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EVALUATION

of the
Directive 2012/19/EU
on waste electrical and electronic equipment (WEEE)

{SWD(2025) 185 final}

Contents

Glossary of acronyms and terms

Acronym	*Meaning*
CEAP	Circular economy action plan
CENELEC	European Committee for Electrotechnical Standardization
CRMA	Critical Raw Materials Act
CRM(s)	Critical raw material(s)
DSA	Digital Services Act
EEE	Electrical and electronic equipment
EIF	Entry into force
ELV	End-of-life vehicle
EPR	Extended producer responsibility
ESPR	Ecodesign for Sustainable Product Regulation
EU	European Union
EWEN	European WEEE Enforcement Network
EWRN	European WEEE Registers Network
FTE	Full-time equivalent
I4R	Information for recyclers
MS	Member State
NGOs	Non-governmental organisations
OPC	Open public consultation
PoM	Placing on the market
POPs	Persistent organic pollutants
PROs	Producer responsibility organisations
PVs	Photovoltaic panels
REACH	Regulation on the registration, evaluation, authorisation and restriction of chemicals
TAC	Technical Adaptation Committee

WEEE	Waste electrical and electronic equipment
WSR	Waste Shipment Regulation

Term	*Definition*
B2B (business to business) WEEE	WEEE coming from users other than private households.
B2C (business to consumer) WEEE	WEEE coming from private households.
Collection	The gathering of waste, including the preliminary sorting and preliminary storage of waste for the purposes of transport to a waste treatment facility.
Disposal	Any operation which is not recovery even where the operation has the reclamation of substances or energy as a secondary consequence.
Free-riders / Free-riding	Producers of electrical and electronic equipment who do not comply with their producer responsibility obligations.
Full-time equivalent (FTE)	Measures the total amount of full-time employees working at any one organisation. It is a way of adding up the hours of full-time, part-time and various other types of employees into measurable 'full-time' units.
Producer responsibility organisation (PRO)	A PRO is a collective body operating nationally, established and managed by producers of electrical and electronic equipment, which takes charge of meeting the legislative requirements of producers on their behalf and against a financial contribution on their part.
Recovery	Any operation the principle result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Recovery includes material recovery, mainly preparing for reuse and recycling, and energy recovery.
Recycling	Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.
Reuse	Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived
Scavenging	WEEE or components of WEEE, stolen or misappropriated for financial gain.
Separate collection	The collection where a waste stream is kept separately by type and nature so as to facilitate a specific treatment.
Preparing for reuse	Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are

	prepared so that they can be reused without any other preprocessing.
Prevention	Measures taken before a substance, material or product has become waste that reduce: (a) the quantity of waste, including through the reuse of products or the extension of the lifespan of products; (b) the adverse impacts of the generated waste on the environment and human health; or (c) the content of hazardous substances in materials and products.
Treatment	Recovery or disposal operations, including preparation before recovery or disposal.
WEEE 1 Directive	Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE)
WEEE 2 Directive	Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (recast)

1. INTRODUCTION

1.1. Purpose of the evaluation

In the European Union (EU), the amount of electrical and electronic equipment (EEE) placed on the market grew by around 80% in less than 10 years (2012-2021)[1]. It includes not only a **large range of devices**, such as mobile phones, computers, televisions, fridges, household appliances and lamps, but also medical devices and photovoltaic panels. It is a very diverse product group characterised by increasingly **fast innovation cycles**.

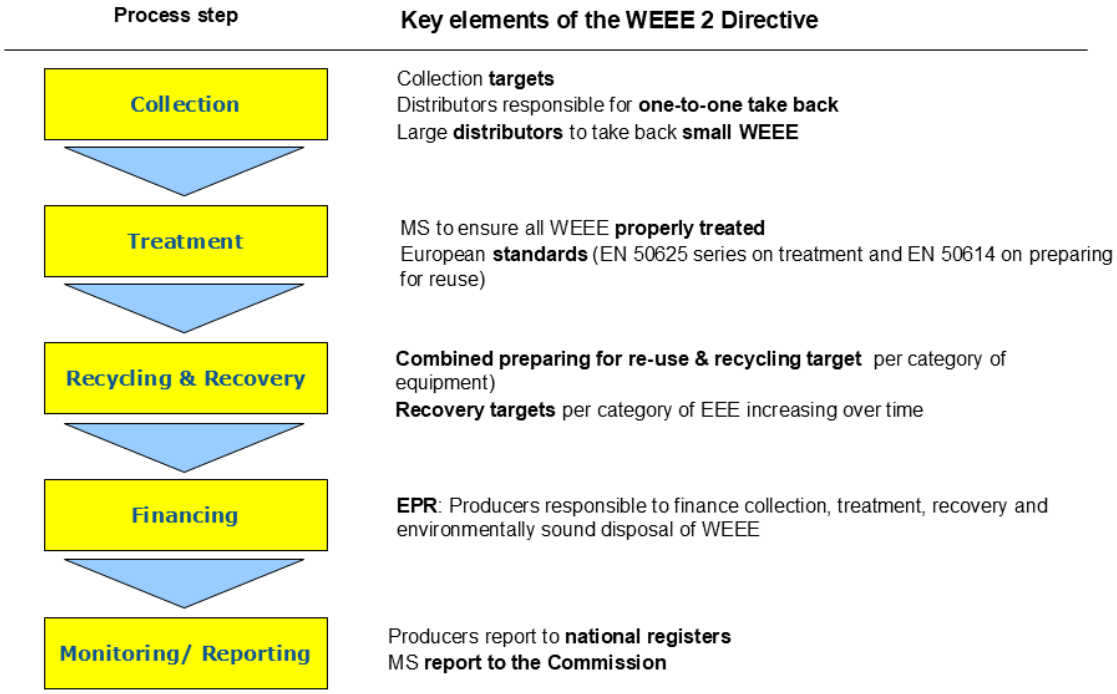
Waste electrical and electronic equipment (WEEE) is one of the fastest growing waste streams globally and in the EU. It contains a complex mixture of materials, some of which are hazardous. These can cause major **environmental and health problems** if the discarded devices are not managed properly. Modern electronics also contain rare and valuable resources, in particular **critical raw materials** (CRMs). Recovering these materials is crucial for supporting a better circular economy and contributing to a sustainable supply of CRMs, thereby **strengthening the EU's economic security**. In the coming years, growing consumption and digitalisation, alongside a growing transition to renewable energy, will pose additional challenges in relation to the quantities of WEEE generated and create additional needs for collection, recycling and recovery of materials.

To address the issues linked to the **generation and management of WEEE**, a Directive was first adopted to regulate the management of this waste stream in 2002[2] (the **WEEE 1** Directive). It was complemented by the Directive restricting hazardous substances in EEE (RoHS Directive[3]). In 2012, the Commission evaluated and revised/recast the WEEE 1 Directive[4].

The 2012 revision (the **WEEE 2** Directive) aimed to protect the environment and human health by preventing and reducing the adverse impacts from the generation and management of WEEE. To reach these objectives, the WEEE 2 Directive incorporates **extended producer responsibility (EPR)**, according to which EEE producers are obliged to finance WEEE collection, treatment, recovery and environmentally sound disposal. The Directive also sets out measures, among other things, for WEEE to be collected separately from unsorted municipal waste, for proper treatment (recovery and recycling) and for promoting preparing for reuse. To that end, it sets collection targets that increase over time, combined targets for preparing for reuse and recycling, and recovery targets for the different categories of WEEE, which also increase over time. The key elements of the WEEE 2 Directive are presented in Figure 1 and in more detail in Annex III to this report.

[1] Source: Eurostat.
[2] Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (OJ L 37, 13.2.2003, p. 24).
[3] Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 37, 13.2.2003, p. 19).
[4] Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (recast) (OJ L 197, 24/07/2012, p. 38).

Figure 1: Key elements of the WEEE 2 Directive



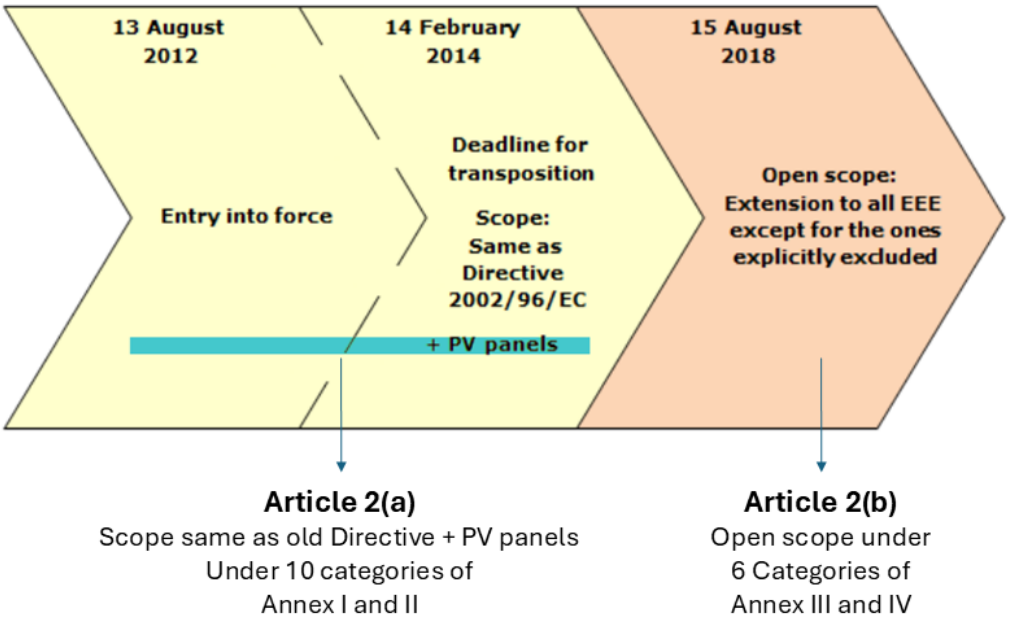
The WEEE 2 Directive extended its scope to include **photovoltaic panels** from its entry into force. In addition, from 2018, all EEE are included, apart from those explicitly excluded[5], as summarised in Figure 2 and presented in more detail in Annex III.

In the WEEE 2 Directive, there was originally no specific provision for its review. However, Directive (EU) 2024/884[6] amending the WEEE 2 Directive, mandates the Commission **to assess the need for a revision** of the WEEE 2 Directive **by 31 December 2026** and, where appropriate, present a legislative proposal accompanied by a thorough socio-economic and environmental impact assessment (this is explained in more detail in Annex III to this report).

[5] The **EEE categories set out in Annex I to the WEEE 2 Directive and used until 14.8.2018** are the following: 1. large household appliances; 2. small household appliances; 3. IT and telecommunications equipment; 4. consumer equipment and photovoltaic panels; 5. lighting equipment; 6. electrical and electronic tools (except large-scale stationary industrial tools); 7. toys, leisure and sports equipment; 8. medical devices (except implanted and infected products); 9. monitoring and control instruments; and 10. automatic dispensers. The **EEE categories set out in Annex III to the WEEE 2 Directive and used from 15.8.2018** are the following: 1. temperature exchange equipment; 2. screens, monitors and equipment containing screens with a surface greater than 100 cm^2; 3. lamps; 4. large equipment (any external dimension more than 50 cm); 5. small equipment (no external dimension more than 50 cm); and 6. small IT and telecommunication equipment (no external dimension more than 50 cm).

[6] Directive (EU) 2024/884 of the European Parliament and of the Council of 13 March 2024 amending Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) (OJ L, 2024/884).

Figure 2: The scope of the WEEE 2 Directive

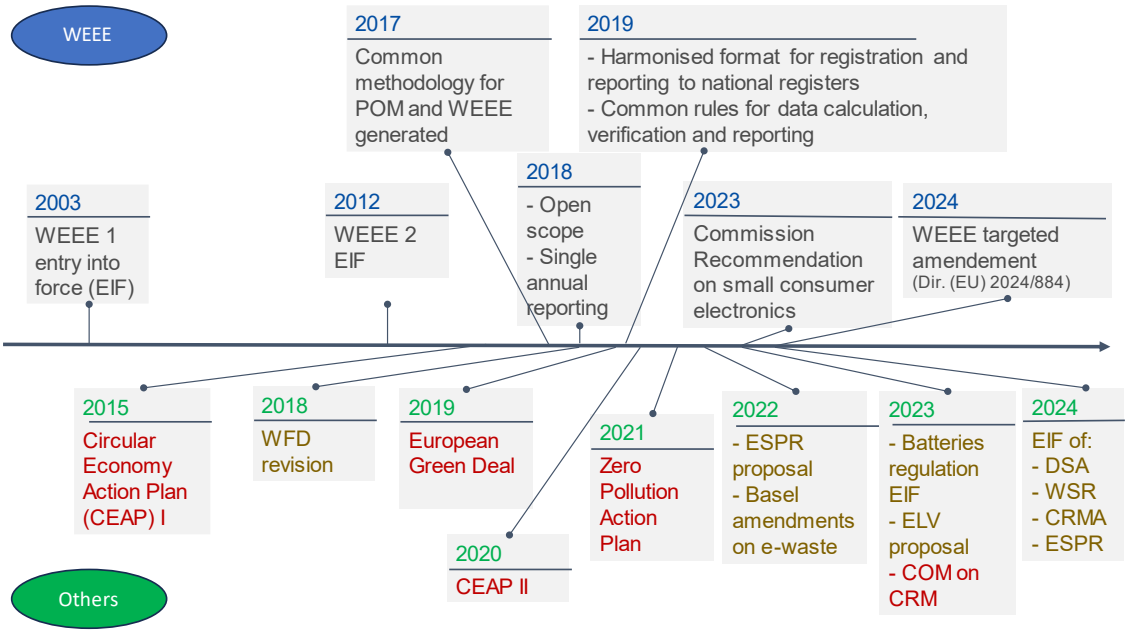


Since the adoption of the WEEE 2 Directive in 2012, there have been considerable changes to the EU policy and regulatory framework, including: (i) the revised Directive on waste[7]; (ii) the new Batteries Regulation[8]; (iii) the new Waste Shipments Regulation[9]; (iv) the Commission proposal for the review of the End-of-life Vehicles Directive[10]; (v) the Regulation on Ecodesign for Sustainable Products[11]; and (vi) various initiatives[12] developed as part of the European Green Deal[13] and the EU circular economy action plans adopted in 2015[14] and 2020[15]. These all go hand in hand with the EU's industrial policy[16],

[7] Directive 2008/98/EC on waste, currently in force as last revised in 2018 by Directive (EU) 2018/851 (OJ L 150, 14.6.2018, p. 109).
[8] Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries (OJ L 191, 28.7.2023, p. 1).
[9] Regulation (EU) 2024/1157 of the European Parliament and of the Council of 11 April 2024 on shipments of waste (OJ L, 2024/1157, 30.4.2024).
[10] Proposal for a Regulation of the European Parliament and of the Council on circularity requirements for vehicle design and on management of end-of-life vehicles, COM/2023/451 final.
[11] Regulation of the European Parliament and of the Council establishing a framework for setting eco-design requirements for sustainable products and repealing Directive 2009/125/EC (COM(2022) 0142 – C9-0132/2022 – 2022/0095(COD)).
[12] For example, the Zero Pollution Action Plan.
[13] Communication - The European Green Deal, COM(2019) 640 final of 11.12.2019.
[14] Communication - Closing the loop - An EU action plan for the Circular Economy, COM(2015) 614 final of 2.12.2015.
[15] Communication - A new Circular Economy Action Plan For a cleaner and more competitive Europe, COM(2020) 98 final of 11.3.2020.
[16] Communication - Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery, COM(2021) 350 final of 5.5.2021.

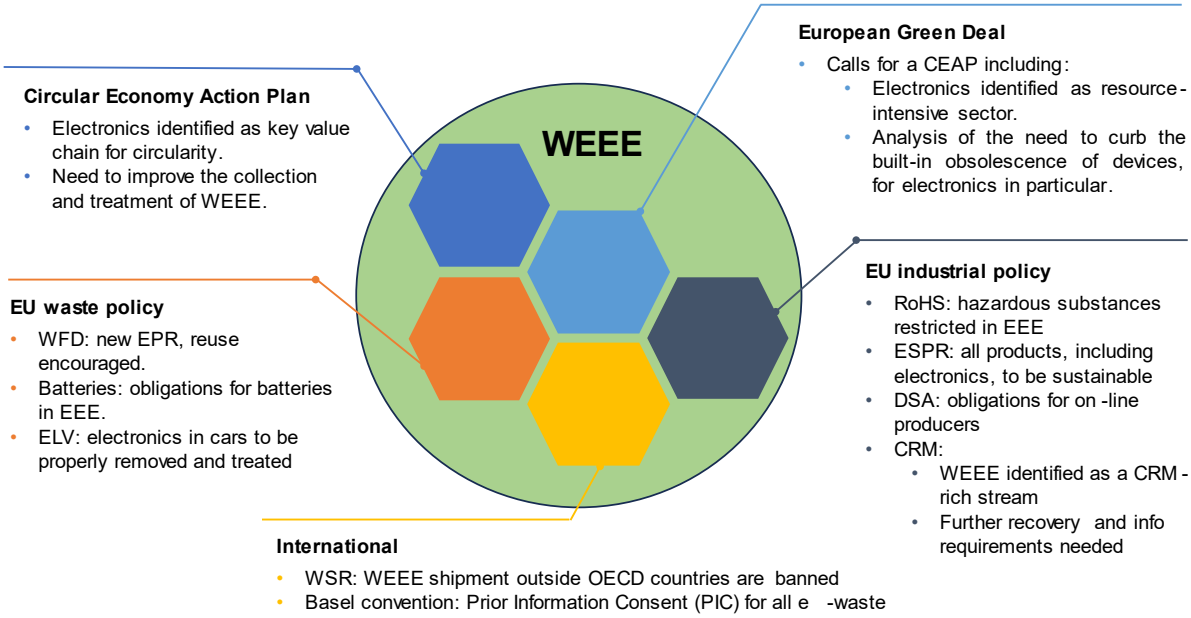
the Competitiveness Compass[17] and the Clean Industrial Deal[18], which aim to make the EU's more competitive, increase decarbonisation and improve economic security, particularly regarding critical raw materials, for which WEEE can be an alternative source. In particular, the need to revise the WEEE 2 Directive is also identified in the Communication from the Commission on a secure and sustainable supply of critical raw materials (CRMs)[19], 'to, inter alia, address CRM-rich equipment in provisions relating to information requirements and recovery targets.'

Figure 3: Political context for the evaluation of the WEEE 2 Directive (timeline)



[17] Communication - A Competitiveness Compass for the EU, COM(2025) 30 final of 29.1.2025.
[18] Communication - The Clean Industrial Deal: A joint roadmap for competitiveness and decarbonisation, COM(2025) 85 final of 26.2.2025.
[19] Communication - A secure and sustainable supply of critical raw materials in support of the twin transition, COM(2023) 165 final of 16.3.2023.

