI) program conducted four pilots to test the application of the ISO 59014 standard.

Figure 3: *The ISO Technical Committee 323 on Circular Economy including the JWG14 which developed the ISO 59014*

The aim of this document is to present the results of the feasibility assessments conducted in four organizations (henceforth also named as pilots) representing different activities and processes along the materials' recovery value chain. The organizations are diverse with respect to their geographical location and type of recoverable resources (materials) processed. A subsequent aim of this document is to assess the certification potential of the four organizations participating in this exercise.

After detailing the key general aspects of the ISO 59014 standard (in 1.2) followed by its underlying principles and set of requirements set (in 1.3), the methodology used for conducting the feasibility assessment (in 1.4) and the certification pathway (in 1.5) are described. With this basis, feasibility assessment results including findings, certification potentials, challenges, recommendations and benefits per organization are presented in sections 2, 3, 4 and 5. Integrated results are discussed in 6, while 7 presents concluding remarks along with conclusions and recommendations for further expansion of ISO 59014.

1.2 Scope, processes, organizations and actors in ISO 59014

During the development of the standard and feasibility assessments, experts, users, and interested organizations raised various questions related to its scope, processes, types of organizations targeted, and relevant actors. The most common questions about the scope, processes, organizations and actors concerned are outlined below with the corresponding clarifications.

What does this document provide in general?

'...principles, requirements and guidance for organizations in fostering the sustainability and traceability of activities and processes for the recovery of secondary materials.'

What does this document provide for organizations that already engage or aim to engage with individuals involved in subsistence activities (SAs)?

'... requirements and guidance... with the aim of ensuring safe and healthy working conditions and the continual improvement of the well-being, livelihoods and professional practices of those individuals.'

For whom is this document intended?

'...for organizations seeking to recover secondary materials systematically and responsibly using life cycle and circular economy perspectives, regardless of their size, type and location.'

What is not in the scope of this standard?

- '...quality criteria for specific types of secondary materials recovered...
- Energy recovery and disposal...
- The preparation and processing of products or components for their reuse or reprocessing.'

What activities and processes are in the scope?

Collection, classification, sorting, and non-destructive and destructive processes are included. Their sequence depends on the recovery pathway designed and the attributes of the recoverable resources received. Figure 4 presents a generic sequence of activities and processes.

Resources non-recoverable as secondary materials are not in the scope of the standard and must be directed towards energy recovery or proper disposal.

What type of organizations and actors are concerned?

The types of organizations that conduct activities and processes for recovering secondary materials include, among others, collectors, dismantlers, reprocessors,

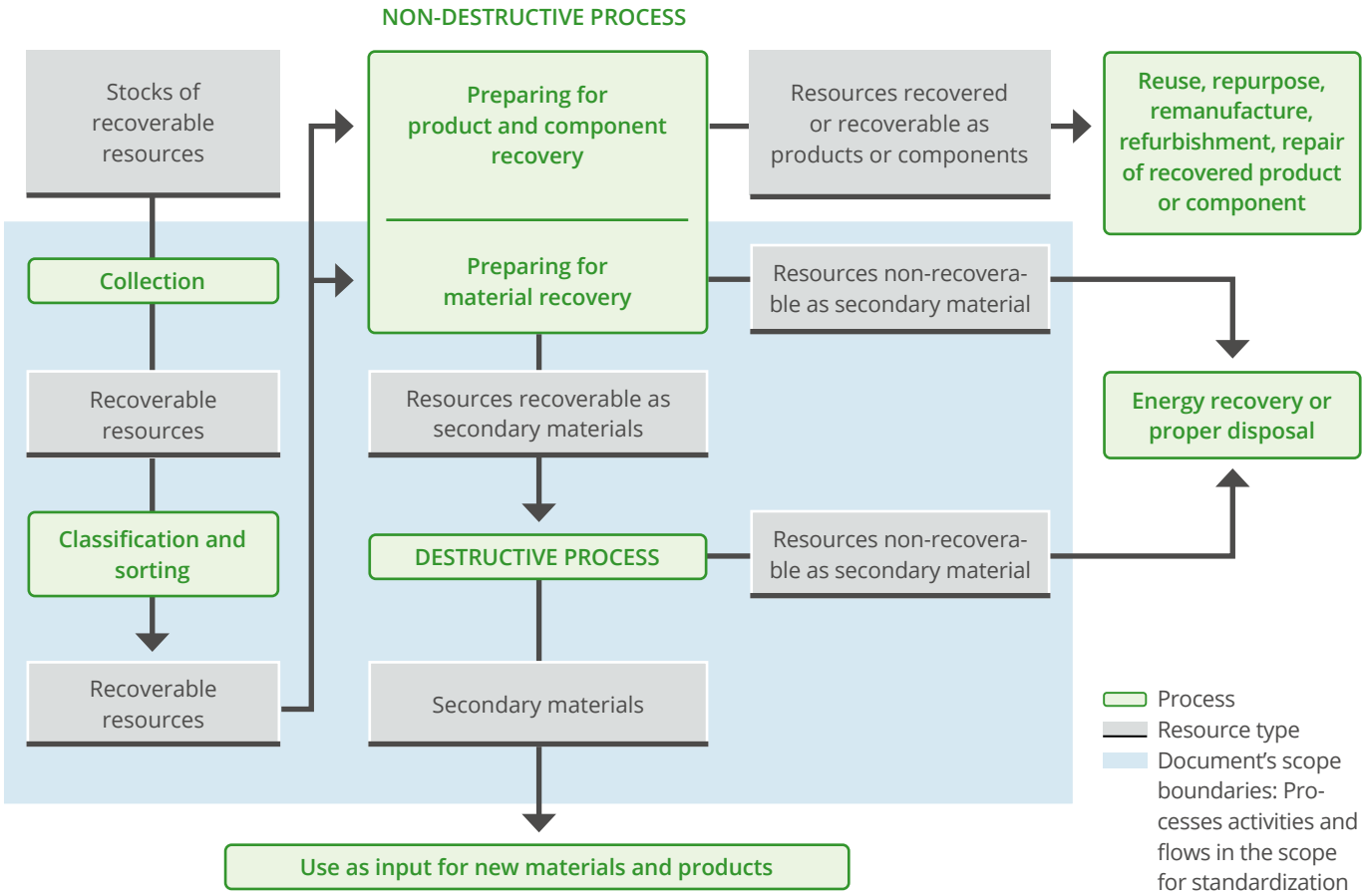


Figure 4: *Generic sequence of activities and processes for recovering secondary materials.*

remanufacturers and refiners. More examples of organizations are provided in the Annex A of ISO 59014.

The standard does not explicitly promote the engagement of individuals in subsistence activities as this generally depends on local contexts and national regulations. However, recognizing that organizations may wish to work with individuals engaged in SAs – or may already do so – in the recovery of secondary materials, the standard provides guidance to help improve their working conditions with supporting mechanisms detailed in Annex C.

1.3 Principles and requirements

Principles providing fundamental high-level basis for the requirements are presented in 1.3.1, the 75 requirements of the standard are explained in 1.3.2, and highlights of the standard including key definitions essential for interpreting the requirements are described in 1.3.3.

1.3.1 Principles

Organizations that aim to implement the ISO 59014 standard are expected to:

- Respect, consider and respond to the **interests and concerns of its interested parties** (Principle 1).
- Consider and take **responsibility for environmental and social aspects along the value chain** of their products, components and materials, in managing their relationships with the organizations concerned (Principle 2).
- Improve the **wellbeing and livelihoods of the individuals in subsistence activities**, respect their rights and support their inclusion in the value chain, if the organization is already engaging or aims to engage with them (Principle 3).
- Enable **safe, healthy and equitable working conditions** (Principle 4).
- **Prevent or mitigate adverse environmental impacts** to restore environmental damage resulting from their activities, processes and products (Principle 5).
- **Conserve resources** by minimizing resource use, especially virgin non-renewable resources, and extend product, component, and material life cycles. This is achieved by upgrading or at least maintaining their function, service life, and material properties based on the best environmental and social outcomes from a life cycle perspective (Principle 6).
- Consider the entire **life cycle of a resource**, from raw material extraction to end-of-life treatment to identify, assess and avoid the negative consequences of shifting environmental and social burdens between life cycle stages or processes (Principle 7).
- Enable the **circular flow of resources** by designing activities, processes, and systems for recovery of resources including products, components and materials after end of use and end of life, and maximize their service life and value (Principle 8).

1.3.2 Requirements

Seventy-five (75) requirements are outlined across three clauses of the ISO 59014 standard: 'clause 6 on operational requirements', 'clause 7 on organizational requirements' and 'clause 8 on traceability requirements'.

A brief description of the subclauses per clause (6, 7 and 8) is presented in the following paragraphs. For more details about the requirements refer to Appendix 1.

Clause 6 on operational requirements

Subclause 6.1 General
This subclause sets out operational requirements in relation to the conducted activities and processes for recovery secondary materials. It focuses on criteria set by the organization for secondary materials to be recovered.

Subclause 6.2 Classification and determination of recovery pathways
Here the requirements are defined for classifying recoverable resources based on specific attributes and determining appropriate recovery pathways accordingly. Examples of these attributes include product, component, and material type, hazard potential, process requirements, and repairability.

Subclause 6.3 Collection
In this subclause requirements are set out regarding collection system to support separate collection of recoverable resources and facilitate their return.

Subclause 6.4 Sorting
This subclause contains requirements for sorting recoverable resources based on identified attributes and available traceability data. It also specifies the requirements for sorting technologies and practices, along with the subsequent treatment steps.

Subclause 6.5 Material recovery processes
Requirements are outlined in this subclause for material recovery processes, covering handling procedures, infrastructure, process selection, depollution, and the routing of hazardous substances among others.

Subclause 6.6 Logistics
This subclause covers requirements for handling, transporting, storing and packaging of recoverable resources.

Clause 7 on organizational requirements

Subclause 7.1 Monitoring and evaluation
Here requirements are set out regarding the monitoring and evaluation plan and highlights aspects that need regular monitoring and review.

Subclause 7.2 Interested party engagement
This subclause focuses on how an organization engages, communicates, collaborates, and resolves conflicts with its stakeholders to ensure effective participation and cooperation in its operations.

Subclause 7.3 Responsibility towards the value chain
This subclause refers to requirements regarding the development, adherence and communication of a value chain code of conduct that considers ethical behaviour, traceability, responsible practices, reuse prioritization, labour standards, climate change mitigation, anti-corruption, fair business practices, review policies, procurement criteria, and capacity development.

Subclause 7.4 Responsibility towards individuals engaged in SAs
Here requirements are outlined regarding the responsibility towards individuals engaged in subsistence activities, especially regarding to continual improvement of their well-being, livelihoods and professional practices.

Subclause 7.5 Equitable working conditions
In this subclause there are requirements for equitable working conditions during activities and processes to recover secondary materials.

Clause 6 on operational requirements

Subclause 7.6 Risks
This subclause includes requirements regarding managing environmental and social risks that arise from the recovery of secondary materials, with special consideration to be given to health and safety risks of workers and individuals engaged in SAs.

Subclause 7.7 Resource use
Here requirements are set out regarding resource use of the company (energy, materials, water, etc.)

Subclause 7.8 Competence and training
This subclause covers the requirements for operational and managerial competencies for tasks under the organization's control, including the need for guidance, training, and awareness-raising.

Clause 8 on traceability requirements

Subclause 8.1 General
This subclause sets out general requirements about the traceability systems and corresponding policy.

Subclause 8.2 Collection of upstream data
This contains the requirements regarding minimum data collection of the upstream value chain.

Subclause 8.3 Collection of processing data
In this subclause requirements are described regarding minimum data collection of the processing activities.

Subclause 8.4 Collection of downstream data
This includes the requirements regarding minimum data collection of the downstream value chain.

Subclause 8.5 Collection of depollution data
This subclause defines the requirements regarding minimum data collection of depollution processes.

Subclause 8.6 Communication
This subclause outlines the requirements for communicating material traceability, ensuring data availability, and improving data collection both upstream and downstream.

Subclause 8.7 Continual improvement
Here requirements are covered to assess and continuously improve the effectiveness of the traceability system in place.

1.3.3 Highlights of the standard

The level of ambition and innovation of the ISO 59014 standard is highlighted in various aspects which represent unique value propositions, some of which are neither covered nor offered by other standards.

a **Individuals engaged in subsistence activities.**
These represent 80% of workers in waste management in least economically developed countries and emerging economies which are often ignored in official statistics and mainly seen as part of the informal sector conglomerate who at the same time operate under poorest working conditions and at times transgressing basic human rights (e.g. incurring in child labour).

However, acknowledging that organizations may want to involve individuals engaged in SAs or are eventually already involving them in the processes for secondary materials recovery, the ISO 59014 standard contributes to improve the engagement contexts and conditions through:

» specific requirements and guidance developed for those organizations.

» supporting mechanisms described in Annex C of this standard.

» tailored definitions of key terms such as 'subsistence activity' and 'child labour'

3.21 Subsistence activity (SA)

... activity that provides typically self-employed individuals with the minimum to subsist ...

3.1 Child labour

... work that deprives children of their childhood, their opportunity to attend school, their potential and their dignity, and that is mentally, physically, socially or morally dangerous and harmful to children ...

Note 1 to entry: Child labour interferes with their schooling by:

• depriving them of the opportunity to attend school;

• obliging them to leave school prematurely; or

• requiring them to attempt to combine school attendance with excessively long hours and heavy duties.

Note 2 to entry: In its most extreme forms, child labour involves children being enslaved, separated from their families, exposed to serious hazards (3.8) and illnesses and/or left to fend for themselves on the streets of large cities, often at a very early age.

Note 3 to entry: Children's participation in work that contributes to their development and the welfare of their families can be considered as positive if this provides them with skills and experience, helps to prepare them to be productive members of society during their adult life and does not affect their health and personal development or interfere with their schooling. These activities include helping their parents around the home, assisting in a family business or earning pocket money outside school hours and during school holidays.

Note 4 to entry: Derived from the International Labour Organization "What is child labour?" (ILO)

b **The use of 'recoverable resource' instead of 'waste' to change mindsets: a hierarchy and careful attention to contaminated fractions as key considerations.** While the official use of the term "waste" in statistics and regulations is recognized, its change to the term "recoverable resource" was intentional to support a shift in thinking and recognize that practically everything has value and resources can be recovered. This is a cornerstone of the circular economy approach and was adopted in the full series of ISO 59004 standards on Circular Economy, and subsequently in the ISO 59014 standard.

For optimal recovery of resources, a well-thought through pathway is essential which takes into consideration underlying hierarchy principles. In the context of this standard, this means that options such as reuse, repairing and refurbishing have been ruled out, and that the materials recycling focus is on recovery pathways that maintain the original material's physical and chemical integrity. Secondary materials recovered that do not achieve the same properties are considered as downgraded or in 'downcycling'.

It is also worth noting that a critical step arises when optimizing the secondary materials' recovery which is the need for careful attention to harmful fractions primarily due to potential negative impacts on health and the environment. Moreover, contaminated fractions can limit or even impede proper recycling and reduce the value of secondary materials to be recovered. The safe removal of harmful fractions is referred to as the 'depollution' step.

The high ambition of the ISO 59014 standard is reflected, among others, by:

- explicitly avoiding the term 'waste' along the standard and replacing it with 'recoverable resource'.
- providing guidance on defining recovery pathways through specific requirements and an example of a recovery pathway methodology (in the Annex B of the standard).
- introducing definitions – first time in ISO – of key terms such as 'recoverable resource', 'recovery pathway' and 'depollution'.

> ***3.16 Recoverable resource***
>
> ... resource that can be recovered and used again after it has already been processed or used ...
>
> Note 1 to entry: Recovery can be undertaken to recover, retain or add value.
>
> Note 2 to entry: A recoverable resource can provide no value and be considered waste.

> ***3.17 Recovery pathway***
>
> ... type and sequence of activities and processes applied to recover products, components and materials from recoverable resources ...

> ***3.5 Depollution***
>
> ... selective treatment during which certain substances, mixtures or components that are potentially harmful are safely removed ...
>
> Note 1 to entry: Examples of removed elements include pollutants and declared hazardous substances.
>
> Note 2 to entry: Depollution does not include the cleaning of food.

C **Life cycle and circular economy perspectives adopting not only environmental but also social considerations.**
A novelty in the ISO 59000 family of standards is its holistic view to achieve a

genuinely effective circular economy. It considers not only resource efficiency and environmental impacts but also the social consequences of different circular options. This is reflected in the definitions of 'circular economy' and 'life cycle perspective' which not only address environmental aspects, but also recognize the need to enhance the social contexts of those involved in circular economy activities and the society overall.

> ***3.11 Life cycle perspective; Life cycle thinking***
>
> … consideration of the environmental, social and circularity aspects relating to a product, component and material during their entire life cycle …
>
> *[SOURCE: ISO 14050:2020, modified – "social and circularity" added after "environmental", "component and material" added after "product".]*

> ***3.2 Circular economy***
>
> … economic system that uses a systemic approach to maintain a circular flow of resources, by recovering, retaining or adding to their value, while contributing to sustainable development …
>
> Note 1 to entry: Resources can be considered concerning both stocks and flows.
>
> Note 2 to entry: The inflow of virgin resources is kept as low as possible, and the circular flow of resources is kept as closed as possible to minimize waste, losses and releases from the economic system.
>
> *[SOURCE: ISO 59004:2024, 3.1.1]*

d **Early-stage decisions based on best social and environmental outcome. This follows a two-fold approach through:**

- Classification, sorting of resources and determination of the best recovery pathway which significantly support optimizing processes and minimizing negative social and environmental impacts
- Non-destructive processes have priority over destructive processes. This enhances the chances of recovering products and materials with the highest value possible

e **Enforcement of policy on upstream and downstream data availability**
Traceability data is the backbone for the increasing demand for high quality and traceable data such as in digital product passports. It not only enhances transparency but also supports the responsible implementation by providing insight into, for example, what materials are contained in the products (the recyclability potential increases).

1.4 Pilots' selection and assessment methodology

Following the selection of the organizations (or pilots) for conducting feasibility assessments according to ISO 59014 (see in 1.4.1), a stepwise approach was designed (in 1.4.2) to guide the feasibility assessment. A tailored methodology for data collection, evaluation, and result consolidation is outlined in section 1.4.3.

1.4.1 Selection of four pilots

The four organizations committed to undergo the feasibility assessment represent different activities and processes along the materials' recovery value chain:

two of them cover the production of recyclates for the building sector originating from demolition waste (CICLO and Spross). The other two organizations process electronic waste (E[co]work and Argo360). The latter operates jointly with IT Solutions and Fairphone in its value chain.

As shown in Figure 5, the organizations are diverse in terms of their geographical location, originating from Peru, India, the Netherlands/Ghana and Switzerland. A description of each company is included in its respective section of this document.

Figure 5: Companies and countries of origin undergoing the pilots according to the ISO 59014 standard.

Countries of companies piloting the ISO 59014 standard

Value chain

1.4.2 Assessment methodology

The feasibility assessment in accordance with the ISO 59014 standard generated the following results:

- **Levels of compliance** – This includes the identification of gaps (or deviations)
- **Feasibility** – This covers the potentials of certification ranging from low to high levels which base on the assessment of capacities and resources available for completing the gaps identified

In addition, feedback on potential benefits and challenges will be gathered from the feasibility assessment conducted to serve as input for decision-making for companies exploring the implementation of the ISO 59014 standard.

Online and in-person interviews conducted

The interviews provided a means to assess the compliance with the 75 requirements, which are expressed in the standard as mandatory, using the term 'shall'. These interviews were carried out by experts in the standard – including contributors to its development – using the interviewing and assessment tool (see in Appendix 2).

On average, about 7 to 8 interactive sessions were conducted per pilot, along with a one-day in-person visit to each organization's facility, where feasible. Evidence was collected from both internal company records and external sources, such as publicly available information posted on the company's website.

The progress and final results were communicated to each company along with an indication of the certification potentials of each case.

A comprehensive questionnaire with 155 questions in form of a checklist (see Appendix 2) was developed to gather feedback on the level of compliance with the 75 requirements of the ISO 59014 standard (in clauses 6, 7 and 8). The checklist follows the structure presented in Table 1, with clarifications in the legend for guidance. For each requirement, the assessment of compliance was determined by one or more questions.

Table 1: Structure of the questionnaire to assess compliance with the ISO 59014 standard – Includes an example on subclause 6.1 requirements.

1 Levels of feasibility

Information on the level of feasibility to comply with identified gaps was also collected for each requirement. For this purpose, four levels were defined in the checklist.

							If not fully compliant, how feasible do you see its full implementation?			
Subclause: 6.1 General				Question does not apply*	No**	Yes***	Not feasible (1)	Low feasible (1)	Medium feasible (1)	Highly feasible (1)
# of requirement	Score of deviation	Code of question	Question for interviewing							
1	1	1.1				1				
2	1	2.1				1				
3	1	3.1			0.5	0.5				1
4	1	4.1			1					1
5	1	5.1				1				
6	1	6.1			1					1

** Answers are indicated with one (1) if 'not applicable'*
*** Answers are indicated with one (1) if 'not fulfilled', (0.5) for 'partially fulfilled'*
****Answers are indicated with one (1) for 'fulfilled', (0.5) for 'partially fulfilled'*

2 Rating of requirements: score of deviation in case of non-compliance

Table 2 provides an overview of the number of requirements whose deviations are considered Major (M) and minor (m) depending on the level of severity of the adverse effects on the sustainability and traceability of secondary materials recovery in cases of non-compliance with the corresponding requirement. Major (M) deviations are rated '2' and minor (m) ones are rated '1'.

It is worth noting that deviations of non-mandatory requirements (these are requirements expressed in the ISO 59014 text as recommendation by using 'should') are classified as remarks with a score of '0'.

Appendix 2 lists all the questions raised, along with the score assigned to each one in case of non-compliance.

Table 2: Overview of the number of requirements whose deviation are considered Major (M) or minor (m).

