

EU Recyclers' Roadmap: For a circular & future-proof e-waste sector

WEEE matters



RECYCLING EUROPE'S 6 RECOMMENDATIONS FOR A CIRCULAR AND FUTURE-PROOF WEEE SECTOR

Between 2012 and 2021, the amount of Waste Electrical and Electronic Equipment (WEEE) generated in the EU increased from 7 Mt to 8,4 Mt (+ 20%) [1], making **WEEE one of the fastest growing waste streams in Europe and globally**. WEEE recycling plays a crucial role in decarbonising the WEEE value chain and contributes significantly to the EU's material sovereignty. In 2020, a total of 2,724 facilities for the initial treatment of WEEE were operating in the EU.

However, currently only **around 40% of all WEEE is reported as recycled in the EU** [2]. For **WEEE plastics, the recycling rate drops to just 20%** [3]. Moreover, under the placed-on-market (POM) calculation method, **only about 46% of WEEE is collected in the EU**, remaining far below the 65% target set out in the WEEE Directive [4]. This results in a substantial loss of valuable resources and constrains the full potential of the circular economy.

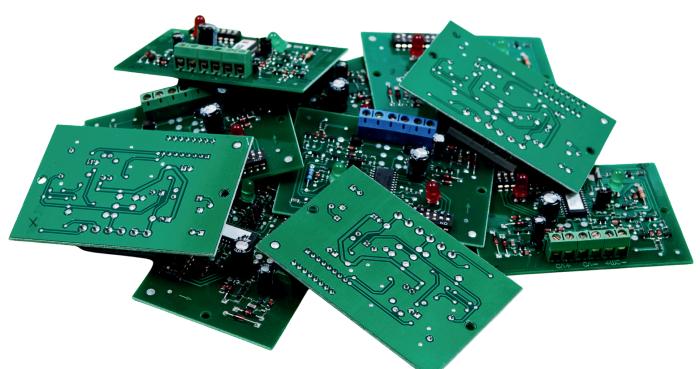
The current regulatory and economic context fails to provide sufficient incentives to enhance circularity across the electrical and electronic equipment value chain. Recyclers face multiple challenges, including low demand for recycled materials, the slow implementation of ecodesign rules in new products, and persistently low collection rates.

Recycling Europe therefore calls for six key measures to boost WEEE recycling in the EU.

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[1] Eurostat, 2022 ([Waste statistics - electrical and electronic equipment - Statistics Explained - Eurostat](#))

[2] SWD WEEE Directive Evaluation ([Staff working document evaluation of the Directive 2012/19/EU on waste electrical and electronic equipment \(WEEE\) - Environment](#))

[3] Plastics Europe, 2023

KEY PROPOSALS INCLUDE:



Improving e-waste collection



Enabling free and fair trade for WEEE within the EU



Enhancing EEE recyclability through ecodesign and the Digital Product Passport (DPP)



Taking down market and regulatory barriers to effective EEE circularity



Ensuring adequate design and implementation of EPR schemes



Future-proofing the WEEE recycling sector

Recycling Europe's Non-ferrous Metals Branch (Recycling Europe Non-ferrous metals) represents Europe's non-ferrous metal recycling and trading industry at EU level. Established in 1990 and integrated into Recycling Europe (EuRIC) in 2016, the branch monitors and analyses EU regulatory and technical developments affecting the processing, recycling, transport, and trade of non-ferrous metals.

Recycling Europe's Plastics Branch (Recycling Europe Plastics) represents the European plastics recycling industry before EU institutions and engages with stakeholders at European and international level. Founded in 2018, it brings together companies and national federations active in the collection, recycling, and trade of recycled plastics, with the aim of strengthening plastics recycling across Europe.



1

IMPROVING E-WASTE COLLECTION

Efficient collection is the foundation of effective e-waste recycling

WEEE can only be properly treated if it reaches the recycling facilities. Most Member States currently fail to meet the collection targets set out in the WEEE Directive, resulting in the loss of valuable resources. Low collection rates are driven by several structural factors.

At household level, many households store electrical and electronic equipment (EEE) that is no longer in use for extended periods of time. **Recent numbers show a growing stock of unused devices in households [4]. Low consumer willingness to dispose of WEEE** properly at end-of-life is further reinforced by a **lack of collection points** and **low threshold disposal options**. Public awareness of the importance of correct sorting and proper disposal (e.g. the use of appropriate containers) also remains inadequate.