Figure 4: Political context for the evaluation of the WEEE 2 Directive (links with other EU policies and international developments)



More information on the links and coherence between the WEEE 2 Directive and EU strategies and legislation is provided in Chapter 4.1.2.(b).

1.2. Scope of the evaluation

There is no agreed definition of the scope or content of a **legislative 'review'**. However, the Commission has a longstanding policy of better regulation, where the Commission aims to evaluate existing legislation before any revision is proposed, supported by an impact assessment and the evaluation itself. In response to the requests of the EU co-legislators, the Commission presents the results of its evaluation in this report, which takes stock of the functioning of the WEEE 2 Directive.

In line with the Commission's better regulation policy, this report assesses whether the WEEE 2 Directive is still fit for purpose (Chapter 4) using the five criteria set for Commission evaluations:

1) **effectiveness**: looking at the extent to which the objectives of the legislation have been achieved by the actions linked to the Directive;
2) **efficiency**: assessing the costs and proportionality of the legislative intervention in relation to the achieved benefits;
3) **coherence**: assessing coherence internally among the different articles of the Directive and externally with other EU policy instruments or international agreements;
4) **relevance**: assessing whether the original objectives and provisions of the Directive are still in line with current and emerging needs and problems;
5) **EU added value**: assessing whether the Directive provides added value to WEEE treatment compared to what Member States could have achieved on their own.

The evaluation also explores the possibilities for **simplifying and removing unnecessary costs, including administrative burden and costs associated with collecting and reporting information**, especially for SMEs.

The **policy area** that the evaluation covers is the WEEE 2 Directive and the following related secondary legislation, which is presented in more detail in Annex III to this report:

- Implementing Regulation (EU) 2017/699 establishing a common methodology for the calculation of the weight of EEE placed on the market of each Member State and a common methodology for the calculation of the quantity of WEEE generated by weight in each Member State[20];
- Implementing Regulation (EU) 2019/290 establishing the format for registration and reporting of producers of electrical and electronic equipment to the register[21];
- Implementing Decision (EU) 2019/2193 laying down rules for the calculation, verification and reporting of data and establishing data formats for the purposes of the WEEE Directive[22].

The period covered by the evaluation is from the entry into force of the WEEE 2 Directive (**13 August 2012) until the end of 2023**. It covers Member States' deadline for transposing this Directive: 14 February 2014. It also reflects the assessment carried out for the recast of the WEEE 1 Directive. Developments having occurred after this period that are relevant for the evaluation have also been taken into account.

1.3. Methodology, robustness and limitations

The analysis is based on the **implementation of the Directive in all EU Member States**, including measures to transpose it into national law. External contractors carried out a study supporting the evaluation of the WEEE 2 Directive[23] (the 'evaluation study'), and this was used as a basis for the evaluation report and was complemented as appropriate.

The sources of information described below were used for this evaluation.

- A review of **existing literature**, including on the recast, and studies by the European Commission, studies by Member States and stakeholders, and relevant EU-funded research projects.
- **Information about the implementation of the Directive**, including data reported by Member States to Eurostat. This includes data on i) EEE placed on the market, WEEE generated and collected and WEEE collection rate and on ii) preparing for

[20] OJ L 103, 19.4.2017, p. 17.
[21] OJ L 48, 20.2.2019, p. 6.
[22] OJ L 330, 20.12.2019, p. 72.
[23] Study supporting the evaluation of Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), final report, 10 May 2024.

re-use, recycling and recovery of WEEE, treatment of WEEE in each Member State and WEEE exported and preparing for re-use, recycling and recovery rates[24].

- **Additional data** to that referred to above and information on stakeholders' perception of the extent to which the WEEE Directive has been successfully implemented and its relevance. This information was gathered through different **stakeholder consultation activities,** as presented in more detail in Annex VI to this report, including:
  - a call for evidence;
  - an open public consultation (OPC);
  - workshops with Member States;
  - workshops with specific groups of stakeholders: (i) WEEE treatment operators; (ii) producers and producer responsible organisations (PROs); and (iii) consumers associations, non-governmental organisations (NGOs) and research organisations;
  - specific stakeholder interviews;
  - a final stakeholder workshop.

Overall, the level and quality of evidence gathered is varied. For some evaluation criteria, in particular relevance and coherence, the evidence gathered was robust and satisfactory. The availability and quality of data was a challenge, affecting in particular the assessment of the effectiveness and efficiency criteria. Other difficulties that complicated the assessment are described below.

- In the literature[25], there is general information about the material composition of WEEE per category. WEEE contains many different materials: approximately 40% metals (ferrous metals, aluminium, copper), 0.01% precious metals (platinum, palladium, gold, silver), 25% plastics and 30% other materials (glass, concrete, wood, and 'contaminants', such as capacitors and batteries). However, there is a lack of information on the quantities of specific materials, such as CRMs, in the different categories of EEE. A further assessment of the possibility and appropriateness of drawing up more product-specific requirements for recycled content and scarce, environmentally relevant and critical raw materials is currently being conducted under the Ecodesign and energy labelling regulatory framework.
- There is scarce specific information available on preparation for reuse and on material recycling, including recycling rates for individual materials, and data on treatment capacities for WEEE materials. The information available shows that high recycling rates up to 95% for metals are achieved, but the recycling rate for precious metals is very much dependent on the choice of pre-treatment of WEEE

[24] See tables 1 and 2 in annex I of Implementing Decision (EU) 2019/2193 laying down rules for the calculation, verification and reporting of data and establishing data formats for the purposes of the WEEE Directive.

[25] Study on 'WEEE recovery targets, preparation for re-use targets and on the method for the calculation of the recovery targets (2015) Publications Office: Final report.

and can vary significantly depending on the treatment process. A mechanical treatment will lead to poor recycling efficiencies, while an in-depth disassembly can lead to recycling efficiencies as high as 95%. Moreover, 44% of **plastics** in WEEE are sent to material recovery and 45% to direct energy recovery. The rest is sent to landfill. Typically, only 50-60% of the input into a WEEE plastic recycling facility is effectively recycled. The rest is sent to incineration[26].

- There is a lack of information on trends in recovery of secondary raw materials (i.e. materials recovered from WEEE and used again in producing EEE).
- Trends in the lifetime of EEE before and after the implementation of the WEEE 2 Directive are not available. Nevertheless, in the context of the methodology drawn up by the Commission to calculate the amount of WEEE generated[27], the lifetimes for EEE per Member State have been estimated and provided in the WEEE calculation tool developed for each Member State.
- The environmental and human health impact of WEEE collection and treatment activities in the EU was hard to evaluate due to the lack of comprehensive data.
- There is a general lack of data on both costs and benefits associated with the implementation of the WEEE 2 Directive.
- Information is sometimes only available at a high level of aggregation, hindering the possibility to draw specific conclusions (e.g. information on research and innovation).
- There is insufficient data on employment in the WEEE management sector.

These data gaps and inconsistencies were identified at a very early stage. They were addressed mainly through targeted workshops with the specific groups of stakeholders mentioned above and through targeted interviews with stakeholders. More details on **how the evaluation was conducted** are available in Annex II to this report.

[26] Haarman, A., Magalini, F [Federico], & Courtois, J. (2020). Study on the Impacts of Brominated Flame Retardants on the Recycling of WEEE plastics in Europe.

[27] Implementing Regulation (EU) 2017/699 establishing a common methodology for the calculation of the weight of EEE placed on the market of each Member State and a common methodology for the calculation of the quantity of WEEE generated by weight in each Member State (OJ L 103, 19.4.2017, p. 17).

2. WHAT WAS THE EXPECTED OUTCOME OF THE WEEE 2 DIRECTIVE?

2.1. Description of the intervention and its objectives

To address the issues linked to the generation and management of WEEE, EU legislation was first adopted for this waste stream in 2002 (WEEE 1 Directive). It was based on producer responsibility and the polluter pays principle. It aimed to prevent the generation of WEEE and to promote reuse, recycling and other forms of recovery in order to reduce the quantity of waste discarded by setting out WEEE collection and recovery targets. A three-year review[28], based on stakeholders and Member States' experience with the Directive, showed several technical, legal and administrative difficulties, which resulted in unintended costs and burden for market actors and administrations. Member States were permitted to implement the Directive based on their actual situations and set additional stricter requirements. As a result, WEEE management moved in divergent directions within the EU. Based on the experiences collected, the review highlighted that it was likely that the reported collection and recycling rates would have not allowed Member States to meet the Directive's environmental and health protection objectives.

A review of the WEEE 1 Directive was therefore considered necessary and the **WEEE 2 Directive** was adopted with the aim to:

- **improve the Directive's effectiveness and implementation** through increased compliance;
- **reduce administrative costs** through the removal of all unnecessary administrative burdens without lowering the level of environmental protection.

The **objectives pursued by the WEEE 2 Directive** are protecting "human health and the environment by preventing or reducing the adverse impacts of the generation and management of [WEEE] and by reducing overall impacts of resource use and improving the efficiency of such use […], thereby contributing to sustainable development" (Article 1). The Directive therefore incorporates the waste hierarchy as set out in Article 4 of the Waste Directive. In addition, the WEEE 2 Directive seeks to improve the environmental performance of all operators involved in the life cycle of EEE.

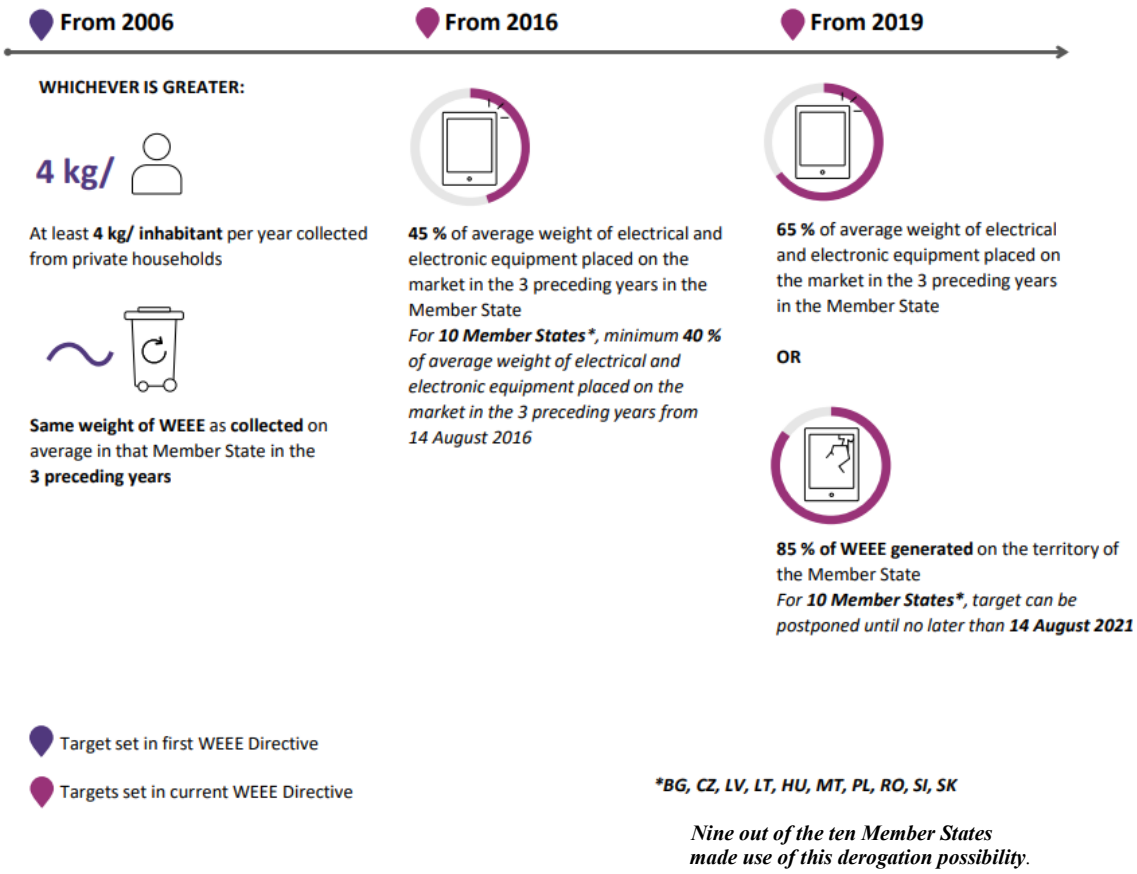
To achieve its objectives, the WEEE 2 Directive takes several steps, which are described below.

- It **broadens its scope to include photovoltaic panels** and introduces a **new classification of EEE** from 10 relatively narrow product-based categories to six more general open categories (open scope) as of 2018 (Article 2). This serves to facilitate reporting on collection, preparing for reuse and recycling (e.g. by distinguishing between small and large equipment).
- It moves from the fixed **collection target** of 4 kg of household WEEE per person per year ('one size fits all') to a variable target that takes into account all WEEE and not only WEEE from households, as well as the economies of individual Member States. In addition, the collection target is phased in with a two-step approach. There is a

[28] From 2003 to 2005, see Commission Staff working paper accompanying the proposal for a Directive of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) (recast) - Impact Assessment, SEC(2008) 2933.

target for 2016 (and a lower phase-in target for some Member States), which then increases from 2019 onwards, with all Member States expected to meet the final target in 2021, as shown in Figure 5 (Article 7(1)).

Figure 5 – WEEE collection targets set out in WEEE 2 Directive



Source: European Court of Auditors, Review No 04/2021: EU actions and existing challenges on electronic waste.

- It **prohibits the disposal of separately collected WEEE** that has not undergone proper treatment (Article 6(1)).
- It introduces **combined targets for preparing for reuse and recycling** by category of EEE (Article 11 and Annex V). This approach is a socially and environmentally viable one that removes barriers to preparing items for reuse. This is because it is also combined with the possibility for reuse centres to access collected WEEE, allowing them to separate WEEE that is to be prepared for reuse (Article 6(2)).
- It improves environmental benefits and material savings by including new recovery and recycling/reuse targets for **medical devices** (Annex V, part 1(c)).
- It sets requirements for WEEE shipments (Article 10) and minimum inspection requirements for Member States to strengthen enforcement of the Directive. There is also support to help Member States identify illegal WEEE shipments by setting minimum monitoring requirements for **WEEE shipments** (Article 23). The Directive also lays down requirements for the distinction between used EEE and WEEE – this obliges exporters to test whether equipment works or not and provide documents on the nature of shipments that could be considered to be illegal (Annex VI).

- It enables producers to **show to consumers** at the time of sale the cost of collecting, treating and disposing of products in an environmentally sound manner, without any time limits and for all types of electrical and electronic equipment (Article 14). This 'visible fee' means that the contribution paid by the producer is indicated on the purchase bill. It guarantees the financial security and transparency of the system and is also meant to inform consumers and raise awareness about the environmental costs of their purchases.
- **It reduces the administrative burden by:**
  a) **harmonising national registration and reporting requirements** (Annex X of the WEEE 2 Directive) and further harmonising these procedures through secondary legislation (Article 16(3) and Implementing Regulation (EU) 2019/290);
  b) giving producers established in a Member State the possibility to appoint an **authorised representative** in other Member States where they sell their EEE (Articles 16(1) and 17);
  c) encouraging cooperation between **national registers** (Article 16(2)(d)).

The WEEE 2 Directive provides a minimum level of harmonisation of the environmental conditions to ensure the proper management of WEEE in the EU as Article 7(1) specifically recognises that Member States may adopt more ambitious rates for the separate collection of WEEE.

The starting point of the intervention logic of the WEEE 2 Directive is the underlying needs that led to the revised WEEE 2 Directive and which stem from the Commission Staff Working Document (European Commission, 2008b, p. 44) accompanying the 2008 proposal for a recast of the WEEE 1 Directive[29].

These needs translate to general and specific objectives, which are an essential part of the Directive.

The **general objectives** of the WEEE 2 Directive are to:

(i) protect human health and the environment from detrimental impacts of WEEE generation and management;

(ii) contribute to sustainable production and consumption through reuse, recycling and other forms of recovery of electronic waste;

(iii) improve the efficient use of resources and the retrieval of valuable secondary raw material from WEEE.

The **specific objectives** provide a more nuanced view and further details on what the Directive is supposed to achieve. These objectives aim to:

(i) increase the separate collection of WEEE;

(ii) ensure and increase the proper treatment of WEEE to maximise the recovery of secondary raw materials;

[29] See Annex IX to this report.

(iii) improve the effectiveness of EPR for all EEE placed on the market (regardless of the sales method to address the challenges of online trade), increase compliance and reduce/avoid 'free-riding';

(iv) raise awareness and improve the environmental performance of those involved in the EEE and WEEE value chain;

(v) encourage product design that facilitates repair, reuse/preparation for reuse and recycling through EPR;

(vi) reduce administrative costs by removing all unnecessary administrative burden, without lowering the level of environmental protection.

Both the general and specific objectives are essential for the evaluation as the results of the intervention since its entry into force are measured against them. The WEEE 2 Directive aimed for several main outcomes: (i) reducing WEEE disposal by increasing WEEE collection and recycling; and (ii) minimising environment and health impacts by increasing and improving WEEE collection, recycling and recovery and retrieving more valuable secondary materials from WEEE. By doing so, the WEEE 2 Directive was expected to have a significant impact on the generation of WEEE and lead to a decrease in the amount of waste generated in all Member States. To achieve these progressive goals, clear, quantifiable targets and expectations were set.

Improvement of separate collection and harmonisation of reporting obligations were addressed by the establishment of a calculation methodology for EEE placed on the market and WEEE generated respectively, which lay the basis for the calculation of collection targets and the subsequent reporting of those targets by the Member States.