Subclauses per clause	# of requirements whose deviation are considered Major (M)	# of requirements whose deviation are considered minor (m)	Total maximum point
Clause 6 – Operational requirements (total: 35) (maximum points: 48)			
6.1 General	0	6	6
6.2 Classification and recovery pathway	1	8	10
6.3 Collection	1	1	3
6.4 Sorting	2	4	8
6.5 Material recovery processes	5	3	13
6.6 Logistics	4	0	8
Clause 7 – Organizational requirements (total: 26) (maximum points: 38)			
7.1 Monitoring and Evaluation	2	2	6
7.2 Interested Party Engagement	1	1	3
7.3 Responsibility towards the value chain	1	3	5
7.4 Responsibility towards individual engaged in subsistence activities	1	0	2
7.5 Equitable working conditions	1	1	3
7.6 Risks	2	3	7
7.7 Resource use	1	0	2
7.8 Competencies and training	3	4	10
Clause 8 – Traceability requirements (total: 14) (maximum points: 17)			
8.1 General	2	2	6
8.2 Collection of upstream data	0	1	1
8.3 Collection of processing data	0	1	1
8.4 Collection of downstream data	0	1	1
8.5 Collection of depollution data	1	1	3
8.6 Communication	0	4	4
8.7 Continual improvement	0	1	1
Total of requirements	75		

3 Level of compliance

Per requirement. The percentage of compliance per requirement is calculated through the following formula:

$$\% \text{ of compliance per requirement} = \frac{\sum(\text{Yes}^{***})}{\sum(\text{Yes}^{***}) + \sum(\text{No}^{**})}$$

Whereas:
* Answers are indicated with one (1) if 'not applicable'
** Answers are indicated with one (1) if 'not fulfilled', (0.5) for 'partially fulfilled'
***Answers are indicated with one (1) for 'fulfilled', (0.5) for 'partially fulfilled'

If non-compliance is higher than 50%, it is considered a **minor** or **Major** non-compliance depending on the rating of this requirement (2 for **Major** and 1 for **minor**).

Per subclause: The level of compliance per subclause is then calculated by the following formula:

% of compliance per requirement =

$$\frac{\sum_i^n (\%\ \text{of compliance per requirement}_i * \text{rating of requirement}_i)}{\text{Maximum score possible}}$$

Whereas: i = 1,2, … n (n = total number of requirements per subclause)

and Maximum score possible =

$$\sum_i^n \text{rating of requirements} - \sum_i^n (\text{non applicability}_i * \text{ranking of requirements}_i)$$

Per clause: The same calculations are applied at the clause level and for overall compliance with n referring to the total number of requirements per clause, or to all requirements across the three clauses, respectively.

4 Consolidation and presentation of results

Following the application of the methodology previously defined, results for each of the four organizations participating in this exercise cover:

- Percentage (%) of compliance per clause
- Percentage (%) of non-compliance per clause
- Overall compliance
- # of **Major** non-compliance (NC), # of **minor** NC

Based on further analysis of the level of non-compliance and gaps identified, the following can also be inferred:

- Certification potentials

Additional insights expressed by the organizations cover:

- Challenges
- High, medium, low or no feasibility to cover the gaps identified
- Benefits of implementing the standard

Results for each organization are accompanied with the following disclaimer.

Disclaimer: The ISO 59014 standard's requirements are not intended to cover legal aspects in laws and regulations, and are by nature, ambitious, generally exceeding those of national laws. Therefore, the assessments conducted cannot be considered as equivalent to legal compliance assessments, hence, the deviations identified do not imply non-compliance with national legislations.

The feasibility assessment results including the findings and deviations represent a picture of the status of the ISO 59014 standard implementation in each organization at the time of conducting the assessment (between August 2024 and June 2025). The deviations identified for each organization may have been partially or fully resolved when reading this document. For an updated status of the implementation of the ISO 59014 standard, readers should contact the company of interest.

1.5 Certification pathway

Organizations aiming to enhance their credibility, competitiveness, and stakeholder confidence can pursue certification to demonstrate that their processes and activities are compliant with the requirements of ISO 59014. The following section outlines key considerations for selecting a certification body and describes the steps involved in obtaining a certificate of compliance.

1.5.1 Selection of an independent certification body

A wide range of well-established certification bodies operate globally, with extensive international experience and local offices in many regions, allowing them to certify organizations across most countries. When selecting a certification body, organizations should consider the following criteria:

- Ensure the body follows the relevant ISO Committee on Conformity Assessment (CASCO) standards (e.g., ISO 17065 for standards on processes).
- Choose an accredited certification body. While accreditation is not mandatory, it confirms the body's competence and credibility.

Some examples of certification bodies include SGS, Bureau Veritas, Lloyd Register, Germanischer Lloyd, and TUV. Examples of national bodies are ICONTEC (Colombia), INN (Chile), and INACAL (Peru). Once a reputable certification body is chosen, the steps below offer an overview of the process toward achieving certification.

1.5.2 Certification process for obtaining a certificate of compliance with the ISO 59014 standard

The following steps outline the typical process for any organization pursuing a certification.

Request for a proposal from a certification body and formalize an agreement
Once potential certification bodies that can assess whether the organization's processes comply with ISO 59014 have been identified, a request for a proposal must be submitted to the certification body. This should include a detailed description of the scope of the processes and activities to be certified, such as collection, dismantling, preparation for recycling, recycling, or any combination of these. The certification body will assess the scope and provide a proposal outlining pricing and timelines.

After reviewing and accepting the proposal, the organization signs a formal agreement to begin the certification process. The agreement outlines all activities to be carried out throughout the certification process.

Optional: Pre-assessment
Organizations can opt for a pre-assessment audit to evaluate readiness and identify areas needing improvement prior to the formal audit.

Stage 1 Audit – Documentation review
The auditor evaluates whether the organization's processes and activities are designed in accordance with the standard's requirements. This includes reviewing manuals, procedures, and records. Any areas of concern that may lead to non-compliances during the next stage are identified and documented.

Stage 2 Audit – Implementation review
A comprehensive on-site audit is conducted to assess whether the organization has effectively documented and implemented the standard. The auditor will observe operational practices, interview personnel and review relevant documents and records. Any areas of concern identified during stage 1 are revisited to verify resolution.

Addressing non-compliances
Once stage 2 is completed, non-compliances are reported as either major or minor. These must be resolved in a timely fashion before certification can proceed.

Certification decision and issuance
The certification body decides based on the auditor's findings from stage 1 and stage 2, as well as the resolution of all identified non-compliances. If the organization is found to be in full compliance, a certificate is issued.

Annual surveillance audit (Year 1 and 2)
Shorter audits are carried out annually to review selected parts of the standard and to verify continuous compliance.

Recertification audit (Year 3)
At the end of the three-year cycle, a full audit is conducted to verify continued compliance with the standard. This audit not only renews the certification but also provides an opportunity for continual improvement and adds further value to the organization.

2 Feasibility assessment of ISO 59014 implementation at E[co]work

The E[co]work feasibility assessment results including the findings and deviations represent a picture of the status of the ISO 59014 standard implementation for the period August 2024 to April 2025. Detailed information on the feasibility assessment conducted at E[co]work can be found in the report on 'Assessing the Practical Implementation of ISO 59014 for Secondary Materials Recovery – Pilot testing at E[co]work in India' (Wehrli & Valdivia, 2025).

2.1 Description of activities and processes

E[co]work is an Indian Waste Electrical and Electronic Equipment (WEEE) recycling company launched in 2023 and officially registered as Inclusive Recycling Foundation (IRF) with a not-for-profit status. Its vision is to establish socially and environmentally responsible WEEE practices. The organization aims to achieve this by bridging the gap between the formal WEEE management industry, the informal sector and formal entities such as regulators, producers, and off-takers.

E[co]work is specialized in WEEE management and more specifically, it:

1. Purchases and collects WEEE for its dismantling activities through self-organized transport or direct delivery by clients. Sourcing methods include auctions, bidding processes, B2B procurement, informal aggregators, and milk-route collection.

2. Classifies and sorts the collected recoverable resources based on factors like material type, potential for reuse, required dismantling efforts, and acceptance criteria upon arrival at the facility. Devices with high reuse potential are sold for preparation for reuse.

3. Dismantles non-reusable devices into material or component fractions. Multiple dismantling steps are necessary to achieve the required granularity. After dismantling, classification and sorting are based on factors like material or component type, grade, purity levels, and presence of hazardous substances. E[co]work mostly applies non-destructive processes. However, destructive processes such as plastic shredding and pelletizing may become part of the organization's operations in the future.

4. Sends the products, components and fractions for preparation for reuse, material recovery, hazardous waste treatment, and disposal.

5. Offers technical training and awareness programs on sustainable practices to anybody working in its facilities (including employees, that were formerly micro-entrepreneurs (MEs)) as well as to external stakeholders (students, local authorities, MEs etc.), thus, contributing to close the skills gap and create a workforce supporting circular economy. Hands-on training covers safe dismantling of electronic waste, proper sorting, material recovery, and adherence to safety and health regulations but also topics like reporting and regulations.

6. Facilitates material tracking, by documenting incoming materials and types, treatments applied and corresponding output fractions and where they are sent to.

7. Collaborates with organizations on data collection to enhance traceability of the recoverable resources, the knowledge about material composition and reporting

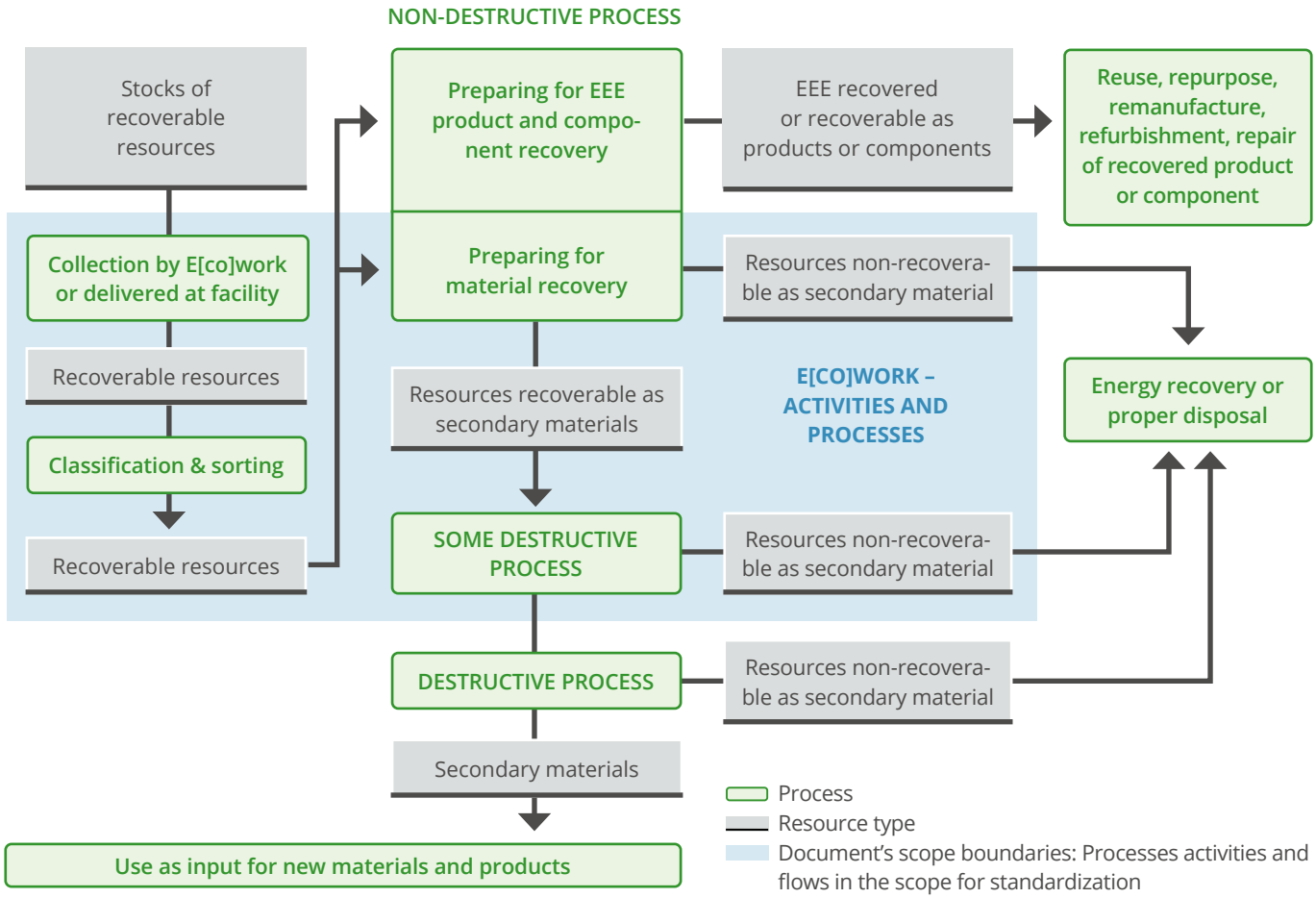
8. Provides services to producers obligated by law to responsibly recycle their end-of-life products, thus, ensuring that this is done under safe working conditions.

Figure 6: Left: Neodymium magnets from dismantled hard disks at E[co]work. Right: Components from a dismantled hard disk at E[co]work. © E[co]work

E[co]work collaborates with upstream stakeholders, such as bulk consumers, MEs, and organizations that generate, aggregate, and channel WEEE. Downstream stakeholders include MEs specializing in direct reuse, organizations for further treatment of the recoverable resources and treatment, and storage and disposal (TSDF) facilities for safe disposal of hazardous and non-valuable fractions.

Figure 7 shows the activities and processes within the scope of feasibility assessment at E[co]work.

Figure 7: Processes and activities within the scope of the feasibility assessment at E[co]work.



2.2 Resources recovery and circular economy in the context of India

Over 4 billion kg of e-waste are produced annually in India, making it one of the largest generators in the world. This growing issue is exacerbated by the nation's quick technical development and rising electronic device usage. Over 90% of e-waste is processed in the informal sector, but it is frequently recycled through both the formal and informal sector actors [1].

With informal workers like scrap traders and waste pickers using rudimentary recycling techniques to extract precious raw materials like gold, copper and aluminium, electronic waste has grown to be a substantial source of economic activity in India, especially for the impoverished. The informal sector provides livelihoods, but it also engages in risky activities that have a negative impact on the environment and public health, e.g. because of the handling of harmful chemicals. While certain informal business owners generate considerable profits, many workers supplying recoverable resources to them or being employed by them on a daily basis for dismantling activities have limited ability to influence working conditions, as they are reliant on daily wages from these informal business owners to meet basic survival needs.

Additionally, MEs sometimes rely on established and powerful larger informal business owners to access necessary resources, given their own lack of networks and investment capital. The intense competition within this market results in very low profit margins, leaving little opportunity or incentive to invest in safer, more sustainable recycling methods and proper disposal of non-valuable and hazardous materials.

The E-Waste (Management and Handling) Rules, 2011 [2] marked the beginning of e-waste regulation in India. Significant adjustments were made to these guidelines in 2016 and 2018, and in 2022 [3]. They were extended to include more than 130 product categories. Extended Producer Responsibility (EPR), which holds manufacturers accountable for the handling of their products after they reach the end of their useful lives, lies at the heart of the legislation. The E-Waste (Management) Amendment Rules, 2024 [4] were introduced by the Ministry of Environment, Forests, and Climate Change on March 8, 2024, and they went into force right away. Among the changes, it is noted the redefinition of "dismantler" now includes any entity or individual engaged in the dismantling of WEEE, even without formal authorization. To give producers and recyclers more flexibility in fulfilling their regulatory requirements, the amendment also permits the central government to extend the deadlines. Additionally, a new provision allows the creation of many online platforms, extending EPR certificate trading opportunities beyond the platforms hosted by the government [4].

2.3 Operational requirements: Main findings

The feasibility assessment of the ISO 59014 at E[co]work revealed the following operational aspects worth highlighting:

- **E[co]work has a clear commitment to environmental and social objectives,** which are embedded in the company's vision. While these principles are not yet formally integrated into the material recovery criteria, this provides a solid foundation for future alignment and systematic incorporation into operational guidelines.
- **E[co]work actively encourages the separate collection of materials,** despite limited influence over the design of the broader collection system. Sorted

materials are directed to registered recovery or authorized disposal facilities, demonstrating responsible downstream management.

- **A structured and documented sorting system is in place,** based on both HS-Code and EEE-Code. This provides a sound methodological basis for material classification. The development of clearer documentation on sorting decision-making processes would further strengthen the traceability and consistency of recovery practices.
- **The facility meets current storage and operational requirements,** including dedicated areas for different material types and hazardous components. There is potential to enhance environmental risk management through improved storage practices (e.g., containerization), material handling, and clearer labelling, which would support operational efficiency and safety.
- **Hazardous waste is managed in compliance with regulatory standards,** with appropriate routing to a certified Treatment, Storage, and Disposal Facility (TSDF). Transport is carried out using box trucks. Additional measures to safeguard fragile items during handling would further support worker safety.

Figure 8: *Left: Fire safety installation at the facility. Right: Dismantling workplace at the facility. © E[co]work*

In general, the well-designed facility of E[co]work along with its operational processes, adheres to high standards. There was no **Major** deviation. In line with continuous improvement, the following **minor** deviations and corresponding areas for improvement have been identified:

- No formal studies have been conducted nor referred to for identifying the best environmental and social outcomes of the materials to be recovered. Hence, environmental outcomes and social outcomes do not form part of the primary criteria for the recovery of materials. They are not yet consistently implemented nor documented.
- The rational for the choice when identifying or defining criteria for the recovery of materials has not been documented.
- The rationale for the choice of the alternative methodology to determine the recovery pathway has not been documented and no studies have been used nor a life cycle assessment conducted.
- There is no documentation on how decisions are made regarding the recovery pathway.
- Decisions regarding the choice of processes are not supported by publicly available studies based on life cycle thinking. Neither are the decisions supported by conducting an LCA in accordance with ISO 14040 and ISO 14044.

Specific recommendations for further improving the operational aspects at E[co]work include:

- Define yearly quantitative targets, for example, the increase of materials recovered with respect to the previous year.
- Apply a methodology to determine the recovery pathway.
- Ensure that all decisions made are systematically documented.
- Ensure and monitor safe execution of depollution processes to prevent any environmental release. This can be supported by implementing clear depollution procedures.
- Strengthen the provision of targeted training and awareness sessions to ensure all dismantlers have the necessary knowledge and skills for safe and effective depollution.
- Improve material storage to prevent spilling between heaps, e.g. use boxes to store the materials which would also facilitate material handling. Alternatively, separating fences could be built along the wall to prevent material spill over and allow higher heaps of materials.

2.4 Organizational requirements: Main findings

The organizational elements at E[co]work have been set up with due care and are implemented by a committed team based on continual improvement. Some key organizational features are:

- **Monitoring and risk management:** E[co]work has established monitoring mechanisms but recognizes the need for a more structured and systematic approach, especially in risk management and competency development.
- **Collaborative framework:** The organization operates within a collaborative network, engaging with stakeholders across informal and formal recycling sectors, including Producer Responsibility Organizations (PROs), MEs and authorities.
- **Engagement with informal sector and social commitment:** E[co]work proactively involves the informal sector, promotes social engagement, conducts research, and enhances worker safety through awareness campaigns and training programs.
- **Value chain code of conduct:** While not currently in place, E[co]work identifies the integration of a value chain code of conduct as a future opportunity, acknowledging current challenges but remaining open to stakeholder collaboration, where possible.
- **Commitment to equitable working conditions:** The organization provides safe workspaces, tools, administrative support, training, and employment opportunities, especially targeting the informal sector and interested parties.
- **Facility infrastructure:** The facility is well-equipped with essential amenities including sanitary facilities, proper ventilation, and air-conditioned offices.
- **Human rights policy:** E[co]work adheres to a Human Rights Policy prohibiting child and forced labor, harassment, and discrimination.
- **Safety measures and protocols:** There are opportunities to improve safety through consistent use of Personal Protective Equipment (PPE) and more formalized depollution procedures.
- **Training and documentation:** E[co]work conducts audits and internal training focused on specific risks and is working toward more structured documentation for risk management, communication, and training plans.

» **Continuous improvement commitment:** The organization shows strong commitment to ongoing social and environmental impact improvements, within the constraints of available resources and framework conditions.

» **Continuous learning and skill development:** E[co]work supports continuous learning and regularly provides training to strengthen staff competencies, clarify roles, and improve understanding of the reporting system.

Figure 9: A dismantling activity with external stakeholders. © E[co]work

The special attention and efforts made to help level the playing field for informal workers in India are acknowledged, as they have led to important achievements. However, in view of meeting the ISO 59014 requirements, the following aspect has been identified as **Major** deviation:

» There is no value chain code of conduct in place. Development and adherence to a value chain code of conduct, that considers the aspects mentioned in the standard is critical.

One **minor** deviation and corresponding area for improvement include:

» The organization does not have a communication plan to address the interests and concerns of interested parties.

Specific recommendations for further improvements the organizational aspects at E[co]work include:

» It is recommended to finalize and implement individual performance indicators to enable regular and direct monitoring of staff competence. This will support more targeted capacity-building and performance management.

» To ensure all relevant personnel are informed, including dismantlers, it is advisable to expand the communication of monitoring results beyond the office team.

» It is recommended to establish a formal grievance mechanism and define preventive measures to address potential conflicts with interested parties.

» It is recommended to develop a policy outlining the procedures and measures to be taken if a worker is pregnant or has recently given birth, including clear steps for identification of their condition, their reassignment, or their leave, in compliance with applicable laws and international standards.

» Enforce personal protective equipment (PPE) and depollution protocols to ensure consistent safety practice through regular monitoring, training, and accountability measures.

- Establish a systematic approach to identify and implement opportunities to minimize resource use across operations.
- Where applicable, evaluate the effectiveness of the actions to ensure that individuals are competent.