These challenges can be addressed through **targeted public awareness campaigns and by expanding the network of collection points**. Such efforts should be financed through existing EPR schemes. Manufacturers should be required to invest more in consumer information to raise citizens' environmental awareness and promote correct disposal practices. For example, consumers should be clearly informed by manufacturers about the importance of not disposing of WEEE, or any items containing batteries, in the mixed residual fraction. *



Well-designed and properly funded take-back incentives can also significantly improve collection rates. These incentives should be accompanied by clear consumer information on take-back procedures, including for products sold via online sales platforms.



Member States are legally responsible for achieving WEEE collection targets. They must therefore **ensure proper enforcement of collection obligations and hold producers accountable**, so that the latter fulfill their part in achieving these targets, including by applying sanctions where necessary.



Moreover, the **collection of WEEE that cannot be reused or refurbished must be more strongly geared towards recycling** to achieve the best possible outcomes.

* DID YOU KNOW THAT

In France, Producer Responsibility Organisations are already required to allocate at least 2% of fees to communication activities.

[4] Eurostat 2025 ([Over 32 kg/person of new electrical & electronic gear - News articles - Eurostat](#))

Currently, recyclers often receive mixed WEEE streams, which can complicate or even prevent final, proper treatment. In this regard, the increasing presence of lithium batteries in collected WEEE represents a major problem. WEEE collection and transport systems are not always adapted to handling these batteries safely, leading to fires during collection, transport and unloading. Similar safety risks arise from gas cylinders, which pose serious hazards to personnel and facilities.



Minimum collection requirements could help address battery fire risks, weather exposure and the presence of hazardous substances. In particular, to prevent battery fires, WEEE -especially smaller appliances- should be collected and transported in appropriately sized (small) and clearly labelled containers or cages that prevent breakage or crushing. Consequently, the bulk transport of WEEE containing batteries should be prohibited. Some Member States have already introduced minimum standards for WEEE collection at municipal collection points (e.g. Germany) or mandatory transport requirements (e.g. Spain). In this context, the role of recyclers in collection must not be overlooked. Unlike retailers or municipal facilities, **WEEE recyclers** are well equipped to manage fire risks and can play a valuable role in local collection; they **should therefore have the option to also act as collection points.**

Another major concern is the lack of traceability of (W)EEE. The high value of certain components and materials makes them easy and attractive targets for illegal activities, starting at the collection stage. Municipal collection points, for example, can be vulnerable to theft of valuable parts of WEEE, such as copper cables or fridge compressors, if security requirements are insufficient. Illegal exports further exacerbate the problem.

At EU level, the **share of WEEE treated outside the EU and not in compliance with EU requirements increased from 22% in 2010 to 25% in 2020**^[6]. Stronger controls by national authorities are therefore needed to ensure the proper enforcement of the distinction between exporting used EEE and WEEE.

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In Germany alone, an estimated 150,000 tons of WEEE are exported illegally each year, often falsely declared as used appliances.

Source: [5] Umweltbundesamt (Optimierung der Steuerung und Kontrolle grenzüberschreitender Stoffströme bei Elektroaltgeräten / Elektroschrott | Umweltbundesamt)

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Moreover, a significant amount of small WEEE (approximately 100,000 tons in Germany and 180,000 tons in France) is disposed of in residual waste bins and subsequently incinerated. Part of the WEEE stream is also treated at illegal sites that are not authorised by the competent authorities. Therefore, **improved identification of such practices and sanctions of such sites are essential. Overall, stronger and more harmonised systems for traceability and accounting of WEEE flows processed across the EU are needed.**

[6] SWD WEEE Directive Evaluation (Staff working document evaluation of the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) - Environment)

ENABLING FREE AND FAIR TRADE FOR WEEE WITHIN THE EU

Creating a true single market for waste and recycled materials in the EU is essential to facilitate recycling

As announced in the upcoming Circular Economy Act (CEA) creating a true single market for waste and recycled materials in the EU is essential to enable efficient recycling. Achieving this objective requires, first and foremost, the **simplification of notification procedures and the rapid deployment of a fully operational EU digital system for waste shipments**.



In parallel, **the harmonisation of the classification of certain waste types (“green-listed” waste) is crucial to facilitate intra-EU shipments**. This should be accompanied by clear and uniform guidelines for competent authorities to prevent divergent interpretations and fragmented implementation across Member States.



In this context, it is imperative to **ensure that non-hazardous e-waste can continue to move freely within the EU without notification as of 2027**. Such flexibility is indispensable to enable economies of scale in the recycling of critical materials such as copper, steel, and plastics. This is particularly important given that, **within the EU, facilities that recycle critical raw materials from e-waste are limited in number** and concentrated in only a few Member States.