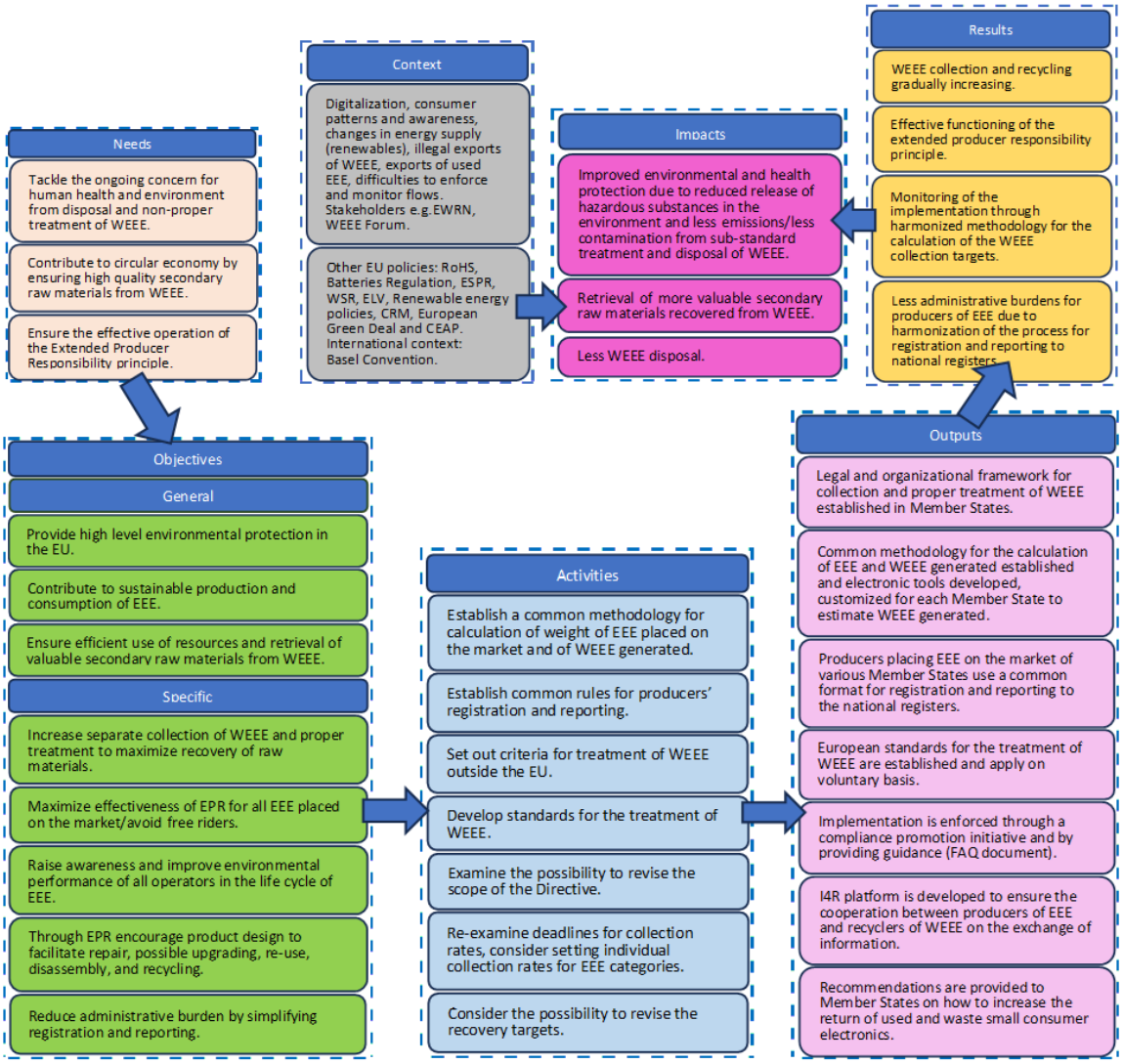
Overall, the whole system was meant to become more effective by reducing administrative burden for involved parties and by addressing the objective of maximising effectiveness of extended producer responsibility (EPR) and the identified challenges with online sales (e-commerce) specifically through the establishment of a format for registration and reporting of producers of EEE to the national registers.

The improvement of environmental performance of actors involved in the (W)EEE value chain and the optimal recovery of raw materials from proper treatment of WEEE were addressed both by the development of standards for the treatment of WEEE (by the European standardisation organisations) and the assessment of equivalent conditions for the treatment of WEEE outside the EU.

Lastly, by opening the scope of the Directive to all EEE and by adjusting current EPR schemes to be more effective, the end-of-life phase of EEE was intended to become more sustainable (more reuse, more repair, more recycling, etc. including separate reporting of such).

The **intervention logic for the WEEE 2 Directive** showing the intended functioning, desired results and overall rationale of the Directive is presented in Figure 6.

Figure 6: Intervention logic of the WEEE 2 Directive



2.2. Points of comparison

The Directive is assessed throughout this report against its expected output and impact.

The first reference or **starting point of comparison (T1)** for this evaluation is determined by the actual situation on the date of entry into force of the WEEE 2 Directive[30].

The Commission's proposal for the WEEE 2 Directive was supported by an impact assessment[31] (referred to in this report as the '2008 impact assessment'), which described how the situation at that time was expected to evolve without further policy action. In addition, this impact assessment assessed the impact associated with a range of policy options that informed decisions on the content of the Commission's proposal. Based on this impact assessment, the **second point of comparison (T2)** reflects the expected impact

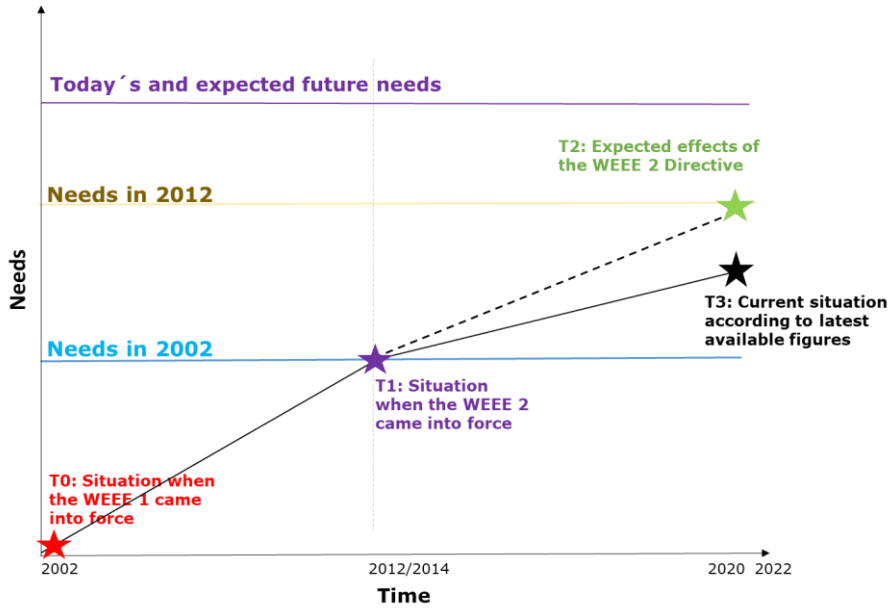
[30] 13 August 2012 (date for transposition by Member States:14 February 2014).
[31] Commission staff working paper accompanying the proposal for a directive of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) (recast) - Impact Assessment {COM(2008) 810 final} {SEC(2008) 2934}, SEC/2008/2933 final of 3.12.2008.

of the Commission's proposal (in the period covered by the impact assessment, 2011-2020) as modified by the co-legislators[32].

Point of comparison (T3) refers to the situation in 2021 according to the latest available data.

Where needed and depending on data availability, an additional and alternative point of reference may also be before the **adoption of the WEEE 1 Directive (T0)** where no EU legislation was in place for WEEE. Figure 7 illustrate the points of comparison.

Figure 7: Points of comparison for the assessment



Source: Evaluation study

For each evaluation criterion, the points of comparison described below were considered.

To assess **effectiveness** in achieving the main objectives of the Directive and how **efficient** the measures were, the **points of comparison** were as described below.

a) If available, projections made in the context of the 2008 impact assessment served as the T2 point of comparison. They were compared with the current and latest available data (T3).
b) For indicators where no such projections were available, the situation at the T1 baseline starting point (WEEE Directive coming into force) was compared with the situation today (T3). These indicators include: (i) WEEE generation per person; (ii) the number of collection points; (iii) relevance of free-riders; (iv) the share of treatment facilities working according to European standards on WEEE treatment

[32] At the end of the codecision process, the WEEE 2 Directive included some changes from the co-legislators, compared to the Commission's initial proposal. The main changes included:
- a new classification of EEE, moving from 10 relatively narrow product-based categories to six open categories (open scope), as of 2018;
- the proposed single registration for all EU requirements – with interoperability and data transfer between Member State producer registers – was not retained;
- the collection target was phased in with a two-step approach.

(i.e. EN 50625 series) or comparable requirements; and (v) recycling capacity for specific WEEE materials, such as CRMs or WEEE plastics. The same applies for other effects of the Directive, for example, effects on research and innovation and effects on the internal market.

When assessing the **relevance** of the WEEE Directive, the current and future needs were either compared with the different needs and objectives described below.

a) The **needs and objectives when the WEEE 2 Directive entered into force** (T1) as described, in particular, in the 2008 impact assessment, the proposal's explanatory memorandum and the preamble of the final legal act. This includes, in particular, the need to increase the share of properly collected and treated WEEE from only about one third of WEEE generated and to make the intervention more efficient by further harmonising measures.
b) **The needs and objectives when the WEEE 1 Directive entered into force** (T0) in 2003: this point of comparison is specifically relevant for evaluating provisions that were not changed in the WEEE 2 Directive. For instance, in order to assess whether the treatment requirements (including Annex VII (Selective treatment) to the Directive) are still relevant from an environmental and technological perspective, the material composition of WEEE at the beginning of the century (T0) was compared with the material composition of WEEE today (T3). To assess whether the specific WEEE types listed in Article 5 are still a high priority for WEEE separate collection, changes to the composition of WEEE in the past 20 years were examined. Examples of WEEE types listed in Article 5 are temperature exchange equipment (TEE) that contain ozone-depleting substances and fluorinated greenhouse gases, fluorescent lamps containing mercury, photovoltaic panels and small equipment as referred to in categories 5 and 6 of Annex III.
c) **The needs and objectives as they stand today (T3) and in the future**. These take account of the green and digital transitions set out in the Clean Industrial Deal and the European Green Deal (including the circular economy action plan), the 'Europe fit for the digital age' priority, and EU depollution, net-zero industry, renewable energy and CRM policies.

When assessing the **coherence** of the WEEE 2 Directive's objectives, targets and measures, the point of comparison was international and EU policy or legislation currently existing and under preparation (T3).

To assess the **EU added value** of the WEEE 2 Directive, the current situation (the level of compliance with the Directive´s provisions) was compared with a situation where there is no EU directive and individual Member States had implemented WEEE legislation at national level. The information about which Member States have adopted relevant provisions going beyond the WEEE 2 Directive and which Member States have not was taken from studies dealing with national implementation of the WEEE 2 Directive[33].

[33] These include: WEEE 2 Directive implementation report (2018); WEEE compliance promotion exercise, Kling, Zotz, and Huranova (2018); Study on the implementation of product design requirements set out in

3. HOW HAS THE SITUATION EVOLVED OVER THE EVALUATION PERIOD?

This section presents the **state of play in implementing** the WEEE 2 Directive (both legally and on the ground) and compliance-specific actions taken over the evaluation period (2012-2023) and relevant recent developments. It focuses on key information available and on data reported by Member States between 2012 and 2021, because 2021[34] is the latest year for which statistical data exists.

3.1. Current state of play

The Commission and Member States have carried out a variety of specific actions throughout the evaluation period to help those involved ensure compliance with the Directive's requirements. These measures are further developed in Annex III on the state of play of the implementation of the WEEE 2 Directive, underpinned by Annex XI on a comparative analysis of implementation in Member States and Annex X on compliance assurance.

Member States' actions have been carried out on an individual level and among countries to strengthen cooperation.

All Member States have fully transposed the WEEE 2 Directive into national legislation. Some Member States have chosen to go further than the minimum requirements set out in the Directive, in particular, by setting:

- collection targets by category of EEE;
- higher recycling targets than those in the Directive for specific categories of EEE;
- specific targets for preparing for reuse;
- **additional requirements for the treatment of WEEE**, including making European standards on WEEE treatment obligatory[35].

All Member States have set up a **register of producers** as required by Article 16 of the Directive. In most Member States, the register is maintained by the national environmental agency or the ministry of the environment[36]. All EEE producers have the obligation to be registered in every Member State in the market where they place EEE and to report the quantity of EEE placed on the market to the relevant register. In 2019, the Commission

Article 4 of the WEEE Directive – The case of reusability of printer cartridge, Kling, Waugh, et al. (2018); Study on quality standards for the treatment of WEEE, Tesar et al. (2021); Study on options for return schemes of mobile phones, tablets and other small electrical and electronic equipment in the EU, Romagnoli et al. (2022).

[34] Under Article 16(6) of the WEEE 2 Directive, Member States report data to the Commission on implementation of the Directive annually within 18 months of the end of the reporting year (i.e. quantities and categories of EEE placed on their markets, collected through all routes, prepared for reuse, recycled and recovered within the Member State, and on separately collected WEEE exported, by weight). The data for 2021 was to be reported to Eurostat by the end of June 2023. For some Member States, data for the 2021 reporting year may still be missing. In this case, data for the 2020 reporting year is taken into consideration.

[35] Six Member States have made the standards obligatory by law, while another four Member States have introduced specific elements of the standards in national legislation. Some PROs also request compliance with the standards to set up agreements with treatment facilities. To date, about 23% of the WEEE treatment facilities set up in the EU operate in compliance with these standards.

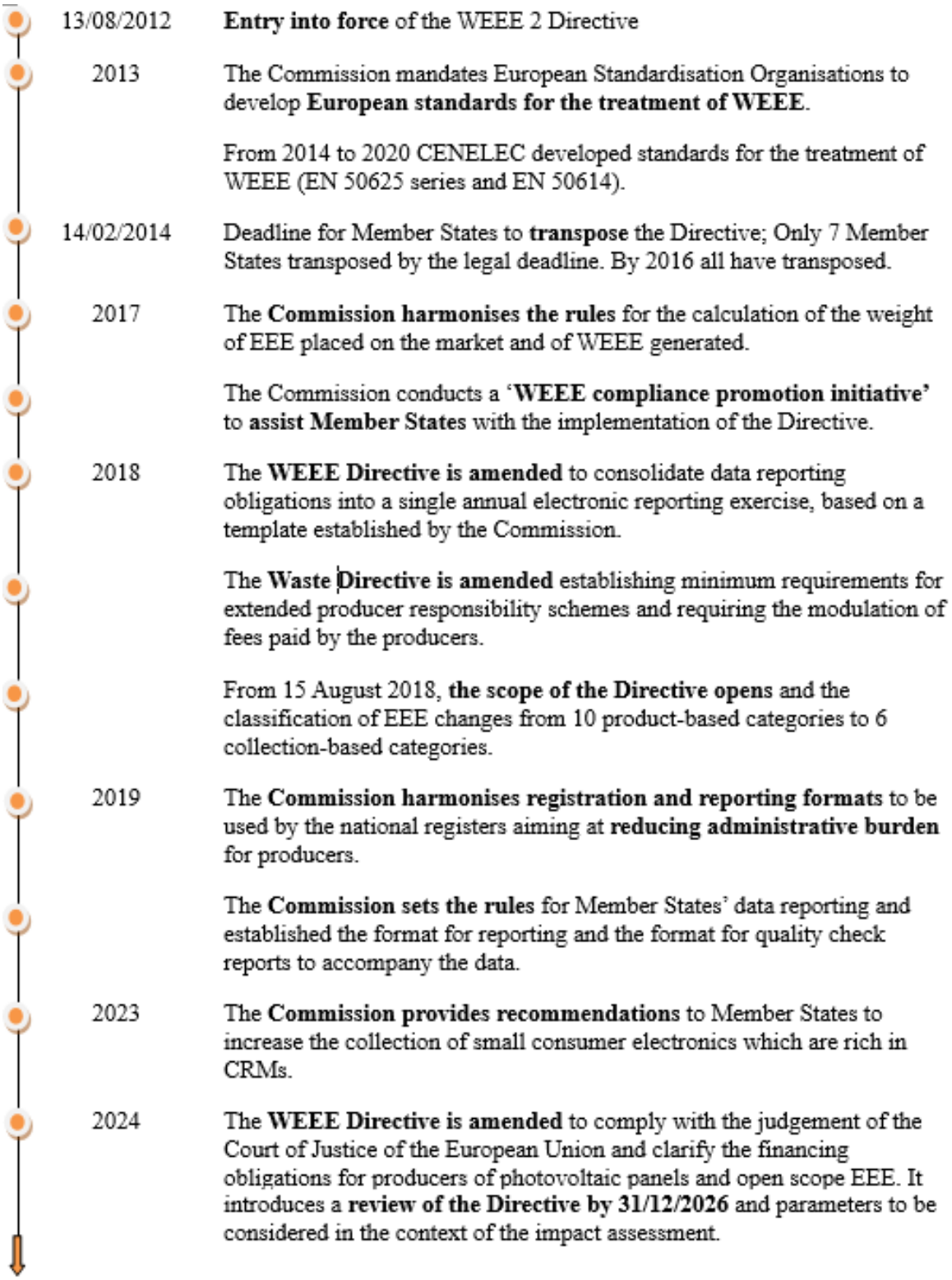
[36] Information about the competent national authorities, including the national registers, is publicly available on a Commission web page.

adopted legislation[37] harmonising the formats to be used by the registers for the registration and reporting of producers. However, the WEEE 2 Directive does not specify the frequency of reporting to the register; therefore, this varies among Member States, but it is every year in most (19) of them. The Commission, despite its efforts[38], did not manage to standardise producers' reporting frequency to the registers because of the different roles that national registers play in the Member States.

Regarding **implementation of the extended producer responsibility (EPR) principle**, as further stated in Chapter 4.1.1.(g) and Annex XI, the most common approach is that producers fulfil their obligation to finance managing the waste from the EEE that they place on the market via producer responsibility organisations (PROs). Eleven Member States[39] impose collection obligations on municipalities as well. However, implementation of EPR schemes varies greatly among Member States, resulting in different EPR fees, models for the calculation of fees, PROs' business models, and reporting obligations on producers by the PROs. In most Member States (14), many PROs exist (ranging from 2 to 28), which creates conditions for competition. In others, only a single PRO operates, which might be the only viable option due to that Member State's size. By contrast, the producers of household EEE in Germany have an individual obligation to take back and recycle equipment, and this obligation is not transferable to third parties. Therefore, there is no PRO in Germany[40,41]. Six Member States[42] have set up bodies to coordinate the management of WEEE flows between different PROs and/or producers. The **differences in EPR schemes** were significant, especially before the amendment of the Waste Directive in 2018 in respect to EPR. The rules for drawing up an EPR scheme were not particularly extensive and gave national approaches a great deal of freedom. With the 2018 amendment, the inclusion of a new Article 8a in the Waste Directive added operational conditions to reduce these differences. The timeline in Figure 8 provides an overview of the milestones in the implementation of the WEEE 2 Directive over the evaluation period. The information provided in this figure is presented in detail in Annex III to this report.

