CWEEEP Pilot Solutions Consolidated Report

Interreg CENTRAL EUROPE
Co-funded by the European Union

Circular WEEEP

I. CONTENT

II. ABBREVIATIONS

BP	Best Practices
EC	European Commission
EEE	Electrical and Electronic Equipment
EP	European Parliament
EPR	Extended Producer Responsibility
ERDF	European Regional Development Fund
EU	European Union
E-waste	Electronic waste
KPI	Key Performance Indicator
MA	Market Assessment
OECD	Organization for Economic Co-operation and Development
TBD	Take-back scheme
SWOT	Strengths, Weaknesses, Opportunities, and Threats
WCO	World Customs Organization
WEEE	Waste Electrical and Electronic Equipment
WEEEP	Waste Electrical and Electronic Equipment and Plastics (packaging)

III. Executive summary

Circular WEEEP is an Interreg Central Europe initiative aimed at transforming e-waste management through a holistic approach spanning the entire lifecycle of electronics. Five pilot actions were implemented, each targeting a different stage or aspect of WEEE (Waste Electrical and Electronic Equipment) management. These pilots – **WEEE Design**, **WEEE Collect & Market**, **WEEE Social**, **WEEE Lives**, and **WEEE Aware** – addressed eco-design, digital collection platforms, social enterprise involvement, reuse/repair, and awareness-raising respectively. Below, we present a structured consolidation of all five pilot solutions, detailing each pilot's objectives, methodologies, achieved outcomes, and guidance for transferability to other regions.

This Consolidated Report brings together the outcomes of the five CWEEEP pilot actions—**WEEE Design, WEEE Collect & Market, WEEE Social, WEEE Lives, and WEEE Aware**—and synthesizes their objectives, methodologies, results, and transferability potential. Together, these pilots demonstrate that effective WEEE management requires a **systemic, multi-stakeholder approach**, spanning from product design to consumer behavior and policy frameworks.

Figure 1: WEEE Lifecycle

Key Findings Across the Five Pilots

- **WEEE Design** focused on eco-design and open product information. It developed and tested practical assessment tools to evaluate the circularity of electronic products and producers' readiness to share technical data. The pilot highlighted strong interest among stakeholders beyond manufacturers (designers, repairers, recyclers), while also revealing structural barriers to deeper producer engagement

without regulatory incentives. Its main value lies in providing reusable tools and evidence to support policy measures promoting circular product design.

- **WEEE Collect & Market** explored digital solutions for WEEE collection and secondary raw material markets. The pilot delivered a transnational online platform prototype and, crucially, generated lessons on what is and is not feasible in practice. It showed that digital platforms must complement—not duplicate—existing local systems, and that secondary raw materials from WEEE are best addressed through **B2B matchmaking rather than consumer marketplaces**. The pilot's outcomes serve as a realistic blueprint for future ICT-based WEEE solutions.
- **WEEE Social** examined the integration of social economy enterprises into WEEE management. While no full operational pilot was implemented, the action delivered an in-depth analysis of legal, operational, and capacity barriers. It produced clear recommendations for future implementation, including the need for standardized cooperation models, training, investment in social enterprises, and enabling policy frameworks. The pilot lays a solid foundation for follow-up projects that combine circular economy goals with social inclusion.
- **WEEE Lives** demonstrated the effectiveness of school-based e-waste collection combined with education, repair, and reuse activities. Engaging 78 schools across four countries, the pilot collected around **20 tonnes of WEEE**, activated thousands of students and families, and showed that even a small share of collected devices can be reused or repaired. Beyond quantitative results, the pilot achieved strong behavioral change and community engagement, proving that schools can act as powerful hubs for circular economy action.
- **WEEE Aware** focused on education and awareness-raising in schools and communities. By providing ready-to-use educational materials, teacher support, and interactive activities, the pilot successfully embedded WEEE topics into school environments where they were previously absent. It reached hundreds of schools and led to tangible changes in student and household behavior regarding e-waste disposal. The modular and scalable design of this pilot makes it highly suitable for wider replication at regional or national level.

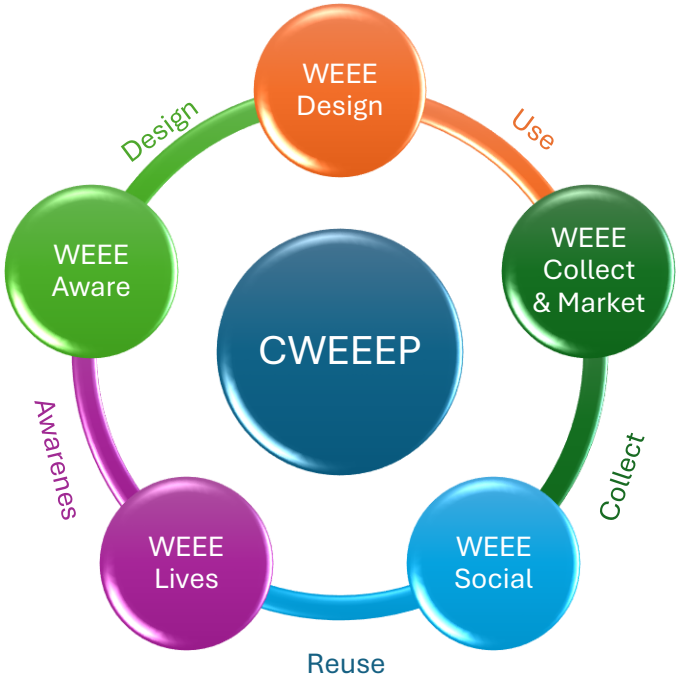

Figure 2: Pilots lifecycle logic

Overall Added Value of the CWEEEP Pilots

Taken together, the five pilot actions demonstrate that **no single solution can address WEEE challenges in isolation**. Instead, impact emerges from the combination of:

- upstream measures (eco-design and product information),
- enabling systems (digital tools and markets),
- inclusive governance (social enterprises),
- practical action (collection, reuse, repair),
- and long-term behavior change (education and awareness).

The CWEEEP pilots collectively provide:

- tested tools and methodologies,
- concrete quantitative and qualitative evidence,
- clearly identified barriers and success factors,
- and well-founded recommendations for policy improvement and replication.

Relevance for Policy and Transferability

The results of CWEEEP are directly relevant for managing authorities, policymakers, and practitioners working on WEEE, circular economy, and sustainability. The pilots support:

- improved policy instruments on eco-design, reuse, and WEEE governance,
- better alignment between regulatory ambition and operational feasibility,
- and stronger integration of social and educational dimensions into waste management systems.

This Consolidated Report therefore serves both as a **practical manual of tested solutions** and as a **strategic input for future policies and projects**, ensuring that CWEEEP's outcomes continue to generate impact beyond the lifetime of the project.

Figure 3: From Product Design to Citizen Awareness

IV. WEEE Design (Eco-Design Pilot by RERA SD)

OBJECTIVES

The WEEE Design pilot (led by RERA SD) focused on **enhancing product design for circularity** – encouraging manufacturers to make electronics easier to dismantle, repair, and recycle. Key objectives included:

- Promoting **eco-design practices** in EEE (Electrical and Electronic Equipment) to combat planned obsolescence and improve recyclability.
- Increasing awareness and adherence to EU Ecodesign and WEEE directives among producers.
- Supporting the collection and sharing of **open technical data** (e.g. repair manuals) to enable device repair, refurbishment, and second-life uses.

Quantitatively, the pilot set out to **engage at least 200 companies**, involve 100 in awareness activities, conduct 20–30 in-depth company assessments, and spur the redesign or documentation of over 50 products for improved circularity.

METHODOLOGIES AND TOOLS

To achieve these goals, RERA SD and partners developed practical tools and followed a phased approach:

- **Eco-Design Assessment Tools:** In collaboration with BOKU University, two complementary tools were created: (1) a **Questionnaire on Open Data for Producers** to evaluate companies' willingness to share technical and repair information (facilitating open documentation), and (2) a **WEEE Design Evaluation Manual & Questionnaire** to assess product design against key criteria (ease of dismantling, material separability, recycling labeling, reuse potential, etc.). These tools provided a structured way to measure current design practices and identify improvements.
- **Stakeholder Outreach (Phase 1 & 2):** The pilot team conducted direct outreach to EEE producers across the region and EU, introducing the assessment program. Initial engagement was lower than expected – many companies lacked resources or familiarity with circular design. To boost participation, an **awareness campaign** was launched, including a public webinar "Sustainable Design and ESPR Compliance" to highlight regulatory requirements and business benefits of circular design. This improved visibility and knowledge, though conversion into active assessments remained modest.
- **Expanded Engagement (Phase 3):** Recognizing the need to broaden involvement, outreach was extended beyond manufacturers to others in the value chain – **repairers, refurbishers, recyclers, designers**, and industry associations. Over 1,300 invitations were sent, yielding **204 completed questionnaires (~15.7% response rate)**. Notably, only 38 respondents (~19%) were actual EEE producers, highlighting the challenge of engaging manufacturers directly.

- **Follow-Up Assessments:** In the final stage, the most engaged companies were offered a **Circular EEE Design self-assessment tool** for deeper evaluation of their product's environmental performance. This allowed committed producers/designers to identify improvement opportunities in energy efficiency, material selection, recyclability, and end-of-life management, thereby providing tailored guidance for eco-design improvements.

Figure 4: Methodology of the WEEE Design Pilot

ACHIEVED OUTCOMES

Despite challenges in producer engagement, the WEEE Design pilot delivered several valuable outcomes:

- **Development and Testing of Tools:** The pilot produced validated **eco-design assessment instruments** (questionnaires and manuals) that can be reused in future initiatives. These tools were piloted with real companies, providing proof-of-concept for evaluating design circularity.
- **Stakeholder Engagement:** In total, **200+ stakeholders** across the EEE value chain were engaged or reached through outreach and awareness efforts. While direct participation by manufacturers was limited, the inclusion of repair shops, recyclers, and designers proved the importance of a broader stakeholder approach.
- **Quantitative Targets Met (Outreach):** The project met its outreach targets by contacting well over the planned 200 companies and collecting 204 responses to the survey. However, the target of 20–30 detailed company design assessments was not fully realized due to the low number of producers willing to undergo full evaluation (only 38 producers responded). This underscores a need for longer timelines or incentives for deep industry participation.

- **Raised Awareness and Capacity:** The pilot raised awareness of **circular design principles** and upcoming regulatory obligations (like the EU Sustainable Products Initiative/ESPR) among companies in the region. It provided direct feedback and support to those producers who did engage, helping them understand how to improve product durability and document repair information.
- **Policy and Data Contributions:** An additional benefit was the contribution to open data – some participating companies shared technical and repair documentation, feeding into collective resources for reuse/refurbishment. The experiences and data gathered also offer evidence to inform regional policies on promoting eco-design (e.g. showing where companies struggle and what support they need).

TRANSFERABILITY GUIDANCE

The WEEE Design model is **highly transferable** to other regions aiming to improve product circularity, provided certain conditions are in place. Key lessons for replication include:

- **Leverage Incentives and Partnerships:** Simply raising awareness is not sufficient to spur companies into action. Future transfers of this pilot should **integrate regulatory or market incentives** (e.g. link assessments to compliance requirements or recognition programs). Collaboration with industry associations and chambers can lend credibility and motivate producers to participate.
- **Keep Tools Simple and Modular:** The feedback indicated that assessment tools must be **user-friendly and adaptable** to companies' real processes. Regions replicating this should use or refine the provided questionnaires/manuals, ensuring they are not too time-consuming and can be modular (allowing companies to engage at different depths).
- **Broaden the Stakeholder Net:** Including **designers, recyclers, repair experts, and academia** can enrich the initiative and compensate for low manufacturer engagement. These groups often welcome eco-design training and can create bottom-up pressure for better product design. Transferring regions should set up a multi-stakeholder network early, rather than relying solely on manufacturers.
- **Scalability:** The approach of combining outreach with technical tools is scalable transnationally. The pilot demonstrated that with **digital distribution of questionnaires and online webinars**, outreach can extend across borders. However, to replicate effectively, **local adaptation** is needed – e.g. translate materials, consider local industry sectors, and align with each country's regulations. The pilot's methodology and tools **"can be transferred and scaled in other regions," especially if supported by policy incentives or industry engagement programs**.

V. WEEE Collect & Market (Transnational Digital Platform Pilot by ASSO & PoR)

OBJECTIVES

The WEEE Collect & Market pilot consisted of two intertwined solutions aimed at modernizing e-waste logistics and trading through ICT. The core objectives were:

- **WEEE Collect:** Develop a **transnational online platform** for WEEE collection requests and coordination. The idea was an easy, multilingual web tool for citizens or organizations to schedule e-waste pickups and link with waste handlers, creating a cross-border collection system.
- **WEEE Market:** Create an **online marketplace for secondary raw materials** from WEEE recycling – essentially an "Amazon of circularity" where output materials (like plastics, metals, components from e-waste) could be listed by treatment plants and purchased by end-users or small businesses. This aimed to foster a direct secondary materials market accessible to a broad audience.

These ambitious objectives sought to integrate what are typically local waste management processes into a **single digital solution at Central Europe level**. The platform was developed by lead partner **ASSO**, with dissemination led by **PoR (Province of Rimini)**.

METHODOLOGIES AND TOOLS

The implementation of WEEE Collect & Market involved developing the digital platform and iteratively adjusting its scope in response to practical challenges:

- **Platform Development:** ASSO built the ICT platform with an initial design to serve both local needs (starting in Italy) and transnational scalability. It was launched in a bilingual format (English and Italian) to cater to international users while piloting in a local context (Rimini province). Key features included a user interface for **collection requests (WEEE Collect)** and a section for listing available recycled materials (WEEE Market). The **front-end was in English** to attract broad interest, and a back-end allowed addition of country-specific sections.
- **Confronting Local Duplication:** Early on, the team discovered a **major constraint**: in Rimini, a very sophisticated local waste app ("Rifiutologo") already handled waste collection bookings. To avoid redundancy, the pilot **pivoted** its strategy. Instead of competing with the local tool, the platform's value was reframed as a **transnational model** for other regions. This led to the decision to emphasize the English version for demonstration purposes and later add local-language sections for other countries (e.g., a Czech section was added). This pragmatic adjustment turned the platform into a showcase of how such a system could be implemented elsewhere, rather than a direct service to Rimini's residents (already served by existing infrastructure).

- **Stakeholder Engagement:** PoR handled dissemination, but faced difficulties engaging the local waste operator (HERA) which saw the new platform as a competitor to its services. The lesson learned was the importance of **early co-design with local operators** – their formal involvement was missing, causing initial resistance. In later stages, project partners organized discussions during transnational meetings (e.g., in Lublin, Sep 2025) to integrate feedback and agree on adding **nationally tailored sections** to the platform for each country.
- **Adapting the Marketplace Model:** The original concept of a public **B2C marketplace for secondary raw materials** proved unworkable. Research and industry feedback revealed that European secondary materials markets are highly **fragmented, technical, and B2B-oriented**, not open commodity markets for consumers. Mid-pilot, the team **redesigned the WEEE Market component as a B2B "matchmaking" portal** instead. Rather than individual citizens buying recovered materials, the platform now facilitates contact between recycling plants and qualified bulk buyers (e.g. manufacturers needing recycled inputs). This shift aligned the platform with real-world market dynamics (where transactions require large volumes, material certifications, and long-term contracts). The adaptation was a necessary compromise that still achieves the goal of improving reuse of secondary materials, but through **coordination of existing B2B supply chains** instead of creating a new consumer market.