As a result, e-waste shipped to these facilities often needs to travel long distances – both geographically and administratively – while being subject to the complex shipment procedures laid down in the Waste Shipment Regulation (WSR).



Currently, the **largely non-digitalised shipment system** – still relying on paper-based processes, original signatures or even fax transmissions –, significantly **undermines efficiency and smooth notification**. It is therefore crucial to fulfil Art. 27 of the new Waste Shipment Regulation (2024/1157) and **make the EU digital system for waste shipments fully operational as soon as possible**. A key condition for the successful implementation of a digital system that enhances efficiency is the **synchronisation between national and European IT declaration systems**. This alignment is essential to avoid multiple data entries and, consequently, the duplication of shipment processing costs, in terms of both time and human resources.

With regard to **shipments of hazardous e-waste, the notification procedure is the right way to go**. However, the **current system** is excessively burdensome and overly complex and **must be significantly streamlined**. In practice, obtaining a new notification takes on average between 3 and 6 months and can go up to 1 year for intra-EU shipments. Renewals are equally time-consuming, often requiring 6 months to 1 year, depending on the competent authorities involved. These delays severely constrain operational planning and investment decisions for recyclers.



Additionally, **recycled materials produced from WEEE that face insufficient EU demand within the EU** -due in particular to the relocation of EU production (such as certain grades of recycled steel and aluminium), **must retain guaranteed access to international markets**. Export restrictions cannot be considered a solution to increasing WEEE recycling rates in Europe. On the contrary, **stable and open market conditions are essential to provide recyclers with the investment certainty** needed to deploy new technologies and scale up WEEE circularity in Europe.

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ENHANCING WEEE RECYCLABILITY THROUGH ECODESIGN AND THE DIGITAL PRODUCT PASSPORT (DPP)

Ecodesign is key to improving the recyclability of WEEE

Certain design choices - such as the use of adhesives, multi-layer plastics or plastics with reinforced fibers – significantly hinder recycling operations. Conversely, **recyclability can be enhanced by eliminating harmful substances, avoiding adhesive bonds and limiting the number and types of plastics used in products**. Moreover, **batteries must be easily removable**, not only to facilitate recycling but also to reduce fire risks during waste handling and recycling.

Against this background, **it is crucial to ensure strong alignment and coherence between the revised WEEE Directive and the Ecodesign for Sustainable Products Regulation (ESPR), both in terms of requirements and implementation timelines**. The ESPR aims to make sustainable products the norm in the EU, and achieving this objective requires a strong focus on the design phase, as design decisions largely determine a product's recyclability and repairability.

Within the ESPR framework, the Digital Product Passport (DPP) has the potential to support WEEE recycling. However, several considerations must be addressed to ensure that the DPP delivers tangible value for recyclers. The type of EEE determines the level and type of information relevant for recyclers to be included in the DPP. At minimum, **the DPP should include indicative disassembly instructions, information on the presence or absence of batteries and critical raw materials, and a list of any hazardous substances contained**, along with their concentrations and location within the product.

A fundamental requirement is that the **DPP remains accessible and readable at end-of-life**. This poses practical challenges, as, for example, DPPs relying solely on physical identifiers such as QR codes are very likely to be damaged over the product's lifetime, rendering them unusable at the treatment stage.



To maximise the use of the DPP data, the available information on **the different materials and substances found in WEEE could also be leveraged for statistical purposes**.

Aggregated information on the composition of WEEE by category would help foresee recovery potential for different material flows.



Moreover, given the large volumes of WEEE processed at recycling sites, **scanning individual DPPs is generally not feasible. Information contained in the DPP must therefore be made available in a simplified and, where possible, aggregated manner**. In this context, the DPP may be particularly valuable in the B2B sector, where structured and homogeneous take-back systems exist, or for targeted repair and reuse operations of specific equipment. To further enhance accessibility, **DPP information should also be available via an online platform**, in addition to being placed on the product itself.



In short, for the DPP to effectively support recyclers, its implementation must be pragmatic, avoid overburdening operational processes, and should integrate smoothly with existing recycling practices.