[37] Commission Implementing Regulation (EU) 2019/290 establishing the format for registration and reporting of producers of electrical and electronic equipment to the register (OJ L 48, 20.2.2019, p. 6).
[38] 'Study on harmonisation of the format for registration and reporting of producers of electrical and electronic equipment (EEE) to the national register and on the frequency of reporting' (2016): Final report.
[39] Germany, Austria, Cyprus, Denmark, Greece, Luxembourg, Malta, the Netherlands, Portugal, Romania and Sweden.
[40] Ademe 'Study on the transposition of the 2012 WEEE Directive in Europe', June 2016.
[41] According to the information provided in the context of the WEEE compliance promotion exercise, in Germany, the Federal Environmental Agency has entrusted the national register (*stiftung ear*) as the coordination body for WEEE management throughout the whole country. The role of the register includes the enforcement of registration of EEE producers, control and monitoring of reporting, and the coordination of WEEE take-back allocation to the individual producers who are obliged to comply (https://www.stiftung-ear.de/en/topics/elektrog/producers-ar/pick-up-coordination and https://www.stiftung-ear.de/en/topics/elektrog/producers-ar/pick-up-coordination/pick-up-obligation).
[42] France, Germany, Austria, Spain, Italy, Slovakia.

Figure 8: Milestones in the implementation of the WEEE 2 Directive



Regarding the **enforcement of the Directive**, the information gathered in the preparation of this report **does not indicate any structural or systematic** issues with infringements of this Directive. Member States have penalties in place for non-compliance with the requirements of the Directive.

During the evaluation period, 14 Member States have developed **inspection plans for WEEE collection and recycling facilities**. Moreover, 20 Member States have set out

specific rules on penalties applicable to infringements of national provisions on WEEE management in publicly available official documents. Member States have individually taken action specific to their national and local circumstances to reduce the number of non-compliant producers, a non-exhaustive list of which is detailed in **Annex X**.

Member States have set up two crucial cooperation networks to boost cooperation on compliance; the European WEEE Enforcement Network (EWEN) and the European WEEE Registers Network (EWRN). These networks are independent but complementary to each other.

EWEN is the body where the national enforcement authorities have joined forces to help each other more effectively identify non-compliant producers and prosecute breaches of the obligation to appoint an authorised representative.

EWRN facilitates cooperation between national registers and substantially supports harmonisation of registration and reporting obligations. EWEN ensures cooperation among the national enforcement authorities. Both networks have become essential to the functioning of the Directive. Alongside these, the **Commission made efforts to improve the application of the WEEE 2 Directive** in Member States, as listed below and explained in more detail in Annex X. Action taken by the Commission on compliance is centred on infringement procedures in cases of non-compliance, as well as enabling efforts improving implementation via targeted workshops, reports and promotion initiatives.

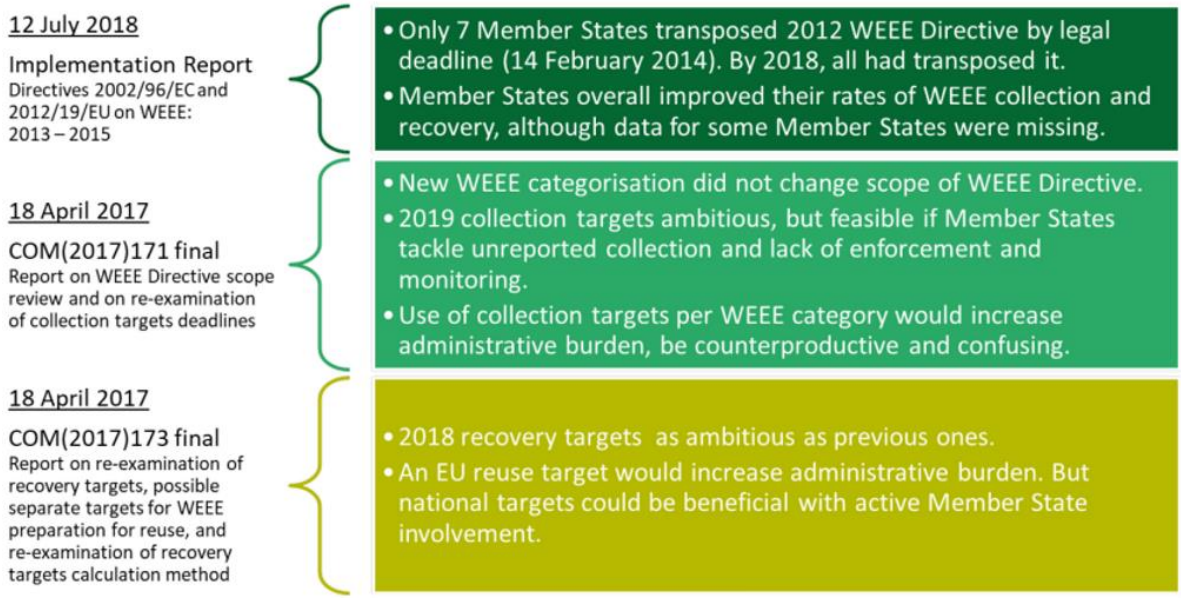
With its decisions of 25 July 2024[43] the Commission **called on 24 Member States to meet, among other things, the WEEE collection targets** and decided to open an infringement procedure by sending letters of formal notice.

- The Commission organised workshops with the relevant national authorities and stakeholders to support implementation of the Directive in specific areas, including:
  i. a workshop to discuss how to improve information about WEEE collected through all routes[44];
  ii. a workshop on implementation of Article 15 of the WEEE 2 Directive on the information exchange between producers and recyclers, which then initiated the development of the 'information for recyclers platform'[45].
- The Commission conducted a WEEE compliance promotion initiative[46] in 2017, aiming to help Member States with the Directive by not only identifying problems and difficulties in relation to implementation but also sharing best practices so Member States could learn from each other.

[43] https://ec.europa.eu/commission/presscorner/detail/en/inf_24_3228.
[44] Workshop report – 'All WEEE flows': How can we improve information as regards collection of WEEE through all routes?
[45] Workshop report – Workshop for Member States and for experts involved in the European Innovation Partnership on Raw Materials and other key stakeholders on Implementation of Article 15 of the WEEE Directive.
[46] European Commission, WEEE compliance promotion exercise – final report, December 2017.

- The Commission has also assessed WEEE policy in reports to the Council and the European Parliament[47], as well as in the last triennial report on implementation of the WEEE Directive between 2013 and 2015[48]. To reduce the administrative burden, the obligation of Member States to report to the Commission at three-year intervals was lifted with the 2018 amendment of the Directive; therefore, the 2013-2015 triennial report was the last one to be published. In the Report from the Commission on the review of the scope of the WEEE 2 Directive, mentioned in Figure 9, the Commission assessed that setting targets by categories of EEE would also imply additional obligations for stakeholders and Member States (e.g. reporting, monitoring).

Figure 9: Summary of selected Commission reports assessing WEEE policy



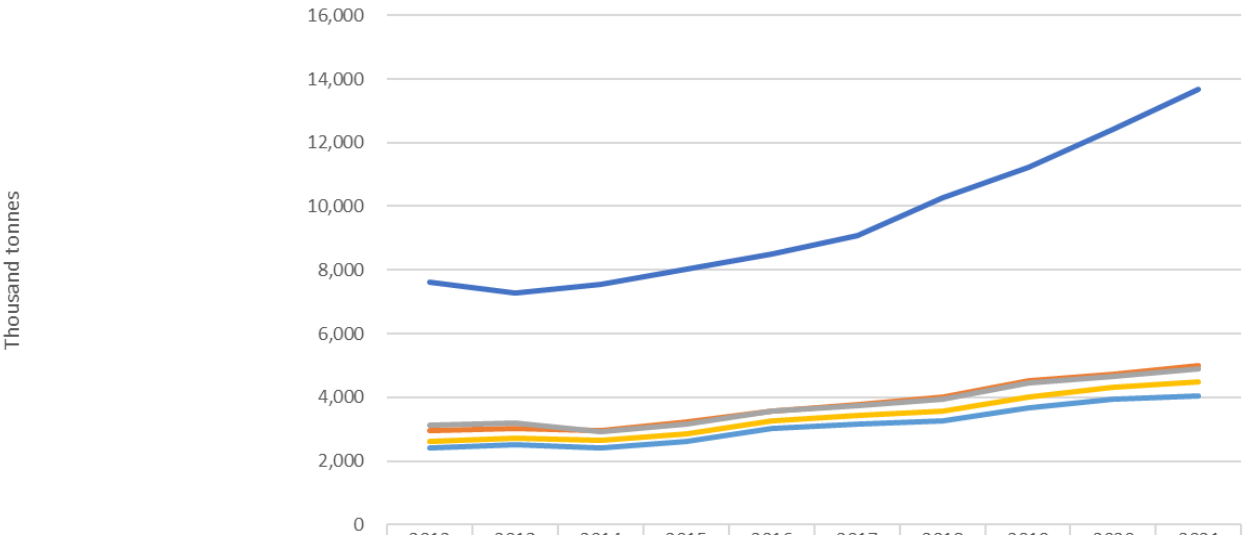
Source: European Court of Auditors, Review No 04/2021: EU actions and existing challenges on electronic waste.

3.2. Levels of compliance

WEEE collection and recovery in the EU-27 increased over the evaluation period as summarised in Figure 10.

[47] See Annex III to this report.
[48] Final Implementation Report for Directives 2002/96/EC and 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE): 2013 – 2015.

Figure 10 – EU-27 WEEE collection and recovery



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total put on the market	7,627	7,283	7,549	8,038	8,512	9,075	10,288	11,214	12,403	13,680
Total collected	2,971	3,032	2,963	3,225	3,578	3,759	3,994	4,516	4,719	5,003
Total treatment	3,108	3,189	2,918	3,148	3,556	3,749	3,926	4,435	4,663	4,888
Total recovered (incl. recycling, energy recovery…)	2,599	2,718	2,643	2,841	3,272	3,431	3,584	4,019	4,314	4,488
Total reused and recycled	2,417	2,508	2,426	2,606	3,012	3,158	3,262	3,673	3,925	4,057

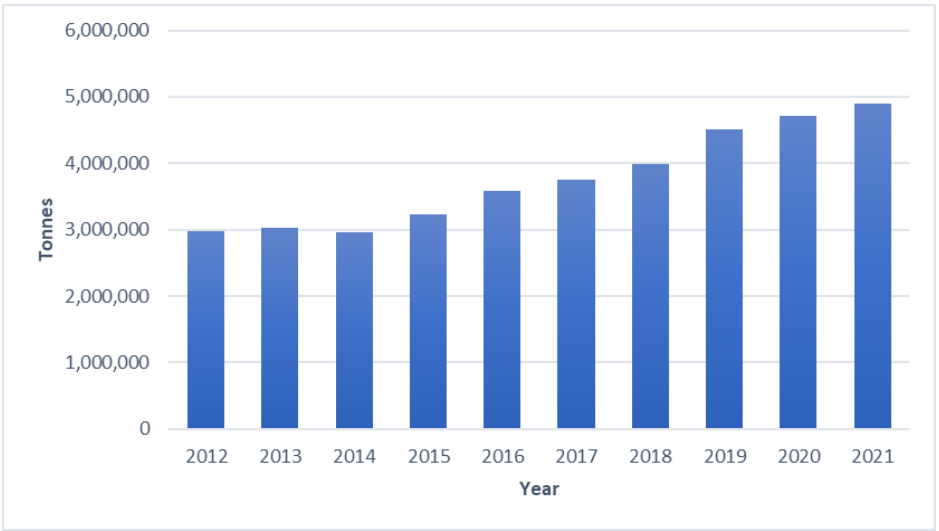
Source: Based on data from Eurostat (ENV_WASELEEOS).

However, this does not mean that all Member States reached all the collection and recovery targets set out in the Directive for the evaluation period. In Annex VIII to this report, there is a detailed description of Member States' achievements in complying with the Directive. These achievements are summarised below, supported by a comparative analysis of implementation by Member States in Annex XI.

WEEE collection

- WEEE collection increased between 2012 and 2021 by 68% in weight.

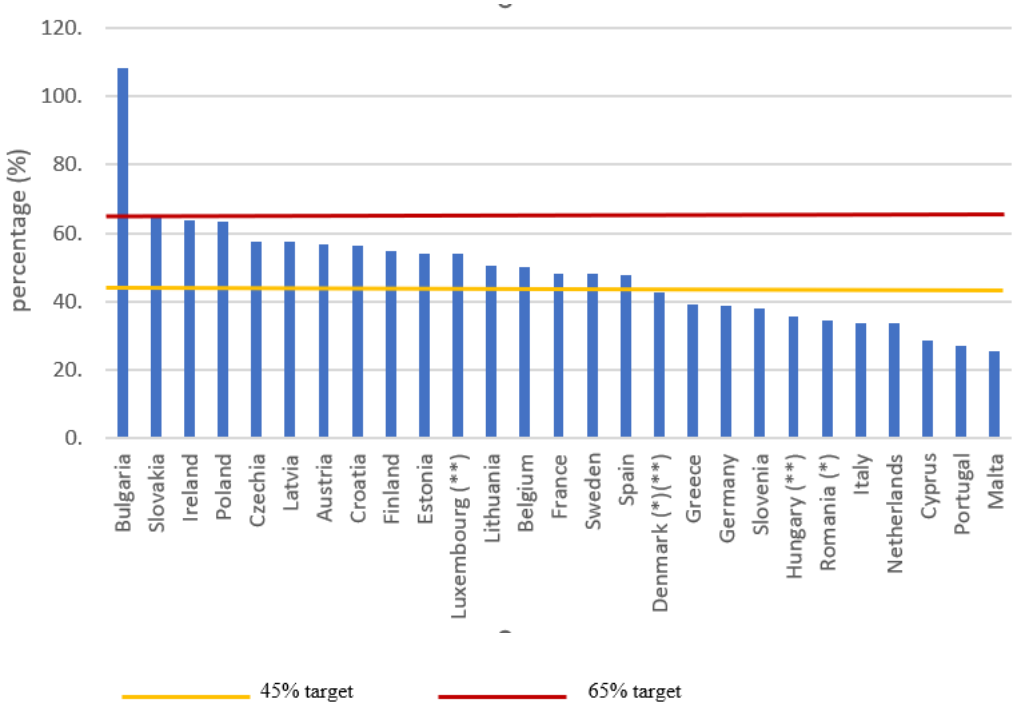
Figure 11 – WEEE collection in the EU-27 from 2012 until 2021 (in tonnes)



Source: Eurostat database ENV_WASELEEOS

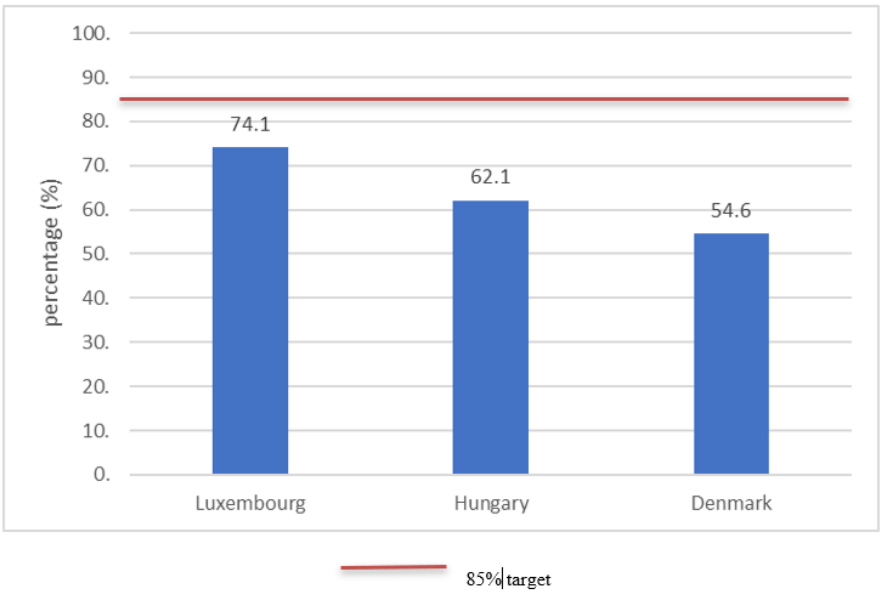
- Data from Eurostat shows the following results.
    - Nearly all Member States met the 2015 WEEE collection target.
    - In 2016, 18 of the 27 Member States needed to achieve a collection rate of 45%, and the other 9 Member States had to achieve a collection rate lower than 45% but higher than 40%. 14 of the 18 Member States that had to achieve a 45% target did so, and 5 out of the 9 Member States that had to achieve a target higher than 40% did so. Another 4 Member States had a collection rate higher than 40%.
    - 2021 was the first year when all Member States had to achieve a collection rate of 65% on the basis of EEE placed on the market in the three preceding years or 85% on the basis of WEEE generated. That year, only two Member States achieved that target, while another two were very close. The reasons why Member States did not manage to reach the collection targets are described in Chapter 4.1.b.
    - Bulgaria reported a WEEE collection rate higher than 100% for the 2021 reporting year, arguing that this was because the collection network had been significantly increased over that year and the year before. However, it was also noted that the average quantity of EEE placed on the market per person in Bulgaria between 2017 and 2019 was the lowest in the EU. This shows that the high collection rate may not only be attributed to collection efforts as such but also to under-reporting of the amount of EEE placed on the market.

Figure 12: Total WEEE collection rate (PoM method), 2021



(*) Data for year 2020
(**) 65% target not applicable; Member State applies calculation method based on WEEE generated
Source: Eurostat (online data code: env_waseleeos)

Figure 13: Total WEEE collection rate (WEEE generated method), 2021



Source: Eurostat (Online data code:env_waseleeos)

WEEE recovery, including recycling and preparing for reuse

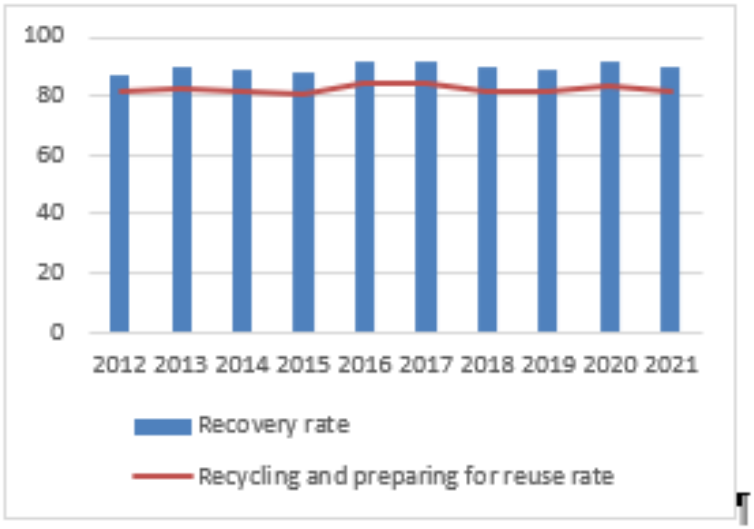
- Recovery comprises material recovery, mainly preparing for reuse and recycling, and incineration with energy recovery.
- The recovery targets, set out in Annex V to the Directive, are by EEE category, and they are split into a combined 'preparing for reuse and recycling' target and a recovery target for each EEE category. In addition, each target increased by 5% from 2012 to 2015, but the recycling target for lamps remained unchanged, as presented in the Table 1.