ACHIEVED OUTCOMES

The WEEE Collect & Market pilot yielded a functioning platform and important insights, even though some initial ambitions were scaled back. Key outcomes include:

- **Digital Platform Prototype:** A **transnational WEEE platform** was developed and made available online. It successfully integrated features for e-waste collection logistics and a marketplace interface. This platform served as a **proof-of-concept** for an ICT tool in WEEE management, with a focus on demonstrating replicability. User engagement metrics on the platform **exceeded the project's original targets**, indicating strong interest[1]. Notably, much of the web traffic came from international stakeholders (municipalities, agencies, etc.) looking for models to adopt, rather than from local Italian users[1]. This confirms that the pilot had greater value as a *model* than as a local service.
- **Increased Knowledge & Visibility:** Through the pilot, the consortium identified critical **gaps between theory and practice**. For example, they documented the economic infeasibility of on-demand household WEEE pickup without incentivizing the waste operator. This kind of lesson, while a setback for implementation, is a valuable outcome for policy makers: it highlights that requiring a private or municipal waste company to implement costly new services (like unscheduled pickups) is unrealistic without subsidies or regulation. Similarly, the attempt at a consumer-facing marketplace exposed the **lack of liquidity and standards in secondary materials markets**, a finding that can guide future projects or policies. These insights were captured in a lessons-learned report for use in future "capitalization" projects (i.e. follow-up initiatives building on this experience).

- **Engagement of Multiple Regions:** By project's end, additional country-specific sections were initiated (e.g., a Czech section of the platform came online later in the pilot). This indicates the platform's content was being localized, involving partners from Czech Republic, Poland, Slovenia, etc. While full deployment in each country was limited by time and resources, the **framework for a decentralized transnational platform** was established. The platform's architecture now accommodates different languages and national information, thanks to the agreed approach where each partner maintains their local data pages.
- **Model for Replication:** One of the less tangible but important outcomes is that the pilot **demonstrated a scalable model** for digital WEEE management that others can learn from. The fact that international interest was high shows a demand for such solutions. Local authorities and city administrators from outside Italy viewed the platform as a **best-practice example** of a structured, scalable e-waste collection system that could be adapted to their context. This reputational outcome positions the CWEEEP platform as a reference point for any region aiming to introduce an ICT tool for WEEE logistics.

It should be noted that **quantitative on-the-ground results (e.g. tons collected or transactions made)** were not a primary success of this pilot – the local uptake in Rimini was minimal due to overlapping services, and the marketplace was not launched in its original form. Instead, the success lies in **validating what works and what doesn't** in a transnational e-waste platform, providing a knowledge base for future efforts.

Platform URL:
www.cweeepplatform.com

TRANSFERABILITY GUIDANCE

The WEEE Collect & Market solution is inherently designed to be replicable (transnational). To transfer this pilot to other regions, the following guidance and scalable elements are emphasized:

- **Adapt to Local Context:** A clear lesson is that "one size fits all" doesn't work. Any region adopting this platform model must explicitly account for **local waste management systems and regulations**. For instance, if a city already has a robust collection app, the solution should *complement* rather than duplicate it. This might mean focusing the platform on underserved areas or on coordinating between regions instead of local citizen services. The pilot proved that the concept is **"easily adaptable to local context" when designed as a modular, replicable model**. Separate the platform's **transnational components** (e.g. sharing general best practices, marketplace listings) from **localized components** (local pickup scheduling, national legal info) – each country or city section should be customized accordingly.
- **Engage Stakeholders Early:** Replication should involve **co-design with local waste operators and authorities from the start**. The pilot's struggle with the

Rimini waste company underscores this – future projects must bring in these critical stakeholders during the planning phase to avoid perceived competition. Establish formal cooperation agreements or at least consultations with municipalities, public waste enterprises, and recycling firms *before* launching the platform. This ensures the digital solution is seen as adding value (e.g. improving efficiency, providing data insights) rather than threatening existing services. Early buy-in will also clarify what logistic services are feasible locally; if on-demand collection is unrealistic, the platform's messaging and features can be adjusted beforehand.

- **Validate Feasibility of Marketplace Concepts:** Regions interested in the marketplace aspect should perform an **ex-ante feasibility check with industry players**. The CWEEEP experience showed that attempting a public marketplace for WEEE-derived materials was too ambitious. Instead, consider framing it as a **B2B exchange** or information hub. Before implementing, consult recycling companies, material brokers, and manufacturers to assess if there's demand for a digital matchmaking service. Focus on **enabling existing processes** (like improving transparency of who has what material available) rather than trying to create entirely new market dynamics overnight. In short, replicate the *adapted* model (B2B coordination platform) not the initial "eBay for e-waste" idea, unless local conditions strongly suggest otherwise.
- **Provide Resources for Localization:** A transferable e-waste platform must budget and plan for **local section development** in each region that uses it. The pilot revealed that without explicit resources, partners delayed or struggled to create their national pages. For scalability, ensure each participating region has the capacity (budget and staff) to populate and maintain its own local information (in the local language, with local legal guidelines, contacts, etc.). The **governance model** should clarify that a central coordinator (like ASSO in the pilot) maintains the core system, but **each region manages its content** – this division of labor is crucial for long-term maintenance.
- **Scalability Potential:** The concept of a shared platform for WEEE was shown to be **scalable across borders** in terms of interest and design. Other regions can build on the CWEEEP platform code or concept, linking multiple countries or cities. The pilot's outcome suggests that when replicating, it's important to maintain a **clear narrative of purpose**: distinguish which parts of the platform serve local citizens (collection requests) and which serve broader audiences (trading info). This helps set appropriate expectations and success metrics for each region (e.g. number of local pickups vs. number of cross-border inquiries). By implementing these transfer guidelines, regions can avoid the pitfalls faced and create a robust, **standardized yet locally flexible** digital tool for e-waste management.

VI. WEEE Social (Inclusive Circular Business Pilot by ARR/Rzeszow)

OBJECTIVES

The WEEE Social pilot aimed to **integrate social economy enterprises (SEEs)** – such as NGOs, cooperatives, or organizations employing disadvantaged groups – into the e-waste management chain. In practice, this meant exploring how activities like e-waste collection, sorting, dismantling or refurbishment could be jointly managed by traditional WEEE companies *and* social enterprises. The underlying objectives were:

- To create **new opportunities for employment and social inclusion** by involving vulnerable or marginalized workers in the electronics reuse/recycling process.
- To help WEEE recycling companies address labor shortages or tedious manual tasks by partnering with SEEs, thereby achieving both economic and social benefits.
- To develop or identify **frameworks for cooperation** (legal, operational, financial) between the private waste management sector and social enterprises, which could be replicated if successful.

In summary, the pilot's vision was to establish a model of "social recycling" where e-waste management contributes to social good (jobs for those with special needs or long-term unemployed) while still meeting all technical and regulatory standards.

METHODOLOGIES AND TOOLS

The implementation of WEEE Social was largely analytical and consultative, as the pilot faced several constraints that limited full on-the-ground testing. The steps and methods included:

- **Stakeholder Analysis & Surveys:** The lead partners (in Poland, involving Powiat Rzeszowski and RARR S.A.) reached out to both **WEEE companies and social economy entities** to identify their interests and concerns in cooperating. Companies were asked about potential uses of SEEs in their operations, and SEEs were consulted on their capabilities and needs. This surfaced critical **barriers from both sides** (detailed in the pilot's report): companies cited uncertainty about how to integrate SEEs, doubts about their technical capacity, and liability concerns. Conversely, SEEs reported lacking equipment, know-how in WEEE regulations, and having workforce constraints that might worry companies.
- **Legal and Regulatory Review:** The pilot examined the regulatory environment governing e-waste and social enterprise collaboration. One finding was the **absence of a clear legal framework to delegate WEEE processing tasks to SEEs**. In highly regulated waste sectors, every handler needs permits and compliance – there was no simple mechanism for a licensed waste company to "outsource" certain activities to a non-profit or sheltered workshop without running afoul of procurement rules or license conditions. This review helped pinpoint what legal changes or clarifications would be needed to enable social-inclusive recycling models.

- **Workshops & Trainings (Planned):** The pilot recognized the need for capacity building – e.g. **training SEEs** on the basics of WEEE handling (safety, record-keeping in the national BDO system, proper disassembly techniques). Due to limited funding in this Interreg project, comprehensive training sessions were *recommended* but not fully executed within the pilot timeframe. The plan was that such training would significantly improve SEEs' readiness to participate by increasing their knowledge and ability to meet standards.
- **Identification of Model Activities:** Even though a live pilot project (like a joint e-waste collection drive or a co-run dismantling workshop) could not be implemented for lack of funding and time, the team conceptually outlined **potential cooperation models**. These included, for example: SEEs running small collection points or pickup services for e-waste, SEEs doing preliminary dismantling of devices (removing cases, sorting components) under supervision, or SEEs operating repair and refurbishment programs for certain electronics. For each model, the **operational requirements** were considered (tools needed, supervision, process checklists, etc.). The absence of actual field tests meant companies could agree in principle but not witness results, which the report notes as a limitation (companies could "make declarations without demonstrating actual readiness" without a practical pilot).

Overall, the methodology was focused on *analysis, dialogue, and planning* rather than execution. The pilot effectively became a **critical assessment of barriers and a blueprint for future action**, identifying what would be needed to truly pilot a social-inclusive WEEE scheme in the future.

ACHIEVED OUTCOMES

The Social WEEE pilot's tangible outcomes were more about **insights and groundwork** than immediate quantitative results, due to the challenges described. Key outcomes include:

- **Comprehensive Barrier Identification:** The pilot produced a clear list of the **barriers preventing collaboration** between WEEE companies and social enterprises. These barriers span operational issues (lack of equipment, concerns about work quality), knowledge gaps (companies not aware of SEEs' capabilities; SEEs not familiar with WEEE regulations), and systemic problems (no legal pathway for partnership, heavily regulated industry). By documenting these, the project has a starting point to address each issue. For example, knowing that liability for errors was a concern means future pilots must clarify insurance or responsibility sharing; knowing that SEEs lack WEEE training means any replication must include a training component, etc. This kind of analysis is **valuable to other regions** because many of these challenges are likely universal when trying to link social sector with a technical waste sector.
- **Recommendations and Framework Proposals:** The lead partner (ARR) formulated detailed **recommendations for future implementation** based on the pilot learnings. These include: establishing **standard cooperation procedures** (templates for contracts between a company and an SEE, clear task checklists) to give companies a ready-made framework; securing **joint investment funds** so

that necessary infrastructure (tools, protective gear, workspace for SEEs) can be provided; and **policy advocacy** to create a legal basis for social enterprise involvement in waste management (for instance, exemptions or facilitated procedures so that involving an SEE doesn't trigger complex procurement rules). These recommendations were a direct outcome of identifying what was missing in the pilot.

- **Raised Awareness (Concept of "Social Recycling"):** The project opened a conversation with WEEE industry players about the concept of social recycling. Initially, many companies viewed working with SEEs purely as a CSR (corporate social responsibility) charity exercise rather than a business optimization. Through meetings and dissemination, the pilot helped reframe it as a potentially *mutually beneficial* model – if done right, a company could outsource certain tasks and gain ESG (Environmental, Social, Governance) benefits, while the SEE gains employment opportunities. This shift in perception is gradual, but the pilot report notes that highlighting **business benefits (cost reduction, compliance, reputational gains)** is key to motivating companies. The recommendation to improve communication of these benefits was taken from this outcome.
- **Foundation for Future Pilot (Capitalization):** Importantly, although this pilot did not implement a full operational model, it **laid the groundwork for a more ambitious follow-up project**. The conclusions explicitly state that the insights gained can serve as a foundation for future initiatives, identifying what further work is needed. Key areas noted are *process standardization, capacity building for SEEs, improved communication*, and development of real-life cooperation models. This outcome is essentially a roadmap: any region or project that wishes to truly integrate social enterprises into e-waste management now has a checklist of prerequisites and can design their project to fill the gaps (e.g. allocate funding for training and equipment, engage government to adjust regulations, etc.). In other words, the WEEE Social pilot produced **knowledge capital** that makes eventual successful implementation in the future more likely.

Because no actual collection or recycling was performed jointly in this pilot, there are no figures on tons collected or people employed to report yet. The "outcome" here is a set of lessons and plans that reduce the trial-and-error for the next attempt.

TRANSFERABILITY GUIDANCE

The concept behind WEEE Social is **highly relevant to many regions** – leveraging the social economy for waste management can yield inclusive growth and circular economy wins. To transfer or scale this pilot to other regions (or to a full implementation), consider the following guidance and scalable components:

- **Establish Clear Cooperation Models:** One major finding was the lack of ready templates. For transferability, it's crucial to **develop standardized cooperation models** that others can pick up. For example, a region can create a model agreement/MoU between a recycler and an SEE, outline roles (who collects, who dismantles, how materials and revenues are split), and define workflows. Providing a *menu* of 2–3 cooperation scenarios (e.g. "SEE-run collection point", "SEE pre-sorting center", "SEE repair workshop") as blueprints will help other

regions replicate without reinventing the wheel. The pilot suggests universities or neutral bodies could spearhead developing these models for general use.

- **Policy and Legal Enablement:** Any region aiming to replicate this must address the **legal barriers**. Advocacy to policymakers is needed to create enabling conditions – for instance, adjusting waste legislation to explicitly allow licensed operators to partner with social enterprises for certain tasks, perhaps via subcontracts or social clauses, without onerous procedures. Also, consider public procurement rules: if a municipality contracts waste services, including provisions that encourage or mandate involvement of SEEs can institutionalize the practice. Transferability is greatly enhanced if the *rules of the game* permit and encourage social inclusion. Regions should share best practices on laws or incentives that have worked (e.g., some countries might count e-waste handled by social projects towards recycling targets, giving companies an incentive to collaborate).
- **Capacity Building and Investment:** The pilot underscored that SEEs often **lack technical capacity** (tools, knowledge, facilities) for WEEE tasks. Thus, replication should come with a package of **support for the social partners**. This means allocating funds to equip them (provide basic dismantling tools, safety equipment, storage for e-waste), and delivering **training programs** on e-waste regulations, safe handling, and repair skills. Without raising the capacity of SEEs, companies will remain hesitant. Joint investment from multiple stakeholders (EU funds, local authorities, even the private companies themselves) can be used to build small e-waste workshops at social enterprises, which then serve as pilot hubs. In short, other regions should plan for an initial investment phase to **"level up" the social enterprise so it can meet industry standards**.
- **Emphasize Mutual Benefits:** A critical transferability factor is convincing traditional e-waste firms that partnering with SEEs is not just charity but can be a **business advantage**. The pilot recommends highlighting things like **ESG reporting benefits, improved public image, access to supplementary workforce for labor-intensive tasks, and possibly cost savings**. When scaling to another region, incorporate strong **communication and incentive strategies** for companies: e.g. offer recognition (awards or public awareness) for companies that pioneer social inclusion, or demonstrate through a small trial how an SEE can take over a time-consuming manual task effectively. Showcasing positive case studies (even from other sectors or countries) can alleviate company concerns. In essence, make the value proposition clear: the company gains a service or benefit while also doing good. This framing is crucial for replication because without willing industry partners, the model cannot take off.
- **Pilot on a Small Scale First:** While the CWEEEP pilot couldn't execute a field test, any region attempting this should try to **pilot a tangible cooperation on a small scale** as proof of concept. For example, start with one recycling company and one social enterprise and have them collaborate on collecting e-waste at a one-day event or have the SEE staff work at the recycler's facility for a short period (with supervision) to sort devices. Collect data on that experience (Was the quality acceptable? What issues arose? How did costs compare?). This will provide localized evidence to refine the model and convince more partners. The **lesson "lack of practical testing hindered obtaining a reliable picture"** in the pilot suggests that replication efforts build in a demonstration phase with real operations, even if modest. That experiential learning will be invaluable before scaling up to multiple companies or an entire region.