2.5 Traceability requirements: Main findings

E[co]work has a traceability system that collects data in particular for the upstream and processing stages. The organization supports sharing knowledge with partners and stakeholders, as long as it does not pose a conflict of interest or compromise business confidentiality. E[co]work is open to data collection and provide traceability data upon request. Regular reviews are conducted to monitor efforts for enhancing its traceability system and operational effectiveness by optimizing procedures, processes, and data collection. Some key traceability features include:

- **Traceability system:** E[co]work has implemented a traceability system and collects detailed data across upstream, processing, and downstream activities to monitor material flows. The organization is committed to strengthening its traceability policy and addressing existing data gaps.
- **Upstream data collection:** Detailed upstream information is recorded, including invoices, supplier details, material descriptions, and costs. While the data is comprehensive, it is currently dispersed across multiple documents, highlighting an opportunity for improved consolidation and accessibility.
- **Processing activity monitoring:** Key operational data – such as worker information, hours worked, dismantling rounds, reference numbers, total weights, and material break-downs – is systematically tracked. HS-Codes are applied to outgoing materials, though documentation could be enhanced by clarifying instances of missing data.
- **Downstream data management:** Downstream records include invoices, buyer details, material descriptions, costs, and HS-Codes. Additional information on recoverable resources, recovery categorization, and output distribution would further improve traceability.
- **Depollution process:** E[co]work conducts depollution and documents hazardous substances sent to a TSDF facility. The process could be further strengthened through a more systematic approach and expanded documentation.
- **Continuous improvement and collaboration:** E[co]work actively explores opportunities to enhance traceability, including engaging with traceability models such as Minimise[1], and remains committed to knowledge sharing and operational improvement.

In general, the organization complies to a large extent with the traceability requirements and there is no **Major** deviation. Nonetheless, there are gaps especially in the area of data collection of the depollution processes and in the area of communication. Two minor deviations include:

- Although, measures are taken to engage and collaborate with organizations involved in the collection, processing, and delivery of materials, components, or products, the engagement is still missing the activity of data gathering aspects.
- No justification is available in written for missing documentation or data.

1) https://www.minimise.today/

Specific recommendations for further improving the traceability aspects at E[co] work include:

- Develop a traceability policy.
- Provide a justification where traceability data cannot be accessed.
- Record the origin of the consignment (this might not be the same as the registered address of the supplier).
- Calculate the percentage of the total amount of inputs routed towards different recovery and final treatment pathways.
- Calculate the percentage of the total quantity of outputs routed towards different clients and final treatment pathways.
- Collect and share information about depollution when receiving from upstream or delivering them downstream. Label incoming materials that may contain hazardous substances and collect information about conducted depollution, where relevant. Document the type of hazardous substances and corresponding weight transferred to TSDF.
- Ensure that traceability system requirements are clearly communicated to all relevant interested parties.

2.6 Overall compliance, challenges and recommendations

Overall compliance

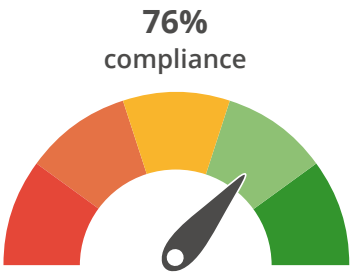
The overall level of compliance is high and was assessed at 76%. The three areas covered by the standard have a similar compliance performance ranging from moderate to high levels.

One **Major** deviation results from the absence of a code of conduct.

The **minor** deviations are primarily related to documentation and data, depollution as well as the need for better references to well-founded life-cycle based studies to support decision-making.

Table 3: Summary of the feasibility assessment results of compliance with the ISO 59014 standard at E[co]work.

Consolidated results	% of non-compliance per clause	% of compliance per clause	# of Major NC	# of minor NC
Clause 6: Operational requirements	21%	79%	0	5
Clause 7: Organizational requirements	22%	78%	1	1
Clause 8: Traceability requirements	36%	64%	0	2
Total	**24%**	**76%**	**1**	**8**



Challenges

The following threats have been identified in E[co]work activities which can hinder progress towards compliance with ISO 59014.

- **Recruitment of skilled candidates is challenging.** The organization actively invests in continuous learning and skill development of its employees to ensure they possess the required competencies.
- **Habits deeply rooted in informal workers** make it difficult to change towards safer habits. The interest of the MEs is primarily linked to financial profit,

therefore any activity beyond this is considered a second priority. This poses challenges to stakeholder engagement, enhancement in traceability and implementation of a value chain code of conduct.

- **E[co]works follows a private business model setting** and must cover its financial costs to continue operating, like any private business. As such, it has limited financial resources to engage in activities that would not directly generate additional incomes.

Fierce market competition and an uneven playing field create unfavourable conditions for safe and sound management, which tends to be more time-intensive and costly. While complying with the ambitious requirements of ISO is considered worthwhile, achieving this without external financial support remains challenging.

Recommendations

For resolving the remaining deviations, priority should be given to the following main recommendations:

- **Establish a value chain code of conduct:** Develop and integrate a value chain code of conduct into contracts where feasible. Communicate it externally and provide internal training to ensure understanding and adherence among stakeholders.
- **Enhance recovery methodology and documentation:** Develop a clear methodology for decision-making on recovery pathways supported by published life-cycle studies (e.g., ISO 14040/14044) and systematically document all related decisions to ensure environmental and social soundness.
- **Strengthen depollution and safety protocols:** Ensure and monitor safe depollution processes with clear procedures to prevent environmental emissions. Enforce PPE use and depollution protocols through regular training, monitoring, and accountability. Label hazardous materials and document hazardous substances sent to TSDFs.
- **Improve training, competency monitoring, and worker protection:** Provide targeted training and supervision for all workers. Finalize and implement individual performance indicators for ongoing competence monitoring. Establish clear policies for protecting pregnant and postpartum workers, aligned with national laws and standards.
- **Optimize material handling and storage:** Improve material storage practices to prevent spillage and enhance handling (e.g., using boxes or separation fences), supporting operational efficiency and environmental safety.
- **Develop and implement traceability systems:** Establish a traceability policy aligned with recognized standards (e.g., ISO 22095 on chain of custody), including recording consignment origins, explaining missing data, and regularly calculating material routing percentages. Actively engage stakeholders to ensure consistent and accurate data collection.

2.7 Certification potential and benefits

Overall compliance

Following an assessment of the deviations identified, E[co]work estimates a high feasibility of resolving deviations in the mid-term both **Major** or **minor** that do not imply significant financial and human resources.

Several deviations have been already resolved in the period right after the feasibility assessment period (February and May 2025) and before the publication of this document. including:

- Optimization of storage area to avoid spillover (however, boxes or fencing are still missing)

- Advancement in the development of detailed SOPs for various processes, e.g. on how to handle incoming material, accounting processes
- Identification and elaboration of additional business monitoring and performance indicators
- Calculation of percentage routed towards reuse and material recovery
- Elaboration of role description and reporting structure
- Detailing description of material categorization and attributes

From the interview E[co]work highlights several positive aspects of implementing the ISO 59014 standard in its facility and value chain:

- Applying ISO 59014 enabled E[co]work to systematically identify improvement areas, particularly gaps in data collection and documentation.
- Enhanced traceability has the potential to provide benefits such as facilitating verification of impact claims, increasing credibility, and potentially enabling access to more materials and financial support for safe recycling.
- A distinctive feature of ISO 59014 is its emphasis on responsibility towards individuals engaged in subsistence activities, supporting E[co]work's efforts to bridge formal and informal sector gaps.
- Adoption of ISO 59014 improves operational efficiency through standardized processes and increases transparency in material flows.
- The standard also helps to mitigate environmental risks, especially related to hazardous substance management.
- Compliance with ISO 59014 can enhance E[co]work's credibility in the global market, support better decision-making, and drive continuous improvement.
- This structured approach of applying ISO 59014 underlines E[co]work's commitment to sustainability, fostering greater trust among stakeholders, clients, regulatory bodies, and the broader community.

"ISO 59014 stands out because it connects the dots between global sustainability goals and local, often invisible, material flows. By recognizing the role of individuals in subsistence activities, it builds a foundation for circular systems that are both effective and equitable – not just technically sound, but socially grounded."

Quote from CEO, Deepali Sinha, E[co]work, May 2025

2.8 References

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3 Feasibility assessment of ISO 59014 implementation at CICLO

The CICLO feasibility assessment results including the findings and deviations represent a picture of the status of the ISO 59014 standard implementation for the period December 2024 to April 2025.

3.1 Description of activities and processes

CICLO is a Peruvian company pioneering sustainable construction by transforming construction and demolition waste (CDW) into eco-friendly building materials. The company was established in 2015 and began commercial operations in 2020 with a facility in Cieneguilla, Lima. This facility is recognized as the first treatment plant in Peru dedicated to the management and recycling of CDW and was visited as part of the feasibility assessment in December 2024. The company employs about 20 workers.

CICLO's core activities include:

- **Comprehensive CDW management:** CICLO offers end-to-end services for the collection, transportation, and recycling of CDW. Registered by the Peruvian Ministry of Environment (MINAM) as a Solid Waste Operating Company (EO-RS), CICLO ensures that waste is processed in compliance with environmental regulations.
- **Production of sustainable construction materials:** The company processes CDW into recycled aggregates, which are then used to manufacture various construction products, including eco-friendly paving stones ('adoquines' in Spanish), concrete blocks and pre-fabricated eco-materials. These products meet national technical standards and are offered at prices comparable to conventional materials.

Additionally, CICLO engages in projects that repurpose industrial waste into raw materials for their eco-products, aligning with zero-waste objectives and promoting circular economy practices.

CICLO operates a circular economy model that integrates waste management with sustainable product manufacturing. Its business model is built on the activities of waste collection and processing, and product manufacturing and sales. The first activity involves partnering with construction and real estate firms to collect CDW, which is then processed at their recycling facility. The collected materials feed into the second activity, where the processed materials are transformed into eco-friendly construction products. As third activity, these products are sold to construction companies through retail partners.

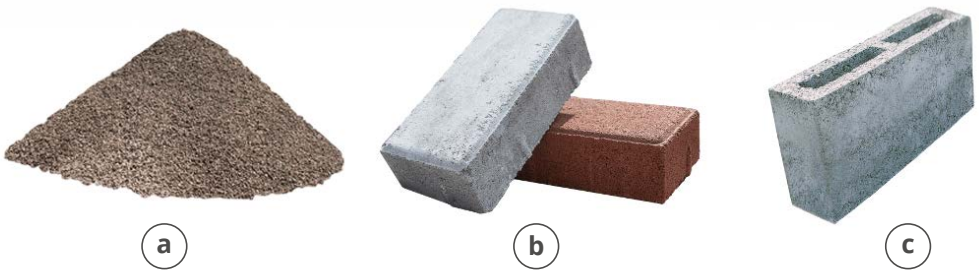

Figure 10: Types of products elaborated by CICLO with processed CDW: (a) recycled aggregates, (b) eco-paving stones and (c) bricks. Source: CICLO.

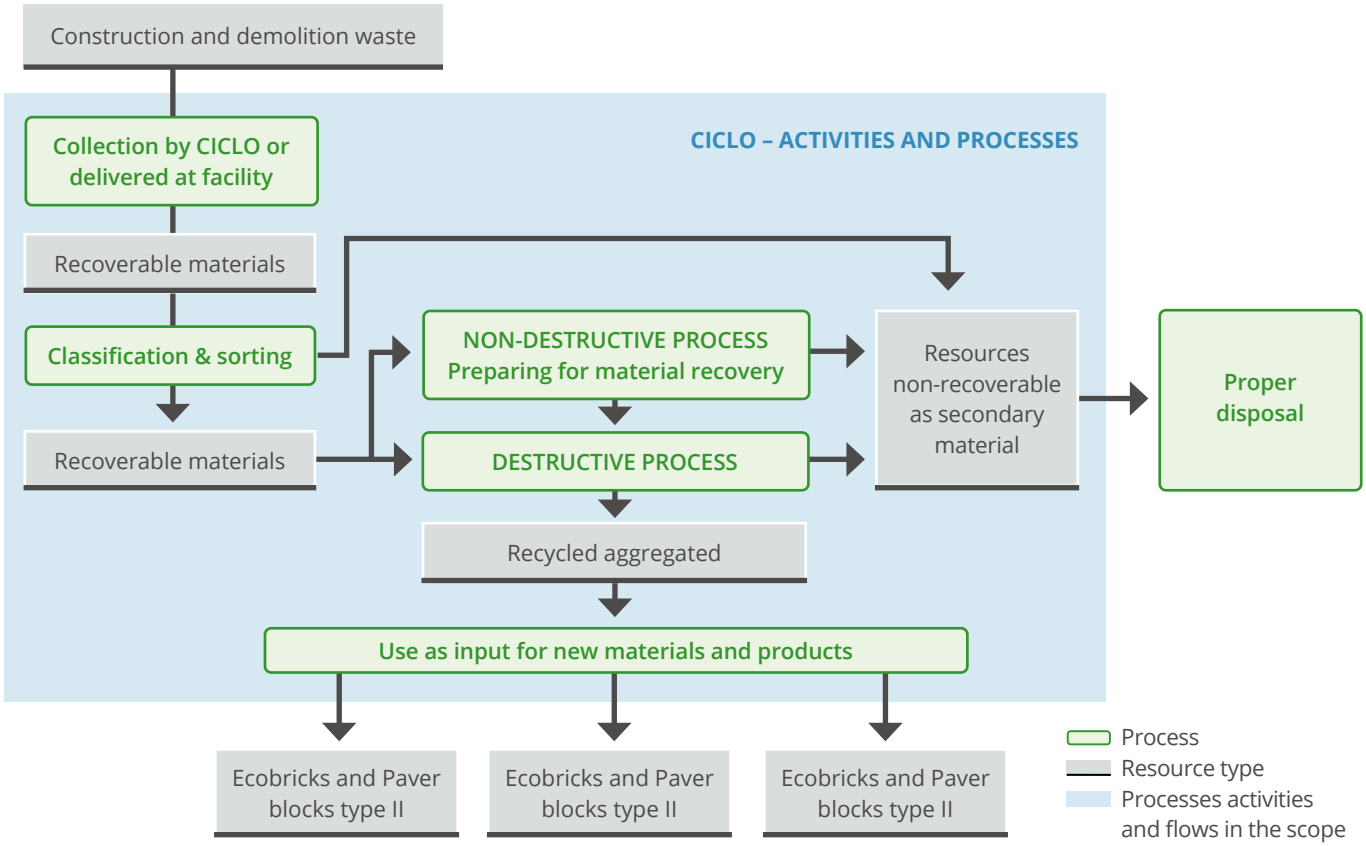

Figure 11: Processes and activities within the scope of the feasibility assessment at CICLO.

Regarding its internal management practices, CICLO has implemented an integrated management system based on ISO 9001:2015 (Quality management system) [1], ISO 14001:2015 (Environmental management system) [2], and ISO 45001: 2018 (Occupational health and safety management system) [3]. At the time of the feasibility assessment, the company was undergoing the process of certification. This reflects CICLO's commitment to enhancing its management practices and leveraging the commercial benefits associated with the proper implementation of international standards. This proactive stance toward continuous improvement and openness to adopting more advanced management practices was a clear asset throughout the feasibility assessment.

Currently, CICLO does not include individuals engaged in subsistence activities (SAs) as stakeholders, due to the fact that SAs do not actively participate in the business-to-business management of this type of waste in the Lima region.

Figure 12: Processing of the construction waste (left) and appearance of the final product. © CICLO

3.2 Resources recovery and circular economy in the context of Peru

Construction and demolition waste (CDW) constitutes a major global environmental challenge, making up an estimated 30% of all solid waste generated worldwide. Of this, approximately 35% ends up in landfills, placing substantial pressure on waste management systems and the environment [4].

In Peru, the construction sector has grown significantly over the past decade, particularly in metropolitan areas. CDW makes up between 30% and 40% of the country's solid waste, with recovery and recycling rates remaining limited [5]. In the Lima Metropolitan Area alone, a study of 265 construction sites found that most waste is not formally treated and often ends up in unauthorized or informal dump sites, contributing to serious environmental impacts [3]. An estimated amount of 20 tons of CDW are disposed of informally each day in Lima [5].

Construction companies, as primary generators, typically handle on-site storage but often disengage from the disposal process, leaving it to municipal or private operators. Weak enforcement mechanisms and insufficient infrastructure have led to a significant increase of informal waste transport and illegal dumping [6]. Subsistence workers, including small-scale transporters and waste pickers, are often involved in CDW disposal activities. Subsistence workers in all sectors including in CDW management comprise around 20% of men's total employment in metropolitan areas of Peru, typically working under precarious, unregulated conditions, with limited access to PPE or formal income opportunities [9].

In response to these challenges, the Peruvian government approved the Regulation for the Management and Handling of Solid Waste from Construction and Demolition (Supreme Decree No. 002-2022-VIVIENDA) in 2022. This regulation establishes clear guidelines for waste minimization, recovery, and proper disposal. It also promotes sustainable practices across the construction sector and supports the country's transition toward a circular economy [7]. Since its adoption, several municipalities have begun implementing infrastructure for CDW management, such as designated zones for sorting, crushing, and processing construction debris. The regulation also clarifies the roles and responsibilities of key actors, including generators, transporters, and local authorities, enhancing the coordination of CDW management [7]. However, despite these advancements, informal dumping and limited enforcement remain barriers to fully achieving the regulation's objectives [6].

Furthermore, Peru's broader commitment to circularity is further reflected in the Ministry of the Environment's National Circular Economy Roadmap to 2030, which outlines strategic objectives to incorporate sustainable design, technological innovation, and efficient resource use across key economic sectors, including construction. The circular economy roadmap, published by the Ministry of the Environment in 2025, aims to reduce environmental impacts, strengthen green business models, and foster a systemic transition to circular practices nationwide [8].

These developments aim to promote increased recycling of demolition waste and acceptance of recycled granulates in concrete and other building materials. CICLO operates within this context and is witnessing initial acceptance of building materials made from demolition waste.

3.3 Operational requirements: Main findings

Overall, the following areas have been notably developed:

- **A list of attributes describing the type and characteristics of the materials to be accepted for processing has been defined and is implemented.** The criteria on this list still need to be further expanded to include environmental and social parameters and ensure the consideration of a life cycle perspective.
- **Recovery criteria have been established, although with a primary focus on ensuring the quality of the source material for the manufacturing process.** Since CICLO uses the collected materials for manufacturing new products, establishing and applying recovery criteria is a central aspect of its operation process, as the characteristics of the source material determines the quality of the manufactured products. Hence, the recovery criteria adopted by CICLO seek primarily to ensure that the recovered materials meet the technical requirements of the inputs needed to obtain a good quality final product. Some of these criteria include parameters such as material composition and granulometry which are based on national technical standards for the construction and concrete manufacturing sectors (such as Normas técnicas peruanas, NTP number 400.037-2018 [10]).
- **The recovery pathway has been defined in detail, given the need to ensure economic profitability of the process.** The bulk CDW collected contains also materials such as steel. Although their volume is relatively low, they have a higher relative value and segregating and selling them is important for improving the profitability of the operation.

However, there is still room for improvement regarding the following aspects:

Major deviation:

- **CICLO's Involvement in the collection process:** CICLO does not encourage on-site separation of materials of different types. Even though it provides containers, there is a lack of emphasis on materials segregation.

Minor deviations:

- **Improving the scientific and technical basis of the processes based on life cycle thinking:** the list of attributes and the recovery pathway have been defined primarily based on the economic criteria (based on quality requirements for the production of new eco-bricks). The recovery pathway should also consider environmental and life cycle perspectives.
- **Recovery targets have not been established:** there is no measurement of the recovery rates pursued of the collected CDW waste.
- **The collection of resources is not assessed and traced individually:** there are no records for individual batches of collected CDW describing the degree of fulfilment of the attributes defined. As result, the treatment given to individual batches of resources received are not adjusted to their specific characteristics, and the same recovery pathway is applied evenly to all batches.
- **The list of attributes is not regularly updated:** this is needed to reflect changes in the material composition of the collected resources, and in the technical processes applied to them.
- **Inadequate management of non-recoverable materials (including hazardous fractions):** after sorting, small volumes of materials are unsuitable for recovery, mainly due to their content of hazardous fractions. A procedure for further processing these fractions has not been clearly defined yet, and these spare materials are being stored in the CICLO facilities.

3.4 Organizational requirements: Main findings

The following aspect reflects a high working standard:

» CICLO is a company clearly committed to creating a fair, safe and healthy work environment. Prior to the feasibility assessment, the company started with the implementation of an integrated management system based on the ISO standards 9001, 14001 and 45001, and is currently in the process of certification. In this context, several requirements from ISO 59014 had already been implemented. A company policy has been formulated and publicly disclosed to all stakeholders stating this commitment.

However, there is still room for improvement concerning the following aspects:

Major deviations:

» **Lack of a monitoring and evaluation plan:** Although certain parameters are already monitored in the context of the existing management system, specific measures are required to assess the implementation of the ISO 59014 requirements. The requirements that need specific monitoring cover issues relevant to the recovery of secondary materials such as the availability of measures and means, application of the code of conduct, concerns from interested parties, performance of workers, performance against targets and traceability data. An incomplete plan of monitoring results in deficient internal reporting to the workforce about the processes status and absence of appropriate records.

» **The training needs have not been adequately identified:** Training demands could occur both inside the company but also across the network of stakeholders. Capacity development needs are not yet completely assessed across the value chain, as an opportunity to apply the code of conduct.

Minor deviations:

» **Communication with interested parties does not promote feedback from the stakeholders:** This is essential for timely understanding their concerns and prevent eventual conflicts or identify opportunities for collaboration.

» **The code of conduct is not communicated throughout the value chain,** for example, by incorporating it as a commercial condition for procurement.

3.5 Traceability requirements: Main findings

At the moment of the feasibility assessment, CICLO has no traceability system in place for the processed materials.

3.6 Overall compliance, challenges and recommendations

Overall compliance

The overall level of compliance is medium and was assessed at 55%.

Table 4 presents the overall results of the feasibility assessment.

Challenges

Since the observations collected during this feasibility assessment are limited, a deeper analysis should be undertaken to assess more precisely the challenges related to the specific deviations identified.

Table 4: Summary of the feasibility assessment results of compliance with the ISO 59014 standard at CICLO.