Table 1: WEEE recovery targets in the EU (Annex V, WEEE 2 Directive)

WEEE recovery targets in the EU		
From 13 August 2012 to 14 August 2015	**From 15 August 2015 to 14 August 2018**	**From 15 August 2018**
80% recovery, with 75% recycling, of WEEE in Annex I categories 1 or 10	85% recovery, with 80% recycling and preparing for reuse, of WEEE in Annex I categories 1 or 10	85% recovery, with 80% recycling and preparing for reuse, of WEEE in Annex III categories 1 or 4
75% recovery, with 65% recycling, of WEEE in Annex I categories 3 or 4	80% recovery, with 70% recycling and preparing for reuse, of WEEE in Annex I categories 3 or 4	80% recovery, with 70% recycling and preparing for reuse, of WEEE in Annex III category 2
70% recovery, with 50% recycling, of WEEE in Annex I categories 2, 5, 6, 7, 8, or 9	75% recovery, with 55% recycling and preparing for reuse, of WEEE in Annex I categories 2, 5, 6, 7, 8, or 9	75% recovery, with 55% recycling and preparing for reuse, of WEEE in Annex III categories 5 or 6
80% recycling for gas discharge lamps	80% recycling for gas discharge lamps	80% recycling for lamps

- Recovered WEEE increased from 2.6 to 4.4 million tonnes between 2012 and 2021 (69.8%), and WEEE recycled and prepared for reuse grew from 2.4 to 4.0 million tonnes (64.8%) in the same period.
- Data from Eurostat shows the rate of recovery and the combined rate of recycling and preparing for reuse was rather stable between 2012 and 2021; over 87% of the WEEE collected was recovered, and over 80% was recycled and prepared for reuse.

Figure 14: WEEE recovery and preparing for reuse and recycling rate in the EU-27



Source: Eurostat database ENV_WASELEEOS

In 2021, 15 of the 27 Member States achieved all recovery and combined preparing for reuse and recycling targets. Eight Member States missed between one and three targets, and four Member States missed between four and six targets. One country has not reported the data for 2021: for this country, the data for 2020 has been taken into consideration (detailed data presented in Table 18 in Annex VIII).

Implementation and compliance

Since the WEEE 2 Directive entered into force in 2012, there have been the following developments.

- In 2012, the **scope** of the Directive was extended to include photovoltaic panels.

- In 2018, the scope was extended to all EEE (open scope), and EEE started to be classified under six new open categories (compared to the previous 10 product-based categories).

- Following several studies, the Commission submitted the following reports to the European Parliament and the Council:

1. Report on the review of the **scope** of the Directive and of the **deadlines for reaching collection targets** and possible setting of **individual collection targets for certain categories** of EEE listed in Annex III;

2. Report on the **review of WEEE recovery targets**, possible setting of separate preparation for reuse targets and the calculation method for recovery targets.

- Three **implementing regulations**[49] were adopted to ensure harmonisation of the documentation on producer registration and reporting to the national registers, which helped reduce the administrative burden.

- Under Article 8(5) of the WEEE Directive, following a mandate from the Commission, from 2014 to 2020, the European Committee for Electrotechnical Standardization (CENELEC) developed a **series of standards** (EN 50625 series and EN50614). These standards cover a range of areas on WEEE collection and logistics, treatment and depollution, as well as preparation for reuse. These standards are voluntary in most Member States; only six Member States have made them mandatory.

Compliance in 2021

- Only two Member States achieved the collection target (Bulgaria, Slovakia).

- However, the minimum recovery targets and joint recycling and preparation for reuse targets (which differ for each category) were exceeded. This raises concerns about the suitability of calculating recovery targets based on input to the recycling process.

In July 2024, the Commission decided to open an infringement procedure over collection targets by sending letters of formal notice to 24 Member States.

[49] Implementing Regulation (EU) 2017/699 establishing a common methodology for the calculation of the weight of EEE placed on the market of each Member State and a common methodology for the calculation of the quantity of WEEE generated by weight in each Member State (OJ L 103, 19.4.2017, p. 17).
Implementing Regulation (EU) 2019/290 establishing the format for registration and reporting of producers of electrical and electronic equipment to the register (OJ L 48, 20.2.2019, p. 6).
Implementing Decision (EU) 2019/2193 laying down rules for the calculation, verification and reporting of data and establishing data formats for the purposes of the WEEE Directive (OJ L 330, 20.12.2019, p. 72).

4. EVALUATION FINDINGS (ANALYTICAL PART)

4.1. To what extent was the intervention successful and why?

4.1.1. Effectiveness and efficiency

The effectiveness of the WEEE 2 Directive has been assessed against its objectives described in Chapter 2.1. To assess the progress made towards achieving the Directive's specific objectives and targets, the analysis took into consideration the factors that have contributed to or hindered their attainment and the extent to which the observed achievements and challenges can be attributed to the Directive. This is further detailed in Annex XI, which presents a comparative analysis of national implementation of the initiative's four targets: (i) the collection targets; (ii) the recovery targets; (iii) the treatment requirements; and (iv) the EPR schemes.

Regarding the efficiency of the WEEE 2 Directive, it was evaluated whether the costs generated by the Directive are strictly necessary to reach the policy objectives described in Section 2.1. The potential for simplification has also been highlighted (see Annexes IV and XIII). The costs and benefits of implementing the WEEE 2 Directive are broken down into direct and indirect costs and benefits (such as CO_2 savings, resource efficiency and depollution) and are calculated to the extent possible in Annex XII to this report. Direct costs cover compliance costs and enforcement costs for those involved in the process. Indirect costs are economic, social and environmental ones that are observed in related upstream or downstream markets or experienced by stakeholders but that are not directly targeted by the Directive. Benefits are linked to the Directive's general objectives of protecting human health and the environment[50].

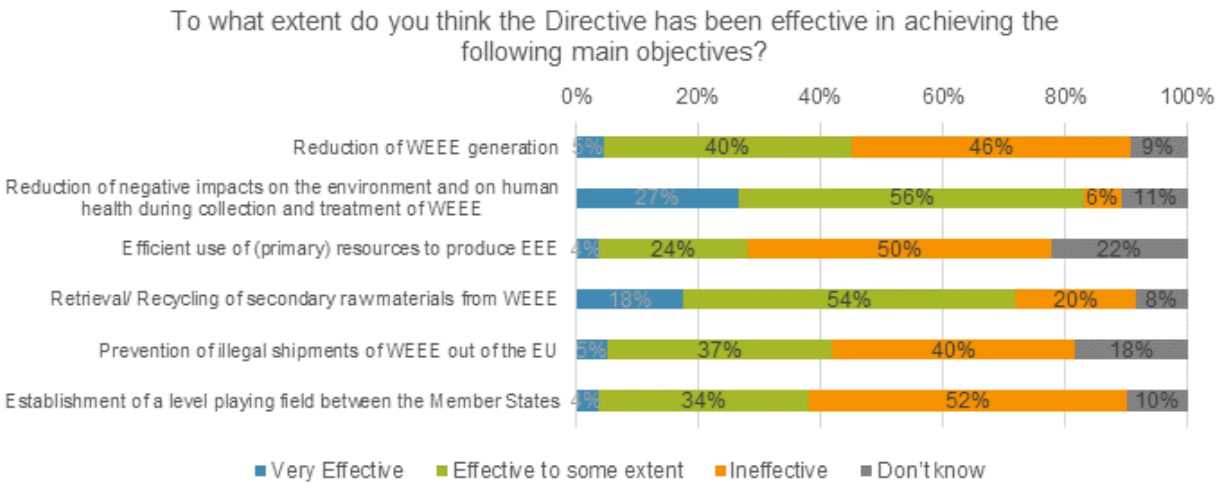
However, it should be clearly noted that no econometric analysis has been carried out, due to limitations in data availability. As a result, no control has been made for other potential drivers of the current state of play. The assessment of efficiency is therefore based on a qualitative and indicative estimation of costs and benefits, using the best available information.

In addition, the evaluation matrix in Annex VI provides the judgement criteria that are used to answer the respective evaluation questions on effectiveness and efficiency, the indicators specifying the data required to make a judgement, potential data sources and the approach chosen for the respective evaluation questions.

Replying to the question on to what extent the WEEE 2 Directive has been successful and why, the responses received in the OPC (see Figure 15) show that the WEEE 2 Directive has not been particularly effective in achieving all its objectives. This is in line with the evaluation study (chapter 6.1.1) and the comparative analysis of national implementation of the WEEE 2 Directive, detailed in annex XI.

[50] For a more detailed analysis on benefits, please refer to Annex XII.

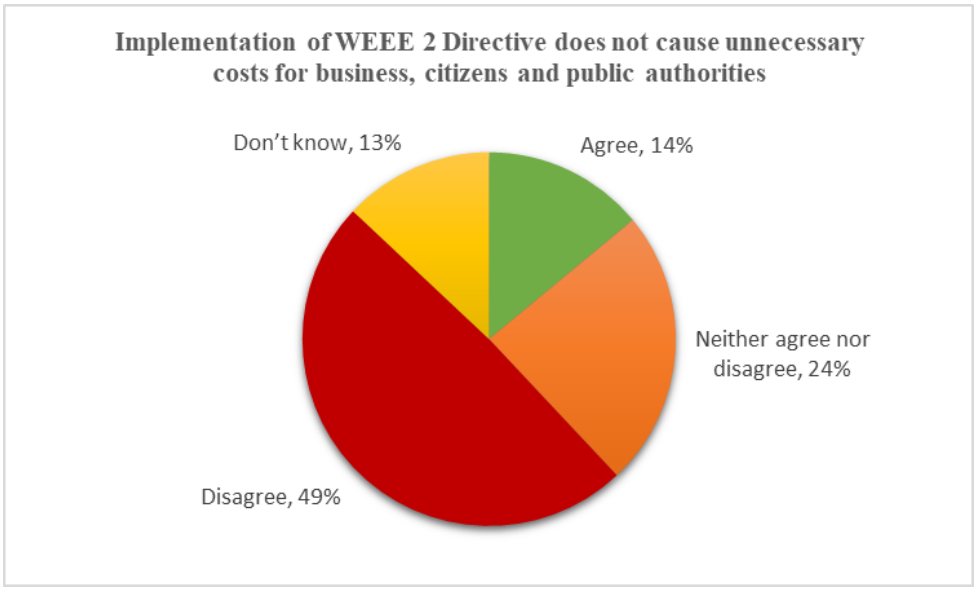
Figure 15: OPC – replies on the WEEE 2 Directive's effectiveness



Source: Evaluation study

In addition, more than half the respondents from industry (51 out of 84) but only some respondents from civil society (11 out of 39) and public authorities (2 out of 8) claim that the WEEE 2 Directive has caused unnecessary costs for EU businesses, individuals and public authorities.

Figure 16: OPC – Unnecessary costs for business, citizens and public authorities



In the following sections, there is a reference to the main effects of the Directive and an analysis of the reasons behind its successes and shortcomings in achieving the specific objectives and of the associated costs and benefits.

(a) Effects of the WEEE 2 Directive on waste prevention and production of more sustainable EEE

The impact of waste prevention measures has been used as an indicator for the analysis to assess the Directive's effectiveness in reducing the generation of WEEE.

The analysis of trends in the quantities of EEE placed on the market (PoM), in WEEE generated and in the repair of EEE[51] as well as of changes in the average lifespan of devices suggests that **waste prevention efforts have not been significantly successful**. According to the feedback from the OPC (Figure 16), the large majority of respondents from all stakeholder groups (113 out of 131) stated that the WEEE 2 Directive has not been effective or only effective to some extent in reducing WEEE generation. This is attributed, among other things, to the large increase of EEE placed on the market (as discussed below) and the lack of incentives for the separate collection of EEE for reuse.

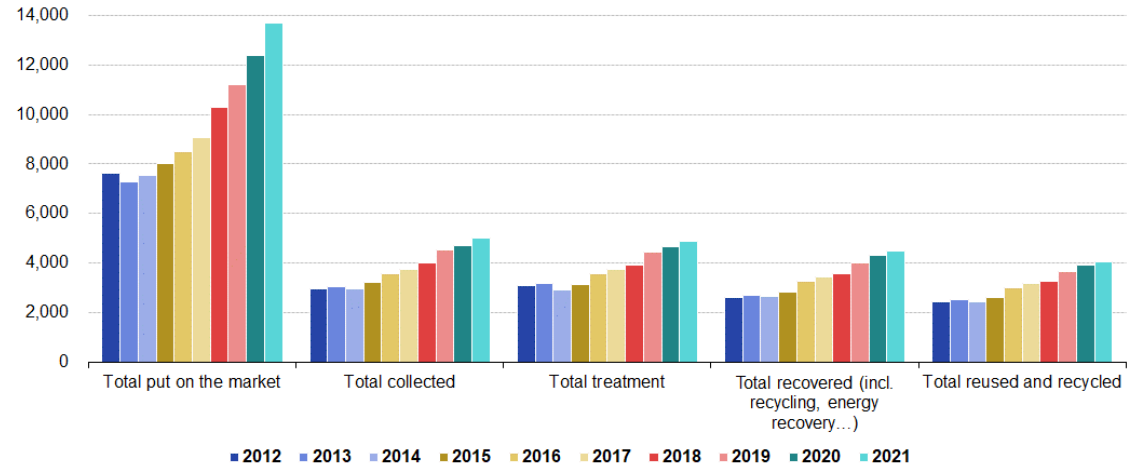
Figure 17 shows the constantly increasing amount of EEE placed on the EU market and of WEEE collected, treated and recovered over the evaluation period.

Considering the **trends in EEE placed on the market**, the data shows that during the evaluation period the amount increased from around 7.5 million tonnes in 2012 and 2014 to more than 13.5 million tonnes in 2021 (up by around 80%). Similarly, the per capita volume of EEE placed on the market increased from 17.3 kg in 2012 to 30.2 kg in 2021 (up 75%). Since the average weight of EEE has remained rather stable in recent years[52], this means that the number of devices placed on the market has increased. This development is basically driven by economic factors and the increase in consumption. To a lesser extent, the transition to an open scope from 2018 also contributed to this trend. Furthermore, EEE producers hold an economic interest in increasing the amount of EEE placed on the market given the development of new models and technologies. In addition, according to the evaluation study (chapter 6.1.1.2), a lack of awareness or concern about the impact of growing EEE consumption in the future generation of waste and the use of resources also contributed to this trend.

[51] Information on repair is based on data published by the Open Repair Alliance and is described in more detail in Annex VII to this report.
[52] According to the study supporting the evaluation of the WEEE 2 Directive.

Figure 17: EEE placed on the market and WEEE collected, treated, recovered, recycled and prepared for reuse in the EU, 2012-2021

(quantities in thousand tonnes)



Note: 2021: Eurostat estimates

Source: Eurostat (online data code: env_waseleeos and env_waselee)

The 2008 impact assessment estimated that the total quantity of EEE placed on the market in the EU would be 15.1 million tonnes in 2020 in the baseline scenario (including the UK and excluding Croatia). According to Eurostat, the actual amount of EEE placed on the market in the EU in 2020 (again including the UK and excluding Croatia) was approximately 14 million tonnes[53], which is around 10% below the estimated value. Although this comparison suggests a positive effect of the WEEE 2 Directive, the data is not robust enough to draw conclusions on whether this reduction was caused by the WEEE 2 Directive or by economic factors.

The reuse and repair of used EEE and the **preparation of WEEE for reuse** can extend the life of equipment and therefore foster waste prevention. Member States must report on **reuse**, including the reuse of EEE, in line with the Waste Directive and Implementing Decision (EU) 2021/19[54], with a first report being for 2021. Data presented in Annex VIII to this report shows that around 710 000 tonnes of EEE were reused in 2021[55], which is about 5.5% of the quantity of EEE that was placed on the market that same year. However, this was a new reporting exercise for collecting and calculating data on reuse of EEE, and the data was gathered using different approaches. Therefore, data may not be comparable, and the relative accuracy and robustness of the approaches is not yet clear.

[53] Data provided in the study supporting the evaluation of the WEEE 2 Directive based on Eurostat data and data from other scientific studies and papers.

[54] Commission Implementing Decision (EU) 2021/19 laying down a common methodology and a format for reporting on reuse in accordance with Directive 2008/98/EC (OJ L 10, 12.1.2021, p. 1).

[55] European Environment Agency 'Reuse flows according to the implementing decision (EU) 2021/19: https://www.eea.europa.eu/en/datahub/datahubitem-view/0686c969-093c-450a-ac59-847a53d83ee6.

Data on the **repair** sector[56] shows that during the evaluation period there was a significant increase in specific actions and events where people could bring non-functional devices and have them repaired. Such events, apart from raising awareness, also led to a significant increase in the number of devices that were repaired from a couple of hundred in 2012 to over 20 000 in 2022. However, this volume is still very low compared to the EEE placed on the market.

In addition, given that the officially reported data on the **preparation for reuse** rate across the EU-27 was between 0.6% and 1.7% between 2012 and 2020, it can be concluded that **the WEEE 2 Directive did not provide enough incentives to this activity.** Compared to the expectations of a preparation for reuse rate of 2% for the EU by 2020 (including the UK and excluding Croatia) that were envisaged in the 2008 impact assessment, the observed rate is still a bit lower. This implies that it is likely that the existing measures and the combined preparation for reuse and recycling target does not incentivise sufficiently or prioritise preparation for reuse over recycling.

Another measure to estimate the impact on waste prevention are the trends in **WEEE generated**. According to estimates for the EU-27[57], the amount of WEEE generated increased from 7 million tonnes in 2012 to about 8.4 million tonnes in 2020, an increase of 20% in less than 10 years. In the 2008 impact assessment, the total amount of WEEE generated across the EU (including the UK and excluding Croatia) was expected to be 12.3 million tonnes in 2020 in the scenario where no further action would be taken. This data is also linked to the data on EEE placed on the market and is influenced by changes in Member States. As such, one should not conclude that the WEEE generated in 2020 was lower than expected because of the WEEE 2 Directive's implementation. However, comparing data on WEEE generated and data on EEE placed on the market implies that the volume of WEEE generated relative to the amount of EEE placed on the market decreased over time.

Finally, waste prevention critically depends on **sustainable products** and **product design**. Article 4 on **product design** requests Member States to encourage cooperation between producers and recyclers in order to facilitate the reuse, dismantling and recovery of WEEE. As Article 4 does not impose a legal obligation but relies on voluntary action by producers, it provides few direct or indirect incentives for more sustainable product design. Other obstacles are the EPR schemes' focus on increasing WEEE collection and recycling rather than on developing more durable products and increasing reuse.