In conclusion, WEEE Social can be replicated in other regions by *first* creating the right frameworks and capacities, *then* launching actual cooperative initiatives. It addresses universal goals (social inclusion and recycling) so with the above supports, it has strong potential for scaling and lasting impact.

VII. WEEE Lives (School E-Waste Collection & Second-Life Pilot by CPU)

OBJECTIVES

The WEEE Lives pilot was designed to **encourage repair and second-life for electronics by engaging youth and communities**. In essence, it combined educational campaigns with hands-on collection and reuse activities. The main objectives were:

- **Raise Awareness and Change Behavior:** Educate school students (and by extension their families) about the importance of proper e-waste disposal, recycling, and the value of extending the life of devices. By targeting young people, the pilot aimed to instill long-term circular economy values early on.
- **Recover Hidden E-Waste from Households:** Implement school-based **e-waste collection drives** (often framed as friendly competitions between classes or schools) to retrieve unused or broken small electronics that tend to languish in drawers. This not only boosts collection rates but makes students active participants in the circular economy.
- **Promote Repair and Reuse:** Introduce students to practical **repair skills and second-hand use** of electronics. Activities like repair workshops, "repair cafés", and visits to reuse centers were planned so that some of the collected items could potentially be fixed or repurposed, demonstrating that not all e-waste is actually waste.
- **Multi-Stakeholder Collaboration:** Engage schools, local municipalities, recycling companies, and reuse/repair centers in a coordinated effort. The pilot set out to create a **model of cooperation** where each stakeholder has a role – schools host collection and education, waste companies handle pickups and recycling, reuse centers evaluate and refurbish where possible, and local governments support with logistics or incentives. Ultimately, the objective was to develop a scalable community-based approach to WEEE management.

METHODOLOGIES AND TOOLS

The WEEE Lives pilot, led by CPU (Center ponovne uporabe, Slovenia) with co-leads in Rogaška Slatina (Slovenia) and Lublin (Poland), executed a comprehensive campaign across multiple countries. The methodology included:

- **School Recruitment and Campaign Design:** A network of **78 schools** across four countries (Poland, Slovenia, Slovakia, Czech Republic) participated. Each school agreed to run an e-waste collection campaign over a set period. The pilot provided guidance on how to organize the drive as a competition (e.g. which class collects the most devices, etc.) and integrated educational sessions alongside the collection. In Lublin (Poland), 5 schools joined; in Rogaška Slatina (Slovenia), 7 schools – these were two focal areas with pilot coordinators. Other schools across SK and CZ were also engaged via project partners, reaching the total of 78.
- **Educational Activities: Interactive workshops and visits** were core to the methodology. For example, during the campaign: students attended workshops where they learned about e-waste sorting, tried dismantling small devices, or

played educational games (one partner created a card game for classifying types of e-waste, making learning fun). Many schools took field trips to local **WEEE recycling centers or reuse facilities** to see what happens after collection. The inclusion of **"repair café" events** – where students could observe or attempt simple repairs under supervision – made the concept of reuse tangible rather than abstract. These experiential learning tools were essential to drive the message home.

- **Collection Logistics:** The pilot arranged for the **placement of e-waste collection bins** at schools and coordinated with waste management companies for regular pickup of the collected items. Schools were briefed on what items were acceptable and safe to bring (mostly small electronics, cables, phones, gadgets). A key innovation recommended was a **triage protocol** – early sorting of collected items into categories: still functional, repairable, or only good for recycling. In practice, a simple guideline was given to help teachers or partnering experts quickly assess devices so that those with reuse potential could be set aside for the repair workshops. Collected e-waste that was not reusable was handed over to professional recyclers.
- **Motivation and Incentives:** To keep enthusiasm high, the pilot built in incentives. **Competition rewards** were offered – for instance, the top collecting school in Lublin received a new waste sorting station as a prize, and high-performing classes got prizes. All participating students often received small tokens of appreciation (certificates, diplomas, or gadgets like eco-friendly school supplies). Importantly, interim results were publicized (e.g. announcing how much e-waste had been collected halfway through) to motivate participants with a sense of progress. Recognition by local authorities or media also helped encourage the schools. Additionally, students were encouraged to involve their parents and neighbors – effectively turning them into awareness ambassadors in their communities.
- **Monitoring and Evaluation:** Data was collected on the number of items and weight of e-waste gathered by each school. For example, in Lublin they counted **2,150 pieces of e-waste** collected across the 5 schools, and in Slovenia 1,579 items across 7 schools. A portion of these was identified as suitable for reuse (3% in the Slovenian batch, which equated to 44 devices that could be repaired). The pilot used shared spreadsheets for tracking, and partners like CTU (Czech Technical University) helped compile and analyze the quantitative data across countries. This monitoring not only measured outcomes but was used to give **feedback to participants** – e.g. telling students "you collected X kg, which means Y resources saved" to reinforce the impact of their actions. Simple reporting templates were provided to each school to uniformly capture results.

Through these methods, WEEE Lives effectively merged *education* with *practical action*, a hallmark of its approach.

ACHIEVED OUTCOMES

The pilot was very successful in terms of participation and e-waste collected, and it provided rich evidence of the benefits of combining collection with education. Key outcomes include:

- **High Engagement and Reach:** The WEEE Lives campaign reached a large number of young people and communities. **78 schools** participated in total, far exceeding initial expectations (the report notes "targets exceeded" in terms of school involvement). Across Poland, Slovenia, Slovakia, and Czechia, **over 1,200 students** were directly involved in pilot activities (e.g. 340 students in Lublin's workshops and ~70 in a Slovenian study visit, plus many more in other schools). This broad engagement demonstrates the scalability of the concept – multiple regions and education systems were able to adopt the model within the project timeline.
- **Substantial E-Waste Collected:** The pilot **collected approximately 20 tons of e-waste overall**, an impressive amount considering it focused on small household items. For instance, the five Lublin schools gathered 2,150 devices (mostly small appliances and IT gadgets) and the seven Slovenian schools gathered 1,579 devices. This translates to several tons per city (the Lublin schools alone collected about 1.232 tons, and Rogaška Slatina area schools about 1.654 tons, per the pilot report). These figures show that significant quantities of unused electronics can be mobilized through school-based drives, quantities that would otherwise likely remain in households or be improperly disposed. Each device collected is now entering the proper recycling stream or being evaluated for reuse.
- **Reuse and Repair Outcomes:** A notable subset of collected items was deemed **suitable for reuse or repair**. In Slovenia, roughly 3% of items (44 pieces) were identified for refurbishment – these might include things like still-working phones or fixable electronics. Students, guided by experts, worked on some of these items during repair workshops, giving them hands-on experience and in a few cases returning a device to working order. While the overall fraction is small, it underscores the pilot's point that not all e-waste is "dead" waste; some can live again (hence *WEEE Lives*). More importantly, **hundreds of students learned how to assess and attempt repairs**, which is an outcome hard to quantify but valuable for creating a repair-minded culture. The pilot also forged stronger links with local reuse centers – for example, CPU (a reuse social enterprise) was able to strengthen collaboration with municipal waste companies to channel repairable items to their workshops. This network-building means the effect of the pilot will persist beyond the immediate campaign.
- **Behavioral and Educational Impact:** Surveys and feedback from teachers and students indicated a significant **increase in awareness and pro-environment behavior**. Many students reportedly began **sorting e-waste at home and involving their parents** in the process as a result of the pilot. By linking classroom learning with at-home action, the pilot achieved one of its key goals: extending impact to the community. Schools noted that **experiential learning** (like taking apart gadgets or seeing a recycling plant) had the strongest impact on students' understanding. This kind of impact is harder to measure, but anecdotal evidence and the enthusiasm observed suggest the pilot succeeded in seeding long-term behavioral change (e.g. students adopting the role of "e-waste ambassadors" among their peers and family). As one internal report summary put it, *"combining*

collection with hands-on education significantly increases both awareness and recovery of small electronic waste".

- **Empowerment and Recognition:** The pilot empowered schools and students by making them key actors in a transnational environmental project. All participating schools received **diplomas and public recognition** for their efforts. Students saw that their actions (like collecting old phones) were part of a bigger Central European initiative, which was very motivating. In the long term, such empowerment can lead schools to independently continue or replicate the campaigns. Indeed, the project's future goal is to **expand its reach to more schools and communities**, building on the momentum generated. Already, the pilot's results have been used to advocate for scaling up – local authorities are more convinced of the approach now that they have seen these outcomes.

In summary, WEEE Lives not only achieved concrete results (tons collected, schools engaged) but also demonstrated the efficacy of an integrated approach to e-waste education and collection.

TRANSFERABILITY GUIDANCE

The WEEE Lives model – school-centered e-waste drives coupled with education – is highly transferable and was in fact piloted in multiple regions concurrently. To replicate or scale this solution in other areas, the following guidance and key elements should be considered:

- **Secure Multi-Stakeholder Commitment:** A successful replication requires buy-in and coordination among **schools, local government, and waste/reuse partners**. Early on, clarify stakeholder roles: Who will provide containers and pick up the e-waste (e.g. a municipal waste company)? Who will conduct educational workshops (maybe an NGO or environmental agency)? And what are schools expected to do (internal promotion, hosting events)? Establishing **clear roles and responsibilities via simple agreements or MOUs** is advised. This prevents confusion during implementation and ensures each party knows their contribution (for example, a reuse center might agree to take all collected laptops for evaluation, a city might agree to provide a small budget for prizes, etc.). The pilot's experience showed that having a **coordinator and periodic stakeholder meetings** keeps everyone aligned.
- **Provide Infrastructure & Materials:** For scalability, make it easy for schools to participate by giving them the tools and materials needed. This includes **collection infrastructure** – e.g. sturdy bins or designated drop boxes placed at schools – and **educational materials** – e.g. ready-made lesson plans, presentations, sorting guidelines, and promotional posters. The CWEEEP project actually developed a **WEEE Educational Pack** for schools (with worksheets, etc.), which any region can adapt. Ensuring each school has a kit of materials and a clear how-to guide lowers the barrier for teachers to get involved. Likewise, coordinate with waste operators to have the right-size containers and **regular pick-up schedules** so schools are not burdened with storing too much waste. Practical tip: use visually appealing bins and put up signage at school explaining what can be tossed in – this visibility also raises awareness among visitors and parents.

- **Incorporate Repair/Reuse Activities (Safely):** The unique aspect of WEEE Lives was adding repair and second-life components. When transferring, try to include a **repair workshop or a field trip** in addition to just collection. Partner with local repair experts or hobby clubs who can run a "fix-it" session at the school. Even if only a few items get fixed, the educational value is high. However, always emphasize **safety and legal compliance** – for example, in some countries any collected e-waste is legally "waste" and cannot be simply given back or tinkered with without special permission. Address this by possibly collecting items *for repair separately* (e.g. ask families to donate still-working devices for educational purposes, distinct from end-of-life devices for recycling). Ensure any repair activities follow guidelines (no opening hazardous electronics like CRT monitors, use protective gloves, etc.). By showing the tangible side of reuse, students and the community grasp the value of treating electronics as resources.
- **Motivation through Competition and Feedback:** Implement the **gamification element** – it's a huge driver of participation. Set up friendly competitions (class vs class, school vs school, or hitting a collective target like "20 tons in our region!"). Recognize achievements with certificates, announcements, and prizes (they need not be expensive; even public recognition or a trophy can excite schools). Just as importantly, **provide feedback** to participants: let them know how much was collected and what the impact is. For example, translate the collected weight into environmental impact (CO_2 savings, raw materials recovered) and share that in an assembly or newsletter. The pilot suggests even publishing interim results during the campaign to keep everyone engaged. This real-time encouragement can combat any mid-project drop in enthusiasm. Many regions have had success with "E-waste challenge" school programs – the key is that element of fun competition combined with learning.
- **Monitoring and Simplified Data Collection:** For scalability, adopt a **simple monitoring system** so results from many schools can be aggregated. A shared online spreadsheet or a basic web-form where each school inputs the number of items or weight collected each week can work. Keep the data points minimal (e.g., number of phones, number of other gadgets, total weight) to make it easy for teachers or students in charge to report. This not only helps in evaluating success and reporting to sponsors, but also can be used to identify which schools might need an extra push or which methods work best (for instance, if one school collected way more, you can inquire and share their approach). In the pilot, having the university partner compile data ensured accuracy, but for replication a designated coordinator (maybe a city officer or a volunteer) could take on this role. Reliable data will also support the case for continuing or expanding the program in subsequent years.
- **Policy Support and Integration:** To replicate widely, it helps to have local authorities formally support the initiative. This could mean integrating school e-waste drives into annual environmental programs or the school curriculum. It could also involve addressing any legal hurdles – as noted, in some places once e-waste is collected by a school, it's subject to waste regulations that might complicate reuse. Authorities can grant **special pilot status or exemptions** to allow, say, a portion of devices to be diverted for educational repair workshops before recycling. Additionally, local governments can provide small budgets for materials or prizes, and facilitate the involvement of municipal waste companies. The pilot's success in multiple countries suggests that when schools and cities cooperate (like the City of Lublin and Rogaška Slatina municipality did), the

program runs smoother. Thus, institutionalizing the collaboration (e.g. via a city resolution supporting "Electronics Recycling Week" in schools each year) can be a way to sustain and scale it.

In essence, **WEEE Lives is a modular, scalable model** – its components (school contests, workshops, collections) can be replicated in one school or 100 schools. The pilot even noted that its **"modular structure (schools – community – local government) supports scalability and transnational transfer"**. By following the above guidelines and adapting to local context, other regions can successfully adopt this engaging approach to e-waste management, yielding both immediate recycling results and long-term educational benefits.