TAKING DOWN MARKET AND REGULATORY BARRIERS TO EFFECTIVE WEEE RECYCLING

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For WEEE recycling to thrive in Europe, stronger and more predictable demand for recycled materials is essential

Today, the uptake of recycled materials in new EEE remains very low. For example, **in 2021 only 4.5% of recycled plastics were used in the production of new EEE.**



To stimulate demand for recycled materials in EEE and to track the progress made in this regard, **disclosure about recycled content included in EEE per material should be made mandatory.**

Demand for recycled Critical Raw Materials (CRMs) - such as those found in printed circuit boards or permanent magnets - is particularly weak in Europe. This is due to **limited EU refinery and smelting capacity, low domestic production of electrical and electronic equipment.**

CRM recovery from WEEE is also challenging. CRMs are present in very small quantities in individual appliances, resulting in a lack of scale. Moreover, **recyclers often lack information on where these CRMs are located** within products. As a result, **CRM recycling from WEEE is costly and frequently not economically viable.**



To address this and boost recycling, **the first step must be to increase demand for recycled CRMs and guarantee adequate profit margins for recyclers**, enabling viable operations and investments in improving recycling rates, both in terms of quality and quantity. At the same time, it is important to promote research and development of treatment methods. Importantly, start-up financing for such R&D projects must also be accessible to and include SMEs.



With regard to recycling operations, the **establishment of EU-wide minimum set of treatment requirements or standards is needed**, as it would help ensure a level playing field within and amongst Member States. It would also increase and improve the environmental benefits through optimised recycling. However, **the costs of certification make mandatory schemes challenging**, especially for SMEs, unless accompanied by financial incentives. **If mandatory standards are introduced, compliance-related costs, especially auditing, should be systematically covered by EPR schemes.** This is essential to avoid disproportionate administrative and financial burden on treatment operators, and to ensure an even playing field for SMEs. Finally, recyclers must be actively involved in the development of standards, to guarantee that they are fit for purpose, and to support WEEE recycling without leading to potential competition or innovation restrictions because of provisions which may be over-prescriptive or not technology neutral.

Beyond regulatory constraints, **EU recyclers also face strong competition from cheaper virgin materials, notably plastics and CRMs.**

To address this structural market failure and strengthen the recycling industry, **EU-sourced recycled content targets are a key tool for materials where markets remain dysfunctional.**

Recycled content targets boost demand for recycled materials, correct market failures, improve market stability and predictability, and **provide the confidence recyclers need** to invest in new recyclers need to invest in new technologies and additional recycling capacity.

In parallel, **robust mechanisms for the verification and traceability of recycled polymers, along with the application of EU-equivalence rules, are necessary to protect the European plastics recycling industry.**



Finally, in addition to competition with virgin materials, **recyclers are increasingly affected by restrictions introduced under the EU's chemicals legislation** (REACH, POPs, CLP Regulations). **These limits have considerably increased the costs of sorting, in some cases making recycling less viable than energy recovery.** **Plastic waste recycling from WEEE is particularly at risk** of being halted altogether, especially if thresholds of restricted substances are reduced to levels that recyclers cannot verify with current industrial-scale analytical tools and quality control methods.

While restricting the use of certain substances in new products is justified, the impacts on recycling must be carefully assessed and addressed to ensure the circular economy can function properly. To ensure that recycling remains viable in the future, **chemicals in waste should be regulated not only on the basis of their hazardous properties, but also on the level of the actual risk they pose.** Given the presence of hazardous “legacy” substances and the prolonged lifespan of certain products within an evolving regulatory framework, such a **“risk-based” approach, rather than a purely “hazard-based” one, is essential to ensure the long-term viability of WEEE recycling.**

5

ENSURING ADEQUATE DESIGN AND IMPLEMENTATION OF EPR SCHEMES

For the WEEE recycling sector to thrive, an adequate design and implementation of Extended Producer Responsibility (EPR) schemes is essential

EPR schemes should be introduced only when there is a clear need to address cases of market failure, rather than applied systematically, to avoid overburdening waste management and recycling companies. If EPR schemes for additional products should be introduced in the context of the WEEE Directive revision, an **independent assessment must first be carried out** to evaluate the need for such an EPR scheme as well as its potential impact on the existing value chain.

In case an EPR scheme is introduced, producers should have the possibility to fulfil their extended producer responsibility obligations either individually or may entrust an authorised producer responsibility organisation to fulfill the EPR obligations on their behalf. **The type of EPR model chosen and its regulation should remain at the discretion of Member States to ensure full efficiency**, so that country-specific structures for collection and recycling can be taken into account on an individual basis. However, minimum criteria could be established at EU level to support greater harmonisation.

💡 In all cases, dominant market positions of EPR schemes or PROs must be avoided to preserve fair competition and safeguard the recycling industry's capacity to invest and innovate. This requires prohibiting PROs from competing in the markets they regulate and from gaining competitive advantages in the recycling sector, for example by holding ownership stakes in recycling companies from which they procure services.

💡 Moreover, recyclers' representation should be guaranteed in the governance boards of EPR schemes to ensure fair decision-making, balanced interests and to promote best practices.