Another measure that could support the development of more sustainable products is the implementation of **eco-modulated financial contributions** paid by EEE producers to comply with their EPR obligations, in line with Article 8a(4) of the Waste Directive. The modulation of the contributions/fees is to be based on the durability, reparability, reusability and recyclability of products and the presence of hazardous substances. However, due to the lack of harmonised criteria, there has been a fragmented

[56] Data provided in the study supporting the evaluation of the WEEE 2 Directive based on data by the Open Repair Alliance (2023) and presented in Annex VIII to this report.
[57] The amounts for 2012 and 2020 are estimated by using the WEEE calculation tools that have been developed by the Commission for each Member State.

implementation of the eco-modulation of fees that has led to a relatively low impact on the ecodesign of products. Studies[58,59] and stakeholder feedback suggests that modulated fees are unlikely to create a financial incentive that is high enough to promote additional investment in sustainable product design.

(b) Effects of the WEEE 2 Directive in increasing WEEE collection

Increasing proper WEEE collection has positive effects on the environment and human health since it reduces the risk of releasing hazardous substances, such as ozone-depleting gases, mercury and others. In addition, WEEE collection is the first step and ultimately enables preparing it for reuse and contributes to the recovery of more valuable and critical raw materials, which reduces primary material demand. Therefore, it is used as an indicator to assess the effectiveness of the WEEE 2 Directive in achieving its objectives.

According to the analysis presented in Chapter 3.2, which is supported by Annex XI comparing Member States' implementation, the **separate collection of WEEE increased during the evaluation period but not enough to reach the targets** set out in the WEEE 2 Directive. The overall amount of WEEE collected in the EU-27 in 2021 reached 4.9 million tonnes. This was still slightly below the 50% of EEE that had been placed on the market in the previous three years and quite far from the 65% WEEE collection target.

Projections in the 2008 impact assessment concluded that, without further action, 5.1 million tonnes of WEEE would be collected separately in the EU[60] in 2020. When estimating comparable data for 2020 (i.e. data reported by Member States to Eurostat, including the UK and excluding Croatia), the volume of WEEE collected in 2020 was very close to these projections – around 5.5 million tonnes. This suggests that either no additional measures were taken to increase WEEE collection or, if measures were taken, they were not effective. This is in particularly true considering that the amount of WEEE generated has been steadily increasing.

Recital 15 of the WEEE 2 Directive states that there is a significant amount of **WEEE that is collected but not reported** and that may also be subject to improper treatment and/or illegal exports. These issues remain; large amounts (46%) of the WEEE generated are still not collected separately. Evidence[61] shows that this WEEE is illegally exported (5%), ends up in metal scrap (14%) or in residual waste bins (8%), exported for reuse (5%) or there is no information about it (14%). Many Member States and different actors in WEEE management have made significant efforts to increase the volume collected, including through legal, organisational and financial measures[62]. The positive effect of these

[58]WEEE Forum (2021) Eco-modulation of fees for 'greener' products: Concerns and challenges https://weee-forum.org/wp-content/uploads/2021/12/Eco-modulation_Interim-findings_2021-07-20_v7_Final2.pdf.

[59] Micheaux, H., & Aggeri, F. (2021). Eco-modulation as a driver for eco-design: A dynamic view of the French collective EPR scheme. Journal of Cleaner Production, 289, 125714. https://doi.org/10.1016/j.jclepro.2020.125714.

[60] The estimate included the UK.

[61] Study supporting the evaluation of the WEEE 2 Directive based on the study by Baldé, C. P., Iattoni, G., Xu, C., & Yamamoto, T. '*Update of WEEE Collection Rates, Targets, Flows, and Hoarding – 2021 in the EU27, United Kingdom, Norway, Switzerland, and Iceland: SCYCLE Programme.'* (2022).

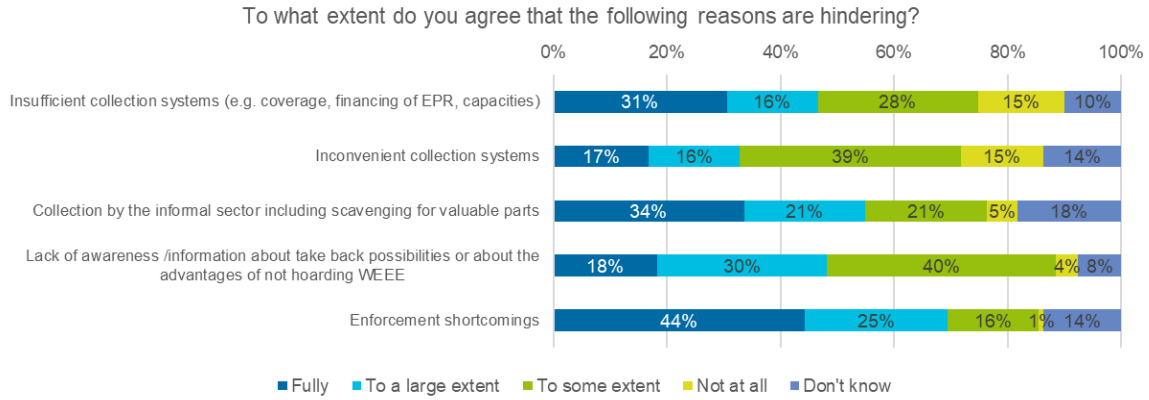
[62] The report on the 'WEEE compliance promotion initiative' provides a detailed overview of the actions taken by Member States up to 2017 to reach the WEEE collection targets.

measures has been supported by a decreasing trend in WEEE found in residual waste bins since 2012. However, the challenges facing WEEE collection remain, and the WEEE 2 Directive has not been sufficiently effective in tackling them all.

The total amount of WEEE collected in weight increased by about 68% between 2012 and 2021, having positive effects on the protection of the environment and human health. While not all Member States experienced the same level of increase, not all of them had started with a similar level of collection or infrastructure. Until 2015, nearly all Member States had achieved the relevant target (4 kg/inhabitant/year). Similarly, most Member States had no major problems in reaching the collection target of 45% of EEE placed on the market in the three preceding years by 2016. However, for the higher 2019 targets (65% of EEE placed on the market), only three Member States managed to reach it, while 24 Member States were at a rather stable collection rate close to that achieved in 2016. Due to these missed collection targets, the Commission decided to open an infringement procedure against the 24 Member States in July 2024. The average collection rate of 54% in the EU together with the achieved recovery targets led to 40% less electronic waste being recycled in the EU.

According to the evaluation study (chapter 6.1.1.2), based on literature findings and on stakeholder input, the **obstacles** to reach collection target include: (i) economic factors (as secure collection and storage may entail significant costs); (ii) the economic interests of illegal actors (scavenging, shipments to non-EU countries) and insufficient enforcement; (iii) deficits in collection infrastructure, in particular in rural areas; and (iv) a lack of environmental awareness among the population.

Figure 18: OPC – factors hindering WEEE collection (number of total replies 131)



Source: evaluation study.

Nevertheless, the binding collection targets, which have become increasingly ambitious over time, provide strong evidence of a positive correlation between the Directive and the observed increase in the collection rate. The targets have had a significant effect in putting pressure on those involved to improve their environmental performance.

It is difficult to directly assess the total **number of jobs created** in the WEEE collection sector. However, the Directive's implementation has led to an increase in the volume of WEEE collected and has had a positive impact on employment in this sector across the

EU. Social enterprises working in WEEE collection and refurbishment have played a significant role in creating jobs in disadvantaged and marginalised communities. Reuse activities can create between 60 and 140 jobs for every 1 000 tonnes of WEEE collected [63].

WEEE collection costs are to be borne by EEE producers, who can choose to fulfil this obligation either individually or by joining a collective scheme, e.g. a PRO. However, most stakeholders believe that the expenses incurred by municipalities for the collection of WEEE are not comprehensively covered by EPR fees, which might lead to costs being passed on to the public through local taxes, user fees and service fees. Many geographic and economic factors affect these costs, which vary greatly across the EU. That difference is likely to be greater than the difference in collection costs caused by collections carried out by different actors. Moreover, particularly for retailers, it is estimated that one or two full-time equivalent (FTE) positions of one day per week are necessary to manage the WEEE collection process, which can result in annual costs ranging between EUR 13 000 and EUR 20 000[64]. Obtaining comprehensive data on the real costs of WEEE collection in Member States was very challenging mainly due to confidentiality concerns among PROs, which operate in a highly competitive market in the EU.

The Commission assessed past data and scenarios on setting individual targets of 85% of WEEE generated for each of the EEE categories. The assessment showed that this would significantly improve the quantities of WEEE collected. Therefore, it needs to be further assessed whether **setting different collection targets** for each of the EEE categories would result in an additional increase of total WEEE collected. In the wider context of the circular economy, as discussed in Annex IX, a deeper analysis will be crucial, taking into consideration the new Critical Raw Material Act, as further elaborated in Chapter 4.1.2 (b) and 4.3, and the need ensure the EU's open strategic autonomy.

(c) Effects of the WEEE 2 Directive in increasing WEEE recycling and other recovery

The amount of recovered WEEE increased from 2.6 to 4.4 million tonnes (69.8%) from 2012 to 2021, and WEEE recycled and prepared for reuse grew from 2.4 to 4.0 million tonnes (64.8%), as detailed in the comparative analysis of Member States' implementation in Annex XI. The difference between WEEE recovered and WEEE recycled and prepared for reuse is WEEE incinerated (energy recovery). In the EU, there are more than 2 700 facilities that can treat WEEE, with a minimum capacity of about 3 million tonnes per year. Detailed information about WEEE recovery rates achieved by the EU-27 Member States during the evaluation period and about the capacity in the EU is presented in Chapter 3.2 and Annex VIII.

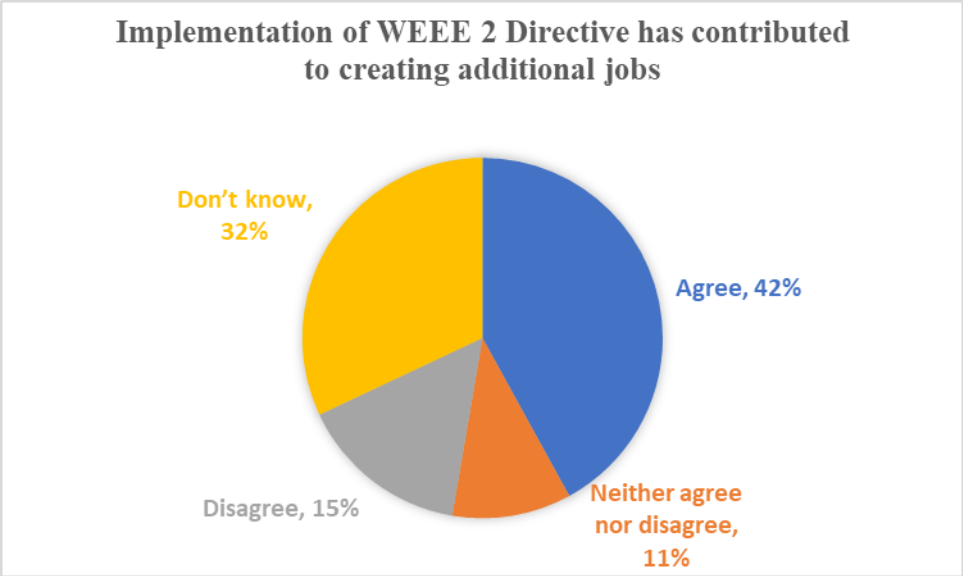
The combined preparing for reuse and recycling rate of WEEE, as reported by Member States, remained consistently high at between 80% and 84% from 2012 to 2021. Given that the preparing for reuse rate only slightly contributed to these rates, as mentioned before,

[63] RREUSE (2021) Job creation in the reuse sector: data insights from social enterprises.
[64] Study supporting the evaluation of the WEEE 2 Directive based on consultation with stakeholders.

this indicates that the increase in the total quantities of WEEE recycled and recovered is the result of the increase in WEEE collection.

In addition, even though there is insufficient data to properly quantify the **effects of the WEEE 2 Directive on the labour market** of the WEEE recycling sector, the increase in the total quantities of WEEE recycled and recovered is likely to have had a positive impact on the labour market over the years. This is also supported by the OPC results, where only around 15% of the respondents argue that the WEEE 2 Directive has not contributed to creating additional jobs.

Figure 19: OPC – creation of jobs (number of total replies 131)



Like WEEE collection costs, **WEEE recycling and other recovery costs** are also to be borne by EEE producers either individually or by joining a collective scheme i.e. a PRO. However, these costs can also be offset by the revenue generated from the sale of recovered materials. Treatment operators report facing economic risks due to fluctuating market prices for commodities, and they have highlighted that **indirect costs**, like fire risks from lithium-ion batteries, are not covered by EPR fees[65]. The average cost related to fire incidents was estimated at EUR 190 000, which can be a significant burden for an individual company, especially an SME[66].

Obtaining comprehensive data on these real costs associated with the recycling and the recovery of WEEE was very difficult, mainly because of the competitive nature of market operators. Treatment operators face **administrative costs** for complying with reporting obligations stemming from the WEEE 2 Directive, estimated at EUR 11 700 per year for surveillance and certification, including batch testing[67]. Further administrative costs for treatment operators in certain Member States stem from the obligation to obtain CENELEC certification required by national legislation or by PROs, which amounts on average to

[65] Targeted consultation workshop with recyclers.
[66] See information provided in: https://euric-aisbl.eu/images/Position-papers/Issue_7_EuRIC_Part.pdf.
[67] See Annex XII to this report.

EUR 5 000 per certified waste stream[68]. However, such certification is not directly mandated by the WEEE 2 Directive.

The rate of recovery and the combined rate of recycling and preparing for reuse between 2012 and 2021 was rather stable in all Member States. The preparing for reuse rate only slightly contributed to the combined preparing for reuse and recycling rate of WEEE. Member States did not have significant difficulties in reaching the recovery targets. Most of them have been overachieving the recovery target and the combined preparing for reuse and recycling target over time.

The overachievement of the recovery targets set out in the WEEE Directive raises concerns about the suitability of the calculation methodology. This is because the recovery rates are calculated on the basis of the input material stream at a certain recycling facility and not on the output material, which is used for new products. Therefore, they have no effect in increasing either the quality of recycling or the quantities of recovered materials. For example, for flat panel displays, the recycling rate would drop from 84% to 41% if the **recycling rate was based on the output of the recycling plant instead of the input**[69].

However, the feasibility of setting recovery targets based on the quantities of material coming from the recycling process **(output-based recovery targets) could not be further assessed** because there was no sufficient data available at that time. However, implementation of the Directive (Article 11(4)), which requires treatment facilities to keep such records, could allow for a feasibility analysis.

In terms of benefits, WEEE recycling had a positive effect on resource efficiency, depollution and CO_2 savings[70]. For example, some estimates suggest that recycled steel from WEEE led to 7 243 CO_2 eq savings per kilotonne of recycled steel.

(d) Effects of the WEEE 2 Directive in increasing materials recycled from WEEE, including critical raw materials

Although comprehensive data on recycling trends for specific materials from WEEE, such as metals, glass and plastics, is not available, in certain areas more advanced recycling technologies leading to higher levels of material recycling have been developed over the last years[71]. Therefore, it can be assumed that implementing the WEEE 2 Directive and reaching its targets might have at least partially contributed to technological developments and innovation. However, as elaborated in Section 4.1.(c), the recovery targets and the

[68] Study on quality standards for the treatment of WEEE, Tesar et al. (2021).
[69] Influence of scope definition in recycling rate calculation for European e-waste extended producer responsibility, Arduin et al. (2019).
[70] See Annex XII.
[71] According to data presented in the study supporting the WEEE 2 Directive based on scientific papers and documents, for metals, high recycling rates up to 95% are achieved, while for plastics in WEEE, 44% is sent to material recovery and 45% to direct energy recovery. The rest is sent to landfill. In some countries, including the Netherlands, France, Germany, Austria and Sweden, the recovery of plastics from WEEE has been implemented.

preparing for reuse and recycling targets are calculated based on the input material stream at a certain facility and not on the output material that is used for new products[72].

The WEEE 2 Directive does not set any targets for the recovery of material or recycling efficiency, and no data is reported on the actual quantities of materials, including critical raw materials, that have been retrieved from the collected WEEE. Apart from this, additional factors hindering the achievement of high levels of material recycling from WEEE include: (i) missing quality standards for recyclates that would promote higher recycling efficiencies and better quality of recycling; (ii) no incentives to increase recycling of materials whose recovery is not or not yet commercially viable; (iii) legal uncertainties at the intersection of chemicals, products and waste legislation regarding substances in WEEE; (iv) limited recycling capacity in certain Member States; and (v) burdensome procedures for shipping between Member States.

The **rules** that the Directive sets out for the treatment, recycling and recovery of WEEE have **not changed** since the WEEE 1 Directive. The main change following the adoption of the WEEE 2 Directive was the development of the European standards for the treatment of WEEE by CENELEC. The existing provisions in the WEEE 2 Directive had little effect on improving recycling and recovery or on diverting WEEE (materials) from landfills and incineration. However, the standards set target values for batteries included in WEEE[73] and capacitors and limit values for concentrations of hazardous substances to be achieved by the end of the treatment process. In addition, the standards (in particular TS 50625-3-1[74]) set out the procedures for specifying the concentrations of the substances of concern. Moreover, operators implementing the standards need to monitor the recycling process, including by calculating its efficiency. Therefore, it is likely that **implementation of the European standards for the treatment of WEEE has had a positive impact on material recycling**.

However, these targets and limit values are not set out in the WEEE 2 Directive, the standards are voluntary, and different approaches exist in how they are implemented (see Table 6 in Annex III). The Directive's rules on treatment, meaning the recycling and other recovery of WEEE, have not changed since 2002. However, a significant development was the adoption of European standards for the treatment of WEEE (EN 50625 series standards). In addition, the 2002 WEEE treatment requirements do not reflect the changes in hazardous components used in EEE and the developments in WEEE treatment technology. Consequently, as further elaborated in Annex XI's comparative analysis of implementation in Member States, there is no level playing field among Member States

[72] For example, in the new Batteries Regulation (EU) 2023/1542, recycling efficiency targets are set, while recycling efficiency means the ratio, expressed as a percentage, obtained by dividing the mass of output fractions accounting for recycling by the mass of the waste batteries' input fraction, in relation to a recycling process.

[73] For example, standard EN 50625-1 sets out that all batteries that are accessible in WEEE without using tools must be removed before any treatment process and that special precautions and safety measures should be put in place for the treatment of WEEE that may contain lithium batteries and for operations involving used lithium batteries, and for fractions containing lithium batteries. Furthermore, TS 50625-3-1 sets a target for batteries to be removed from small appliances (1.8 kg of batteries per tonne of small appliances treated), either as a distinct fraction or as an identifiable part of a stream and sent to proper treatment.