VIII. WEEE Aware (Education & Awareness Pilot by ENVIROS/CTU & Partners)

OBJECTIVES:

The WEEE Aware pilot focused on **awareness-raising campaigns in schools, communities, and public institutions** to foster responsible e-waste behavior. Unlike WEEE Lives, which centered on collection drives, WEEE Aware was slightly broader in scope, emphasizing curriculum integration and community outreach. Its objectives included:

- **Integrate E-Waste Education into Schools:** Develop and introduce **educational content about WEEE** in primary and secondary schools, addressing a gap since e-waste topics are often missing from standard curricula. This involved giving teachers and students the knowledge about why e-waste is a problem and how to manage electronics sustainably (reduce, return, recycle, etc.).
- **Empower Teachers and Educators:** Provide training and **ready-to-use teaching materials** so that educators feel confident to teach about e-waste. Many teachers lacked clarity on how to incorporate the topic initially, so the pilot aimed to supply worksheets, presentations, videos, and methodological guides that align with their needs.
- **Hands-on Awareness Activities:** Organize engaging activities such as **guest lectures, school events, and community initiatives** (repair cafés, electronics swap events, recycling facility visits) to make e-waste a tangible issue for participants. The goal was to connect abstract knowledge with real-world action and to extend awareness beyond the classroom into the community.
- **Promote Long-term Behavior Change:** Ultimately, the pilot sought to not just inform, but to **change behaviors** regarding e-waste – encouraging students (and their families) to collect e-waste properly, to consider repair before disposal, and to spread what they learned. By the end, the aim was to have a model that could be taken up by other schools or even nationally, proving that e-waste education can be effective in driving better disposal habits.

METHODOLOGIES AND TOOLS

The WEEE Aware pilot, implemented across multiple countries (with notable activities in Slovakia, Czech Republic, and Poland), employed a variety of methods to deliver its awareness objectives:

- **Educational Material Development:** The project team created a **"WEEE Educational Pack"** containing lesson plans, fact sheets, slide decks, and even short videos tailored for school use. These materials were designed to be plug-and-play for teachers – for example, a science teacher could take a prepared presentation on the environmental impact of e-waste and use it directly in class. By providing these resources upfront (a lesson learned was to have them **"ready from the start"**), the pilot made it easier for schools to participate without overburdening teachers. Topics covered included the importance of recycling

critical materials, the concept of circular economy for electronics, and how to properly dispose of old devices.

- **Teacher Trainings and Support:** WEEE Aware organized **training sessions for teachers** and pilot coordinators. Early on, it became evident that teachers needed guidance on where this topic fits (geography class? science? as an extracurricular?). Trainings (some in-person, some webinars) were delivered to introduce the materials and suggest pedagogy (like interactive exercises, discussion prompts). The pilot recommends delivering such training **earlier and in a more structured way** in future iterations, as initial delays left some teachers uncertain at first. Continuous communication channels (like WhatsApp groups or an online forum for participating teachers) were also established so that educators could ask questions and share experiences throughout the pilot.
- **Interactive Student Activities:** A range of **engaging activities** were rolled out in schools to make learning about e-waste fun and impactful. For example, the Slovenian partner CPU introduced a **classification card game** where students had to sort types of e-waste into the correct EU category – this reinforced understanding of different e-waste streams. Other activities included **device teardown workshops** (students safely disassembling old electronics to see what's inside), creative DIY projects (making art from e-waste components), **quizzes and competitions** (e.g., poster contests on e-waste themes). A key strategy was **experiential learning** – the pilot found that hands-on experiences "generate the strongest educational impact" on this topic.
- **Involvement of Experts and External Partners:** The pilot actively involved **recycling experts, NGOs, and companies** to bring real-world perspectives. Guest speakers from recycling companies (like ENVIDOM in Slovakia) were invited to give talks or demos. Some schools organized **field trips** to local e-waste collection or processing facilities, giving students a first-hand look at recycling operations. These external inputs not only lent credibility but also excitement – hearing from a professional or going on a site visit made the issue more concrete. It also fostered cooperation between schools and local waste management entities (some pilots had municipal offices or waste firms co-sponsor school events).
- **Community Outreach Components:** To extend awareness beyond schools, WEEE Aware encouraged **community-based events**. Examples included setting up **electronic swap events** (where people could exchange old gadgets) or **repair cafés** open to the public. Students and teachers helped organize these, thus acting as ambassadors. While not all schools managed to implement a community event during the pilot timeframe, those that did found they attracted parents and local residents, effectively multiplying the awareness impact. The pilot suggests doing even more of this ("increase community-based activities to expand impact beyond schools") in future runs.
- **Use of Digital Platforms:** The project leveraged digital tools like the **EduPage platform** (an educational communication tool) to share information, challenges, and results among the school community. For instance, they posted announcements of e-waste collection days, progress updates, and tips via school online systems or social media. This kept the momentum up and integrated the campaign into channels students and parents already use. Digital tracking of certain metrics (like how many kg each class collected, posted on a common dashboard) was also piloted, highlighting the value of **unified monitoring tools** –

an insight was that having standard data collection across schools from the beginning would facilitate better comparison and evaluation.

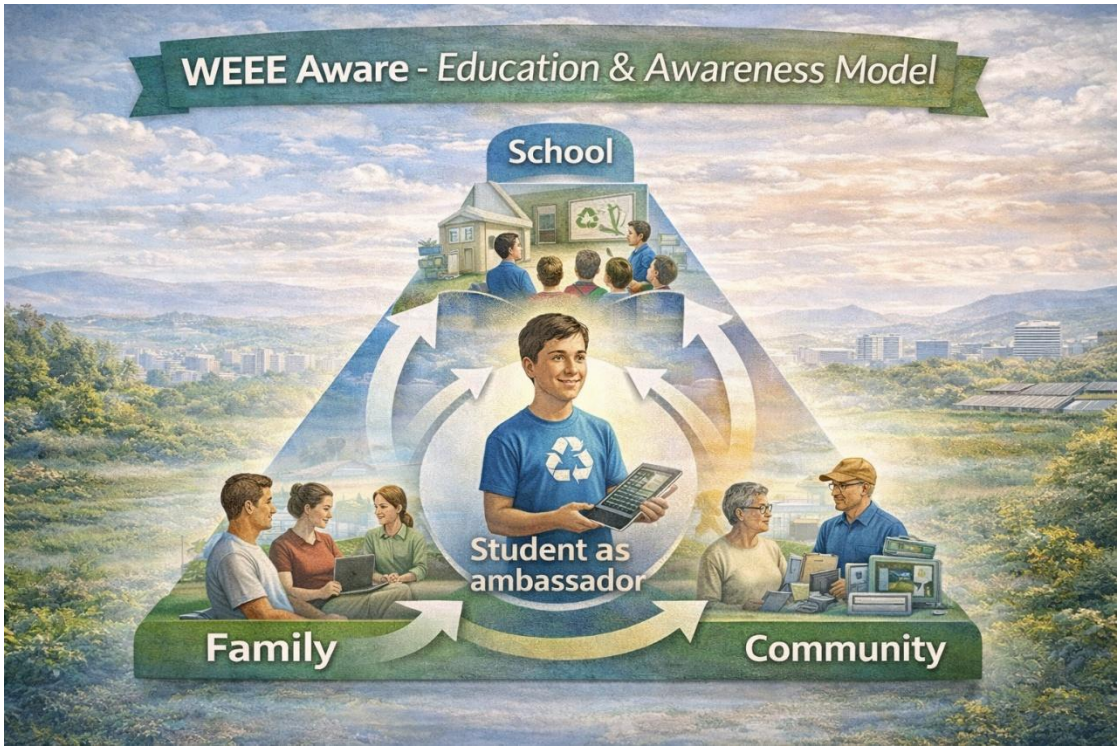

Figure 5: WEEE Aware – Education & Awareness Model

ACHIEVED OUTCOMES

The WEEE Aware pilot successfully demonstrated that structured educational interventions can lead to measurable awareness and participation in e-waste activities. Notable outcomes include:

- **Wide Reach Across Schools and Countries:** The pilot engaged **377 schools across 3 countries**, reaching a total of **1,068 students** with direct educational activities. (These figures were reported by the lead partner; though the ratio seems low – likely it means 1,068 students were actively involved in pilot workshops or special events, across hundreds of schools. Many more students may have been indirectly reached via assemblies or materials.) This broad participation shows that the model was adopted in many locations, indicating its flexibility. The fact that it spanned multiple countries underscores that the content and approach have cross-cultural relevance and can be implemented at scale.

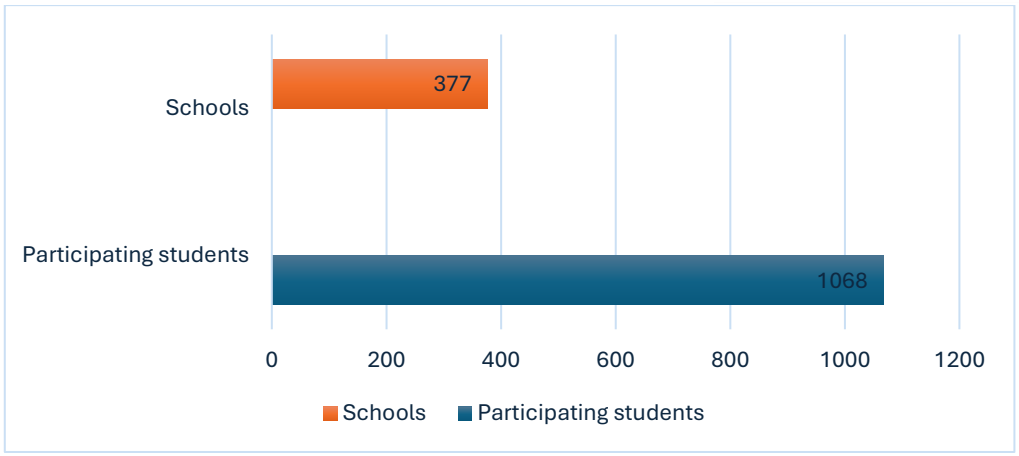

Figure 6: WEEE Aware Pilot Outcomes

- **Improved Knowledge and Engagement:** Qualitative feedback indicated a **substantial increase in e-waste awareness** among participating students. They became conversant in topics like the e-waste problem, the need for recycling critical materials, and how to dispose of devices properly. More concretely, **students began to take action**: many started **bringing old devices from home for recycling** (some schools set up e-waste bins as part of the awareness campaign) and discussed e-waste with their families. By linking the awareness campaign with actual collection drives at schools, the pilot reported that students **"began sorting e-waste at home and involved their parents"**, demonstrating real behavior change. This outcome is crucial – the goal was not just knowledge for knowledge's sake, but to drive responsible behavior, and indeed students adopted the role of influencers in their households.
- **Teacher Empowerment and Educational Value:** Teachers who participated reported that having ready-made resources and support made it feasible to cover a non-curriculum topic like e-waste. They appreciated the **"simple, ready-to-use tools"** provided, given their limited time. As a result, e-waste topics were taught in dozens of schools where they had never been addressed before. The interactive methods kept student interest high – educators noted strong student enthusiasm during dismantling workshops or games, which also boosted overall STEM learning and environmental awareness. The pilot's approach even integrated with broader themes like circular economy, giving a practical context to theoretical concepts. By the project's end, many teachers indicated they would continue using the materials in future years, institutionalizing the topic in their teaching.
- **Partnerships and Community Impact:** The involvement of **families and communities** was a significant outcome. Through school events and communications, parents became aware of e-waste issues via their children. Some communities held public awareness events (e.g., a booth on e-waste at a local fair, or a recycling day in coordination with the pilot). The pilot emphasized that **"involving families significantly increases behavioral change"**, a lesson well noted. Additionally, partnerships formed or strengthened – for example, recycling companies that gave guest lectures often donated collection bins or offered continued support to the schools, creating a legacy of cooperation. Local authorities that supported the pilot saw positive public response, encouraging them to potentially integrate such educational efforts into official programs (one city declared an annual e-waste awareness week following the pilot's success).

- **Scalability and Model Validation:** Perhaps the most important outcome is that the pilot **validated a scalable model for e-waste education**. The combination of modular components (school, community, local government) and digital support tools proved effective and **"confirmed the effectiveness and transferability of the model"**. This is evidenced by the multi-country implementation and the measurable results in student engagement. The pilot also noted strong **scalability potential supported by digital tools and a modular design**, meaning it could readily be expanded to new regions or more schools. This outcome provides a blueprint for any educational authority or organization looking to replicate the success – it shows that with the right content and support, even an out-of-curriculum topic like e-waste can be widely adopted by schools and lead to real-world impact.

TRANSFERABILITY GUIDANCE

The WEEE Aware approach is highly replicable, and indeed broader adoption is encouraged. For successful transfer to other regions or a larger scale, consider the following guidance drawn from the pilot's lessons:

- **Develop a Toolkit and Launchpad:** Just as the pilot did, create a **comprehensive toolkit** for schools. This should include lesson materials, activity guides, and background info for teachers. Having these prepared (and ideally translated into the local language) *before* recruiting schools will smooth the rollout. Essentially, do the prep work centrally and offer a "program in a box" to schools. In starting the program, provide a **kickoff training or webinar** for teachers to walk them through the toolkit. Emphasize that materials are adaptable – teachers can fit them into existing subjects (science, civic education, etc.). Make sure to incorporate engaging elements (games, videos) because that was key to success.
- **Early and Ongoing Teacher Engagement:** One of the pilot's recommendations is to deliver **earlier and more structured teacher training**. When scaling up, engage teachers early in the planning phase – perhaps even involve a few educators in co-creating the materials to ensure they align with classroom realities. Once the program starts, keep communication flowing: set up an online community of practice (e.g. a Facebook group or Slack) for participating teachers to share experiences, ask questions, and get troubleshooting help. Continuous support is vital because teachers might encounter challenges (like a tricky question from students or a need for extra info). Recognize teachers' efforts (certificates or public thanks) to keep them motivated as champions of the cause.
- **Leverage Expert Partners: Partnerships with e-waste experts or organizations are invaluable**. When transferring, link the education campaign to local recycling firms, environmental NGOs, or government environment departments. They can supply guest lecturers, host site visits, or provide up-to-date information. These experts lend authority and can often show real equipment or data that fascinates students (for example, a recycler might bring a bin of e-scrap to show in an assembly). Also, involving them means you have logistical support – for instance, a recycling company can help set up a one-time e-waste collection at the school as a practical component. Collaboration might also extend to tech companies or retailers who could sponsor events or donate old devices for educational

teardown. The pilot noted that such partnerships are **"essential for both logistics and professional content"**.