Consolidated results	% of non-compliance per clause	% of compliance per clause	# of Major NC	# of minor NC
Clause 6: Operational requirements	44%	56%	1	11
Clause 7: Organizational requirements	47%	53%	3	5
Clause 8: Traceability requirements	100%	0%	-	-
Total	**45%**	**55%**	**4**	**16**

55%
compliance compliance*

** excluding the 'traceability' compliance results*

- **Technical complexity of implementing a traceability system:** Although beneficial in the long term, implementing traceability procedures across CICLO's processes will require significant investment in equipment and capacity building. Collecting data from the resource processing stages and from internal management processes involves setting up a strong data management culture within the organization, an endeavour that represents a substantial challenge and would require mid- to long-term commitment.
- **Limited resources in the team:** The expansion of the scope of the integrated management system by integrating the ISO 59014 standard should be accompanied by an increase in the capabilities of the team responsible for its management. This involves a significant strengthening of the team, allocation of required time, knowledge and skills, infrastructure and equipment.
- **Limited availability of essential services at the Cieneguilla facility:** During the visit in December 2024, some challenges were observed regarding the availability of essential services such as energy and water. In terms of energy, the facility is not yet connected to the electricity grid of Lima and, therefore, relies on self-generated power which bases on diesel-fuelled generators. Regarding water, the lack of access to a nearby distribution network limits the supply, requiring the company to purchase water from distant providers and manage its delivery accordingly.

Recommendations

The following measures are feasible in the mid-term and would support closing the major gaps identified:

- **Establish a traceability system.** A procedure to measure and assess both technical and operational parameters needs to be implemented.
- **Improve the scientific and technical basis of the process design based on life cycle thinking (list of attributes and recovery pathways).** Identify and assess studies on CDW recovery which apply a life cycle perspective covering environmental and social aspects.
- **Increase the involvement in the collection and transportation process.** Enhance the engagement with construction companies who generate CDW for encouraging them to improve their on-site sorting practices. This would result in an increased process efficiency and would also maximize the recovery of materials that would otherwise get downgraded in the collection and sorting stages.
- **Expand the engagement with suppliers.** This can be done by promoting the principles established in the code of conduct and providing training, as needed, to key actors whose performance is key to the overall operation.

3.7 Feasibility, certification potential and benefits

Considering that the overall level of compliance for Clauses 6 and 7 is moderate (55%) and because the traceability system (Clause 8) does not currently exist, the certification is not achievable at this point.

As described, CICLO has already implemented an integrated management system based on other ISO standards. Hence, expanding this system to include the ISO 59014 requirements is considered achievable and recommended in the mid-term.

Most of the minor deviations have been assessed by CICLO as having a high feasibility of resolution in the short- or mid-term. Interest in solving the major deviations is high and its feasibility will be fully assessed in the second half of 2025, after the certification process of the Integrated Management System. A limitation CICLO foresees for obtaining a certification according to the ISO 59014 standard is that auditing firms in the Peruvian market have not yet included this standard in their certification portfolio.

The main benefits for CICLO of implementing the ISO 59014 standard are:

- **Improved efficiency in the recovery of secondary materials from CDW.** Implementing a traceability system would enable regular monitoring of quality parameters, allowing for timely adjustments of its processing. Recovery targets could be set based on these measurements, encouraging the evaluation and adoption of new technological options. Moreover, more active engagement with clients would also contribute to this outcome. For instance, a mutual arrangement of improved on-site CDW treatment practices would result in an increased recovery of reusable materials and a more efficient post-collection treatment.
- **Opportunities for identifying processing improvements** enabled by some of the standard's recommendations. For instance, adopting a list of attributes proved to be useful for reassessing the processes' efficiency and evaluating new options.
- **Expanded quality attributes of CICLO's products.** Including a life cycle perspective in the CDW treatment processes and ultimately manufacturing of new products, will enable these to have improved results in terms of environmental and social impacts of their products.
- **Alignment with national standardization developments.** By implementing the ISO 59014 requirements, CICLO could align more smoothly and timely with emerging standardization efforts lead by official Peruvian institutions such as INACAL (National Institute for Quality) [11].

As a result of the high-feasibility and commitment for resolving the deviations in the short- to mid-term, the certification potential is considered high in the mid-term (1.5-2.5 years).

"Piloting the ISO 59014 in CICLO allowed us to gain efficiency in managing and recycling construction and demolition waste without leaving behind our key stakeholders like recycling associations. In particular we discovered and advanced in a new area which is traceability. CICLO aims to certify its processes according to ISO 59014 which will be fundamental for growing and achieving our desired sustainability impacts in Peru."

Quote from CEO, Roger Mori Pizzino, CICLO, May 2025

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4 Feasibility assessment of ISO 59014 implementation at Argo360

The Argo360 feasibility assessment results including the findings and deviations represent a picture of the status of the ISO 59014 standard implementation for the period September 2024 to April 2025.

4.1 Description of activities and processes

Argo360 is a company based in The Netherlands, located in the industrial park Sloterdijk which covers a surface of about 25 km2. It started its operations in 2009 and is a small company with 23 workers.

They provide IT asset disposition services, including secure data destruction and the resale or reuse of equipment, with a strong emphasis on environmental and social responsibility. Argo360 handles IT equipment in a way that minimizes environmental impacts, focusing on reuse, resale, and responsible recycling. It is also considered a social impact company by offering employment to people with barriers to enter the traditional labour market and by supporting its suppliers in complying with the high production standards and ethical values stated in its code of conduct.

Argo360 processed about 260 tonnes of IT items and components in 2024. Laptops, monitors, PCs and mobiles are the main items received making up 33%, 18%, 14% and 7%, correspondingly. Out of the 260 tonnes, 56% was recovered for reuse, 35% for material recycling and 7% for energy recovery. The remaining 2% was disposed of after a thermal treatment.

Argo360 holds several certifications related to sustainable IT practices and WEEE management, including the WEEELABEX standards (CEN 50625 series on WEEE collection and treatment) [1]), ISO 9001:2015 (Quality management system [2]), ISO 14001:2015 (Environmental management system [3]), ISO 27001:2022 (Information security, cybersecurity and privacy protection [4]), and the PSO[2] 3|30+ [5]. Additionally, Argo360 is an approved collector according to TCO Certified [6].

The aim of Argo360 is to maximise the recovery of IT products and components via refurnishing and remanufacturing which are then sold via online through wholesale retailers (e.g. such as The Broker Site [7], Broker Bin [8], Remarkt [9], Preiswerte-It [10]), eBay and Amazon. The main market is The Netherlands, followed by other European countries. A growing demand is developing in India and other North African countries. What cannot be reused, is then dismantled for materials recovery.

Recovered items are classified in four grades. Grade A describes a tested and fully operational product, grade B includes functional products with some detectable scraps, grade C covers not functional but repairable products, and grade D comprises non repairable products to be considered for materials recycling (which is in the scope of the feasibility assessment).

2) The PSO3|30+ certification is the highest level of the Performance Ladder for Social Enterprise (PSO) in the Netherlands, signifying that an organization is among the top 10% of Dutch companies in social entrepreneurship

After classification, sorting and dismantling, Argo360 delivers resources recoverable as materials (metals and plastics) for destructive processing (e.g. refining) to European recycling facilities. The rest is incinerated. Following their ambitious target of 'zero landfilled waste', none is disposed of (in reality, a negligible amount of 0.3% in mass terms was disposed of as waste in 2024-2025).

Li-ion batteries, toners and capacitors need to go through depollution prior any recycling or energy recovery measures, which is completed by an authorized facility, A&M Recycling B.V.

The value chain defined in the scope of this feasibility assessment includes the Argo360's supplier Affordable IT Solutions in Accra, Ghana. This is a microenterprise which typically collects used electronic devices from businesses but also sometimes from individuals in subsistence activities.

The Argo360 business model bases on the waste compensation mechanism which, through the financial support of partners such as Fairphone, allows the responsible handling of e-waste in locations with weaker infrastructure while at the same time recovering strategic and critical materials. Through this, supporting partners can claim that their involvement has ensured the responsible and ethical sourcing of a certain amount of strategic and critical materials. This business model represents a circular approach according to ISO 59004 (2024) [11] that aims to produce new devices with 'zero' material-footprint.

Through this WEEE compensation mechanism, Fairphone along with Argo360 aim to tie up with Ghanaian actors such as Affordable IT Solutions to contribute to increasing incomes of e-waste workers including those in subsistence activities, improving their working conditions and building local recycling capacities [12]. This Fairphone project is supported by the Social Sustainability Fund, as part of The Netherlands Enterprise Agency (RVO) and the Dutch Ministry of Foreign Affairs [12]. See in the Figure 13 the scope of activities considered for the feasibility assessment.

Figure 13: Processes and activities within the scope of the feasibility assessment at Argo360 and its supplier Affordable IT Solutions.

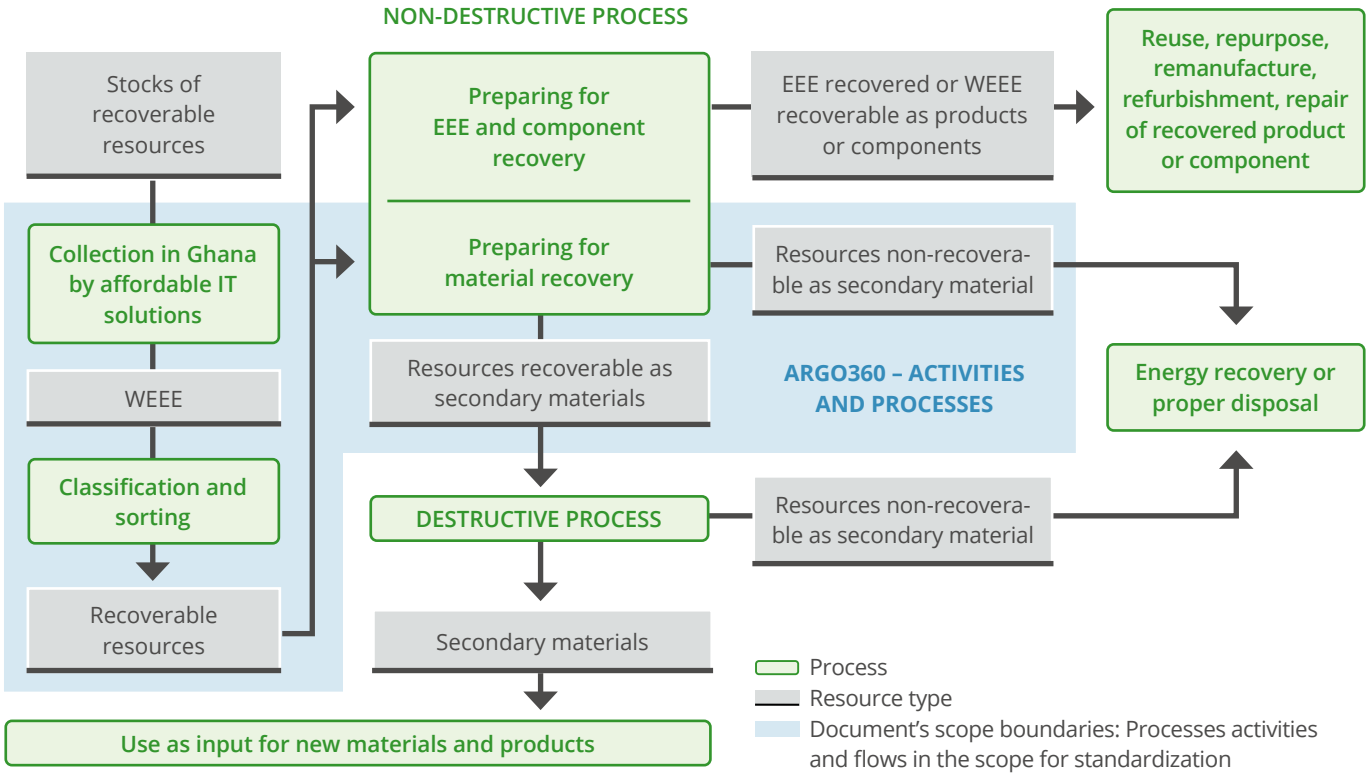

Figure 14: *Affordable IT Solutions – commercial details. © Argo360*

4.2 Resources recovery and circular economy in the context of The Netherlands and Ghana

At European level, three key Directives regulate the activities of WEEE treatment and recycling companies: The WEEE Directive [12], the Circular Economy Action Plan [13] and the Corporate Sustainability Due Diligence Directive (CSDDD) [14].

The WEEE Directive mandates separate collection of WEEE from general waste, sets recovery and recycling targets for various product categories, ensures proper labelling of products with a crossed-out wheeled bin symbol, and requires take-back systems for consumers and professional users.

The Circular Economy Action Plan (under the European Green Deal) targets high-impact sectors like electronics and batteries. It promotes the durability, repairability, and recyclability of products, pushes for a "right to repair" for consumers, encourages companies to reduce waste generation, increases the use of secondary raw materials, and expands producer responsibility to include full life cycle impacts.

Although the Corporate Sustainability Due Diligence Directive (CSDDD) mainly applies to EU companies with over 500 employees and €150M turnover (or €40M in high-risk sectors) which is not the case of Argo360, it sets ambitions high and the future direction the European region is taking on Due Diligence and social responsibility matters. It requires large EU and non-EU companies to identify and mitigate human rights and environmental risks in their supply chains, demands integration of due diligence into corporate policies, mandates risk assessments and stakeholder engagement, requires corrective actions, grievance mechanisms, and public reporting and holds companies legally liable for harms that could have been prevented through proper due diligence.

In this context Argo360 has a strong foundation and set of requirements that guide and support their work towards environmentally and socially responsible activities.

In Ghana, the context is different with good progress made on the responsible management of WEEE. Ghana's e-waste management framework, primarily guided by the Hazardous and Electronic Waste Control and Management Act (Act 917) [15] and the associated Legal Instrument (LI 2250) [16], establishes specific requirements for collectors and recyclers to ensure environmentally sound practices. Requirements for collectors such as individuals in subsistence

activities in Ghana established in the Technical Guidelines in Environmental Sound E-Waste Management [16] include the following steps that Affordable IT Solutions complies with:

- Proper registration with the EPA and maintenance of a list of associated collectors.
- Prohibition of treatment or disposal; must only receive, sort, and store e-waste.
- Ensure safe and adequate workplaces to prevent leaks and contamination.
- Keep detailed records of all incoming and outgoing e-waste materials.
- Proper storage and transport to prevent environmental pollution.

However, the social-related requirements do not exist or their enforcement remain week.

4.3 Operational requirements: Main findings

The following noteworthy operational aspects were identified from the ISO 59014 feasibility assessment at Argo360:

- **Manual of processes at Argo360 includes pathways for IT recovery and recycling.** Argo360 has developed a set of instructions and fact sheets for the various IT items it processes in form of a Process Manual (henceforth also mentioned as 'Manual'). The Argo360 Manual is a key document covering recovery pathway aspects ranging from logistics of inbound equipment, sorting operations, testing and data management, cleaning, disassembly, outbound logistics, and workplace safety. It outlines procedures for establishing the grades (A, B, C and D) of each device processed as described earlier designating and managing the labelling of the products recovered and determining the parts that will be delivered for material recycling.
- **Training and monitoring: Cornerstones of Argo360's operational success.** The training of workers on the Manual content and the proper monitoring of its implementation are outstanding developments in Argo360 and ensures that the operational requirements established in the ISO 59014 are successfully implemented.

Three **minor** deviations were identified and are described below:

- **Lack of documentation on life-cycle based studies supporting criteria for achieving best environmental and social outcomes of secondary materials recovery.** There is no documented evidence showing that the criteria used for receiving electronic waste from Ghana, such as those described by Argo360, are based on achieving the best environmental and social outcomes from secondary material recovery.
- **Tailored ways of approaching the different qualities or properties of the same materials is lacking in the definition of the recovery pathway steps.** The manual lacks references to published life cycle thinking-based studies and no partial or full life cycle assessment (LCA) studies to compare the environmental outcomes of different recovery pathways have been conducted. This results in decisions regarding the choice of processes not clearly supported by life cycle thinking.
- **No continuous improvement consideration when setting targets.** It is not clear if continual improvement is considered when setting targets on the maximum amount of secondary materials recovery. Documentation on this matter needs to be improved.

4.4 Organizational requirements: Main findings

A well-defined set of organizational procedures is fundamental to the success of a management system, as it ensures consistency, clarity and effective monitoring and control of potential deviations from any standard. The following related elements implemented in Argo360 are worth highlighting as they successfully contribute to the implementation of the organizational requirements of ISO 59014.

- **Safeguarding ethics: Argo360's conduct and compliance policies.** Argo360 Code of Conduct is publicly available on their website. The Argo360 Code of Conduct targets the company and supplier operations and includes general guidelines, among others, on child labour and business ethics. The code of conduct regulates distribution network and stakeholder interactions. Specific policies have been further developed in separate documents on anti-bribery & corruption, whistleblowing, grievance and child labour. There is sufficient evidence of Argo360's code of conduct being included in its agreements with suppliers.
- **Successful cooperation between Argo360 and the Ghana supplier.** Commercial cooperation with Affordable IT Solutions (Ghana) whose workers previously worked in Agbogbloshie[3] under informal conditions include agreements based on Argo360 Code of Conduct and a strong support with operational procedures. All workers in Affordable IT Solutions are formally employed.
- **Argo360's commitment to renewable energy and efficiency.** Furthermore, a positive impactful area is related to the efficient use of resources such as energy. In Argo360, wind energy is mainly used through the energy provider GreenChoice. This is complemented with regular monitoring and measures implemented for reducing energy consumption (use of LED lighting, reduced use of boilers, etc.).

On the other side, the following deviations were identified during the feasibility assessment.

Minor deviations:

- **Insufficient evidence on regular monitoring of training needs identification.** Evidence was lacking on regular monitoring to identify training needs for organizations Argo360 engages with, such as suppliers and subcontractors.
- **No regular monitoring of interested parties concerns and interests.** No regular monitoring takes place to investigate potential interested parties and their relevant concerns, which is a requirement in ISO 59014. Local communities and neighbourhoods are not relevant stakeholders since the company's facility is situated in an industrial park, however, with time new stakeholders may emerge and their needs to be regularly assessed.
- **Insufficient communication and training on the Argo360 code of conduct.** Argo360 has not ensured that its expectations contained in the code of conduct are communicated and understood by its suppliers, and no training is provided in this regard. The company has not identified capacity development needs in the value chain and does not regularly provide suppliers training for proper application of the code of conduct. No regular monitoring is conducted of the implementation of its agreed-upon code of conduct with suppliers.

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3) Agbogbloshie, located in Accra, Ghana, was a former scrap yard, primarily known as a major e-waste processing site. It was a place where electronic and other scrap materials were dismantled and recycled, often under harmful conditions. The site was demolished by the Ghanaian government in 2021 [19]

4.5 Traceability requirements: Main findings

Notably, Argo360 has a robust IT tool in place to manage its data and systems efficiently. This tool supports the collection of traceability data.

Two **minor** deviations were identified during the assessment.

- **No evidence of a publicly available traceability policy.** Although there is a well-established traceability system in place, it does not have a clear, publicly accessible policy.
- **Insufficient communication to value chain actors on the traceability policy.** There is no sufficient evidence that value chain participants, such as employees and suppliers with whom Argo360 has contractual agreements, have been informed of the traceability system's features and data needs.

4.6 Overall compliance, challenges and recommendations

Overall compliance

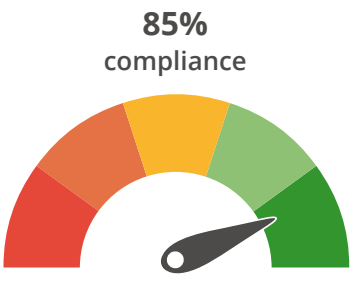
The overall level of compliance is high and was assessed at 85%.

The operational requirements present a high-level of compliance with some room for improvement on the traceability ones which mainly refers to the need for a publicly available policy and specific data to be collected and communicated along the value chain.

Regarding the organizational requirements, one deviation results from not regularly identifying training needs for organizations with whom Argo360 engages, such as suppliers and subcontractors, and in particular suppliers involving individuals engaged in SAs. This is linked to requirements in subclause 7.8. on competence and training. The training-related aspect is a crucial step for covering any understanding and training gaps, aligning employee skills with organizational goals, improving performance, boosting morale and engagement, and optimizing training budgets. This is relevant for ensuring smooth cooperation with the supplier in Ghana.

Table 5: Summary of the feasibility assessment results of compliance with the ISO 59014 standard at Argo360.

Consolidated results	% of non-compliance per clause	% of compliance per clause	# of Major NC	# of minor NC
Clause 6: Operational requirements	7%	93%	0	3
Clause 7: Organizational requirements	19%	81%	0	3
Clause 8: Traceability requirements	28%	72%	0	2
Total	**15%**	**85%**	**0**	**8**



Challenges

The complexity of managing long-distance suppliers and the need to effectively communicate required performance improvements in an articulated way for different audiences have been identified as challenges, which are described below.

- **The complexity of managing long-distance suppliers.** Good supplier management is the foundation of Argo360's operations, and strong, effective cooperation with suppliers is key in achieving its business objectives, its commitments

to its customers, and the progress of its suppliers, whom it hopes to impact positively. However, the complexity of managing long-distance suppliers, operating in diverse settings and cultural contexts, poses a challenge to achieving effective and close cooperation. In particular, supported by Argo360, Affordable IT Solutions (Ghana) should be required to improve their IT communication system for better quality communications, exchanges, training and monitoring.

- **Challenging analytical process of defining key performance indicators** (KPIs) among too many indicators. The diverse aspects of sustainability (safety, environment, social, economics) addressed in Argo360's policies and systems contribute to the proliferation of indicators, making their prioritization difficult in the absence of a well-designed analytical process. Furthermore, the reporting of many indicators in a non-organic way increases the risks of ineffective communications. These aspects pose challenges for a successful monitoring of the performance and for their communication.