[74] TS 50625-3-1: Specification for De-pollution - General.

regarding the WEEE treatment requirements. In addition, the new Batteries Regulation[75] provides for making it possible to remove and replace portable batteries and batteries for light means of transport (Article 11), and this is likely to make the recycling of WEEE more efficient.

The level of retrieval/recycling of **critical raw materials (CRMs)** from WEEE largely depends on the type of recovery application, the market value of the primary and secondary raw materials, and product design. For example, precious metals in electronics (e.g. platinum group metals in printed circuit boards) are generally separated and recycled because this is economically viable. However, a number of CRM and other materials (e.g. silicon metal, indium[76], gallium, germanium, magnesium, tantalum and rare earth elements) are lost in shredding residues or diluted in other recycled fractions[77,78]. The recovery of CRMs is influenced by the availability of recycling technologies, the product's design and ease of disassembly, the care taken at treatment facilities, and the economic feasibility of the recycling operation. Technology gaps and a lack of information on the actual presence of CRMs in WEEE (e.g. the amount and location) present additional barriers to dismantling, sorting and recovering CRMs. Weight-based targets of the WEEE Directive encourage the recovery of base metals more than CRMs[79].

Under the WEEE 2 Directive and Implementing Decision (EU) 2019/2193 laying down the rules for the data reported by the Member States, data on the quantities of recycled materials are not reported, and therefore **official data on recycling efficiency or on recovery of materials is not reported**. For these reasons, for most CRMs, recycling rates are at very low levels and the targeted collection, treatment and recycling of CRM-rich products and components or recovery of CRMs are lacking.

Therefore, **it is likely that the Directive has not been particularly effective in the recovery of valuable secondary raw materials, particularly CRMs**. It is clear that increasing the collection and recycling efficiency rates of waste containing valuable raw materials and the recovery rates of CRMs has great potential to reduce dependencies on strategic raw materials, build value chains and create local jobs (e.g. in the recycling industry). This is explored thoroughly in Annex IX.

[75] Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries (OJ L 191, 28.7.2023, p. 1).
[76] Not in Critical Raw Materials Act Annex II. However, Indium has been critical in the 2011, 2014, 2017, and 2020 lists, which are during the evaluation period.
[77] (JRC, 2017). Critical Raw Materials and the Circular Economy – Background report. JRC Science-for-policy report, EUR 28832 EN, Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-74282-8 https://doi.org/10.2760/378123 JRC108710.
[78] Chancerel P; Marwede M; Mathieux F; Talens Peiro L. Feasibility study for setting up reference values to support the calculation of recyclability / recoverability rates of electr(on)ic products. EUR 27922. Luxembourg (Luxembourg): Publications Office of the European Union; 2016. JRC101426 https://doi.org/10.2788/901715.
[79] European Commission, 3rd Raw Materials Scoreboard – European innovation partnership on raw materials, Publications Office, 2021, Indicator 13 on Management of waste of electrical and electronic equipment (WEEE), https://rmis.jrc.ec.europa.eu/uploads/scoreboard2021/indicators/ind13.pdf.

(e) Effects of the WEEE 2 Directive in improving the performance of all operators involved in the life cycle of EEE

According to recital 6 of the WEEE 2 Directive, one of the Directive's purposes is to improve the environmental **performance of all operators involved in the life cycle of EEE**, e.g. producers, distributors and consumers, in particular, those operators directly involved in the collection and treatment of WEEE.

One of the **benefits of the Directive** is the awareness it has raised of WEEE and its impact on the environment, among these operators[80]. Through implementation of the EN 50625 series standards, it has also improved the impact on the environment in treatment facilities[81].

In many Member States, producers and public authorities have launched **legislative and operational measures** that aim to increase the separate collection of WEEE from private households, including running collection campaigns and creating more take-back possibilities. In addition, producer associations, with the WEEE Forum ahead, developed successful approaches together for many aspects of WEEE management, including consumer awareness, the set-up of suitable take-back networks and procedures to monitor meeting collection and treatment targets.

The WEEE 2 Directive has helped **improve knowledge transfer and cooperation** among operators involved in the EEE life cycle. In particular, the Directive put in place:

- the exchange of information between producers and treatment and recycling operators (Article 15) that led to developing the 'Information for recyclers – I4R-platform'[82];
- the cooperation of national registers (Article 16(2)(d)), in particular, under the European WEEE Registers Network (EWRN)[83] that had already been established in 2006;
- the cooperation among the national enforcement authorities that led to the establishment of the European WEEE Enforcement Network (EWEN)[84].

More information about these networks is available in Annex III to this report. The resulting communication chain has promoted the exchange of knowledge across the value chain, which has an impact on coordination and knowledge transfer in the sector.

Requirements to **inform users about EEE** were already set out in the WEEE 1 Directive. Awareness campaigns are widely used by Member States to educate consumers, mostly on

[80] Even if there is still room for improvement when it comes to general public awareness, feedback from stakeholders stressed that awareness on WEEE and it impact on the environment generally increased since 2012.
[81] See Annex XII.
[82] I4R-platform (2023). I4R. URL: https://i4r-platform.eu/about/.
[83] Independent network of national registers of the EU Member States, which are responsible for monitoring the national implementation of the WEEE 2 Directive URL: https://www.ewrn.org/.
[84] In 2019, the network consisted of 13 members from ministries and environmental agencies, which collaborated in line with Article 18 of the WEEE 2 Directive. First results of this collaboration included 'an internal list with contact details and information about the enforcement structures in Member States', as well as the development of 'standardised complaints forms' available through the website of the European WEEE Registers Network.

how to properly dispose WEEE. The results of the compliance promotion initiative (described in Annex III to this report) and stakeholder feedback confirms the benefits of these campaigns, and some stakeholders see a need for these kind of campaigns to be further intensified.

The open public consultation looked at the **distribution of costs and benefits among stakeholders**. Half of respondents from industry and public authorities but only some civil society respondents (14 out of 39) felt that WEEE management costs were adequately covered by producer financing. In addition, one third of respondents from industry and about half the respondents from civil society and public authorities believed that costs were only partially covered.

According to the information provided by the stakeholders during the various consultation activities described in Annex VI to this report, **public authorities face administrative costs** for running producer registers and carrying out related tasks, such as awareness-raising campaigns that vary from about EUR 26 000 to EUR 100 000 per year and up to EUR 8.9 million per year[85]. These high amounts can be attributed to the specific nature of the national EPR system. Differences in Member States' costs can be partly attributed to the administrative design of the registers (i.e. overseeing EPR obligations for single waste streams or multiple waste streams) and to country sizes.

(f) Effects of the WEEE 2 Directive in achieving greater harmonisation and simplification and reducing administrative burden

There is considerable variation in the administrative costs related to the implementation of the WEEE 2 Directive for different stakeholders. According to the information provided by the stakeholders during the various consultation activities and based on extrapolation, for PROs these costs are on average EUR 474 per year in the EU[86]. In the OPC, the majority of the respondents from industry (66 out of 84) and public authorities (6 out of 8) and more than one third of civil society respondents stated that administrative costs had increased to some extent or had increased significantly because of the new requirements in the WEEE 2 Directive. Only a few respondents from all stakeholder groups stated that administrative costs had not changed or had even decreased under the WEEE 2 Directive, suggesting that most stakeholders face higher costs.

As described in Annex III to this report, in relation to the **scope** of the WEEE 2 Directive, the main new element was the transition from the 10 product-oriented and relatively narrow categories to the six 'open' categories. This transition has been effective as it has helped to increase legal certainty and to better harmonise implementation of the Directive. This is because classification of EEE under the new, more general and size-based categories is simpler and more straightforward. Producers first need to consider if a product falls into any of the specific product group categories, i.e. temperature exchange equipment, screens, lamps, and small IT and telecommunication equipment. If not, the only parameter the producer needs to consider is the size of the equipment. Therefore, this

[85] See Annex XII to this report.
[86] Data points from PROs in Belgium and Italy. Cost estimation for remunerations and direct social securities (not administrative tasks exclusively). (Ahlers et al., 2021).

classification method is less burdensome for producers. It is also less burdensome for collection and treatment operators as it reflects how WEEE is collected in practice. This makes reporting simpler for these operators. In addition, the open scope allows flexibility to accommodate new EEE on the market and therefore, to immediately cover any new type of EEE that did not exist previously. Therefore, the **change in the EEE classification system has led to a decrease in administration**. However, introducing this reclassification entailed **an investment of time and labour** for producers, PROs and national authorities. All producers had to re-structure their reporting systems to be able to report on the quantities of EEE placed on the market under the new categories, and WEEE treatment operators had to do the same to report on the quantities of WEEE treated under the new categories. The amount of work was the same for all PROs across the EU and for the national registers that had to make changes to their IT systems, provide updated information, adjust the scope and allocation of EEE and modify the reporting procedures. The cost varied depending on the operator, and it was not possible to obtain specific estimates, but this is one of the parameters explaining the replies given in the OPC.

In addition, as demonstrated in Annex XIII, the **implementation of the secondary legislation**[87] **had a significant effect in reducing the administrative burden** for operators.

- First, the application of Implementing Regulation (EU) 2019/290 ensures a **harmonised format for registration and reporting for all national registers** and therefore helps to reduce administration, especially for producers active in more than one Member State.

  However, the format for reporting to PROs has not been harmonised. Therefore, PROs may use different and many more sub-categories of EEE for reporting by producers because they may need this more detailed information to calculate EPR contributions/fees. Therefore, producers still have to navigate different criteria within different EPR schemes and comply with different procedures in each Member State, which can prove time-consuming and expensive.
- Second, Implementing Regulation (EU) 2017/699 set out the methodology for calculating the weight of EEE placed on the market in each Member State and the quantity of WEEE generated in each Member State. This has improved **harmonisation and ensures the comparability of reported data**. In addition, the Commission has supported Member States in the implementation of the Directive by developing and continuously updating the tools customised for each Member State to allow them calculate the WEEE generated. This ensures harmonisation and reduces the amount of work for national authorities.
- Third, the amendment to the WEEE Directive in 2018 (deletion of Article 16(5)) **repealed the burdensome obligation for Member States to submit a report on the implementation of the Directive to the Commission at three-year intervals**. The report was also based on an obsolete questionnaire laid down in Commission Decision 2004/249/EC[88]. Following that amendment, Implementing Decision (EU) 2019/2193

[87] See Annex III to this report.

[88] 2004/249/EC: Commission Decision of 11 March 2004 concerning a questionnaire for Member States reports on the implementation of Directive 2002/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) (OJ L 78, 16.3.2004, p. 56).

deleted obsolete reporting requirements and benchmarked national reporting methodologies to **further simplify the reporting procedure for Member States.** It also introduced a data quality check report. Data reported by Member States is essential for the Commission to assess compliance with the WEEE Directive.

The network of national registers **(EWRN) played a significant role in supporting harmonisation** of registration and reporting by fostering cooperation among national registers. The network provides guidance to national registers and has developed an online tool (scoping tool) where they can raise questions on the classification of specific EEE.

Despite the efforts already made to simplify and harmonise procedures and reduce administration, according to the OPC and targeted consultations[89] the interpretation, transposition and implementation of the WEEE 2 Directive still vary across EU Member States. This has led to calls for a WEEE regulation for more consistent implementation. 36 out of 131 respondents to the OPC (26 from industry, 1 public authority and 9 from civil society) pointed out that a WEEE regulation may be a more appropriate legal instrument to ensure consistent implementation across Member States. As presented in Annex VII, more than half of respondents to the OPC from industry, a third from civil society and almost half from public authorities share the view that the WEEE 2 Directive has **not contributed to a level playing field among Member States**. WEEE treatment standards are not universally binding, resulting in disparities in practices. These differences contribute to insufficient harmonisation. **Inconsistencies in registration and reporting approaches**[90] across countries make it difficult to meet reporting requirements, exacerbating the lack of standardisation. The current registration and reporting requirements also impose a significant administrative burden and significant costs on low-volume producers.

Simplification, removal of administrative burden and reporting requirements[91]

Secondary legislation and amendments to the Waste Directive and the WEEE 2 Directive have already brought some **simplification** and reduced administration for Member States, producers and PROs in terms of methodology, reporting format and reporting obligations, as well as strengthening legal certainty and transparency.

In particular regarding the **reporting requirements**, the Commission took action during the evaluation period to reduce the administrative burden as much as possible by:
- repealing the obligation for Member States to submit a report to the Commission on the implementation of the WEEE 2 Directive every three years;

[89] According to the analysis presented in Annex VII to this report, in particular the analysis of the OPC and the targeted consultation with producers and recyclers, as well as the results of the final workshop.
[90] According to the '*Study on harmonisation of the format for registration and reporting of producers of EEE to the national register and on the frequency of reporting*' (European Commission, 2016), producers may be registered and report to the national registers directly, or, through a PRO or they may have both possibilities i.e. to be registered either directly or through a PRO.
[91] See also Annexes IV, V and XIII to this report.

- putting in place a single annual electronic reporting exercise, where Member States report essential data to the Commission to demonstrate compliance with the targets set out in the WEEE 2 Directive;

- drawing up a new format for Member States' reporting to the Commission;

- introducing two sub-categories under EEE category 4 'large equipment', namely '4a: Large equipment excluding photovoltaic panels' and '4b: Photovoltaic panels'; this ensures harmonised reporting methodologies to allow Member States and the Commission to assess how the quantities of PV panels placed on the market affect the annual collection rate.

The remaining reporting obligations under Article 16 of the WEEE 2 Directive are essential for the Commission to assess Member States' compliance with the Directive, in particular the collection and recovery targets.

The rest of the reporting requirements concern the need for Member States to report to the Commission if they go beyond the provisions of the Directive for environmental reasons ('gold-plating') or to inform the Commission of amendments to relevant national legislation (Article 5(2)(b), Article 7(1), Article 8(5), Article 22, Article 24(3)). Such provisions are usually part of the transposition obligation and therefore notified to the Commission once. Subsequently, only amendments to the legislation need to be reported.

Further opportunities for simplification and reducing administration related to reporting requirements could lie in exemptions from reporting obligations for **SMEs** and *de minimis* turnover/amounts, set by specific criteria (see Annex IV).

However, the feasibility and the impact of such opportunities need to be further assessed through a proper impact assessment. They could therefore form part of a future review of the WEEE 2 Directive. Further reducing requirements for economic operators would only be possible through further harmonisation, which would require a change of legal instrument to a regulation. In any case, this would require a more thorough assessment.

(g) Effects of the WEEE 2 Directive in improving extended producer responsibility

As detailed in Annex XI, there are four different WEEE EPR models that are implemented in the EU: (i) the state fund (eco-tax) model (with or without a single executing agency); (ii) the single organisation model, which is applicable only in small countries; (iii) the competing organisation model (with or without a coordination centre or with eco-tax back-up), which is the model applied in most Member States; and (iv) the German model, which is based on individual producer responsibility and is applied only in Germany. As the EPR systems vary from one Member State to another, drawing conclusions on a successful one-size-fits-all EPR system is a complex endeavour and probably not feasible because such a system may not exist. For example, Table 16 in Annex XI shows that none of the four WEEE EPR models is superior in achieving WEEE collection and recovery targets. The four WEEE EPR models are rather the result of different administrative structures in Member States.

Success factors (i.e. actions that could support Member States in increasing WEEE collection) through EPR include: (i) coordination of PROs by a central authority, including a clearing house system; (ii) developing a strong regulatory framework and authorisation procedures for PROs and their monitoring; and (iii) awareness campaigns for producers of EEE to reduce the number of free-riders and campaigns to increase awareness among the general public.

When evaluating the extent to which the WEEE 2 Directive has succeeded in ensuring that producers finance the costs associated with managing WEEE, the OPC results reveal that the majority of the respondents from all stakeholder groups (97 out of 131) believe it has not been successful or only successful to some extent. One of the major concerns raised by respondents is the detrimental impact of **online free-riders**.

Although required by the WEEE Directive, producers supplying EEE by means of distance communication (**online sellers**) often do not have a physical legal presence in the country where the consumer resides, are not registered in national registers, and do not have contractual agreements with PROs to fulfil their EPR obligations. The main reasons for this lack of compliance are the administrative burden and associated costs for being WEEE compliant, which can make up a significant portion of the overall WEEE management costs (depending on the product category).

To cut administration for producers who sell their products in several Member States, the WEEE 2 Directive introduced the possibility to register an **authorised representative** (Article 17). This means that a producer already established in one Member State but selling EEE in another can appoint an authorised representative to carry out its obligations instead of having to establish itself there. While each Member State has incorporated Article 17 of the WEEE 2 Directive into its national legislation, specific and detailed requirements for the appointment of an authorised representative vary among Member States. Recognising this disparity, it was deemed beneficial to offer guidance to stakeholders on the process of appointing an authorised representative in each Member State[92]. This indicates that the **positive impact of Article 17 was not fully used in practice due to different national approaches**.

Regarding the financing of EPR, according to the information provided by stakeholders during the various consultation activities described in Annex VI to this report, producers incur costs in the form of **EPR fees**, typically ranging from EUR 100 to EUR 250 per tonne depending on the EEE category[93]. According to information available on PRO websites, the range is even wider – from EUR 0.05 per item (lamp) to EUR 1 200 per tonne (large equipment)[94]. These fees encompass collection, handling and treatment costs. The adoption of higher treatment standards may result in higher costs for specific WEEE categories and

[92] The IMPEL Article 17 WEEE project concluded that developing a shared guidance document within the project would be more efficient and effective than each WEEE authority drawing up its own. This approach allows for a standardised format of the guidance document, facilitating easy comparison across Member States (IMPEL project - Article 17 WEEE Directive, 2020).
[93] Sousa, R., Agante, E., Cerejeira, J., & Portela, M. (2018). EEE fees and the WEEE system - A model of efficiency and income in European countries. Waste Management (New York, N.Y.), 79, 770-780. https://doi.org/10.1016/j.wasman.2018.08.008.
[94] See Annex XII.

material fractions. However, there is a lack of data available on the costs of treatment and infrastructure needed to achieve higher treatment standards compared to the baseline before implementation of the WEEE 2 Directive. As a result, it is difficult to assess the cost effectiveness of drawing up improved treatment standards.

Adjustment costs related to the revised EEE classification system present substantial challenges. The reduction in the number of categories necessitates a structured transition strategy for producers and PROs. Challenges include understanding obligations, navigating registration, estimating costs and coping with the complexities of the EPR scheme. This requires additional EU guidance. Concerns about confidentiality hinder access to comprehensive data, exacerbating challenges for PROs and recyclers and leading to increased costs. However, adjustment costs caused by changes in the categorisation, registration and EPR provisions are expected to decline over time.