- **Combine Awareness with Action:** Like WEEE Lives, WEEE Aware found that linking knowledge to action reinforces learning. So when replicating, include at least a small **action component**: for example, each school could host an e-waste collection day or a battery recycling week as part of the program. This gives students a chance to apply what they learned immediately and see a result (like a pile of old devices collected). It also engages the wider community. The pilot highlighted **"linking awareness with practical experience"** as a key to success. Even if the primary goal is education, these tangible actions make it memorable and habit-forming. Ensure safety and proper handling during such activities (provide gloves, stress not to open anything dangerous, etc.). If full collection events aren't feasible, consider simulations (e.g. role-playing a recycling center in the classroom).
- **Standardize Monitoring and Showcase Impact:** When scaling to many schools, implement **unified monitoring tools from the beginning**. This could be as simple as a feedback form each teacher fills, reporting what activities were done and any quantifiable outcomes (like number of students who brought e-waste from home). Having consistent data allows you to evaluate and compare across schools or regions. More importantly, it lets you **showcase the collective impact** – for instance, "Across 50 schools, 1,000 students participated and they brought in 500 kg of e-waste for recycling". Such figures are powerful for sustaining support from sponsors or authorities and for motivating participants by making them feel part of something bigger. The pilot's final results (1,068 students, 377 schools) are an example of aggregating data to demonstrate effectiveness. Additionally, capturing anecdotal success stories (like a quote from a student or teacher) can be useful for promotion. With permission, share photos of activities to further spread awareness.
- **Ensure Continuity and Scale Up:** The modular design of WEEE Aware – working at the **schools, community, and local government levels** – was highlighted as supporting transnational transfer. For other regions, this means you should think about how to embed the program into existing structures for longevity. For example, work with the education ministry or school district to include e-waste topics in the official curriculum or annual eco-calendar. Encourage local governments to adopt the school awareness model as part of their waste management outreach strategy (the pilot's success could be used to advocate for this). To scale up, consider a **train-the-trainer approach**: empower some teachers or NGO staff to become master trainers who can then bring new schools on board each year. The **digital tools** used (EduPage, etc.) can be expanded to national platforms or integrated into educational portals for wider access. In short, plan for how the pilot transitions from a one-time project to an ongoing program. Given the strong results and positive reception, many communities will be interested in continuing – facilitating that (through policy support, resource reusability, and champion networks) will maximize long-term impact.

By following these guidelines, regions can replicate the WEEE Aware pilot to cultivate a generation of e-waste aware citizens. The pilot's experiences show that with creativity, support, and collaboration, even a complex environmental issue like e-waste can be effectively introduced to young learners, leading to meaningful changes in attitudes and behavior that benefit the whole community.

IX. Summary of the solutions and improvements

WEEE DESIGN

- **Challenge:** Engaging actual manufacturers proved difficult – only ~19% of survey respondents were producers. Many companies had limited time or familiarity with circular design. The result was that quantitative targets for deep product assessments (20–30 firms) were unmet.
- **Improvement:** Future pilots should combine outreach with stronger incentives. The project found that *awareness alone is insufficient without incentives*. Integrating eco-design assessments with regulatory or market drivers (e.g. linking them to compliance or recognition) and working through industry associations can motivate participation.
- **Tool Refinement:** Keep assessment tools simple and modular. Feedback showed that companies favor user-friendly, adaptable questionnaires rather than lengthy surveys. Iteratively refining the manuals based on pilot feedback would improve uptake.
- **Stakeholder Scope:** In practice, involving repairers, recyclers and designers helped compensate for low manufacturer interest. Future replication should form a multi-stakeholder network from the start, so that pressures for circular design come from many directions, not just producers.
- **Transferability:** The developed questionnaires and manuals have cross-regional value. However, implementers must translate and adapt materials to local sectors and regulations, and ensure alignment with each country's eco-design policies. In short, lean on the tested tools but **tailor them locally** and tie them to real incentives.

WEEE COLLECT & MARKET

- **Challenge – Local Context:** A major hurdle was overlap with existing systems. For example, Rimini already had an advanced waste app, so the pilot platform could not add new local value. Similarly, the original "consumer marketplace" concept clashed with the realities of secondary materials trading. Without recognizing these, the project's early ambitions had to be scaled back.
- **Improvement – Adapt to Context:** Future implementations must **complement, not duplicate** local services. Regions should map existing collection tools and regulations first. The CWEEEP team concluded that a transnational platform only makes sense if it adds something new – for instance, focusing on underserved areas or enabling cross-border coordination. The platform's architecture should clearly separate common (transnational) functions from local modules. Each country or city page needs locally relevant content, language and legal details. This avoids confusion over who the audience is.

- **Stakeholder Engagement:** The project struggled because local waste operators (e.g. the Rimini company) felt threatened by a new system. Lesson: **co-design with operators from the outset**. Formally involve municipal and private waste companies in planning (e.g. through MOUs) so that they see the digital tool as supporting, not competing with, their services. Early buy-in allows you to jointly define feasible features. For example, since unscheduled WEEE pickups were found too costly for operators, future platforms might focus on scheduled or B2B coordination instead.
- **Marketplace Model:** The original vision of a consumer-facing e-waste materials market was unworkable. Industry feedback led to a mid-pilot pivot: the WEEE Market became a **B2B matchmaking portal** for large buyers and recyclers. Future projects should validate such concepts before building them. In practice, that means consulting recycling firms and manufacturers up front. In CWEEEP's words, regions should plan for a B2B exchange rather than an "eBay for e-waste" unless local conditions truly support it.
- **Localization Resources:** A key oversight was under-budgeting for local content. At the end of CWEEEP, partners were still populating their country pages. For transferability, ensure each region has dedicated funding and staff to maintain its section. Clarify the governance: one coordinator (like ASSO) runs the core platform, but national/local teams manage their own data and outreach.
- **Summary for Replication:** Overall, "one size does not fit all". Other regions should adopt the **modular, cross-border model** but carefully calibrate it. The CWEEEP platform succeeded as a proof-of-concept, but concrete results came from learning what *doesn't* work. New pilots should heed those lessons: adapt to local waste systems, involve stakeholders early, focus on realistic use cases (like B2B material exchange), and plan for localization from day one.

WEEE SOCIAL

- **Challenges:** No live pilot was actually run – findings were entirely analytical. This revealed many barriers: companies reported **no clear legal framework** to outsource tasks to social enterprises, and deep uncertainty about SEE capabilities. SEEs lacked equipment, training and knowledge of strict WEEE regulations, while firms worried about liability and quality if vulnerable workers handled e-waste. Communication was often at the operational level, so strategic buy-in was limited. In sum, both sides had **operational, legal and perceptual obstacles** to overcome.
- **Improvements – Frameworks & Capacity:** The pilot notes that future efforts need **ready-to-use cooperation models**. This means producing template agreements or checklists detailing who does what (e.g. "SEE-run collection point" vs. "SEE dismantling center"). In practice, drafting a few standardized business models would help companies envision real

projects. Similarly, training SEEs on WEEE compliance (BDO registration, safe dismantling, record-keeping) would raise their credibility. Without these, SEEs remain riskier partners.

- **Improvements – Policy & Advocacy:** Legal barriers were a major finding. To improve, regions must work with policymakers to **enable SEE involvement**. For example, waste laws could explicitly allow licensed recyclers to subcontract to social cooperatives without triggering onerous procurement rules. Including "social clauses" in public contracts (giving points for SEE partnerships) could institutionalize the model. In short, future projects should include a policy component to lobby for the necessary regulatory adjustments.
- **Demonstration Projects:** Because the CWEEEP pilot could not test any real joint operations, it advises doing small-scale field trials early. For instance, start with one company and one SEE working together on a one-day collection or supervised sorting workshop. This practical test would reveal unforeseen issues (like material quality or supervision costs) and generate local "proof" of concept. The lack of such pilots was noted as a key shortcoming. Building in a demonstration phase (even very limited) would greatly improve confidence on both sides.
- **Engagement & Messaging:** Finally, the findings emphasize **mutual benefits**. Companies in the pilot often saw SEEs as charity, but the pilot suggests framing partnerships as *win-win*: highlight cost savings on labor-intensive tasks, ESG/CSR gains, and positive publicity. Future initiatives should include communications strategies (workshops, success stories, awards) to change perceptions. CWEEEP recommends showing concrete business advantages of social recycling.
- **For Replication:** In summary, transferability hinges on preparing the ground: establish clear cooperation models, equip and train SEEs, engage regulators, and pilot in practice. These steps address the **key lessons learned** (e.g. need for standardized procedures, capacity building and policy enablers). With these in place, the social-inclusive WEEE model has strong potential for scale and lasting impact.

WEEE LIVES

- **Successes & Risks:** The school-based collection model was highly effective (78 schools, ~20 t collected), but key lessons emerged. Stakeholder coordination must be crystal clear: roles and responsibilities need pre-definition (who provides bins, who transports WEEE, who sorts/repairs, etc.). Without this governance, items can "fall through the cracks." Similarly, uniform infrastructure is vital – for example, all schools should have large, well-marked bins for e-waste. A standard triage protocol (sorting items into "reusable/repairable" vs. waste) was recommended to avoid losing good devices. Monitoring also needs simplicity and consistency: CWEEEP used shared spreadsheets and

dedicated coordinators to track weights and items, and advises replicators to do likewise.

- **Legal Constraint:** A challenge noted was that under existing law all collected electronics become "waste," which in some places (e.g. Lublin) legally prevents any reuse or repair of those items. In practice this means potential "repairable" devices must often be set aside and cannot be given back without special permission. Future programs should clarify these rules in advance and work with authorities on safe ways to conduct repair workshops (or treat donated functional devices differently).
- **Engagement & Motivation:** Sustaining enthusiasm over the campaign is critical. The pilot found that **gamification and feedback work**: friendly competitions, prizes (even symbolic trophies), and public updates on tonnages kept schools involved. For replication, build in interim communications (e.g. announce mid-campaign totals or CO_2 savings) and rewards for top collectors. Continuous communication through teachers and parent channels (school newsletters, meetings, social media) is needed to maintain momentum.
- **"Do Differently" Takeaways:** The CPU team noted they would enhance community involvement and logistics. For example, schools should inform parents early and often (flyers, WhatsApp groups, etc.) to boost participation. They'd also set up a collection point accessible outside school hours so households can drop off e-waste on evenings/weekends. Publishing interim results and environmental impact (e.g. "X kg collected = Y kg CO_2 saved") was another desired change to keep interest high.
- **Transferability:** The WEEE Lives model is inherently modular and scalable. Key components for replication are: securing multi-stakeholder commitment (schools, waste firms, reuse centers, local government) with clear MOUs; providing schools with everything needed (bins, lesson materials, guides); including safe repair/reuse activities (with proper supervision and protective gear); and ensuring continuous motivation through contests and feedback. Project partners should also plan for data collection (simple forms or spreadsheets) and seek local policy support (e.g. a city adopting the school program as an annual event). Overall, by addressing the identified risks – clarity of roles, infrastructure, legal issues, and engagement – other regions can replicate the high participation and education benefits of CWEEEP's school drive.

WEEE AWARE

- **Challenge – Preparedness:** At the outset, schools lacked instructional materials and guidance. The pilot found that teachers needed ready-made lesson plans, worksheets, videos and clear protocols – which were only developed later. The appendix notes "schools requested… that can be easily integrated into lessons". Similarly, teachers were uncertain how e-waste fits into the curriculum, indicating a need for **earlier and more**

structured training. Future efforts should assemble a comprehensive toolkit and train teachers before the campaign launches.

- **Community Engagement:** WEEE Aware already included some community events, but could expand this further. The team recommends more electro-swap meets and repair cafés to involve the public beyond the school. Involving local recycling organizations and experts was also highlighted – these guest speakers were "among the most impactful activities". Planning additional hands-on events (e.g. school–community e-waste fairs) would extend the pilot's reach.
- **Monitoring & Feedback:** Data collection should be standardized from the start. Appendix guidance calls for **unified monitoring tools** so results across countries or schools can be compared. Simple teacher feedback forms or online surveys can be used. Regular updates (e.g. summing up kilograms collected or students reached) motivate participants and justify continuing support. CWEEEP's final tally (377 schools, 1,068 students) is most powerful when put in context – replicators should plan to compile and publicize such figures.
- **Safety & Logistics:** Practical points noted include ensuring clear signage and safety measures. E-waste collection points at schools must be well-marked so students/visitors know what to toss. Any hands-on activities (like dismantling workshops) need safety protocols (gloves, no opening hazardous devices). Also, maintaining ongoing communication (help desks or teacher hotlines) can smooth implementation.
- **Transferability:** Many aspects of WEEE Aware are highly replicable. Key guidance includes: start with a **"program in a box"** for schools – translated materials and a clear launch training session; engage teachers early and sustain support via online communities or recognition (certificates, awards); partner with recycling firms and NGOs to provide expertise and logistics; and always **link awareness to action** (e.g. mini collection days). With these in place, regions can embed e-waste topics into education with lasting impact.

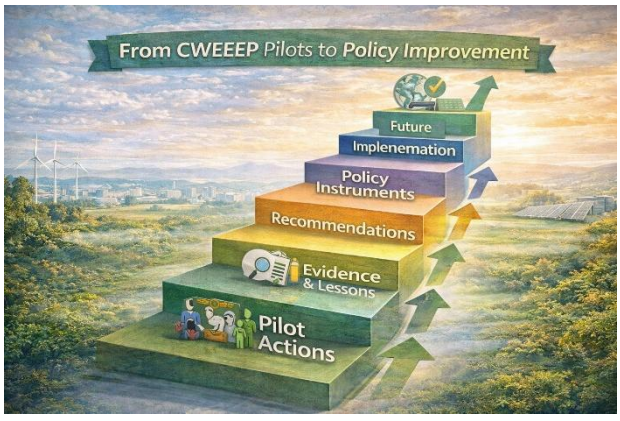

Figure 7: From CWEEEP Pilots to Policy Improvement

X. Comparative Summary of Pilot Outcomes

To conclude, the table below provides an **overview of key outcomes and transferable elements** from each CWEEEP pilot solution, highlighting the diversity of approaches and results:

Pilot Solution	Key Outcomes Achieved	Transferable Elements for Scaling
WEEE Design (Eco-Design)	• Developed **eco-design assessment tools** (questionnaires/manual) and pilot-tested them with companies. • Engaged **200+ stakeholders** (producers, repairers, etc.), with 204 survey responses (~16% response; ~38 producers participated). • Improved awareness of **circular design** and identified gaps in industry readiness (need for incentives, support). • Contributed to open sharing of repair documentation and informed policy recommendations.	• **Assessment tools & methodology** can be adopted by other regions/agencies to evaluate local companies' product designs. • Emphasize **regulatory incentives & partnerships** to boost industry engagement (e.g. link assessments to compliance or work with industry bodies). • **Modular, simple tool design** allows tailoring to different industries or regions (ensure translation and adaptation to local business contexts). • Insights on stakeholder engagement (include repair shops, etc.) are applicable broadly to improve participation.
WEEE Collect & Market (Digital Platform) [1]	• Created a **transnational WEEE platform** (for collection coordination and materials marketplace) and launched it in multiple languages. • **Exceeded user engagement targets** – site traffic and interest from international stakeholders indicated high replicability, though local use was limited due to existing solutions. • Uncovered critical **operational lessons**: on-demand collection needs incentives; a public "eBay for e-waste" model was unrealistic, leading to a pivot to B2B matchmaking.	• **Digital platform blueprint** available for reuse – other regions can implement similar ICT tools, focusing on modular local content vs. global features. • **Adaptability**: The model is scalable if one separates local citizen-facing functions and transnational exchange functions (apply the pilot's architectural separation). • **Stakeholder co-design** is essential: involve waste companies and authorities from day one to align the platform with local systems (pre-empt competition issues).