Recommendations

The following recommendations aim to enhance alignment with the ISO 59014 standard:

- **Closer oversight of and support to suppliers abroad is required.** Increased efforts are required in monitoring, training, and communication, as well as other support needed by suppliers such as Affordable IT Solutions (Ghana).
- **Development of an analytical process for defining SMART KPIs.** This will allow setting goals that are:
  - Specific (related to the vision, policies and high-level goals of the organization)
  - Measurable
  - Achievable
  - Realistic (and relevant)
  - Time-bound
- **Identification of life-cycle related studies.** These can be used as first sources to understand the hotspots that apply to similar value chains. These can serve as basis for decision-making and as background information for the recovery pathway methodology.
- **Integration of documentation and the existing elements for the various existing systems.** This will allow integration and conversant exchange among the systems to improve the efficiency in data management and results communication.
- **Resolve all other deviations identified.** Plan the resources and measures required to close the gaps identified.

4.7 Feasibility, certification potential and benefits

Considering the commitment and resources available in Argo360 for resolving the 8 minor deviations identified in the short-term, the ISO 59014 certification potential is considered high.

Argo360 expressed the following as possible benefits of having ISO 59014 fully implemented:

- Better understanding of value creation.
- More strategic decisions can be made based on a circular economy thinking, life cycle thinking and social responsibility.
- Improved stakeholder trust.
- Improved collection, dismantling processes and preparation for reuse processes.

"Implementing ISO 59014 isn't just about ticking a box – it's a logical next step in our drive for continuous improvement. It challenges us to look critically at the value we create and preserve – for our customers, for the environment, and for society as a whole. Yes, it's complex at times. But that's exactly what makes it so relevant and worthwhile. Because to us, quality is about more than just a good product – it's about taking responsibility for tomorrow."

Quote from CEO, Mimoun Batou, Argo360, May 2025

4.8 References

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5 Feasibility assessment of ISO 59014 implementation at Spross Recyclingwerk Zürich

The Spross Recyclingwerk Zürich feasibility assessment results including the findings and deviations represent a picture of the status of the ISO 59014 standard implementation for the period November 2024 to June 2025.

5.1 Description of activities and processes

Spross Transport & Recycling AG, a family-owned company based in Zurich, Switzerland, began its activities in 1954 and nowadays operates a comprehensive recycling process at its Spross Recyclingwerk Zürich (henceforth named RWZ) facility [1]. Spross employs around 40 staff on site. In 2024 the facility handled approximately 270,000 tonnes of construction and demolition waste (CDW), bulky household items, and other industrial wastes [2]. In the same year it produced 71,455 tonnes of recycling concrete compliant with the technical requirements established in the standards SN EN 206 [3] and SIA 262 [4] and the SIA Merkblatt 2030 [5]. The RWZ serves as a central hub where waste is either processed into reusable or recycled materials or transported to specialized further processing facilities across Switzerland or abroad.

The activities along the value chain of the Spross Recyclingwerk Zürich (RWZ) are illustrated in Figure 15 in more detail and described below.

1. Demolition and generation of construction waste. Demolition sites generate construction waste such as mixed rubble, concrete debris, excavated earth and mixed construction waste. These materials are collected by Spross trucks or client vehicles and transported to the recycling facility.

2. Sorting process at RWZ. Upon delivery, hazardous waste is separated out. Mixed construction waste is going through a rough sorting using electric excavators that separate metal, wood, combustible materials and a fine mixed fraction. Combustible materials are shredded and sent to waste incineration. The fine mixed fraction is further sorted out using sieves, air blowers, magnetic separation, and both manual and robot sorting.

3. Recycling at RWZ. Mineral construction waste, such as concrete debris and mixed demolition waste is processed using crushers, sieves, magnets and air blowers. This results in aggregates that can be used as a gravel substitute for concrete production. In this way, concrete debris is recycled on site into recycling concrete.

4. Concrete Mixing Plant. The granulate materials are used to produce Spross recycled concrete (Recyclingbeton). CO_2 is added to the granulate, where it reacts with calcium oxide to form limestone. This allows for the storage of approximately 10 kg of CO2 per ton of granulates used. Cement, sand, and gravel are transported by rail, received by RWZ, and used as input to produce concrete. The recycled concrete is then delivered to new construction sites in Zurich. See Figure 17 for a list of the products supplied to the market for construction activities.

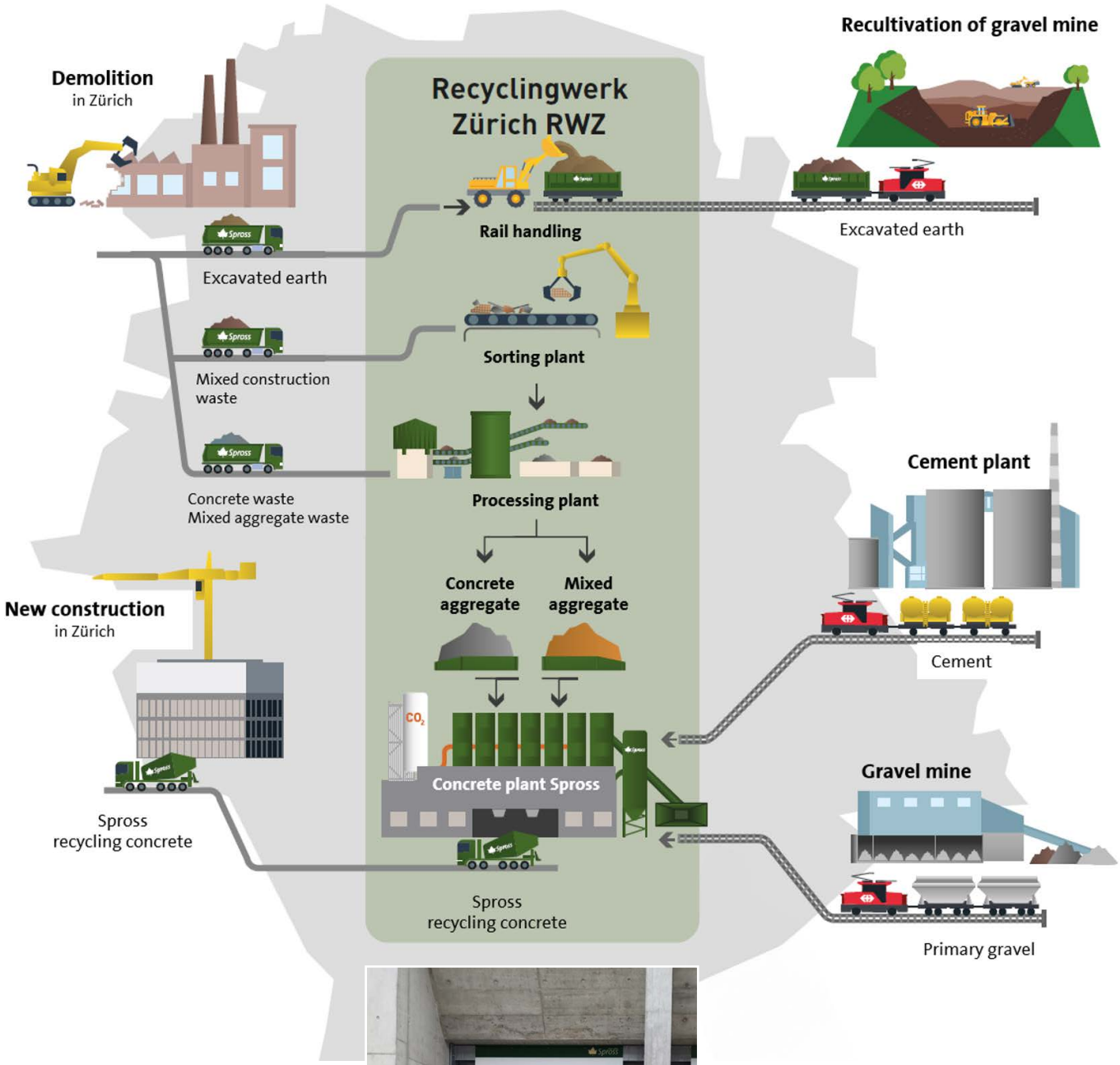
5. Other Material Flows. After preparation, the excavated earth is then sent via railway to former gravel pits for restoration via recultivation.

6. Transport. Spross also collaborates with the Swiss Federal Railways (SBB is the acronym in German) Cargo at the Hardfeld transshipment hub in Zurich.

It is worth highlighting that using rail transport minimizes CO_2 emissions. This partnership facilitates the rail-based transport of sorted recyclables, including paper, glass, and cardboard, from municipal collection points to recycling facilities.

Practices implemented at RWZ aim to contribute to supporting circular economy principles in the construction industry.

Figure 15: Processes and activities within the scope of the feasibility assessment at Spross (scope in green area).



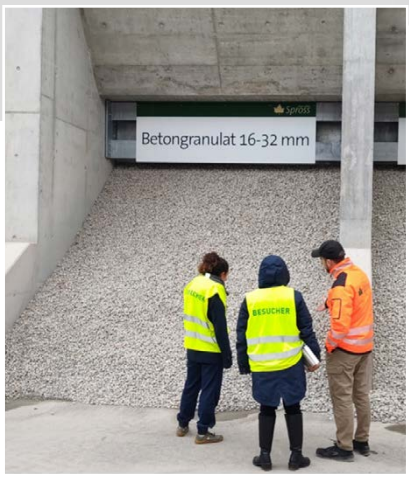
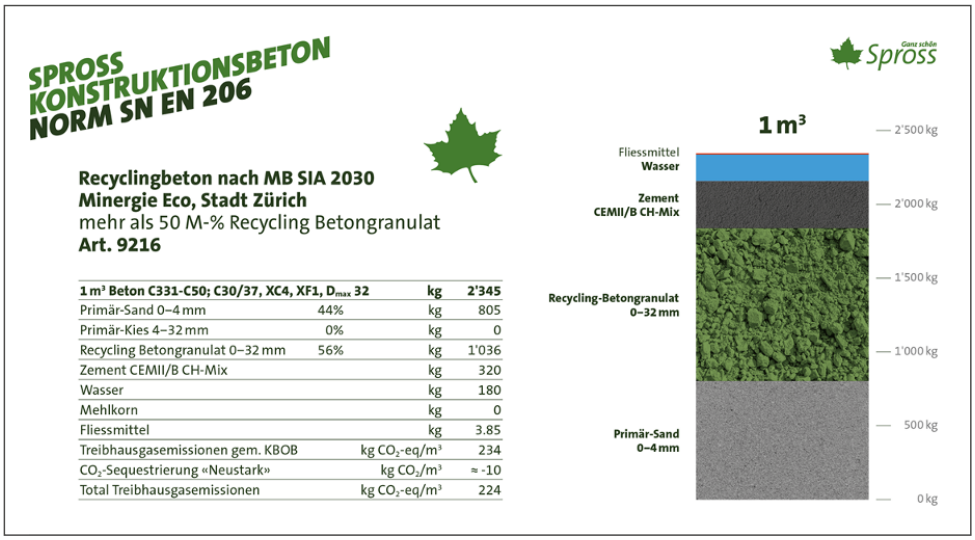


Figure 16: Recycling concrete granulate 16 – 32 mm (according to SN EN 12620, 1 m3 = 1.6 t).

Figure 17: Spross concrete for construction. Norm SN EN 206 - Recycling concrete according to MB SIA 2030. Minergie Eco, Stadt Zürich. More than 50% of recycled concrete.



Translation into English of concrete characteristics (Art. 9216)			
1m³ concrete C331-C50; C30/37, XC4, XF1, Dmax 32		Kg	2,345
Primary sand 0-4 mm	44%	Kg	805
Primary gravel 4 – 32 mm	0%	Kg	0
Recycled concrete granulate 0 – 32 mm	56%	Kg	1,036
Cement		Kg	320
Water		Kg	180
Others		Kg	3.85
CO_2 emissions		kg CO_2-eq/m³	234
CO_2-sequestration		kg CO_2-eq/m³	10
Total CO_2 emissions		kg CO_2-eq/m³	224

5.2 Resources recovery and circular economy in the context of Switzerland

Switzerland is highly dependent on imports of natural raw materials, making the development of a functioning circular economy a strategically important goal. The recovery of secondary materials plays a central role in conserving resources, reducing emissions, and supporting sustainable development. Particularly in the construction sector, which accounts for over 80% [7] of the country's total waste volume, there is significant potential for the material recycling of mineral-based materials such as concrete, asphalt, masonry, and mixed demolition waste.

The legal foundations for the recovery of secondary materials are embedded in the Swiss Environmental Protection Act (EPA) and the Ordinance on the Avoidance and Disposal of Waste (VVEA). The VVEA requires developers and waste handlers to maximize the material recovery of construction waste [8].

For construction projects that generate large volumes of waste (> 200 m³) or involve hazardous substances, the construction permit application must include details regarding the type, quality, and quantity of the waste generated as well as the planned disposal methods [8]. Furthermore, the ordinance requires that recyclable materials such as concrete, bricks, and asphalt be collected separately and recycled, whenever possible [8].

According to the Swiss Federal Office for the Environment (FOEN), approximately 11.7 million tonnes out of' the 17.8 million tonnes of demolition materials generated were reused, representing a recycling rate of about 65% [9]. However, recycling performance varies significantly depending on the material: while metals are recovered at rates up to 98%, gypsum has a recycling rate of only around 17%. The largest share of demolition waste consists of mineral materials, primarily concrete and mixed debris. Although concrete is often cited with an impressive 96% recovery rate, only about 56% of demolition waste consists of pure concrete, which can indeed be materially recovered at that rate. Around 30% of demolition waste ends up in landfills, and an additional 14% is classified as mixed demolition waste, which has an overall material recovery rate of only about 50%.

The Swiss Federal Council's 2022 report on promoting resource efficiency and the circular economy presented a comprehensive analysis of existing barriers along with a catalogue of proposed measures [10]. The ongoing parliamentary initiative 20.433 aims to strengthen the circular economy through targeted legal and regulatory reforms.

Another key instrument is the Circularity Gap Report Switzerland (2023), which estimates the country's circularity rate at just 6.9% – a clear indicator that over 93% of materials used still originate from primary sources [11]. The Circularity Gap Report Switzerland (2023) identifies the construction sector in particular as a crucial area for improving material circularity.

5.3 Operational requirements: Main findings

The following aspects have been satisfactorily implemented:

- **Criteria for secondary materials are established.** The technical criteria for the recycled concrete produced by RWZ are in the technical requirements established in the standards SN EN 206 [3] and SIA 262 [4] and the SIA Merkblatt 2030 [5]. Recycled concrete contributes to reducing the environmental impacts compared to new concrete, meaning that environmental outcomes are implicitly considered to some extent. The carbon footprint of key products is calculated and used for communication to customers. In the context of Switzerland, social aspects and labour rights are strongly promoted through laws, regulations and funded programmes, and enforced by federal and local authorities. As a result, labour conditions do not represent hotspots in the business reports. At RWZ, compliance with social-related standards are embedded in the organization's statutes and are shared with value chain actors. Consequently, the primary criteria guiding secondary material recovery processes are technical, environmental and economic criteria ones – not focusing on the social criteria.
- **Attributes of materials received for treatment – recoverable resources - are well defined.** The Spross price list provides clear guidance for what can be collected, which follows the established official classification of building waste in Zurich. It also specifies what is not accepted (see Figure 18). While it is assumed that customers should adhere to this guidance and official recommendations, mixed waste (e.g. mixed construction waste with carton, wood and even small pieces of WEEE) is often received.
- **Depollution practices are conducted in a controlled manner.** Incoming items requiring depollution (e.g., those containing hazardous substances) are handled by appropriately trained personnel. Transportation is carried out by both the company and authorized third-party services, using licensed trucks.

» **A recovery pathway methodology is established.** The methodology is outlined in the Operation Regulations document (of 30 September 2024) and is routinely applied. Its implementation is documented within the organization's internal online system.

Two **minor** deviations were identified during the assessment:

» **Life cycle-based studies are not considered for defining outcomes and recovery pathways and for making decisions about specific recovery processes.** References of life cycle-based studies are limited to the carbon footprint which only represents one impact category. Other relevant aspects, such as the water use, and the use of virgin sand and gravel, among others, are not considered.

» **Recovery targets are missing.** Performance indicators for recovery processes and /or secondary materials recovered are not clearly defined. However, the goal is to recover as much as possible.

Figure 18: Examples of wastes fractions that RWZ receives and processes (original German version)

Roof tile
Clay bricks without concrete adhesions

Clean mixed materials from excavation or construction
Mixed mineral excavated materials or from construction such as bricks, sand-lime brick, clay, concrete
x no gypsum, ceramic

Non-clean CDW (B-Material)
Mineral CDW mixed with problematic materials such as ceramic, plaster, light weight concrete, expanded clay, excavated material
x no wood fibre cement

Recovered asphalt
0 - 250 mg PAK Pro kg
milled pavement break-up or in slabs
x no mastic asphalt

Gypsum
Gypsum bricks, gypsum plates
x no fibre cement or light weight concrete

Clean excavated material (A-material)
Materials excavated and from construction without impurities (max 1%) such as demolition waste, coating, wood, roots, etc.
x no mud

Clean soil/humus (A-material)
Clean and dry soil/humus (acc. to VVEA) and without pollutants and without impurities
x no tree roots

Non-clean excavated material (B-material)
excavated material with mineral/organic impurities such as concrete, mixed excavated material, glass, gypsum, porous concrete, expanded clay, roots, etc. acc. to VVEA Annex 5, art 2

Non-clean soil/humus (B-material)
Soil/humus acc. to VVEA Annex 5, Art. 2 with mixed materials from excavation or construction, concrete, glass, coating, etc.
x no tree roots

Concrete
Waste concrete with fractions smaller/bigger than 70 cm with or without reinforcing steel
x no isolation materials

5.4 Organizational requirements: Main findings

The organizational aspects at Spross are in general well conducted and documented. Spross operates mostly in a business-to-business setting, hence, the absence of individuals as customers bringing smaller amounts of materials for treatment. The organizational subclause has a high level of compliance with ISO 59014. The following areas positively outstand.

- **Existence of IT-based monitoring tools.** RWZ counts on IT supported tools for monitoring the flow of materials from the reception, throughout the processing until the delivery to the next facilities or customers. The monitoring of the incoming and outgoing materials is properly managed.
- **No disturbance to neighbours due to operations.** The RWZ facilities are located in a large complex that includes a train station dedicated to its facilities. As a result, traffic and noise, primarily train-related, are comparable to other Swiss freight stations. RWZ has not identified complaints or concerns from stakeholders.
- **Appropriate facilities and technologies.** Facilities are appropriate for their operations including available PPE and sanitary infrastructure.
- **Code of conduct communicated to value chain actors**. The code of conduct at Spross is contained in its statutes and are communicated to suppliers. Their focus is on regulatory aspects and on responsible practices.

Some room for improvement is described in one minor NC identified.

Minor deviation:

- **While training activities are documented, it is unclear how the training needs of value chain actors, including workers, are identified.** This includes potential training needs of suppliers and transporters on topics such as ethical behaviour, traceability, recovery targets, and other relevant areas. It may also involve identifying training needs for workers related to new and emerging topics, such as new technologies, regulations, or standards to be adopted.

5.5 Traceability requirements: Main findings

Spross has demonstrated good practice in traceability, particularly through the following:

- **Existence of IT-based traceability system.** The RWZ IT system and platform supports not only material flow monitoring (see findings in subclause on organizational requirements) but also traceability practices.

Traceability aspects are in the consolidation stage. As outlined in the following bullets, there remains scope for further development.

Minor deviations

- **No identification of consignments received which have no traceability data.** RWZ does not maintain separation of materials received between those for which it has traceability data and those for which it does not. These materials are kept mixed.
- **Publicly available policy and communications covering aspects of traceability are missing.**

5.6 Overall compliance, challenges and recommendations

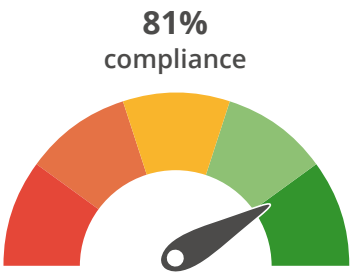
Overall compliance

The overall level of compliance is medium-high and was assessed at 81%.

The operational requirements and the organizational ones present a high-level of compliance with some room for improvement on the traceability part. The latter mainly refers to the need for a publicly available policy, and data needs communicated along the value chain.

In line with the vision of continuous improvement required by the ISO 59014 standard, a minor deviation results from the lack of a systematic procedure for identifying training needs concerning, e.g., new and emerging topics (such as those related to new technologies, regulations or standards. to be adopted). This applies to organizations in the value chain and workers with whom Spross engages with. The effectiveness of trainings implemented should be considered when revising the identification of training needs. See Table 6 for a summary of the results for Spross.

Table 6: Summary of the feasibility assessment results of compliance with the ISO 59014 standard at RWZ.



Consolidated results	% of non-compliance per clause	% of compliance per clause	# of Major NC	# of minor NC
Clause 6: Operational requirements	18%	82%	0	2
Clause 7: Organizational requirements	14%	86%	0	1
Clause 8: Traceability requirements	31%	69%	0	2
Total	**19%**	**81%**	**0**	**5**

Challenges

The strict regulations and standards to be complied with in the building materials industry, combined with increasingly demanding customer expectations, poses a significant challenge for producers of building materials such as Spross. They must navigate complex and often evolving compliance requirements related to safety, sustainability, and performance, which demand robust data management, traceability, and documentation. At the same time, customers are expecting higher quality, transparency, and environmental responsibility. Balancing these demands requires significant resources, coordination across the supply chain, and continuous adaptation, putting pressure on operational efficiency and innovation.

In particular, the lack of resources for additional ambitious tasks is a constraint for implementing them in the short-term.

Recommendations

The following steps are proposed to support better adherence to the ISO 59014 standard:

- Assess the benefits and links with economic implications (e.g. cost savings) for Spross of addressing the identified deviations and develop a business proposal for Top Management to secure the necessary support.
- If required data is not available or difficult to measure, conduct fast-track LCAs based primarily on secondary data. These are cost-effective and can still provide valuable insights for decision-making
- Align ISO 59014 implementation with other Swiss and international standards already implemented by Spross to enhance efficiency and reduce costs.