💡 Recyclers must also at all times retain ownership of recycled materials. This is essential to ensure that recycling remains a viable business model, to avoid unnecessary burdens and costs for producers and consumers, and thus, to encourage investment in research and development – a critical condition for delivering the EU's environmental, climate and strategic autonomy objectives.



FUTURE-PROOFING THE WEEE RECYCLING SECTOR

The EEE sector is undergoing structural changes that increasingly undermine the economic and operational viability of WEEE recyclers

As more and more EEE is placed on the market, the share of cheap, (usually) small domestic appliances has also increased. To cut costs, these products increasingly rely on **plastics at the expense of more valuable materials and particularly metals, leading to a higher proportion of materials that are more difficult, or some times impossible, to recycle**. This shift in material composition jeopardises the economic viability of recycling and must be duly reflected when revising recycling targets under the WEEE Directive.

At the same time, the number of products containing lithium-ion batteries, which are often difficult or impossible to remove prior to treatment, is also rising. This translates into an **increasing risk of battery fires in recycling and waste management facilities, with detrimental effects for recyclers**. In France, for example, the number of fires linked to lithium batteries in such facilities doubled between 2019 and 2023. In Germany, up to 30 fire incidents occur every day in waste collection vehicles and treatment facilities, with around 80% attributed to lithium batteries. These incidents have severe safety, environmental and financial consequences for **recyclers, who are increasingly struggling to obtain insurance coverage due to elevated fire risks**. In some cases, a single fire incident can lead to the permanent closure of a recycling facility. To address the issue of battery fires and mitigate these risks for EU recyclers:



Producer Responsibility Organisations (**PROs**) **should be required to finance targeted awareness campaigns** on how to properly sort waste containing lithium-ion batteries.



In addition, PROs should also **contribute to the additional costs associated with the safe removal** of these batteries prior to mechanical processing in recycling plants.



To address recyclers' increasing difficulties in obtaining insurance coverage due to the high risk of fires, **part of the costs arising from major fires should be covered by PROs, for example through a dedicated fund** established within the framework of the EPR scheme.[6]



Moreover, **single-use products containing batteries, such as disposable vapes or battery-powered greeting cards, should be banned**. This would be an effective measure to reduce battery-related fires caused by such type of disposable WEEE that is frequently incorrectly discarded with mixed residual waste.

[6] For more information on addressing battery fires: [Battery_Fires_in_Waste_Management_Joint_Paper.pdf](#)

Beyond these immediate measures, future-proofing the WEEE recycling sector, requires a framework – the WEEE Directive –, in our case, that is fit for purpose. To be more coherent with the developments in the WEEE sector, certain categories of the appliances currently within the scope of the Directive must be revised.



Among others, the revised legislation should **introduce a new category for photovoltaic (PV) panels**, consolidate ICT appliances with small appliances, and merge the current categories 5 and 6.

More broadly, **product classification should focus more on product composition and treatment requirements** rather than size.



More coherence is also needed with other relevant legislation, such as the Batteries Regulation and the End-of-Life Vehicles Regulation to **clarify the current “open scope” approach under the WEEE Directive**.

The open scope approach has led to the inclusion of certain items such as textiles or furniture containing cables or batteries under the WEEE Directive, despite the existence of more appropriate and established recycling channels for these products. Continuing down this path risks undermining both regulatory clarity and recycling efficiency.

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In some cases, a single fire incident can lead to the permanent closure of a recycling facility.

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[1] Under Article 18(5) of the EU Waste Shipment Regulation 2024/1157 (EU WSR)

CO₂ savings from recycling WEEE materials



Info Box

Recycling materials from waste electrical and electronic equipment (WEEE) avoids significant greenhouse gas emissions by replacing primary raw material production.

Recycled steel

7.243
kt CO₂ eq



Recycled aluminium

2.870
kt CO₂ eq



Recycled copper

1.405
kt CO₂ eq



Recycled plastics

2.030
kt CO₂ eq



Recycled palladium

391
kt CO₂ eq



Recycled glass

285
kt CO₂ eq



* Source: SWD WEEE Directive Evaluation (Staff working document evaluation of the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) - Environment)

Recycling Europe is the voice of Europe's recycling industries, representing **80 members across 24 EU & EFTA countries**, and over **5,500 companies**. We drive a 95 billion EUR contribution to the EU **economy** and support **300,000 green, local jobs**. By turning **waste into valuable resources** and reintroducing materials into value chains, we are at the forefront of circularity and climate neutrality. As a catalyst in Europe's green transition, **Recycling Europe is driving the industrial shift that boosts EU competitiveness, resilience, and strategic autonomy**.



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