	• Initiated localized platform sections (e.g. Czech, Polish content) to address national differences, demonstrating a framework for decentralized cooperation.	• **Feasibility focus**: Validate market and process assumptions in advance (the pilot's experience offers a checklist of what to verify – e.g. existing services, material market conditions). Use the pilot's recommendations as a guide for writing robust project plans.
WEEE Social (Social Enterprise Inclusion)	• Conducted extensive **barrier analysis** – identified legal, operational, and perceptual obstacles to partnering WEEE companies with social economy entities (e.g. regulatory gaps, lack of frameworks, training needs). • Produced **recommendations and models** for future pilots: need for standard procedures, joint investment in SEE capacity, legal clarifications, and highlighting business incentives for companies. • Built awareness among stakeholders about the concept of "social recycling" and created a foundation (in terms of plans and knowledge) for a follow-up implementation with better preparation.	• **Framework templates**: Develop standard cooperation models (MOUs, process checklists) for company-SEE partnerships, as identified by the pilot. These templates can be shared across regions to jump-start similar initiatives. • **Policy change leverage**: Use pilot insights to advocate for enabling legislation or policies (e.g. simplified procedures for involving social enterprises in waste management). This is a transferable advocacy point for any region. • **Capacity building programs**: The pilot's recommended training topics (WEEE regulations, dismantling techniques, safety) can be turned into a training module that can be offered wherever a similar cooperation is attempted. • **Stepwise approach**: Other regions can replicate by first addressing prerequisites (legal clarity, training, equipment), then implementing small-scale pilots. The *knowledge* from this pilot serves as a transferable "what to do first" checklist to avoid false starts.
WEEE Lives (School Collection & Reuse)	• Engaged **78 schools** across 4 countries in e-waste collection competitions and education, greatly exceeding initial expectations. • Collected **~20 tons** of e-waste in total, recovering thousands of small devices that likely would have been unsafely disposed	• **School campaign model**: Easily replicable in any region – requires coordination but low-cost. Key elements to transfer: define roles (school, waste company, etc.), provide educational kit, set competition rules, and involve local media for publicity.

	or forgotten (e.g. 2,150 items in Lublin, 1,579 in Slovenian schools). A portion (≈3%) of collected items was identified for **reuse/repair**, with students participating in fixing some gadgets. • Combined **education with action**: students gained hands-on experience (repair workshops, visits) and demonstrated measurable behavior change (bringing e-waste from home, advocacy in families). Schools and local partners formed lasting links, and the model proved effective in both urban and rural settings.	• **Stakeholder coordination**: Establish clear partnerships between schools, municipalities, and waste/reuse operators. The pilot's coordination strategy (e.g. regular check-ins, assigned responsibilities) can be duplicated to manage multi-school efforts. • **Educational integration**: The concept of using schools as hubs for circular economy action is universally scalable. One can adopt the pilot's workshop ideas (device disassembly, etc.) with local twist, and use the **sorting guidelines & monitoring templates** developed to standardize practices across all participating schools. • **Community engagement**: Transferrable aspect is involving the community via the school – e.g. inviting parents to school e-waste days or opening "repair café" events to the public. This multiplies impact and can be scaled city-wide or region-wide by networking many schools. The pilot's results show scalability both vertically (deeper per school) and horizontally (more schools/areas).
WEEE Aware (Awareness & Education)	• Implemented **awareness campaigns in hundreds of schools** (377 schools, 1,068 students directly involved) across multiple countries. Successfully embedded e-waste topics into classrooms despite not being in curricula, by providing teachers with ready resources. • Led to **tangible behavior change**: students and families started proactively sorting and collecting e-waste for proper disposal. Many schools held e-waste days or added permanent collection bins as a result. Teachers reported increased student engagement with environmental topics after the pilot.	• **Educational content & toolkit**: All lesson plans, games, and materials developed can be shared and adapted. The pilot's approach of providing plug-and-play materials is crucial for transfer – invest in creating a comprehensive kit in the local language and align it with school needs for easy adoption. • **Best practices for engagement**: Transfer the pilot's identified best practices: start with teacher training and clear guidance, use **interactive activities** (not just lectures), and incorporate field experiences or guest talks for impact. These

	• Created a replicable **toolkit of educational materials**, and demonstrated that a **modular approach** (linking school lessons, digital engagement, and community events) can be scaled up. The pilot highlighted key success factors like experiential learning, family involvement, and partnerships with experts.	methods have broad applicability in environmental education. • **Scalability & modularity**: The model can be implemented in one school or 500 schools. Its **modular design (school, community, local gov)** means parts can be added depending on capacity. For example, a region can start with just the school lessons, then later add community e-waste events. The success in three countries suggests it's culturally adaptable and could even go national with ministry support. • **Continuous improvement**: The pilot's lessons (need for early planning, unified monitoring, etc.) are transferable knowledge – new regions can improve upon the model by, for instance, building in a standard evaluation from the start or customizing content to local waste rules. In sum, the approach is **highly transferable** as a template for raising e-waste awareness broadly in society, via the education system.

Each of the five pilot solutions addresses a different facet of the e-waste challenge, but all share a common thread: they generated **valuable insights and tools that can be scaled and adapted** beyond the pilot regions. By learning from their successes and shortcomings, other regions can **replicate and build upon these initiatives** – whether it's implementing eco-design workshops with local manufacturers, rolling out a multi-city e-waste platform, forging partnerships between recyclers and social enterprises, engaging schools in collection and repair, or integrating e-waste topics into educational curricula. The CWEEEP pilots together form a rich *manual of innovation* for circular economy practitioners, policy makers, and educators across Europe and beyond. The experiences documented here can guide new projects to achieve even greater impact in the pursuit of sustainable e-waste management.

XI. Appendix 1: FINAL REPORT - WEEE DESIGN Pilot Action (Pilot lead: RERA SD)

1. INTRODUCTION AND PILOT SCOPE

The WEEE Design pilot action, led by RERA SD, was implemented within the framework of the Circular WEEEP project with the overarching aim of promoting circular economy principles in the design of electrical and electronic equipment (EEE). The pilot focused on improving eco-design practices, enhancing repairability and recyclability, and supporting better end-of-life management of EEE products in line with EU WEEE and Ecodesign policy objectives.

The pilot was developed and implemented in close cooperation with project partners, in particular BOKU, which contributed scientific expertise and developed assessment tools, and CTU, which supported methodological alignment and dissemination.

2. OBJECTIVES OF THE WEEE DESIGN PILOT

The pilot pursued several interlinked objectives:

- Encourage manufacturers to design EEE products for easy dismantling and recycling
- Combat planned and functional obsolescence by supporting repairability and component reuse
- Promote adherence to eco-design directives and improved recycling labelling
- Foster awareness among companies and citizens about sustainable product design
- Support the collection of open technical data to enable repair, refurbishment, and second-life use

As defined in the project application, the pilot aimed to:

- Identify and contact more than 200 companies
- Involve 100 companies in awareness activities
- Carry out 20–30 company assessments
- Support redesign or documentation of more than 50 EEE products for improved circularity

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3. METHODOLOGY AND TOOLS DEVELOPED

To operationalise the pilot objectives, RERA SD coordinated the development and deployment of two complementary tools, created by BOKU:

3.1 Questionnaire on Open Data for Producers

This questionnaire assessed companies' willingness and capacity to:

- Share technical specifications
- Provide repair and maintenance information
- Contribute to open databases supporting reuse and second life of EEE

The tool supported transparency and circular-economy principles by identifying realistic pathways for open technical documentation.

3.2 WEEE Design Evaluation Manual and Assessment Questionnaire

This assessment tool evaluated EEE design performance against key eco-design criteria, including:

- Ease of dismantling
- Material separability
- Recycling and labelling clarity
- Potential for reuse and second-life applications

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4. IMPLEMENTATION PHASES AND RESULTS

Phase 1: Initial Outreach to Producers

Duration: Start of pilot – February 2025

RERA SD conducted direct outreach to EEE producers at national and EU level, introducing the WEEE Design pilot and inviting participation in the assessment process.

Key actions included:

- Distribution of the Open Data Questionnaire
- Direct contact via email, phone calls, and online meetings
- Initial piloting of the evaluation methodology with BOKU

Main challenge:
Producer engagement was significantly lower than expected. Many companies lacked internal resources or familiarity with eco-design and circular design concepts.

Mitigation measures:

- Launch of targeted awareness activities
- Cross-promotion with related initiatives (e.g. CIRCOTRONIC)
- Mobilisation of project partners to expand outreach in their respective countries

Phase 2: Educational and Awareness Campaign

Duration: March – May 2025

To strengthen engagement, RERA SD coordinated an awareness campaign targeting both companies and experts.

Key activity:

- Organisation of a public webinar titled "Sustainable Design and ESPR Compliance", addressing regulatory requirements and business benefits of circular design.

Results:

- Increased awareness and understanding of eco-design principles
- Improved stakeholder trust and visibility of the pilot
- However, conversion from awareness to completed assessments remained limited

Phase 3: Expanded Outreach to Wider Stakeholders

Duration: June – August 2025

Recognising the need to meet quantitative targets, RERA SD broadened the outreach to include:

- Repairers and refurbishers
- Recyclers and waste operators
- Designers and service providers
- Industry associations

Quantitative results:

- **1,300 emails** sent across the partnership
- **204 completed questionnaires** collected
- Overall response rate: **approx. 15.7%**

Critical limitation:

Only **38 respondents were actual EEE producers** (18.6% of total responses), which constrained the statistical robustness of the assessment results

5. FOLLOW-UP ACTION: CIRCULAR EEE DESIGN ASSESSMENT TOOL

In the final stage of the pilot, and based on coordination with BOKU, a targeted follow-up action was implemented with companies that had already engaged.

Companies identified by BOKU) as EEE producers and product designers received the Circular EEE Design Assessment Tool.

Purpose of the Tool

The tool provides a structured self-assessment framework allowing producers and designers to:

- Evaluate environmental performance of their products
- Identify improvement opportunities in:
  - Energy efficiency
  - Material selection
  - Recyclability
  - End-of-life management
- Support informed and proactive eco-design decisions

This follow-up strengthened the qualitative impact of the pilot by offering practical, actionable guidance, even where large-scale empirical assessment was not feasible.

6. KEY CHALLENGES AND LESSONS LEARNED

Main Challenges

- Persistently low engagement from EEE producers
- Limited availability of internal company resources
- Difficulty obtaining product-specific design data

Lessons Learned

- Awareness activities are essential but not sufficient without incentives
- Designers, repairers, and refurbishers are highly relevant stakeholders for circular design
- Assessment tools must be simple, modular, and adaptable to real company practices

These insights are critical for future replication and scaling of similar pilot actions.

7. OUTCOMES, ADDED VALUE, AND TRANSFERABILITY

Despite engagement challenges, the WEEE Design pilot delivered clear added value:

- Development and testing of eco-design assessment tools
- Engagement of over 200 stakeholders across the EEE value chain
- Improved awareness of circular design and ESPR obligations
- Direct follow-up support to identified producers and designers
- Contribution to the collection of open technical and repair documentation

The pilot provided practical evidence and lessons to inform future WEEE-related policies The pilot methodology and tools can be transferred and scaled in other regions, especially when combined with regulatory incentives or industry association involvement.and initiatives.

8. CONCLUSIONS AND RECOMMENDATIONS

The WEEE Design pilot confirmed that circular design of EEE products remains a critical but underdeveloped area, particularly among producers. While quantitative targets were achieved in terms of outreach, qualitative engagement with manufacturers requires longer timeframes, incentives, and regulatory alignment.

Key Recommendations:

- Integrate eco-design assessments with regulatory or market incentives
- Strengthen collaboration with industry associations
- Focus on open repair documentation as a realistic entry point
- Continue refining assessment tools based on user feedback

XII. Appendix 2: Pilot Actions WEEE COLLECT and WEEE MARKET – Critical Analysis, Lessons Learned and Foundations for Capitalization (Pilot lead: ASSO)

INTRODUCTION

The two pilot actions WEEE COLLECT and WEEE MARKET, implemented within the Circular WEEEP project, represent a significant learning experience for understanding how to implement transnational digital platforms in the electronic waste management sector. Developed by **ASSO** (responsible for platform development) and promoted by **PoR** (responsible for dissemination), the two pilots provided an in-depth learning opportunity regarding the tensions between project ambitions and operational feasibility, between localization and transnational standardization, and between theoretical models of circularity and consolidated market dynamics.

This report documents the contradictions identified between the application form objectives and implementation practice, not to highlight failures, but to **extract valuable lessons for future capitalization projects**, clearly identifying which directions have been successfully pursued, which unexpected convergences have emerged, and which assumptions require fundamental revision in the design of digital platforms for transnational WEEE management.

1. FUNDAMENTAL CONTRADICTIONS IDENTIFIED IN THE APPLICATION FORM: LESSONS FOR FUTURE PROJECTS

1.1 Tension between Internationalization and Excessive Localization

The application form explicitly requires that the platform be **"promoted at Central Europe level, displayed in several languages, in an easy and intuitive way"**, with the objective of creating **a transnational WEEE collection online system that would coordinate collection logistics in a cross-border manner**. However, dissemination objectives and engagement metrics were defined with primary reference to an Italian audience and, specifically, the Rimini province.

Lesson learned: In future application forms for transnational platforms, the **localization model** selected must be explicitly stated: simple multilingualism does not create effective transnationality. An architecture serving primarily a local territory (Rimini) but displayed in English for international appeal risks creating confusion about who the true target audience is.

1.2 Ambiguity Regarding International Target and Primary Audience

The application form does not clearly specify: - Whether the primary target was truly international or whether internationality was merely secondary framing - How to balance depth of local information (essential for practical utility) with the need for international appeal - Which parts of the platform should be localized and which should remain transnational

This gap forced implementation partners to make ex-post decisions (such as opening a Czech section) not provided for in the original specifications, yet it also enabled the consortium to empirically identify the correct solution.

This experience of pragmatic adaptation holds value for future projects: **the need to provide, in initial design planning, a certain degree of architectural flexibility and a platform evolution roadmap**, rather than crystallizing objectives in a single version at launch.

2. IMPLEMENTATION PROBLEMS IDENTIFIED: DIVERGENCES BETWEEN ASSUMPTIONS AND OPERATIONAL REALITY

2.1 Redundancy with Pre-existing Local Infrastructure: How to Transform a Constraint into Opportunity

A critical element not immediately apparent from the application form is the pre-existence of already consolidated and highly evolved digital solutions at local level. In the Rimini province, **Hera has developed and maintains "Rifiutologo"**, an extremely sophisticated geolocalized mobile application that allows citizens to locate in real time differentiated waste collection centers, book pickups, and obtain detailed information on correct waste disposals for each waste type.

This situation creates an **apparent pragmatic contradiction**: the local population of Rimini would hardly benefit from a WEEE COLLECT platform that replicated functionality already available in a more evolved and consolidated version.