5.7 Feasibility, certification potentials and benefits

Following an assessment of the deviations identified, RWZ leadership confirms there is high-feasibility of resolving the five minor deviations in the mid-term.

With this the ISO 59014 certification potential in the mid-term is considered high.

RWZ also shared their perspective on the benefits of implementing ISO 59014:

- Reinforced credibility by costumers about the green and sustainable features of the recycled materials produced at RWZ.
- Timely and more accurate KPIs for reporting purposes to value chain holders such as the board and other business decision-makers at RWZ.
- Improved communications to value chain holders (customers, the board, local authorities) about KPIs related to environmental aspects.
- Improved training system in place, including the identification of training needs and monitoring of training effectiveness.

"The conducted 'preaudit' helped us in assessing our operations and realizing where we still have potential for further improvement."

Quote from Director of Operations, Martin Gasser,
Spross Recycling Werk Zürich, May 2025

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6 Results and discussion

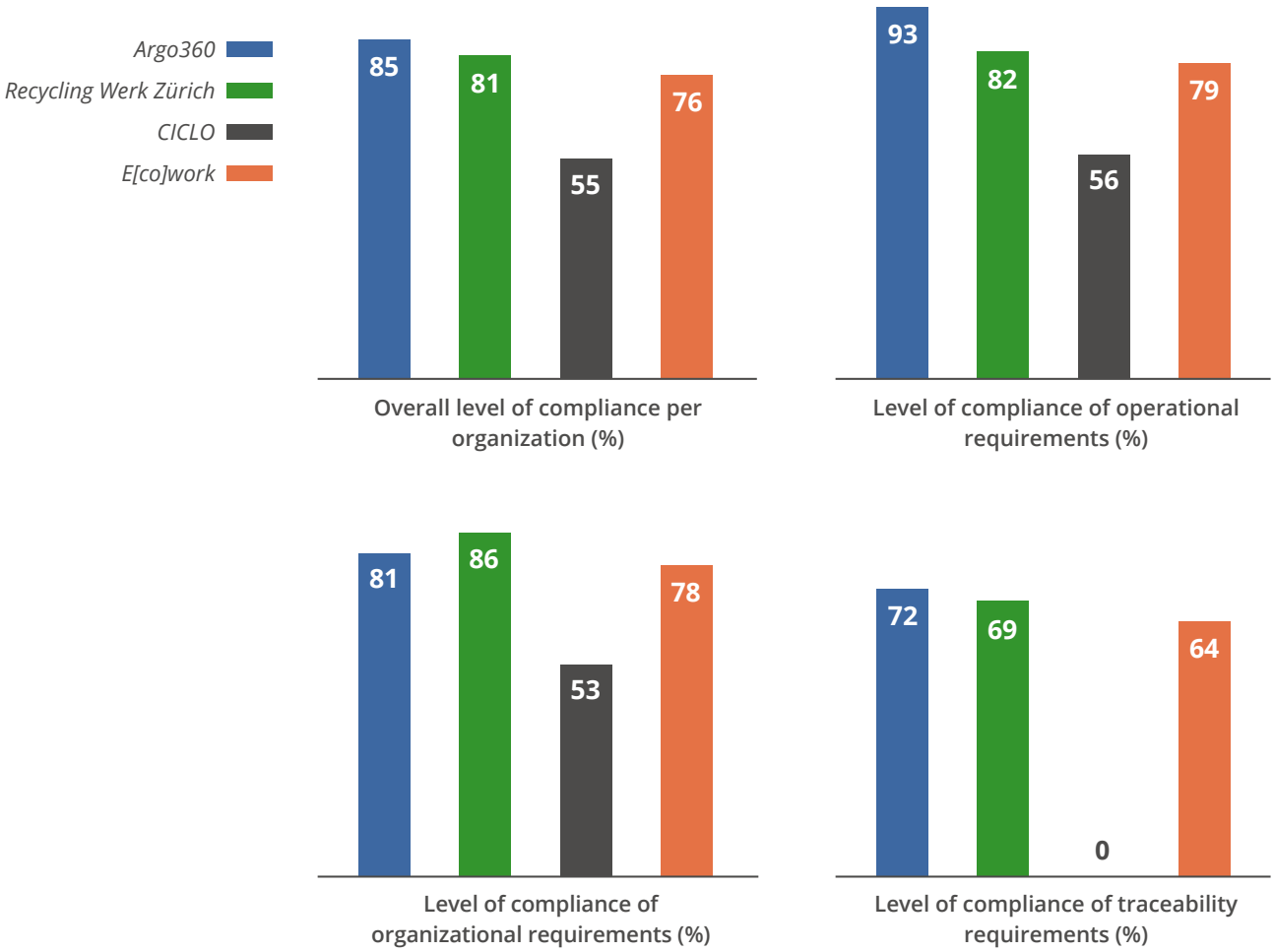
6.1 Overall compliance and challenges

In this section possible aspects causing the different levels of compliance are identified, described and complemented with a discussion of challenges identified in the different contexts of the four organizations.

6.1.1 Levels of compliance

The four participating organizations have achieved overall levels of compliance ranging from 55% to 85% (see Figure 19.A), with most significant development at the operational level (Figure 19.B), followed by the organizational level (Figure 19.C), and then the traceability one (Figure 19.D). Companies with more years of operation and financial, human and technical resources (which enables them to afford, for example, external consultants, training, software, and certification audits) such as Argo360 and Recycling Werk Zurich (Spross) have higher levels of compliance than those more recently established such as E[co]work) and CICLO.

Figure 19: Overall level of compliance (A) and compliance of specific clauses (B-D) by organization



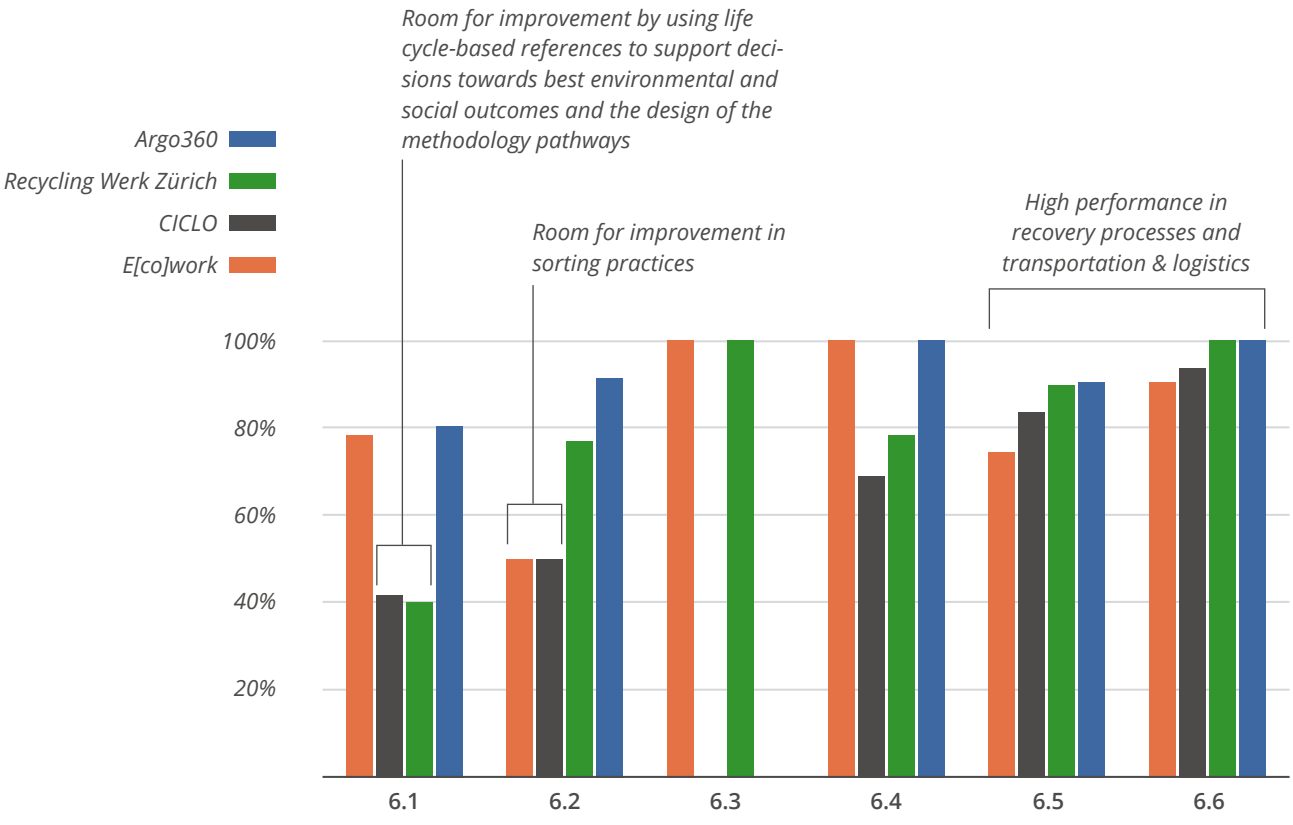
The ones with long-standing organizational structures due to their more years of operation and implemented standards (such as CEN standards), have a more mature culture of compliance and continuous improvement which makes them better prepared to integrate additional standards such as ISO 59014. In addition, consolidated companies with more years of operation are in a closer connection with regulators, investors, and customers, putting them under more pressure to pursue renowned certifications like ISO.

On the other hand, small business may face barriers such as insufficient personnel and limited financial resources to drive a standard implementation. Furthermore, the management systems of young organizations such as CICLO and E[co]work are still in a consolidation stage, where modifications can occur, which makes such developments more challenging.

The high level of compliance at E[co]work and the mid-level (above 50% compliance) at CICLO, despite their short trajectory, can be attributed to the dedication and motivation of their leadership and personnel. Motivation is crucial for successful implementation of ISO standards like ISO 59014, as it influences engagement, consistency, and long-term commitment across all levels of an organization. Motivated individuals are more open to adapting and learning and maintaining the focus during continuous improvement journeys. Motivation fosters a culture of accountability for roles and teams which may result in significant changes in standard behaviours in certain regions.

The bar chart in Figure 20 compares the percentage values of the four organizations across six subclauses (6.1 to 6.6). When looking into the details, it is worth highlighting the highest compliances of 75% to 100% for the recovery processes (subclause 6.5) and transportation & logistics (subclause 6.6) of the four organizations concerned. When considering life cycle-based references to support decisions towards best environmental and social outcomes and the design of the methodology pathways (subclauses 6.1 and 6.2) organizations score lower. Targeted recommendations on the latter will be drawn in section 7. The sorting process varies notably from low levels of compliance for the smaller organizations (E[co]work and CICLO) to higher levels for the bigger ones (Spross and Argo360). Detailed discussions and descriptions of areas in need for improvements can be found in the sections developed for each organization.

Figure 20: *Highlights of findings on operational requirements by subclause and organization.*



The bar chart in Figure 21 shows the percentage scores on the organizational performance for the four organizations concerned.

It is noteworthy that compliance rates ranging from 75% to 100% demonstrate that the organizations are committed to providing equitable working conditions (subclause 7.5) and are actively striving for resource-efficient operations (subclause 7.7).

Organizations receive lower scores when it comes to having systematic processes for managing the value chain responsibly (subclause 7.3) through a code of conduct that is properly communicated and to consistently enhancing the competences and skills of their employees (subclause 7.8).

Concerning the engagement of individuals in subsistence activities E[co]work is the only company which directly and purposedly engages with them in an outstanding way. See their highest score in Figure 21 for subclause 7.4.

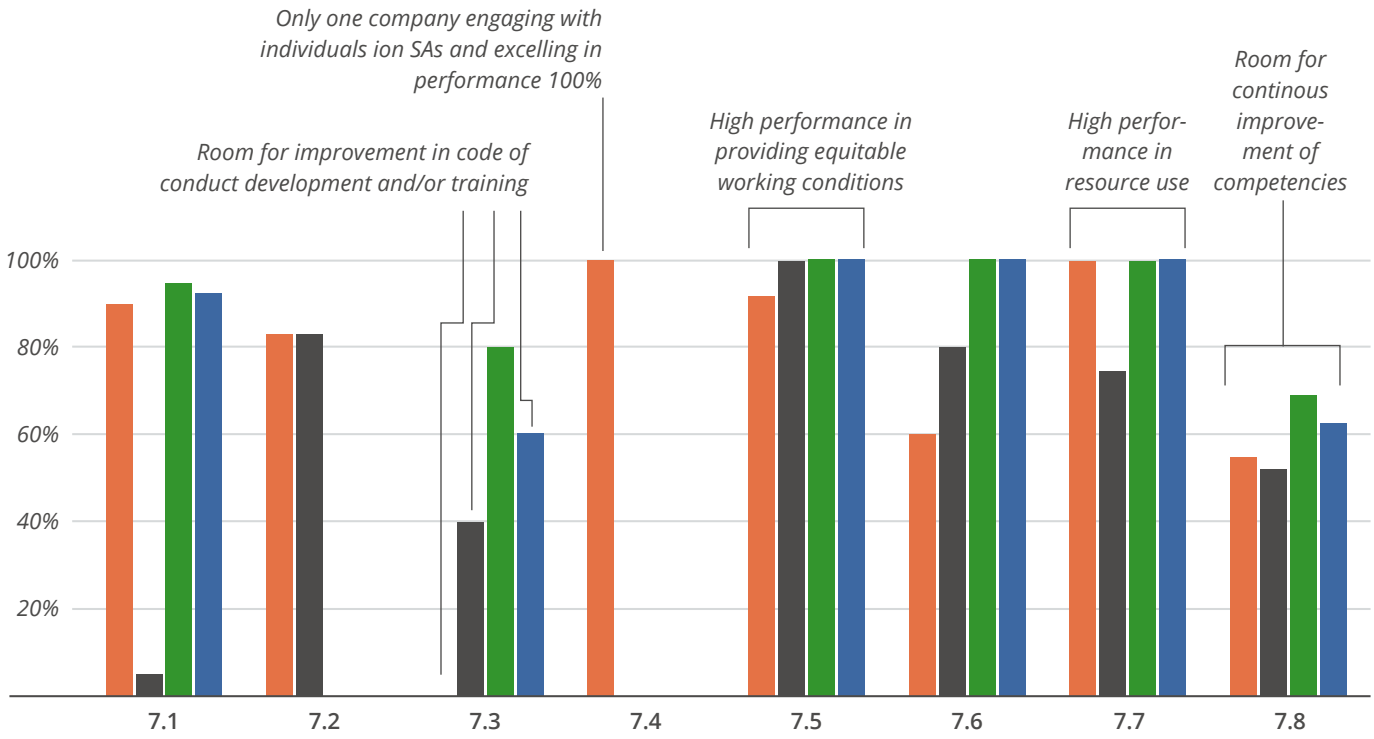


Figure 21: *Highlights of findings on organizational requirements by subclause and organization.*

With respect to the traceability requirements (see Figure 22), three out of the four organizations have established data management systems that support traceability: Argo360, Spross and E[co]work. The results show a scattered implementation with lower and higher levels which may be linked to the quick pace of evolution of data managements tools requiring skilled personnel to manage these.

In particular, the areas in need for improvements resulting from the assessment of compliance of all organizations are the policy availability (subclause 8.1) and the data needed on depollution processes (subclause 8.5).

6.1.2 Challenges

From the feasibility assessments, the following key challenges were identified for achieving a full implementation of the ISO 59014 standard over the medium term.

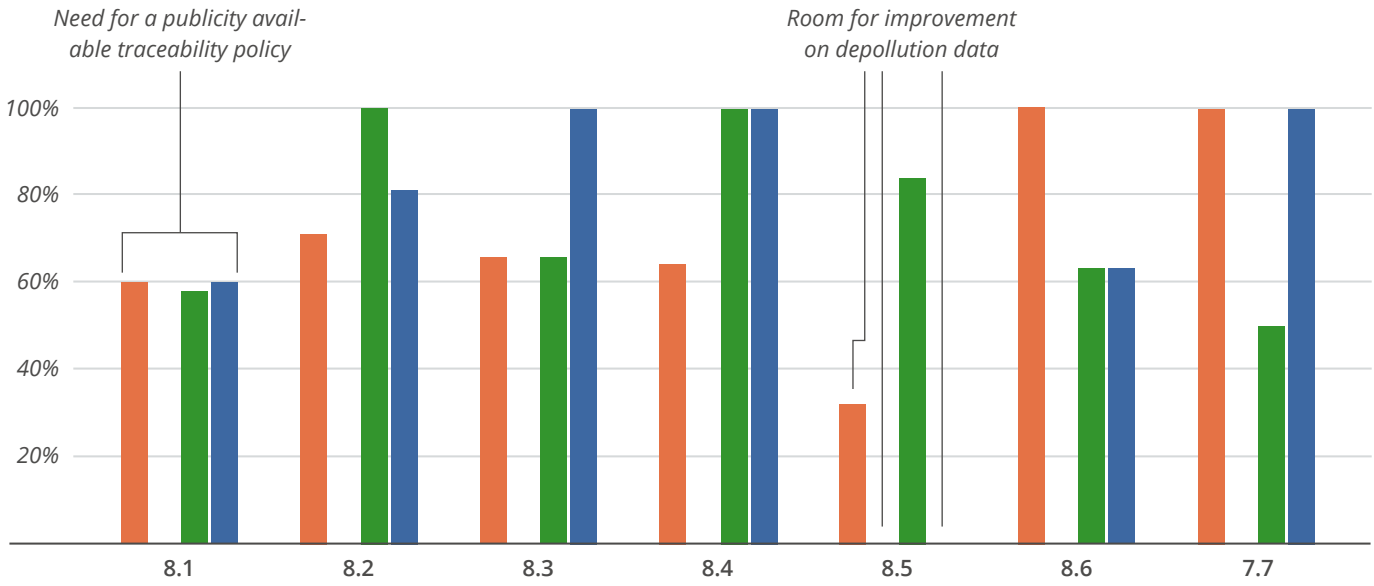


Figure 22: Highlights of findings on traceability requirements by subclause and organization.

Argo360
Recycling Werk Zürich
CICLO
E[co]work

» **Market and regulatory constraints focusing on organizations in less industrialized countries.** In spite of the positive environmental footprint of secondary materials (lower CO2 emissions compared to natural resources) and the reduced prices of secondary materials (an average taken from price lists of the organizations assessed), markets for secondary materials are still limited. Import/export restrictions for recycled materials, and the lack of a strong domestic market for recycled products can restrict growth and attractiveness for investments in this type of operations. Additionally, growing compliance demands (e.g., ESG, traceability) can be hard to meet without institutional support or clear policy frameworks.

» **Inconsistent supply, quality of recyclable materials, and small market.** In the particular case of smaller markets, the volumes and variety of recyclable waste may be limited or can fluctuate, making it difficult to maintain a consistent input stream. Inadequate separation at the source and contamination can further reduce material quality, hampering efficient processing and profitability.

» **Interconnectivity and efficiency issues of implementing a growing number of complementary sustainability standards.** This is in particular relevant for larger-size organizations with existing standards in place. The decision on which standards to implement should be based on a well-thought strategy considering target audience, benefits and resources available. A simultaneous implementation can add further complexity, requiring sufficient understanding of overlapping, interoperability and complementarities.

» **Skills, capacities and workforce development.** Upscaling often requires counting on staff possessing specialized skills in areas such as process optimization, environmental management, or recycling operations. Specifically, the understanding of life cycle and circular economy perspectives, are domains in need of more experience and capacities as evidenced during the feasibility assessment.

» **Limited financial resources.** Implementing a standard often requires financial investment in areas such as training, external expertise, dedicated internal personnel for specialized tasks and external audits particularly if a certification is sought. These costs can place a burden on smaller organizations, making it difficult for them to fully adopt and maintain the standard.

» **Implementing a traceability system presents technical challenges.** While it offers long-term benefits, establishing traceability demands an investment in

both equipment and workforce development. Beyond simply tracking materials, the system must integrate data from every stage of resource processing and internal operations. This necessitates a shift toward a data-driven organizational mindset, something that cannot be achieved overnight. Establishing such a culture and system will involve a phased approach, sustained effort, and strategic commitment over several years.

6.2 Feasibility, certification potentials and benefits

The CEOs of the organizations that underwent the feasibility assessment, expressed in their interviews that the identified deviations could be resolved in the short- to middle term (one to two years).

Based on this, the ISO 59014 certification potential is considered feasible in the mid-term (2-3 years).

A series of perceived benefits were raised by the managers interviewed from the four organizations, ranging from internal aspects that would be strengthened to improved positioning vis-à-vis external stakeholders. The most notable benefits are described below:

Strengthened internal aspects:

- **Better decision-making and strategic planning.** Informed strategic decisions are enabled The standard also fosters circular economy thinking, life cycle thinking, and social responsibility.
- **Systematic analysis and continuous improvement.** Implementing this standard promotes a culture of process analysis and documenting changes and their consequences. This allows for constant monitoring and revision toward continuous improvement.
- **Enhanced operational efficiency.** This is achieved through process standardization and improved collection, dismantling, and preparation for reuse. At the same time, efficiency in recovering secondary materials is increased.
- **Greater transparency and traceability.** The standard helps improving transparency in material flows and supports verification of claimed data. It also supports enabling regular monitoring of quality parameters and adjustment of processing.
- **Improved regulatory compliance and environmental risk management.** The process of implementation promotes compliance with regulations and mitigates environmental risks, especially in the management of hazardous substances.
- **More robust training framework.** The standard enables the systematic identification of skill gaps and the regular assessment of training outcomes to ensure continuous improvement.
- **Greater transparency and traceability:** Enhances transparency in material flows, supports verification of claimed data, and enables regular monitoring of quality parameters and processing adjustments. This is supported with the enhanced competencies regarding data management.
- **Enhanced product quality and value creation.** The quality attributes of products by integrating life cycle perspectives are expanded and a better understanding of value creation and improved environmental and social impacts is fostered.