Yet the consortium transformed this constraint into a higher-value opportunity: the solution actually implemented—to develop the platform primarily in English—represents a pragmatic strategic inversion that revealed the true and higher-value target of the solution. Internationalization transformed the project from "local duplicate" to **transnational replicable model**, demonstrating to local authorities, cities, and Czech partners how to systematically implement a structured, scalable digital WEEE collection solution easily adaptable to local context.

The visualization and engagement numbers achieved (which exceeded application form targets) do not derive primarily from Italian audiences (already served by alternative local solutions) but rather from **international traffic genuinely interested in understanding how to develop similar solutions in their own areas of competence**.

For capitalization: future projects should recognize that the existence of consolidated local infrastructure does not invalidate the relevance of a project solution; rather, it requalifies the target from local citizens to **policy decision-makers and city administrators seeking best-practice models to replicate**.

2.2 Relational Dynamics with Local Operators: The Necessity of Timely Co-design

The language choice created a significant challenge in terms of **dissemination and local synergy (primary responsibility of PoR)**. In the Italian version of the platform, **the local**

waste management company (Hera) perceived the CWEEP solution as a duplicate and even direct competitor to its already consolidated application.

PoR faced significant difficulties in creating synergies with the main local operator, who viewed the CWEEP platform not as complementary but as potentially harmful to its investments and market position.

Lesson learned and recommendation for future projects: The absence of timely formal involvement of local waste management operators in the co-design phase generated a perceived competition dynamic. **In future projects, it is essential to conduct a structured preliminary consultation phase with sector operators** to identify how the platform can integrate and create added value rather than compete with already consolidated systems.

2.3 Economic and Operational Sustainability Assumptions: The Gap between Project Ambition and Feasibility

The application form requires that the platform facilitate **"on-demand WEEE collection"** (on-demand collection), presupposing that the local waste management company would implement ad-hoc logistics services. **This assumption proved economically and logistically unsustainable** for an operator like Hera for structural reasons:

1. **Economic incompatibility**: On-demand collection would entail significant logistics costs for pickups often of small WEEE quantities, with non-existent or negative economic margins.
2. **Disruption of consolidated processes**: Hera manages waste collection through processes optimized over years (fixed centers, pre-established collection days, planned logistics routes). Inserting an on-demand system would require deep operational redefinition.
3. **Absence of economic incentive**: The application form does not specify financing mechanisms to cover additional collection costs, nor does it provide economic margins for the operator.
4. **Lack of formal involvement**: Hera was not a formal project partner but an external entity being asked (implicitly) to adopt costly procedures.

Fundamental lesson for capitalization: **It is not possible to require in an application form that local economic actors (non-formal partners) transform consolidated processes in conformity to theoretical sustainability visions generated at project level, without providing direct economic incentives or parity involvement in co-design**. The distinction between binding requirements for formal consortium partners and recommendations/coordination opportunities with external subjects must be explicit in the application form.

2.4 Unrealistic Assumptions Regarding Market Dynamics and Necessary Pragmatic Adaptation

The WEEE MARKET component of the application form presupposed the creation of **an online marketplace where individual citizens or small operators purchase secondary raw materials directly from WEEE treatment plants**, according to a model stylized as "Amazon of circularity".

This assumption proved structurally unrealistic compared to the consolidated reality of European secondary raw materials markets:

1. **Fragmentation and absence of standardization**: European secondary raw materials markets (SRM) suffer from lack of technical standardization and end-of-waste criteria misalignment across countries. There is no "generic secondary raw material" sellable on a marketplace; each batch requires case-by-case assessment.
2. **Market liquidity shortages**: European research shows that **of secondary markets analyzed, only three (aluminum, paper, glass) are functioning**. Markets for components extracted from WEEE present extremely low liquidity.
3. **Supply chain complexity**: Secondary raw materials from WEEE follow structured B2B supply chains vertically integrated with large recycling companies, not dispersed.
4. **Economic and scale barriers**: Buyers of secondary raw materials require minimum quantities (typically tonnes), certifications, supply continuity—none compatible with spot transactions between citizens and plants.
5. **Absence of demand-side**: European Parliament and EEA research shows producer reluctance to invest in technologies integrating SRM in sourcing operations.

Facing these structural market constraints, the CWEEP consortium adopted a pragmatic approach significantly divergent from original specifications: rather than a B2C marketplace, the WEEE MARKET component was recalibrated as **a B2B supply-demand coordination platform**, facilitating contacts and negotiations between treatment plants and qualified buyers through matchmaking models.

This transformation is **conceptually correct and represents adaptation necessary to operational reality**. It highlights a failure in the requirements definition phase: the application form presupposed market dynamics that do not exist and cannot be created by a three-year Interreg project.

Yet this pragmatic adaptation also represents valuable learning: clearly distinguish between components enabling existing processes (achievable) and components transforming/creating new markets (unrealistic in short timeframes). **For capitalization**, this experience offers a **methodological framework for assessing feasibility of "market creation" components** in future application forms, validating assumptions ex-ante through direct consultation with consolidated operators.

2.5 Transnational Localization: Decentralized Responsibilities and Dedicated Financing for National Sections

A critical gap emerges regarding the creation and maintenance of localized national platform sections. As emerges from the **Lublin transnational meeting (September 2025)**, it was established that **each project partner (PP) would provide a national or local section clearly identifying local waste management provisions, measures and national laws governing WEEE management**, structured as mirror to the Italian section to avoid normative confusion and guarantee local applicability.

This solution is **conceptually correct and necessary for platform's effective transnationality**: without explicit national sections clarifying normative divergences

between Italy, Czech Republic, Poland, Slovenia, Croatia, Austria and Slovakia, the platform remains an Italian tool hardly replicable.

Yet application form analysis reveals absence of clear specification regarding responsibility and resource allocation:

1. **Local development responsibility**: It must be explicitly established that **ASSO, as core platform developer, cannot be responsible for developing pages in local languages and specific national normative content**. ASSO can perform a **limited role in technical coordination and architectural compatibility validation**, but material resources directly working on the platform (translation, normative adaptation, local system integration, QA) must be **necessarily local resources of each national partner**, possessing language and territorial normative expertise.
2. **Explicit budget allocation**: It is unclear whether the AF provides dedicated budget lines for each partner to develop their own local sections, or whether the assumption was that each PP would absorb these costs as "in-kind contribution". This ambiguity is critical: localization is not an optional or accessory feature but an essential element of transnational project mission.
3. **Maintenance costs**: The AF does not address recurring costs to maintain sections updated against continuously evolving regulations.

Practical impact observed: Absence of explicit financing and clear roadmap probably determined delays in Czech section opening, implemented in later phase rather than at launch, and uneven quality among sections.

Lesson for capitalization: Transnational platforms require: - **Clear role distinction**: ASSO coordinates and validates; local resources develop and manage national sections - **Explicit and dedicated budget allocation** for each partner to develop their own local section, with sequential but coordinated launch timeline - This is an **essential project mission feature**, not "accessory"

3. STRATEGIC RECOMMENDATIONS FOR FUTURE CAPITALIZATION PROJECTS

Based on analysis of contradictions identified and pragmatic adaptations realized by the CWEEP consortium, a set of methodological recommendations emerges for designing transnational digital platforms in the WEEE management sector:

3.1 Assessment Methodology Based on Feasibility Validation

In future application forms, include a **dedicated chapter on "market and operational feasibility analysis"** conducted in collaboration with: - Consolidated WEEE treatment operators - Qualified secondary raw materials buyers - Trade associations - National environmental agencies

This chapter must validate ex-ante that business models presupposed by the project are compatible with real sector functioning mechanisms, clearly distinguishing between: - **Enabling components**: existing processes that the platform facilitates (matching,

traceability, coordination) - **Transformation components**: assumptions requiring significant changes in consolidated economic behaviors or processes

3.2 Architectural Separation between Local and Transnational Components

WEEE COLLECT (citizen-facing, heavily localized) and WEEE MARKET (B2B, transnational) should have **distinct architectures** with differentiated information taxonomies. This allows: - Adapting WEEE COLLECT to local normative specificities without compromising WEEE MARKET trading logic - Maintaining narrative clarity about which component serves which audience - Modulating engagement targets accordingly

3.3 Timely Co-design with Operational Stakeholders

Before finalizing the application form, conduct a structured consultation phase with: - Local waste management operators (like Hera in Rimini) - Testing partners (like CTU for Czech Republic) - Potential secondary raw materials buyers and sellers

This phase must identify how the platform can integrate with consolidated local infrastructure, which requirements are truly implementable, and what real incentives exist for operator adoption.

3.4 Explicit Transnational Governance and Structured Feedback Loop

Define pre-project: - **Decision-making roles**: How and where platform decisions are made at consortium level - **Test feedback**: Formal mechanisms through which testing partners (like CTU) report incongruences between platform design and local realities - **Development iteration**: Processes enabling timely corrections rather than post-launch recalibration

3.5 Explicit Budget and Timeline for National Localization

For transnational applications, allocate in budget: - **Dedicated line items for each PP** for developing their own local section, including normative consultation, technical development (local system integration) and QA

- **Explicit timeline**: when each national section must be operational (e.g., Italian + Czech section at M12, Poland and Slovenia sections at M18)
- **Clear responsibilities**: explicit assignment of which partner is responsible for developing, validating and maintaining each section, with ASSO in coordination and architectural validation role, not direct execution

4. STRUCTURAL PROBLEMS IDENTIFIED AND THEIR SUSTAINABILITY IMPLICATIONS

4.1 Absence of Structured Feedback Loop from Testing Partners

Czech Republic (through CTU) tested the platform, yet no formal evidence emerges of: - Structured process for reporting difficulties encountered - Feedback mechanisms allowing CTU to report incongruences between design and local realities - Bidirectional communication enabling development improvements during coding

Lesson learned: Testing processes must be integrated in a **formal and timely feedback loop** permitting testers to influence design during development, not merely validate finished product. This maximizes testing phase value as co-design tool rather than simple quality control.

4.2 Fundamental Contradiction between Project's Temporal Nature and Permanent Sustainability Expectations

A critical theme emerging during implementation concerns the tension between **project's temporal nature** and **implicit expectation of post-project sustainability**.

By consolidated Project Management definition, **a project is a "temporary endeavour" with defined beginning and end**. Contrasted with this, an **operation is a recurring activity without defined termination**. The distinction is critical:

- **Project budget**: allocated for temporary endeavour (2023-2026 in CWEEP case), necessary and sufficient to achieve objectives within temporal duration
- **Operation budget**: allocated recurrently, to sustain post-project continuous activities

CWEEP's application form contains an implicit contradiction: it requires digital platform development (temporal), yet generates expectations that the platform be maintained, updated and managed indefinitely post-project (recurring operation).

This contradiction:

1. **Violates project definition itself**: a temporary endeavour cannot generate infinite maintenance obligations based on budget allocated for the temporary endeavour
2. **Creates conflict with partner-funder agreements**: budget was allocated for temporary endeavour, not post-project operations. Demanding permanent maintenance means asking partners to "donate" resources indefinitely
3. **Is not resolved in the AF**, which does not specify:
    - Whether the platform is a "deliverable" (like a report) delivered at project end or a permanent operating infrastructure
    - Who has post-project responsibility and with which budget
4. **Is not even resolved as strategic position of Interreg Central Europe**: the program has not clarified whether digital platforms developed in funded projects should be treated as "disposable" or as permanent infrastructure requiring recurrent financing

This gap was highlighted by ASSO at the Prague kickoff meeting and remains unresolved both in the AF and as the program's position regarding management of transnational digital deliverables.

For capitalization projects, it is essential that an **explicit strategic decision** be made:

- **Option A** (**Temporary Deliverable**): The platform is delivered at project end. Post-project responsibility is of external subjects (Local authorities, foundations) with separate financing.

- **Option B** (**Permanent Infrastructure**): The platform is recognized as transnational public infrastructure. Interreg program (or other funders) must provide dedicated recurrent financing or identify "institutional custodians" (environmental agencies) responsible with ordinary budgets.

Without this clarification, future projects will continue containing the same governance contradiction.

4.3 Normative Incompatibility between Countries and Need for Differentiated National Sections

Italy and Czech Republic have: - Different **extended producer responsibility (EPR)** systems and different enforcement levels - Divergent regulations on collection procedures, treatment and WEEE end-of-waste criteria - Significantly different WEEE Consortium governance structures - Different reporting and traceability obligations

The solution identified at the Lublin meeting is appropriate: each PP should provide a **national section clearly identifying local provisions and measures**, structured as mirror to the Italian section. This guarantees parallelism with content reflecting each country's normative reality.

Yet this localization effort entails significant costs that must be explicitly allocated in budget and planned in timelines, with clear partner responsibilities and normative update mechanisms.

For capitalization: Localized national sections are **essential for effective transnationality**, not optional or accessory.

5. SUMMARY AND CAPITALIZATION ORIENTATION

This report documents a project experience of significant value for the transnational WEEE waste management sector. The WEEE COLLECT and WEEE MARKET pilot actions represented a **"gymnasium" for empirically testing** what is achievable and what requires structural recalibration.

What has been learned and works: - Platform internationalization actually attracted transnational interest exceeding expectations, creating basis for replication in other contexts - Pragmatic adaptation toward B2B supply-demand coordination model aligned WEEE MARKET component with consolidated sector realities - Lublin meeting correctly identified mirrored national sections solution for transnational normative incompatibility challenge

What requires fundamental revision for future projects: - **Ex-ante validation of operational and market assumptions** through direct consolidated stakeholder consultation, not a priori assumption - **Explicit financing and budget allocation** for national localization components, with clear distinction between local execution and central coordination - **Timely co-design** with local operators and testing partners before application form finalization - **Transnational governance and structured feedback loops** enabling development adaptation, not post-launch recalibration only - **Resolution of contradiction between project's temporal nature and permanent sustainability expectations**, with explicit strategic decision (Option A: temporary deliverable with

external post-project responsibility; Option B: permanent infrastructure with dedicated recurrent financing)

CAPITALIZATION ORIENTATION:

Future projects building on this experience should assume CWEEP as **scientific and methodological learning base**, clearly extrapolating:

- **What doesn't work and why**: unrealistic market creation assumptions, absence of operator co-design, implicit financing of critical components, post-project sustainability ambiguity
- **What works and under which conditions**: coordination and matchmaking platforms facilitating pre-existing supply-demand connections, mirrored national sections with dedicated financing and local responsibility, transnational target of policy-makers and city administrators rather than general citizens
- **Which promising directions to pursue**: integration with consolidated traceability systems, hybrid models leveraging public platforms to facilitate already consolidated market dynamics, transnational governance enabling local adaptation within common parameters

This report transforms CWEEP experience into a **valuable teaching resource** for the scientific and project community working on digital platforms for circularity, clearly identifying boundaries of what is realistic to pursue and which directions require recalibration to maximize success probability and sustainability in future capitalization projects.

XIII. Appendix 3: Identified Barriers and Challenges in Implementing the Social WEEE Pilot (Pilot lead: ARSA)

CONSTRAINTS REPORTED BY COMPANIES IN THE WEEE SECTOR:

Absence of Clear Cooperation Frameworks: The lack of well-defined procedures for collaboration with Social Economy Entities (SEEs) creates uncertainty among companies regarding the formal and operational integration of these entities into existing processes. Consequently, businesses tend to adhere to established operational models, avoiding perceived risks associated with change.

Limited Awareness of SEE Capabilities: Insufficient knowledge about the competencies of SEEs has led to doubts concerning their ability to ensure continuity of work and maintain quality standards. This uncertainty has raised concerns about potential reductions in service quality and increased costs related to supervision and oversight.

Legal Liability Concerns: Companies engaged in WEEE recycling express apprehension about potential legal responsibility for errors occurring during dismantling or storage of equipment by individuals from vulnerable groups. These concerns further inhibit readiness to establish cooperative arrangements.

Barriers on the Side of Social Economy Entities (SEEs)

Technical and Infrastructure Deficiencies: The absence of specialized equipment and adequate infrastructure significantly limits SEEs' ability to undertake activities that require compliance with standards for electrical waste processing. For many entities, this constitutes a financial and logistical barrier that cannot be overcome without external support.

Insufficient Knowledge of Regulatory Frameworks: A lack of familiarity with regulations governing the WEEE market (including BDO registration, waste record-keeping, and classification requirements) has led SEEs to adopt a cautious approach and created uncertainty regarding their capacity to operate effectively in this sector.

Workforce Availability Challenges: Many SEEs rely on employees with diverse needs or limited availability, which poses difficulties for companies that require stability and consistency in operational processes.

Legal and Regulatory Barriers

Highly Regulated Sector Requirements: The WEEE sector is among the most heavily regulated areas of waste management, requiring partners to have detailed knowledge of procedures and to meet stringent standards. SEEs often lack the resources to comply with these requirements without advisory support.

Absence of Legal Framework for Delegation: The lack of legal provisions enabling the delegation of specific tasks in the electrical waste processing chain to social entities creates interpretative uncertainty, discouraging both parties from engaging in pilot cooperation initiatives.

Communication and Awareness Barriers

Low Awareness of "Social Recycling" Concept: Limited understanding of the "social recycling" concept among WEEE companies resulted in the project being perceived primarily as a CSR initiative rather than a genuine opportunity to optimize operational processes.

Insufficient Strategic-Level Engagement: In many cases, pilot contacts occurred at the operational level rather than with decision-makers capable of making strategic commitments, reducing the effectiveness of collaboration invitations.

Operational Barriers

Lack of Practical Testing: The pilot did not include full-scale testing of models in practice, which meant that organizations could make declarations without demonstrating actual readiness for implementation. This hindered the ability to obtain a reliable picture of SEEs' real potential.

Absence of Standardized Cooperation Models: The lack of ready-to-use, standardized collaboration frameworks and operational guidelines forced each company to independently consider how cooperation would work in practice, leading to decreased motivation to test new solutions.

II. AREAS FOR IMPROVEMENT DURING THE PILOT PHASE

Earlier Development of Operational Standards

Preparing a set of procedures, checklists, and process examples could have significantly increased companies' confidence, making it easier for them to envision practical implementation.

Provision of Industry-Specific Training for SEE

Training on BDO registration, safety standards, proper WEEE classification, and basic dismantling techniques would have enhanced SEEs' competencies and enabled their meaningful participation in electrical waste processing, paving the way for more advanced cooperation.

Greater Emphasis on Practical Piloting *(Not foreseen in the project due to lack of funding and implementation capacity by Powiat and ARR SA)*

Conducting even a few real-world tests based on actual logistical or dismantling processes would have increased the project's credibility and provided valuable data for subsequent implementation stages.

Improved Communication of Business Benefits

WEEE companies require strong economic arguments—highlighting cost reductions, compliance with ESG requirements, and reputational benefits could have resulted in higher engagement levels.

III. RECOMMENDATIONS AND FUTURE GUIDELINES

Joint Investment Projects: There is a need for greater financial resources (not available under Interreg EC) and active involvement of WEEE sector partners and SEEs as genuine stakeholders. There is a need for establishing further legal and financial capacity to implement such specialized activities—universities may be better suited as coordinators, given their position between private companies and the social sector.

Funding for Technical Infrastructure: Investments in technical infrastructure, workstations, and workshop equipment would enable SEEs to enter the WEEE market effectively, while helping companies reduce operational costs through social partnerships.

Promotion to benefit WEEE Companies: Integrating SEEs into recycling activities can be leveraged in ESG reporting, which is increasingly important for modern enterprises and contributes to competitive advantage.

Development of Cooperation Models Based on Real Processes: Creating several ready-to-use models—such as basic dismantling, equipment collection, and repair models—would allow companies to select solutions best suited to their operational profile. Given the complexity of this task, universities appear to be more effective actors for such initiatives for reasons outlined above.

CONCLUSION

The Social WEEE pilot represented an important step toward integrating social initiatives with the circular economy. Although the project encountered numerous barriers, it also provided valuable insights that can serve as a foundation for future initiatives. Key areas requiring further work include process standardization, capacity building for SEEs, improved communication, and the development of cooperation models based on real-world processes. Implementing the recommended actions could significantly increase adoption rates and ensure lasting social and environmental impacts in subsequent project phases.

Key limitations include the absence of a legal basis for directly outsourcing waste-related activities to SEEs without public procurement procedures, restricted ability to finance strictly waste-related infrastructure, and the risk of exceeding county competencies by intervening in the WEEE market.

XIV. Appendix 4: WEEE lives Solutions Key experiences (Pilot lead partner: CPU)

Below is a concise analysis on experiences and recommendations from implementing the WEEE Lives pilot action under Circular WEEEP (Deliverable D.2.2.1.) — **what worked, what to watch out for.**

WHAT WORKED
• Engaging schools proved effective: Targets exceed. 5 schools Lublin (PP10 as co-leader); 7 schools Rogaška Slatina (PP3 as co-leader) + CPU (PP4 as leader) 78 schools overall (PL, SI, SK, CZ).
• The campaign mobilized significant quantities of e-waste: the pilot collected ~ 20 tons overall (PL, SI, SK, CZ). 1,232 t in Lublin (PP10 as co-leader); 1,654 t in Rogaška Slatina (PP3 as co-leader) + CPU Slovenske Konjice (PPP4 as leader)
• The combination of collection + education + practical skills helped embed circular-economy values early on — a strong basis for long-term behavioral change. (Based on schools' feedback)
• Using "repair café", visits to REUSE/Waste collection centers, and practical workshops made reuse/repair more tangible, not just abstract.

KEY RISKS AND WHAT TO WATCH OUT FOR
• Need for clear governance and stakeholders' coordination: Since the pilot involves schools, collection/reuse centres, municipalities and possibly private partners, clear roles/responsibilities are needed (who collects, transports, stores, assesses, repairs). Without strong coordination, items may fall through the cracks.
• Collection infrastructure: Ensure uniform and sufficiently large collection containers in schools with clear markings of what belongs in them. To avoid the loss of potentially reusable EEE, a standardized triage protocol is recommended for all collection sites. This protocol enables early classification of devices into categories such as *functional, repairable*, or *suitable for parts recovery*. The pilot needs clear criteria for reuse vs recycling, and a realistic assessment of what portion of collected waste can meaningfully be given a "second life."
• Monitoring: Monitoring must be simple and consistent to evaluate and report results — e.g., a shared spreadsheet or centralized platform for all stakeholders, periodic updates, and a designated person responsible.

• Engagement / motivation: Relying on schools, parents and volunteers (students, teachers) can lead to uneven participation or drop-off if incentives or communication fade. Ensuring continuous motivation (e.g. via rewards, public recognition) helps, but this requires resources and planning.
• Legal framework surrounding e-waste management limiting repair & reuse: In Lublin, current regulations classify collected e-waste as waste, prohibiting repair and reuse for second life applications.

As the pilot lead partner of the WEEE Lives pilot project, CPU further shares its experience from the WEEE Lives pilot action implemented in Rogaška Slatina and Slovenske Konjice, Slovenia.

What we would do differently if implementing the pilot action again:

- **Community involvement:** Ask schools to inform parents early through multiple channels — Publication on their site, flyers in school bags, WhatsApp groups, or parent meetings.

- **Collection place:** Provide a collection area or infrastructure, where the e-waste could be collected anytime during the campaign (outside of schools opening hours).
- **Communication and impact**: Publish interim results to keep motivation and present the impact of the collection – e.g. how much CO_2 was saved.

What we plan to continue implementing and the approaches that have proven effective.

- **Provide ready-to-use educational materials:** Support teachers with ready-to-use classroom activities, short educational videos or presentations about e-waste.

The development of educational materials, such as worksheets, proved effective in fostering a

better understanding of circular economy principles and e-waste among pupils.

- **Provide practical workshops:** CPU integrates hands-on learning during the school visits to raise awareness about electronic waste.

Activities like dismantling small devices and basic repair not only engage pupils but also promote a culture of reuse and sustainability.

PRACTICAL FINDINGS AND LESSONS APPLIED

The WEEE Lives pilot showed that **combining collection with hands-on education significantly increases both awareness and recovery of small electronic waste, especially forgotten small electronics like phones, cables, and gadgets.**

The role of recycling centers and waste management companies is crucial to the success of the initiative. **Their involvement ensures that collected e-waste is processed responsibly, highlighting the importance of such partnerships in community-driven actions.**

Collaboration with local reuse centres enabled more **efficient repair assessments and strengthened circular practices**. CPU strengthened its collaboration with the waste management companies in the communities of Rogaška Slatina and Slovenske Konjice during school visits.

PROPOSAL OF SOLUTIONS DERIVED FROM WEEE LIVES PILOT IMPLEMENTATION EXPERIENCE

Based on the insights gained during the implementation of the WEEE lives pilot action, a proposal of solutions has been developed to enhance the reuse and second-life potential of devices which had been discarded as WEEE by organizing e-waste competition in schools.

The WEEE lives pilot demonstrated that effective reuse requires coordinated engagement among schools, recycling centers, NGOs, waste management companies, repair actors, and final beneficiaries.

This proposed solution builds directly on the practical experiences and challenges identified during the pilot action. **It includes indications of the actions and resources needed for it to be taken up or to be up-scaled.**

PROPOSAL OF SOLUTIONS DERIVED FROM WEEE LIVES PILOT IMPLEMENTATION EXPERIENCE:

Actions & Resources

Stakeholder Roles and Coordination

Clear Stakeholder Roles

- **Actions:** Agree on responsibilities between schools, municipalities, waste collectors, and reuse centres through brief cooperation agreements.
- **Resources:** Rules and role-sharing document, contact list, periodic coordination meetings.

Enhanced Collection Infrastructure

School-Based WEEE Micro Collection Points

- **Actions:** Install small collection boxes and secure temporary storage space in schools; run short awareness sessions or educational displays; schedule regular pick-ups.
- **Resources:** Collection containers, simple posters, contact person in each school, transport support from waste operators.

Easy Sorting Criteria for WEEE

- **Actions**: Provide simple guidance to categorize items as reusable, repairable, or recyclable; share examples and quick-check lists.
- **Resources**: One-page sorting guideline, support from waste and reuse operators for assessment.

Monitoring & Feedback System

Light Monitoring & Feedback System

- **Actions:** Use a shared spreadsheet or centralized platform for all stakeholders to track quantities collected, workshop attendance, repair outcomes, and feedbacks.
- **Resources:** Basic digital tools (Google Forms/Excel), a designated coordinator to compile data, short reporting templates.

Schools Engagement / motivation

Participation Incentives

- **Actions:** Publish interim results can increase motivation to carry out the action; offer certificates, public recognition, or small rewards to motivate engagement.
- **Resources:** Digital badges or certificates, communication materials, small non-monetary prizes (e.g., school supplies).

Repair & Reuse workshops

- **Actions:** Organize hands-on sessions where pupils learn to assess, repair, and safely dismantle devices; partnership with repair professionals or local repair cafés and reuse centres.
- **Resources:** Workshop space, trainers/technicians, basic tools (screwdrivers, testers), selected WEEE items for learning.

Integration of “Repair & Reuse Academies” in Schools

Establishing **Repair & Reuse Academies** — supported by repair professionals, reuse centres and NGO partners — would provide students with hands-on experience in diagnostics and repair, while ensuring a consistent flow of refurbished devices. This contributes to long-term capacity building and awareness of circular economy principles.

XV. Appendix 5: Experiences and Recommendations from the Implementation of Circular WEEEP - WEEE AWARE Pilot Solutions (Pilot lead partner: Bratislava Staré Mesto)

Based on the progress of the Circular WEEEP pilot activities and feedback from schools, coordinators, and partner organizations, we summarize the following insights, recommendations, and lessons learned.

1. WHAT WE WOULD DO DIFFERENTLY IF IMPLEMENTING THE PILOTS AGAIN

- **Provide ready-to-use educational materials from the start.** Schools requested worksheets, presentations, videos, and methodological guidance that can be easily integrated into lessons.
- **Deliver earlier and more structured teacher training.** Teachers lacked clarity on how and where to include the topic, as e-waste is not part of the curriculum.
- **Strengthen cooperation with recycling experts and organizations.** Guest speakers, ENVIDOM lectures, discussions, and site visits were among the most impactful activities.
- **Introduce unified monitoring tools from the beginning.** Standardised data collection would facilitate cross-country comparison.
- **Increase community-based activities**, such as electro-swap events and repair cafés, to expand the impact beyond schools.

2. KEY POINTS TO WATCH OUT FOR TO ENSURE SMOOTH AND EFFECTIVE IMPLEMENTATION

- **Clear, visual, and user-friendly materials** for teachers and students.
- **Continuous communication with participating schools**, including guidance and troubleshooting.
- **Safety protocols** for practical dismantling or handling of devices.
- **Well-marked and visible e-waste collection points** at schools and institutions.
- **Cooperation with recycling companies**, both for logistics and educational content.
- **Community involvement** to enhance long-term behaviour change.
- **Linking awareness with practical experience**, such as school collection days.

3. WHAT WE PLAN TO CONTINUE – APPROACHES THAT HAVE PROVEN EFFECTIVE

- **Interactive, experiential learning.**
  Dismantling devices, creative workshops, videos, and class discussions were the most appreciated.

- **School e-waste collection campaigns integrated with education.** Students began sorting e-waste at home and involved their parents.
- **Expert-led lectures and workshops**, which improve understanding and credibility.
- **Use of digital platforms such as EduPage** to communicate, motivate, and share results.
- **Community engagement events** that help spread awareness beyond the school environment.
- **Modular structure** (schools – community – local government), which supports scalability and transnational transfer.

4. PRACTICAL FINDINGS AND LESSONS ALREADY APPLIED

- **General awareness of e-waste is very low** and requires foundational education.
- **Experiential learning generates the strongest educational impact.**
- **Schools highly value simple, ready-to-use tools**, given limited staff capacity.
- **Involving families significantly increases behavioural change.**
- **Partnerships with experts and recycling organizations are essential** for both logistics and professional content.
- **The pilot demonstrated strong scalability potential**, supported by digital tools and modular design.
- **The achieved results (1068 students, 377 schools, 3 countries)** confirm the effectiveness and transferability of the model.

XVI. Table of figures