- **Improved stakeholder communication and reporting.** Communication of environmental performance indicators is timely and enhanced, ensuring that key stakeholders across the value chain – including clients and the board – are kept well-informed and aligned. For example, KPIs for value chain stakeholders (e.g., customers, board, local authorities) are more accurate. Communications will make use of social media for community management.

Stronger-standing related aspects vis-à-vis external stakeholders

- **Increased visibility and reinforced credibility by public authorities, customers and financial organizations.** Through the standard, the organizational credibility and reputation is strengthened and customer confidence in the sustainability of secondary materials reinforced. Expanded access to financial resources may result from improved credibility.
- **Reduced client audits.** This type of ISO certification serves as proof of first-class business practices, potentially reducing the need for client audits.
- **Expanded availability of resources.** Implementing the standard will increase the availability in the market to a wider range of sustainable and traceable secondary materials.
- **Demonstrated feasibility in small organizations and in less industrialized countries.** This is sustained with the medium to high levels of compliance and the motivation to engage in resolving deviations in the short-to mid-term. This can serve as an inspiration for future implementation in other SMEs in similar socio-economic settings.

7 Conclusions and recommendations

Looking ahead, this section offers an overview of trends in the context of the ISO 59014 implementation and its upscaling (see the SWOT in 7.1 to illustrate the main aspects).

It is inevitable to discuss the positioning of the standard in the landscape of similar (competing) standards, in particular if a choice between different standards needs to be made. This discussion and relevant aspects for making a choice is exemplified in 7.2 based on the most accepted WEEE standards (CEN standards, R2 and e-Stewardship) and the gaps the ISO 59014 standard fills (Heinz Böni, 2025).

Finally, recommendations for facilitating the implementation of the ISO 59014 standard are provided in 7.3 and concluding remarks in 7.4.

7.1 Strengths, weaknesses, opportunities, and threats (SWOT)

The key strengths, weaknesses, opportunities, and threats related to the ISO 59014 standard and the upscaling of its implementation are presented in Figure 23. Strengths, opportunities, and threats were analysed through interviews with CEOs during the feasibility assessment, . Weaknesses stem from the feasibility assessment, highlighting the main areas requiring improvement.

Strengths and weaknesses are within the sphere of influence of those implementing the standard; therefore, implementers should capitalize on existing strengths and actively develop strategies to address and overcome identified weaknesses (see section 7.3 for recommendations). Opportunities and threats generally stem from external enabling conditions and are typically beyond the direct control of organizations but close monitoring of these conditions is recommended for timely reaction.

Figure 23: SWOT of the ISO 59014 standard and the upscaling of its implementation.

OPPORTUNITIES

- Contribution to expanded availability of secondary materials in the market
- Demonstrated feasibility in small organizations and less industrialized countries
- Momentum in the market towards circular economy actions such as those promoted by the ISO 59014 standard

STRENGTHS

- Benefits identified from the pilots conducted*,
- Guidance available when aiming to engage with individuals in subsistence activities (SAs). No other international standard covers this.

ISO 59014 STANDARD

THREATS

- Risks of fatigue by customers and recyclers due to a number of (competing) sustainability / ESG standards in the market
- High costs perceived associated with the certification

WEAKNESSES

- Some aspects in the standard require additional guidance** and more business cases to support implementation
- ISO 59014 is still in the early stages of implementation, with only a limited number of cases to date

** **Benefits identified from implementing the ISO 59014 standard such as:** Enhanced Decision-Making and Continuous Improvement; Increased Operational Efficiency and Product Quality; Strengthened Compliance, Transparency, and Data Management; Improved Communication, Reporting, and Training; Increased Visibility and Reinforced Credibility by Public Authorities, Customers and Financial Organizations; Reduced Client Audits*

*** **Aspects that require additional guidance concern, for example:** Considering the life cycle for best environmental and social outcomes and recovery pathways; traceability supported with a low-cost data management architecture; code of conduct development and implementation*

7.2 Example of positioning the ISO 59014 standard in the context of existing WEEE standards

It is essential to discuss how the ISO 59014 standard positions itself within the landscape of similar or competing standards, especially when organizations are faced with making a choice. In this section this is illustrated based on the study of Böni (2025) who examined the most widely recognized e-waste standards (such as CEN standards, R2, and e-Stewardship), while also highlighting the unique gaps addressed by the ISO 59014 standard and its unique advantages. This study aims to help organizations make informed choices.

According to Böni (2025), the highlights of a comparison of the ISO 59014 with three major international WEEE-related standards are as follows:

- CEN 50625 (European Standard): This standard emphasizes material recovery, depollution, and operational compliance within Europe, with a strong focus on traceability. However, it does not extend to broader sustainability principles such as life cycle assessment or social responsibility.
- R2v3 (Responsible Recycling Standard): As a global standard, R2v3 prioritizes environmental protection, reuse, and worker safety. Nevertheless, it lacks a comprehensive approach to social impact and does not provide full traceability throughout the material chain.
- e-Stewards: Designed to prevent unethical e-waste disposal, e-Stewards enforces strict controls on hazardous materials and prohibits exports to developing countries. While its framework is robust, the emphasis is primarily on compliance, rather than on the wider sustainability principles incorporated in ISO 59014.

A key differentiator of ISO 59014 is its comprehensive focus on sustainability. The standard promotes non-destructive recovery processes, ethical material handling, and inclusive stakeholder engagement, extending even to workers involved in subsistence activities. It also enhances material traceability across the entire value chain, fostering greater transparency and accountability.

Rather than replacing existing WEEE management standards, ISO 59014 serves as a complementary framework. By emphasizing life cycle and circular economy perspectives, ethical practices, and inclusivity, it bridges the gap between environmental responsibility, social impact, and efficient material recovery, offering significant added value to organizations.

7.3 Recommendations for an improved implementation of selected ISO 59014 requirements

The following recommendations are designed to support the effective implementation of the ISO 59014 standard. They are organized around key areas that have been identified as requiring the most improvement (Figure 24).

Code of conduct (subclause 7.3).

When developing or improving an existing code of conduct (CoC), it is advised to:

- follow the text in the ISO 59014 standard which is clear and detailed concerning the scope and examples of what should be considered in a code of conduct. In the praxis the standard requires its sharing among suppliers and value chain actors.
- look into existing examples. As an example serves The Code of Conduct of Argo360, which is accessible on their website[4].

4) https://argo360.nl/wp-content/uploads/2025/05/ARGO360_COC_EN_V1.2.pdf

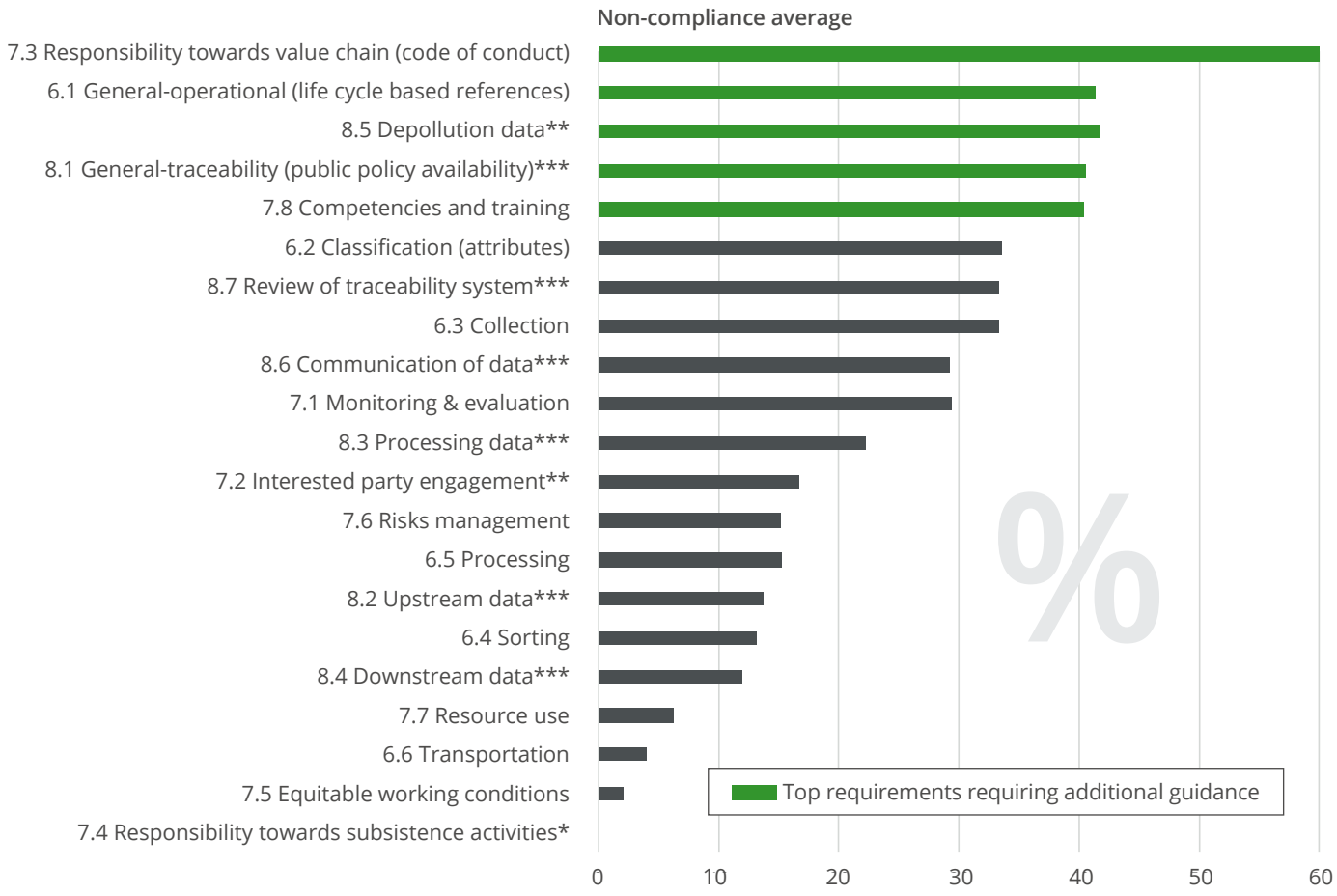


Figure 24: Non-compliances levels (in %) per subclause – averages.

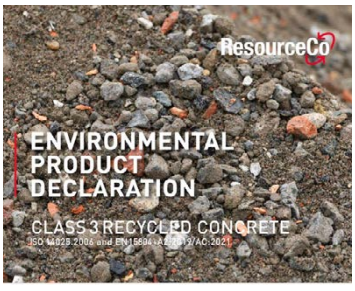
Basis for the average calculations: 4 companies: **** base for calculation is three companies; ** base for calculation is two companies; * base for calculation is one company*

Use of life cycle-based studies and defining a recovery pathway

As stated in subclause 6.1, life cycle-based studies are required to support defining best environmental and social outcomes. Life cycle-based studies also serve subclause 6.2 for defining the recovery pathways methodology. For the definition of the recovery pathways, most organizations apply methodologies based on widely recognized circular economy hierarchies. It is often understood that LCA studies are the only way to obtain the necessary results to support subclauses 6.1 and 6.2. However, as clarified in the recommendations, conducting such studies is not strictly required.

It is recommended to:

- consult well selected life-cycle based references (such as LCA studies) from similar cases, as these can effectively help identify the environmental and social hotspots and benefits associated with different technological options a company may encounter. Nowadays, good-quality environmental LCA studies are often published open access in renowned journals.
- search in the Environmental Product Declaration (EPD) library which provides publicly available LCA studies for a range of product categories with a focus on building materials. A good example is the LCA developed for recycled concrete published on the EPD portal[5].
- conduct baseline research to identify the social impacts and hotspots, as this area heavily relies on local and primary data, which is rarely available in publication or databases. This research process should begin with stake-



5) *https://www.environdec.com/library/epd16705*

holder identification, followed by understanding their concerns and their roles. Strengthening partnerships with suppliers and other key stakeholders will enhance communication, foster alignment across the value chain and improve overall system reliability and compliance, ultimately supporting the achievement of best social outcomes.

- describe and document the recovery pathway methodology applied. If inspiration source is needed, consider the example provided in Annex B of the ISO 59014 standard.

Traceability aspects and depollution data

In general, organizations generate and keep key business data, representing a good basis when developing a traceability system as required in clause 8. Frequent gaps identified refer to the lack of a traceability policy and depollution data. A traceability system requires a data management infrastructure, as well as competent personnel.

To strengthen data traceability within an organization, it is recommended to:

- Identify the necessary competencies and provide targeted training, ensuring a thorough understanding of the requirements outlined in clause 8 of the ISO 59014 standard.
- Collaborate with local experts and academic institutions to support the development of a robust IT infrastructure and effective data traceability systems.
- Ensure that depollution processes are conducted safely, are thoroughly documented, and that all records are maintained within the traceability system. This is an essential aspect for legal compliance, particularly regarding hazardous components and substances.
- Integrate data traceability principles into existing environmental, quality, or sustainability policies, or within the organization's code of conduct, and communicate these commitments openly to promote transparency across both upstream and downstream operations.

7.4 Concluding remarks

The application of ISO 59014 is highly relevant for recyclers of all scales, as it provides a unified framework for managing secondary materials in a way that prioritizes environmental and social sustainability while facilitating traceability. The standard supports responsible practices throughout the value chain and proves particularly beneficial when engaging individuals involved in subsistence activities, helping to enhance their working conditions and inclusion in the formal recycling system.

The results of four pilot projects conducted in different regions and across various recoverable resource streams – such as construction materials and electronic products – demonstrate that implementing ISO 59014 is feasible in the short to medium term. The pilots showed that applying the standard leads to operational improvements, increased recognition of recyclers' contributions to the circular economy, enhanced traceability, and stronger compliance with ESG criteria. Importantly, the pilots also demonstrated the potential to meaningfully engage vulnerable individuals in selected organizational activities.

To fully realize the environmental and social benefits, upscaling the implementation of ISO 59014 is essential. Doing so contributes to resource efficiency and improves the well-being of all actors in the recycling value chain, especially those from vulnerable groups. Ultimately, ISO 59014 serves as a vital tool for promoting sustainable, transparent, and inclusive recycling systems in both local and global markets.

8 Appendix

Appendix 1: ISO 59014 requirements

Core operational requirements

General (6.1)
A fundamental requirement is that organizations shall identify criteria for secondary materials to be recovered following aspects of quality and function with the best environmental and social outcome. This shall be referred from documented studies which follow a life cycle perspective which at least include energy consumption and resource scarcity aspects. If such studies do not provide the desired information, own LCA studies based on ISO standards shall be considered. Considering continual improvement, quantitative and qualitative targets for secondary materials to be recovered shall be identified.

Classification and determination of recovery pathways (6.2)
Based on an established, documented and maintained list of attributes relevant to recoverable resources organizations shall determine recovery pathways and processes based on methodology provided in the standard (Annex B) or alternatively using one based on a life cycle perspective or LCA studies in accordance with the ISO standards. Decisions on the selected recovery pathway need to be documented as well as list of any relevant changes to the recoverable resources handled and the activities and processes applied.

Collection (6.3)
Organizations shall support the separate collection of recoverable resources and support measures to facilitate the return or collection of recoverable resources.

This requirement only applies if the organization operates a collection system or is part of such a system.

Sorting (6.4)
The standard distinguishes between recoverable resources and those non-recoverable as secondary materials.

- **Recoverable resources as products,** components or materials should be directed to non-destructive processing or to organizations which handle these resources for reuse, repairing, refurbishing or remanufacturing.
- **Resources non-recoverable as secondary materials** shall be sent to energy recovery or proper disposal at authorized organizations.

Material recovery processes (6.5)
The processes applied for the recovery of secondary materials shall be done by operating an adequate infrastructure, technology and processes. The selection between non-destructive and destructive processes shall focus on maximizing the quantity and fulfilling the defined quality criteria of the material recovered with the best environmental and social outcome. The latter should be based upon publicly available studies applying a life cycle perspective or on an LCA done by the organization.

Depollution processes shall be done in a way that the release of substances or mixtures to the environment are prevented without applying the concept of dilution.

Logistics (6.6)
Handling, transport and storage of recoverable resources shall be done in a

way that facilitates the recovery as product, component or material ensuring a best environmental outcome using adequate transport, storage, packaging methods and packaging materials.

Core organizational requirements

Monitoring and evaluation (7.1)
A monitoring and evaluation plan shall be established, maintained and implemented regarding among others:

- Issues and risks relevant to the recovery of secondary materials based upon fulfilling the requirements of the standard,
- the application of the code of conduct agreed upon between the organization and its suppliers,
- information about interested parties and their relevant requirements,
- performance against targets, and
- traceability data.

Interested party engagement (7.2)
Cooperation and communication with interested parties which are affected by or can potentially influence its operations are key requirements in the standard. A continuously monitored collaborative structure should facilitate the inclusion of supplier(s), customer(s) and other organizations involved in the collection, classification, sorting, processing, transport and logistics (including business-to-consumers, business-to-business and individuals in subsistence activities) and other interested parties.

Responsibility towards the value chain (7.3)
Organizations "...shall develop or adhere to a value chain code of conduct ..." which includes ethical behaviour, traceability aspects and responsible practices for achieving the quality and targets expected of the secondary material to be recovered. The aspects of the code of conduct (CoC) shall be incorporated in any type of agreement with value chain partners.

The CoC should set among other priorities for reuse before secondary material recovery, and emphasize labour practices and standards e.g. on child labour laws, anti-discrimination practices, health and safety standards, working conditions, working hours, compensation, right to association and freely chosen employment, climate change mitigation measures, anti-corruption measures and fair business practices.

Responsibility towards individuals engaged in subsistence activities (7.4)
Organizations engaging or intending to engage with individuals working in subsistence activities shall create an enabling environment for collaborative work addressing their needs and interests regarding their well-being and livelihoods and their continuous improvement.

This requirement only applies if the organization is engaged or intends to engage with individuals working in subsistence activities.

Equitable working conditions (7.5)
Organizations shall establish decent working conditions, prevent child labour, forced labour harassment and any form of discrimination with a specific focus on vulnerable and disadvantaged workers, women and individuals involved in SAs. Freedom of association and the right to collective bargaining shall be ensured in any case. Safety and occupational health aspects shall encompass free provision of personal protective equipment, toilets and sanitary facilities and

specific safety and health measures and infrastructure for pregnant workers and workers who have recently given birth or are breastfeeding.

Environmental and social risks (7.6.1)
Organisations shall identify social and environmental risks and impacts and address them by developing protocols to prevent, reduce or control them. A communication plan addressing interests and concerns of interested parties shall be put in place

Harmful substances or harmful practices are to be removed if these cannot be properly managed. Otherwise, practices shall be improved to make them safer. Activities and processes for recovering secondary materials should not increase risks of environmental harm arising from the release of hazardous substances.

Health and safety risks of workers and individuals involved in SAs (7.6.2)
The organization shall consider and communicate of health and safety risks, develop protocols for prevention, reduction and control risks.

This shall include own workers and individuals involved in SAs. ***This aspect of the requirement only applies if the organization is engaged or intends to engage with individuals working in subsistence activities.***

Resource use (7.7)
The organisation shall identify opportunities to minimize resource use and implement corresponding measures, e.g. considering replacement and substitution of scarce materials, non-renewable with renewable resources, minimizing energy and fuel use etc. based on a LC perspective.

Operational and managerial competences (7.8.1)
The organisation shall determine and assess the necessary managerial and operational competences of individuals for work under its control that affects the performance and effectiveness of its activities and processes. Training needs to be provided where needed.

Training needs (7.8.2)
The organisation shall identify of training needs for anyone with whom it engages – including individuals engaged in SAs – and plan and conduct training in the areas of need.

Core traceability requirements

General (8.1)
The organization shall develop and implement a traceability system on products, components and materials handled and make publicly available a relevant policy.

Collection of upstream data (8.2)
Upstream data shall include among others confirmation of compliance with CoC from the organizations in its value chain, the sorting attributes and indication of recoverable resources that have completed the appropriate stage identified for non-destructive or destructive processes.

Collection of processing data (8.3)
Processing data shall be preferably categorized by input and output data, and percentage of input routed towards different recovery pathways and shall include information on activities and processes applied including depollution.

Collection of downstream data (8.4)
The percentage of the total amount of outputs routed towards different clients

and recovery pathways or energy recovery or proper disposal shall be retrieved, classifying types of products, components or materials according to a classification system (e.g. UNU Key code for electronic waste).

Collection of depollution data (8.5)
Recoverable resources shall be accompanied by information on removed materials, substances or mixtures, presence of declared hazardous substances when receiving from upstream or delivering downstream. Related information forwarded with the recoverable resources downstream shall document the removed components, materials, substances and mixtures and the routing for proper treatment for recovery, energy recovery or disposal.

Communication (8.6)
Relevant requirements for implementation of the traceability system applied shall be made available effectively across all relevant interested parties, including workers and suppliers with whom the organization has contractual relationships.

Traceability data shall be made available to the organization's immediate downstream and upstream organizations who can require it whereby collaboration with all direct suppliers and other organizations involved in collection, processing and delivery of the materials, components or products is needed.

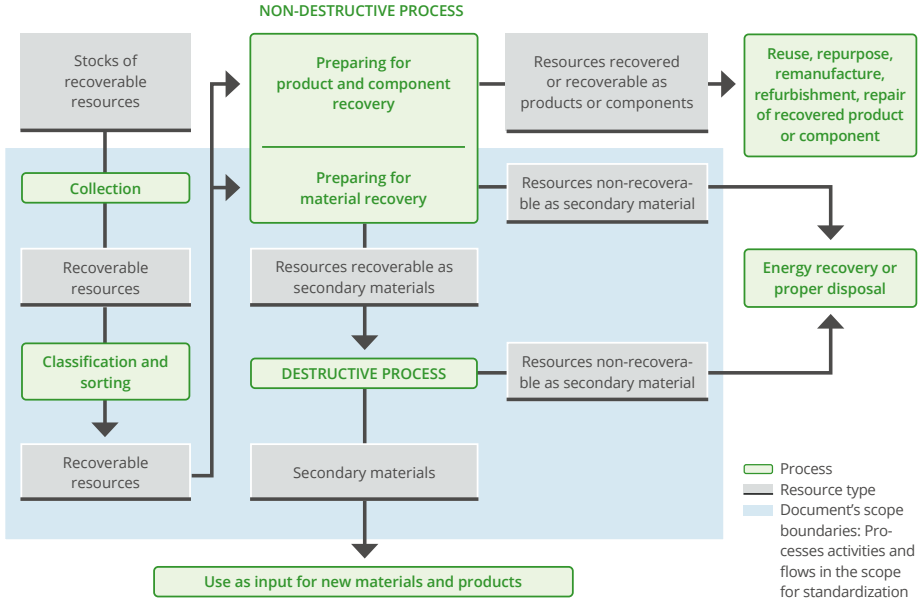
Continual improvement (8.7)
Regular reviews of the effectiveness of the traceability system shall be conducted by the organizations, any aspect revised if found to be ineffective, and enhancements towards continual improvement implemented.

Appendix 2: Questionnaire on ISO 59014 compliance assessment and feasibility of completing gaps identified

Clause 6: Operational requirements

If your organization is concerned with any of the activities and processes within the scope of the standard 59014, continue with the self-assessment.

*** Please indicate your answers with the number one (1), if full compliance. If partial compliance, please indicate (0.5)**



Require-ment #	Score of deviation	6.1 General (if your organization is only concerned with collection by collecting or influencing the collection systems design, it can still identify or define criteria for secondary materials to be recovered, for example, "it has to be valuable, otherwise we do not collect it", "no child labour should be involved, otherwise we do not collect it / do not transfer it forwards nor sell it"		Question does not apply	No	Yes	If not, how feasible do you see its implementation?			
							Not feasible	Low feasibility	Medium feasibility	Highly feasible
1	1	1.1	Has the requirements in clause 6 being applied in accordance with the relevant activities and processes undertaken by the organization?							
2	1	2.1	Has the organization identified or defined criteria for secondary materials to be recovered?							
		2.2	If yes to 2.1., do the criteria take into consideration the quality and function of the secondary materials TB recovered?							
		2.3	If yes to 2.1., do the criteria take into consideration the best environmental and social outcome of the secondary materials TB recovered?							
3	1	3.1	If yes to 2.1., are there documented studies that infer the best environmental and social outcomes for secondary material recovery?							
		3.2	If yes to 3.1., do these studies apply a life cycle perspective?							
		3.3	If yes to 3.1., do the studies consider energy consumption and resource scarcity?							
4	1	4.1	If the studies did not provide sufficient information to define the best environmental outcome when identifying or defining the criteria, has the organization considered conducting studies in accordance with ISO 14040, ISO 14044, and ISO 14075?							
5	1	5.1	If ISO 14040, ISO 14044, and ISO 14075 were not applied, has the organization documented a rationale for the choice?							
6	1	6.1	Based on the properties of the incoming recoverable resources, has the organization identified quantitative and qualitative targets for the recovery of secondary materials?							
		6.2	If yes to 4.1, does the organization consider continual improvement when setting targets for the recovery of secondary materials?							

								If not, how feasible do you see its implementation?			
Require-ment #	**Score of deviation**	**6.2 Classification** (acc. to a list of attributes of recoverable resources received such as product, component and material type and characteristics, hazard potential, process requirements, repairability) **and determination of recovery pathways. Answer these questions if your organization is concerned with collection by collecting or influencing the collection systems design.**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
7	2	7.1	Has the organization established, documented, and maintained a list of attributes (e.g. component and material (3.122) type and characteristics, hazard (3.8) potential, process requirements, repairability.) relevant to the recoverable resources it handles?							
		7.2	If yes to 5.1, which is the list of attributes and how did you come up with this list?							
8	1	8.1	Does the organization apply a methodology, such as the one described in informative Annex B, to determine the recovery pathway?							
9	1	9.1	If an alternative methodology to Annex B has been chosen, does it aim for the best environmental outcome based on life cycle thinking?							
10	1	10.1	If an alternative methodology was used, has the rationale for its choice been documented?							
		10.2	Has your organization used publicly available studies based on life cycle thinking to supplement Annex B?							
		10.3	Has your organization conducted a life cycle assessment (LCA) in accordance with ISO 14040 and ISO 14044 to compare the environmental outcomes of different recovery pathways?							
11	1	11.1	Has the organization identified each delivery of recoverable resources received in accordance with the list of established attributes?							
12	1	12.1	Has the documented information about the identification process for each delivery been maintained as part of your traceability system?							
13	1	13.1	If data about attributes was not available, has your organization applied measures such as testing the received batch of recoverable resources?							
14	1	14.1	Has the organization documented how decisions regarding the recovery pathway for each delivery were made?							
15	1	15.1	Has the organization ensured that the list of attributes is kept up to date with any relevant changes to the recoverable resources or the processes applied?							
Require-ment #	**Score of deviation**	**6.3 Collection. Answer these questions if your organization is concerned with collection by collecting or influencing the collection systems design.**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
16	2	16.1	Where there is influence on collection systems design, does the organization support the separate collection of recoverable resources (e.g., through the provision of separate containers or separate collection points)?							
17	1	17.1	Where there is influence on collection or return, does the organization support the development and implementation of mesures to facilitate the return or collection of recoverable resources returned or collected (e.g., by supporting collectors with materials lists, communication campaigns, and take-back scheme in place)?							
Require-ment #	**Score of deviation**	**6.4 Sorting. Answer these questions if your organization ~~is~~ sorts or has an influence on sorting practices.**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
18	2	18.1	Does the organization consistently sort recoverable resources in accordance with the identified attributes?							
19	1	19.1	When sorting recoverable resources, does the organization employ appropriate sorting technologies and practices to facilitate the achievement of the defined criteria?							
20	1	20.1	After sorting, have non-recoverable secondary materials been sent to energy recovery or proper disposal at authorized organizations, where available?							
		20.2	If authorized organizations were not available, have these materials been sent to organizations that handle them properly?							
21	2	21.1	After sorting, have resources that are recoverable as products, components, or materials been sent for proper non-destructive processing or to authorized organizations for reuse, repairing, or refurbishing?							
22	1	22.1	Does the organization maintain separation between recoverable resources for which it has traceability data and those for which it does not?							
23	1	23.1	If maintaining this separation is not feasible, has the entire consignment been considered not traceable in accordance with the requirements of this document?							

								If not, how feasible do you see its implementation?			
Require-ment #	**Score of deviation**	**6.5 Material Recovery Processes. Answer these questions if your organization is conducting material processing or has an influence on material recovery processes.**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
24	2	24.1	Does the organization keep recoverable resources that have been sorted into material types separate to facilitate further processing?							
25	1	25.1	When preparing for material recovery, does the organization operate and maintain an adequate infrastructure, technologies, and practices that facilitate achieving the criteria defined for secondary materials to be recovered?							
26	2	26.1	Does the selection of non-destructive and destructive processes, or any combination thereof, focus on maximizing the quantity and on fulfilling the defined quality criteria of the material recovered, with the best environmental and social outcome?							
27	1	27.1	Are decisions regarding the choice of processes supported by using publicly available studies based on life cycle thinking to compare the environmental outcomes of the different processing options?							
		27.2	If no to 20.1, are decisions regarding the choice of processes supported by conducting a life cycle assessment (LCA in accordance with ISO 14040 and ISO 14044) to compare the environmental outcomes of the different processing options?							
28	2	28.1	Are depollution processes undertaken in such a way that prevents the release of any substances or mixtures to the environment?							
29	2	29.1	Is dilution of the concentration of substances or mixtures to be removed avoided as part of the depollution process?							
30	1	30.1	Is depollution carried out by personnel who are competent based on appropriate education, training, or experience regarding depollution?							
31	2	31.1	Does the organization route any resulting hazardous substances and components to proper further treatment?							
Require-ment #	**Score of deviation**	**6.6 Logistics**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
32	2	32.1	Does the organization handle, transport, and store recoverable resources in a manner that facilitates their subsequent recovery as whole products, components, or materials?							
		32.2	Is the way that the handling, transporation and storing of these recoverable resources done ensure the best environmental outcome?							
33	2	33.1	Are resources that are not recovered as materials, components, or products handled, transported, and stored in a way that facilitates their energy recovery or proper disposal?							
34	2	34.1	Are adequate transport, storage, packaging methods, and packaging materials used to prevent environmental and human health risks?							
		34.2	Are adequate transport, storage, packaging methods, and packaging materials used to minimize damage to recoverable resources?							
35	2	35.1	Are adequate transport, storage, packaging methods, and packaging materials used to reduce resource use?							

								If not, how feasible do you see its implementation?			
Require-ment #	Score of deviation	7.1 Monitoring and evaluation			Question does not apply	No	Yes	Not feasible	Low feasibility	Medium feasibility	Highly feasible
36	2	1	36.1	Has the organization established, implemented, and maintained a monitoring and evaluation plan?							
37	2	2	37.1	Does the organization regularly monitor and review issues that are relevant to the recovery of secondary materials and that affect its ability to fulfill the requirements in this document?							
			37.2	Does the organization regularly monitor and review the measures and means required?							
			37.3	Does the organization regularly monitor and review the application of the code of conduct where it has been agreed to between the organization and the suppliers?							
			37.4	Does the organization regularly monitor and review information about interested parties and their relevant requirements?							
			37.5	Does the organization regularly monitor and review evidence of competence of individuals doing work under its control that affects the performance and effectiveness of its activities and processes?							
			37.6	Does the organization regularly monitor and review performance against targets, such as the percentage of secondary material							
			37.7	Does the organization regularly monitor and review traceability data in accordance with clause 8?							
38	1	3	38.1	Are workers informed of the monitoring results?							
39	1	4	39.1	Does the organization retain appropriate documented information?							
40	2	5	40.1	Does the organization take into account the interests and concerns of interested parties that are affected by or can potentially have an effect on its operations?							
41	1	6	41.1	Has the organization established clear and accessible channels for two-way communication with the interested parties identified?							
			41.2	Has the organization established measures to prevent conflicts with the interested parties identified and grievance mechanisms to resolve active ones?							

									If not, how feasible do you see its implementation?			
Require-ment #	**Score of deviation**	**7.3 Responsibility towards the value chain**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
42	2	42.1	Has the organization developed or adhered to a value chain code of conduct?							
		42.2	If yes to 8.1, has the organization communicated the value chain code of conduct as an expectation of the organization?							
43	1	43.1	If yes to 8.1, does the value chain code of conduct refer to ethical behavior, traceability aspects, and responsible practices for achieving the quality and targets expected of the secondary material to be							
44	1	44.1	Does the organization incorporate the value chain code of conduct aspects into any type of agreement with the organizations concerned along the value chain?							
Recom-mendation	0		Does the code of conduct prioritize reuse before processes and activities for secondary material recovery?							
			Does the code of conduct include labour practice and standards such as child labour laws, anti-discrimination practices, health and safety standards, working conditions, working hours, compensation, right to association, and freely chosen employment?							
			Does the code of conduct include climate change mitigation measures and pollution prevention during product and material use, extraction, production, recovery, disposal, and transportation?							
			Does the code of conduct include anti-corruption measures such as those addressed in ISO 37001?							
			Does the code of conduct include fair business practices (e.g., upstream in the supply chain)?							
			Does the code of conduct include a review and documentation policy?							
Recom-mendation	0		Has the organization established procurement criteria in accordance with the value chain code of conduct developed?							
45	1	45.1	Has the organization identified capacity development needs in the value chain and provided corresponding training options for properly applying the code of conduct, based on the properties of the incoming recoverable resources and considering continual improvement?							

							If not, how feasible do you see its implementation?			
Require-ment #	**Score of deviation**	**7.4 Responsibiliy towards individuals engaged in subsistence activities (SA)**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
46	2	46.1	Does the organization create an enabling environment to work collaboratively with organizations or individuals involved in SAs?							
		46.2	Does the environment address the organizations or individuals involved in SAs needs and interests with regards to their well-being and livelihoods?							
Recom-mendation	0		Where applicable, has the organization developed mechanisms for supporting any individuals involved in subsistence activities (SAs), who are part of its value chain, in the continual improvement of their well-being, livelihoods and professional practices?							
Require-ment #	**Score of deviation**	**7.5 Equitable working conditions (During activities and processes to recover secondary materials)**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
47	2	47.1	Has the organization established decent work conditions in their own operations?							
		47.2	Does the organization take measures to prevent child labor, forced labor, harassment, and any form of discrimination, with a specific focus on vulnerable and disadvantaged workers, women, and individuals involved in subsistence activities with whom the organization engages with?							
		47.3	Does the organization provide personal protective equipment (PPE) to workers?							
		47.4	Are toilet and sanitary facilities regularly accessible to workers?							
		47.5	Has the organization put in place safety and health measures and infrastructure for pregnant workers and workers who have recently given birth or are breastfeeding?							
48	1	48.1	Does the organization ensure freedom of association and the right to collective bargaining?							
		48.2	Does the organization inform workers of any existing collective bargaining agreement at workplace sites?							
		48.3	If the formation of workers' associations or unions is prohibited in the country of operations, does the organization provide other mechanisms to engage in a dialogue with workers (such as a health and safety committee with representatives from workers and management)?							

Require-ment #	Score of deviation	7.6 Risks		Question does not apply	No	Yes	If not, how feasible do you see its implementation? Not feasible	Low feasibility	Medium feasibility	Highly feasible
7.6.1 Environmental and social risks										
49	2	49.1	Does the organization undertake actions to address identified environmental and social risks arising from its activities for the recovery of secondary materials?							
		49.2	Has the organization developed protocols to prevent, reduce, or control social or environmental risks and adverse social or environmental impacts from releases?							
		49.3	Has the organization developed protocols, activities, processes, and mechanisms to aid and accelerate the recovery of ecosystems that have been degraded or destroyed by its activities? Does the organization ensure financing for preventive and restorative measures?							
50	1	50.1	Has the organization implemented a communication plan to address the interests and concerns of interested parties?							
		50.2	If yes to 23.1, does the communication plan consider any risks to the environment or the community related to its processes and activities?							
		50.3	If yes to 23.1, does the communication plan include protocols for preserving healthy and safe living conditions?							
		50.4	If yes to 23.1, does the communication plan include emergency protocols (e.g., explosion, fire, contamination, or accident)?							
51	1	51.1	Does the organization seek to identify information that helps it prevent or mitigate risks when the risks of current practices are not well understood?							
52	1	52.1	Has the organization removed harmful substances from the activities and processes where it has identified that it is not properly managing them?							
		52.2	Has the organization improved practices to make them safer in situations where it has identified that it is not properly managing harmful substances or is engaging in harmful practices?							
Recom-mendation	0		Do the activities and processes for recovering secondary materials not increase the risks of environmental harm from releases of hazardous substances?							
7.6.2 Health and safety risks of workers and individuals involves in SAs										
53	2	53.1	Does the organization consider health and safety risks for secondary material recovery at the workplace of their workers and individuals involved in SAs with whom the organization is engaging?							
		53.2	Has the organization developed protocols to prevent, reduce, or control health and safety risks for secondary material recovery							
		53.3	Does the organization communicate these risks to those concerned?							

							If not, how feasible do you see its implementation?			
Require-ment #	Score of deviation	7.7 Resource use		Question does not apply	No	Yes	Not feasible	Low feasibility	Medium feasibility	Highly feasible
54	2	54.1	Does the organization identify opportunities to minimize resource use?							
		54.2	Does the organization implement corresponding measures to minimize resource use?							
Recom-mendation	0		Does the organization consider replacing materials made from primary resources with secondary materials when it represents the best environmental outcome based on life cycle thinking?							
			Does the organization reduce or subsitute the use of materials, particularly those that are likely to be scarce for current and future generations?							
			Does the organization prioritize replacing non-renewable resources with renewable resources when it represents the best environmental outcome based on life cycle thinking?							
			Does the organization avoid, reduce, or substitute the use of resources that pose a risk to the environment and human health, such as very persistent, very bioaccumulative (VPVB) substances?							
			Does the organization minimize energy or fuel use when transporting, sorting and processing recoverable resources or secondary materials?							

							If not, how feasible do you see its implementation?		
Require-ment #	Score of deviation	7.8 Competencies and training	Question does not apply	No	Yes	Not feasible	Low feasibility	Medium feasibility	Highly feasible
7.8.1 Operation and managerial competencies									
55	2	55.1 Has the organization determined the necessary operational competencies of individuals doing work under its control that affects the performance and effectiveness of its activities and processes?							
		55.2 Has the organization appointed individuals with the required competencies responsible for the operational activities and processes, and activities or management processes, with a description of the roles of this position?							
		55.3 Does the organization assess whether individuals concerned possess the identified competencies?							
		55.4 Where applicable, has the organization taken actions to ensure that individuals are competent based on appropriate education, training, mentoring, or experience?							
		55.5 Does the organization evaluate the effectiveness of these actions?							
7.8.2 Training needs									
56	2	56.1 Has the organization identifed training needs for any organization with whom it engages, such as suppliers, subcontractors, and individuals engaged in SAs?							
57	1	57.1 Does the organization plan and conduct training activities in the areas of need?							
58	1	58.1 If yes to 35.1, do the training activities include training on the organization's value chain code of conduct?							
59	1	59.1 Does the organization provide guidance, training, and awareness-raising to workers in appropriate forms, manners, and languages?							
60	1	60.1 Does the guidance cover topics such as occupational health and safety, emergency response, first aid, safe handling, collection, classification, sorting, logistics, and in-depth training in treatment processes?							
61	2	61.1 When the organization engages with individuals involved in SAs, are they provided with guidance, training, and awareness-raising in appropriate forms, manners, and language(s), at least on operating safely, emergency response topics, and standard operating procedures (SOPs)?							

								If not, how feasible do you see its implementation?			
Require-ment #	**Score of deviation**	**8.1 General**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
62	2	62.1	Has the organization developed and implemented a traceability system that includes procedures?							
		62.2	Has the organization developed and implemented a relevant policy for the traceability system?							
63	1	63.1	Is the policy publicly available?							
64	2	64.1	Does the organization collect data about the products, components, or materials handled?							
65	1	65.1	Is a justification provided if traceability data cannot be accessed?							
Require-ment #	**Score of deviation**	**8.2 UPSTREAM: Does the collected data cover the following minimum requirements**		**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
66	1	66.1	Name and address of the organizations in its value chain with which it has contractual relationships. Organizations in the value chain can include those doing collection, processing, and delivery of the consignment of products, components, or materials, including the names of the responsible staff.							
		66.2	Confirmation of compliance with the code of conduct from the organizations in its value chain with which it has contractual relationships.							
		66.3	Date of receipt of the recoverable resource and their date of release or shipment.							
		66.4	Origin (address) of the consignment.							
		66.5	Unique reference number of the recoverable resource							
		66.6	If no to 8.2, has the organization assigned one?							
		66.7	Classification system used for classifying products, components, or materials (e.g., UNU Key-code for electronic waste).							
		66.8	Assigned attributes for sorting.							
		66.9	Indication of recoverable resources that have completed the appropriate stage identified for nondestructive or destructive processes							

							If not, how feasible do you see its implementation?		
Require-ment #	**Score of deviation**	**8.3 DURING PROCESSING: Does the collected data cover the following minimum requirements**	**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
67	1	67.1 Inputs by mass or volume (in SI units) or number of units, preferably categorized by product, component or material types, according to the Harmonized System (HS code);							
		67.2 Percentage of the total amount of inputs routed towards different recovery and final treatment pathways, identifying main activities and processes applied including depollution;							
		67.3 Outputs by mass or volume (in SI units) or number of units, preferably categorized by product, component or material types, according to the Harmonized System Codes (HS Codes);							
Require-ment #	**Score of deviation**	**8.4 DOWNSTREAM: Does the collected data cover the following minimum requirements**	**Question does not apply**	**No**	**Yes**	**Not feasible**	**Low feasibility**	**Medium feasibility**	**Highly feasible**
68	1	68.1 Name and address of the receiving organizations;							
		68.2 Shipment address;							
		68.3 Percentage of the total amount of outputs routed towards different clients and final treatment pathwayS, identifying types of products, components or materials;							
		68.4 Unique reference number (e.g. products or components identification or batch number) generated with commonly accepted code systems; if not available, the organization should assign one;							
		68.5 Classification system used for classifying products, components or materials;							
		68.6 Assigned attributes for sorting;							
		68.7 Indication of recoverable resources that have completed the appropriate stage identified for nondestructive or destructive processes							

							If not, how feasible do you see its implementation?		
Require-ment #	Score of deviation	8.5 Depollution	Question does not apply	No	Yes	Not feasible	Low feasibility	Medium feasibility	Highly feasible
69	2	69.1 If depollution is carried out, are the recoverable resources accompanied by the related information when receiving them from upstream or delivering them downstream?							
		69.2 If yes to 29.1, does the information include the component, materials, substances, or mixtures fully or partially removed?							
		69.3 If yes to 29.1, does the information include the presence of declared hazardous substances and their concentration?							
		69.4 If yes to 29.1,does the information include documentation demonstrating proper treatment for recovery or final treatment?							
70	1	70.1 If data upstream or data downstream cannot be collected, is a justification provided?							
Require-ment #	Score of deviation	8.6 Communication	Question does not apply	No	Yes	Not feasible	Low feasibility	Medium feasibility	Highly feasible
71	1	71.1 Does the organization adhere to a recognized model, such as ISO 22095, or equivalent when communicating about the traceability of materials?							
72	1	72.1 Are the relevant requirements for the implementation of the traceability system effectively communicated across all relevant interested parties, including workers and suppliers with whom the organization has contractual relationships?							
73	1	73.1 Is traceability data made available to the organization's immediate downstream and upstream organizations who can require it?							
74	1	74.1 Does the organization take measures to engage and collaborate with all direct suppliers and other organizations involved in the collection, processing, and delivery of materials, components, or products, and support them with their data gathering?							
Require-ment #	Score of deviation	8.7 Continual Improvement	Question does not apply	No	Yes	Not feasible	Low feasibility	Medium feasibility	Highly feasible
75	1	75.1 Does the organization undertake regular reviews of the effectiveness of the traceability system and revise any aspect found to be							

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