Some stakeholders argue that competition between PROs produces an uneven impact on market players. Feedback received, including messages from SMEs through the Europe Direct Contact Centre and the 'Fit for Future' Platform[95] eliciting stakeholder views on simplification, indicates that compliance with the WEEE 2 Directive's requirements can pose a **barrier to market** entry, especially for smaller producers and businesses. This is due to the administrative burden and costs related to the obligation for registration and reporting, and for appointing an authorised representative in every Member State where SMEs place EEE on the market. This may disproportionately affect small and innovative companies, potentially hindering competition and innovation in the market. It may also affect competition between producers based on their ability to comply with EPR and manage the associated costs.

The WEEE 2 Directive also introduced the possibility for producers to use '**visible fees**' (Article 14). This implies that the fees associated with waste management and disposal are transparent and readily clear to all industry stakeholders. This transparency ensures that all producers are aware of the financial obligations and costs incurred for the proper management of waste, promoting fairness and equal treatment across the board. It also provides information to consumers on the fees that producers pay for the management of each piece of EEE sold, contributing to consumers' awareness. However, it has been used in only three Member States and also represents an administrative burden on the producer. In addition, since the fees are low in relation to the product cost, it is unlikely to influence consumers' choices. Although no evidence could be found, it is likely that incurred costs are passed on to consumers through product costs or taxes[96].

Identifying **indirect costs** was a challenge. Results of the OPC show that 35-45% of participants from all stakeholder groups reported an increase in indirect costs, mainly attributed to indirect compliance costs. However, a substantial 45-55% of the respondents expressed uncertainty about the Directive's impact on these costs, emphasising the complexity and varied experiences. The results of the OPC also show that retailers encounter specific challenges due to insufficient compensation for their role in providing

[95] Fit for Future Platform (F4F).
[96] For more detailed analysis on the visible fee, please refer to Annex XII.

space for in-store WEEE collection. Providing such space for WEEE collection, storage and handling processes demands approximately 6% of retail space, introducing an extra cost to retailers[97].

As mentioned previously, another indirect cost relates to the risk of fires from batteries contained in WEEE. These can ignite during shredding, causing high costs for treatment operators. Other risks include safety, pollution and contamination, e.g. from substances of concern leaching during storage[98]. Such indirect operational costs are not considered to be covered by EPR fees paid through PROs to treatment operators.

(h) Effects of the WEEE 2 Directive in improving enforcement

The WEEE 2 Directive introduced (i) **minimum inspection requirements** for Member States (Article 23) to improve the application of the Directive at EU level; and (ii) **minimum monitoring requirements** for shipments of WEEE (Annex VI).

The measures set out in the WEEE 2 Directive **may not have been sufficiently effective** in reducing the volumes of WEEE leaving the EU in an uncontrolled manner. It has been estimated[99] that the rate of WEEE treated outside the EU and not in line with the EU requirements may even have increased from 22% in 2010 to 25% in 2020. Consequently, the treatment/disposal of WEEE outside the EU – mostly in developing countries – continues to cause great harm to the environment and human health.

The criteria to **distinguish between WEEE and used EEE** (Annex VI), introduced in the WEEE 2 Directive, are considered helpful in cross-border controls. The criteria were developed on the basis of guidance developed in 2007 by the waste shipment correspondents[100] and are among the strictest in the world. However, their impact on reducing illegal WEEE exports is considered low, mostly owing to the Member States' limited resources for inspection of cross-border movements.

National enforcement authorities have limited resources for checking producers' compliance with EPR obligations. Despite this, they have joined forces under the **European WEEE Enforcement Network (EWEN)**, as also referred to in Chapter 3 and Annex X on compliance, to support each other to identify non-compliant producers and more effectively prosecute breaches of the obligation to appoint an authorised representative. As a means to increase collaboration, EWEN has drawn up an internal list with contact details and information about the enforcement structures in Member States and standardised complaint forms.

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[97] See Annex XII of this report.

[98] See Report: 'Leaching of problematic substances during storage of WEEE' (2023), Link: 978-87-7038-482-7.pdf (mst.dk).

[99] Estimations done in the context of the study supporting the evaluation based on data from Baldé, Iattoni, et al. (2022), which take into consideration estimates on illegal exports of WEEE, exports of EEE for reuse and estimates of WEEE with unknown whereabouts.

[100] Correspondents' Guidelines No 1 on Shipments of WEEE of 2007 inspired the drafting of Annex VI to the WEEE 2 Directive. In 2017, after the entry into force of the WEEE 2 Directive, the Correspondents' Guidelines were adapted to reflect the changes in the WEEE 2 Directive, and subsequently were again adapted to incorporate the Technical guidelines on transboundary movements of WEEE and used EEE, in particular regarding the distinction between waste and non-waste under the Basel Convention.

Limited data was available to assess **enforcement costs**, as also elaborated in Annex XII. In the OPC, two thirds of the respondents from industry (56 out of 84), almost half from civil society (17 out of 39) and more than half from public authorities (5 out of 8) stated that enforcement costs linked to the implementation of the WEEE 2 Directive had increased to some extent or had increased significantly. Only a few of the respondents from industry and civil society but almost half of public authorities (3 out of 8) argued that enforcement costs had not changed or had even fallen as a result of the Directive. The variations in responses also suggest that the impact of the Directive on enforcement costs varies among Member States. Even though specific information is not available for all Member States, the data received through the consultation with national authorities suggests that public authorities spend EUR 80 000-150 000 per year on overseeing and enforcing compliance with the existing legislative framework and about EUR 4 000 per year on technology and equipment for effective enforcement.

Effectiveness and efficiency

Several conclusions can be drawn from the assessment of the WEEE 2 Directive against its objectives.

- **Waste prevention** efforts have not been particularly successful. Challenges remain to evaluate effects on reuse, repair of used EEE and preparation of WEEE for reuse. The WEEE 2 Directive also does not provide enough incentives to promote preparation for reuse. Article 4 of the WEEE 2 Directive provides few direct or indirect incentives for more sustainable product design.

- With less than 40% of electronic waste currently being recycled in the EU, increasing the amount of **WEEE collected and recycled** remains crucial to protect the environment and human health and secure valuable secondary raw materials.

- The Directive has encouraged **innovation** in waste management technology and recycling processes. The voluntary European standards for the treatment of WEEE have a positive impact on material recycling, but are only applied in six Member States.

- The lack of specific obligations in the WEEE 2 Directive regarding **CRMs** – combined with a lack of information on the actual amount and location of CRMs in WEEE – hinders their recovery and return to the economy.

- None of the four WEEE EPR models is superior to achieve WEEE collection and recovery targets. The four models are rather the result of different administrative structures in Member States. Success factors are authorisation and coordination of PROs and awareness campaigns to reduce the number of free-riders.

- There is also room for further **harmonisation, simplification and better enforcement**.

As detailed in Annex XII, benefits of the WEEE 2 Directive are mainly linked to recycling that has had a positive effect on resource efficiency, depollution and CO_2 savings. For example, some extrapolations show that recycled steel in WEEE has enabled savings of 7 243 kt CO_2 eq.

In terms of **costs**, administrative, enforcement, adjustment and indirect costs were identified despite limited availability of data. It was not possible to make a specific correlation, in monetary terms, between the costs and benefits of the Directive. However, it can be stressed that administrative processes, such as producer registers and reporting, enabled the financing of management of WEEE.

As detailed in Annex XII, the main costs are the **direct compliance costs** for collection, treatment and logistics, which are borne by producers/PROs. Extrapolations based on several factors show that the average cost for collection, treatment and logistics is around EUR 1 975 per PRO per year. If the administrative costs linked to the development of annual statistics/reporting on WEEE quantities are added to that (representing EUR 474 per PRO per year on average), the total compliance costs per PRO per year would average EUR 2 449.

In terms of **administrative costs**, there are notable differences due to the national transpositions of the WEEE 2 Directive. There are also significant variations in EPR schemes across Member States, posing challenges for producers who have to understand and comply with differing obligations.

In terms of **adjustment costs**, some challenges were raised in relation to the revised classification system and the reduction from 10 to six EEE categories. There have been transitional hurdles for producers and PROs and difficulties for producers in understanding obligations, navigating registration and estimating costs. This has necessitated additional guidance from the EU.

These elements show that the Directive has likely made a successful contribution, particularly to reducing negative effects on the environment and human health and increasing recycling and recovery of secondary materials. However, it has not been successful in achieving all its objectives, in particular less generation and more collection of WEEE, and has not been cost-effective.

4.1.2. Coherence

The analysis assessing to what extent the WEEE 2 Directive was successful and why also focuses on evaluating how the various components of the Directive operate together to achieve its objectives. It considers whether there are any inconsistencies, overlaps or gaps within and between the secondary legislation[101] (internal coherence) and whether there are potential inconsistencies, overlaps or gaps with other EU and international policies (external coherence).

(a) Internal coherence

The WEEE 2 Directive appears to be well constructed, and there are no obvious contradictions or duplication within the Directive itself or with its secondary legislation. Nevertheless, a detailed analysis of certain provisions identifies some uncertainties and legislative gaps.

[101] Implementing Regulation (EU) 2017/699, Implementing Regulation (EU) 2019/290, and Implementing Decision (EU) 2019/2193.

First, in relation to **scope** (Article 2 and Annexes I and III) the main gap that was identified was the lack of a separate category for photovoltaic panels (PVs) linked to the specific characteristics of such products. As described in Annex III to this report, PVs have been classified together with consumer equipment and household appliances without taking into consideration their different characteristics both in relation to lifespan and to collection and recycling. Therefore, this classification created distortions regarding the WEEE collection achievements per category when the method used for the calculation of the collection rate is based on the quantities of EEE placed on the market. It also creates uncertainties regarding the efficiency of the recovery targets that are set per category. To eliminate the effect of this gap as soon as possible, the Commission introduced a requirement in Implementing Decision (EU) 2019/2193 for Member States to report data on PVs separately (see Annex III to this report).

Regarding the **open scope** of the WEEE 2 Directive (Article 2), as mentioned under the previous Section 4.1.1, the classification of EEE under the six open categories is less burdensome for producers and provides the flexibility to cover all EEE and to adapt to future product developments. This means that the Directive remains coherent with its objectives. However, differences in transposition of the open scope and in how Member States have interpreted it influence the achievable WEEE collection rate. For example, some Member States have interpreted the open scope as including any type of EEE, even those where electrical energy is used only for support or control functions. Such different interpretations can cause market distortions[102]. Therefore, this raises an issue of internal incoherence and an additional question on whether the **definition** of EEE (Article 3(1)(a) of the Directive) linked to the voltage rating which the EEE is designed to use is in line with the objectives of the Directive. In addition, there are challenges related to consumer perception for specific open scope products like textiles, furniture and construction products that have integrated electronic components and need electricity to fulfil their basic function. Such products may not be disposed of as WEEE because consumers do not recognise them as such. This is because historically there were different disposal pathways for such products.

In addition, the WEEE 2 Directive lacks specific provisions on the obligations of authorised representatives and of producers supplying EEE by means of distance communication and online marketplaces. The lack of detailed obligations for these specific operators creates ambiguities and different interpretations that affect the coherence of the Directive. Any future provisions targeting online marketplaces or distance sellers should be fully aligned with the DSA framework, to ensure consistency and avoid duplication of platform obligations.

[102] Source: Member States' targeted questionnaire and opinions provided by Member States through the scoping tool developed by EWRN (https://www.ewrn.org/). For example, Member States have provided different opinions on whether specific products fall within the scope of the WEEE 2 Directive, e.g. shoes or clothes with lights, jugs with an electronic indicator to determine when the filter needs replacing, furniture with some electrical equipment attached, greetings cards with batteries.

In addition, stakeholders[103] have pointed out the lack of harmonised approaches to the collection and treatment of WEEE from private households (B2C WEEE) and of WEEE from users other than private households (B2B WEEE). With the implementation of the WEEE 2 Directive, since 2016, B2B WEEE collection has counted towards the collection rate, and this waste must be collected and reported accordingly. However, the WEEE 2 Directive does not specify the requirements for B2B WEEE collection (as it does for B2C WEEE in its Article 5(2)) and therefore this waste may not be collected by PROs, it may be collected together with metal scrap or it may not be reported even if properly collected and treated. Aligning these requirements would boost clarity, reduce loopholes, and minimise instances of non-compliance of producers. This would also reduce the challenges for PROs.

Regarding the **methods used for the calculation of the WEEE collection rate** (Article 7), questions have been raised on whether the method based on the average quantity of EEE placed on the market in the three preceding years (PoM method) is consistent with the method using WEEE generated, which takes into consideration the lifespan of the different types and categories of EEE. On the one hand, the WEEE generated method uses a statistical model to estimate the WEEE generated and as such is more complex than the PoM method. On the other hand, the PoM method is simpler but relies on the market for EEE being stable/saturated. However, this assumption has not proven to be appropriate in relation to trends in renewable energy (e.g. PVs) and digitalisation. Therefore, there is no issue regarding the consistentcy between the two methods as they are designed to cover different needs and conditions.

(b) External coherence

The WEEE 2 Directive has been evaluated within the context of the objectives set by the European Green Deal and the circular economy action plan. The evaluation took into account other relevant developments in EU environmental and waste policy (e.g. on renewable energy, batteries, ecodesign for sustainable products, restriction of hazardous substances in EEE, end-of-life vehicles, waste shipments, critical raw materials) as well as international developments (e.g. the Basel Convention on the control of transboundary movements of hazardous wastes and their disposal).

The Directive is aligned with the EU strategies that support the transition to a circular economy as further elaborated in Annex IX, such as the EU Green Deal, the circular economy action plan, the chemicals strategy for sustainability, the sustainable products initiative, and the clean energy transition. It is also to a large extent consistent with other EU initiatives with similar objectives, and with relevant international agreements.

i. Waste Directive

The WEEE 2 Directive complements the Waste Directive by laying down specific obligations for the management of the specific waste stream of WEEE. Even though the WEEE 2 Directive refers to some key concepts from the Waste Directive, such as the waste

[103] Source: Various consultation activities – final stakeholder workshop, Member States' targeted workshop #1, targeted consultation with producers, PROs and their associations (see information in Annex VII to this document).

hierarchy (recital 6), it does not include specific provisions on waste prevention, for example. During the final stakeholder workshop and in the consultation with NGOs, it was noted that the WEEE 2 Directive does not deal with reuse and preparation for reuse with the same ambition as the Waste Directive. This argument was based on the fact that there is no specific target for preparation for reuse, but only a combined 'preparation for reuse and recycling' target. However, from the various stakeholder consultation activities, it is evident that the distinction between reuse and preparation for reuse may not always be feasible. Setting specific reuse targets may therefore be seen as too much intervening in the market and quite burdensome to calculate. In addition, Commission Recommendation (EU) 2023/2585 on improving the rate of return of used and waste mobile phones, tablets and laptops provides specific recommendations to Member States to incentivise both reuse and preparation for reuse of this specific group of products for which there is already a second-hand market, and one which incorporates valuable and critical raw materials. For example, the Recommendation includes financial incentives, such as discounts, vouchers, deposit-return schemes and monetary rewards targeting small consumer electronics that still work but remain lying around unused.

In addition, the Waste Directive lays down an obligation for Member States to take measures to encourage reuse as part of their waste prevention programmes, and to monitor and assess implementation of these measures by measuring reuse, including the reuse of EEE[104]. Therefore, the fact that the WEEE Directive does not include specific provisions on reuse supports the consistency between the two directives, avoiding overlap and legal uncertainty.

ii. Ecodesign Directive and the new Ecodesign for Sustainable Products Regulation

The WEEE 2 Directive shows some inconsistency with the Ecodesign Directive[105], and this remains with the new Ecodesign for Sustainable Products Regulation[106].

Article 4 of the WEEE 2 Directive, mirroring the Ecodesign Directive, requires Member States to take appropriate measures to promote the design and production of EEE with a view to facilitating reuse, dismantling and recovery of WEEE. Therefore, there is an overlap between Article 4 of the WEEE 2 Directive and the Ecodesign Directive. On the one hand, this overlap has not had any negative impact because there are no specific product design requirements in the WEEE 2 Directive. It is therefore concluded that it supports the Ecodesign Directive. On the other hand though, there is no significant added value to just referring to the Ecodesign Directive in waste legislation.

[104] Commission Implementing Decision (EU) 2021/19 of 18 December 2020 laying down a common methodology and a format for reporting on reuse in accordance with Directive 2008/98/EC of the European Parliament and of the Council (OJ L 10, 12.1.2021, p. 1).
[105] Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (OJ L 285, 31.10.2009, p. 10).
[106] Regulation (EU) 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products, amending Directive (EU) 2020/1828 and Regulation (EU) 2023/1542 and repealing Directive 2009/125/EC (OJ L, 2024/1781, 28.6.2024).

In addition, producers of EEE strongly support the principle that product design should be regulated exclusively under the new ESPR and that the WEEE 2 Directive should focus on the end-of-life stage of EEE. By contrast, other stakeholders argue that product design and end-of-life aspects are interrelated and should work together. They still consider it relevant to have cross-cutting ecodesign requirements in the WEEE 2 Directive (making certain components and materials removeable, ensuring products can be dismantled, and using recycled materials). However, the ESPR empowers the Commission to adopt horizontal ecodesign requirements for multiple products (including EEE) in one delegated act, for instance on the above-mentioned elements. As the WEEE 2 Directive does not contain specific requirements for recycled content, the ESPR can cover this need.

iii. Critical Raw Materials Act[107]

The WEEE 2 Directive helps to foster the recovery of valuable materials, including CRMs, from discarded electronics. However, the recovery of CRMs is currently low, as the WEEE 2 Directive (Annex V on minimum recovery targets) does not specify which CRM-relevant components are to be separated, and CRMs recovered may not be reported separately. This inconsistency is addressed by the CRM Act, which first instructs the Commission to adopt implementing acts specifying a list of products, components and waste streams with relevant critical raw material recovery potential (Article 26(7)). The Act then instructs Member States to report data on the quantities of components containing relevant amounts of CRMs removed from WEEE and the quantities of CRMs recovered from such equipment (Article 26(5)).

The CRM Communication staff working document also states that the Commission will harmonise waste management rules for certain waste streams with significant CRM recovery potential and assess the integration of additional CRM-rich products, such as wind turbines, into EU waste legislation. The CRM Act also contains provisions on recycling permanent magnets contained in WEEE (Article 28).

In the focused consultation activities, producers of EEE noted that the recycling capacity targets set out in the CRM Act are not reflected in the WEEE Directive, although WEEE will play a significant role in recovering CRMs.

iv. Batteries Directive and the new Batteries Regulation

The evaluation of the Batteries Directive[108] stated that it had a big potential overlap with the WEEE 2 Directive, in particular for the management on the ground of WEEE that incorporates batteries. The new Batteries Regulation therefore covers batteries incorporated into EEE and provides the possibility for batteries to be collected together with WEEE. It sets out a clear distinction of EPR responsibilities: dismantling batteries incorporated into WEEE and storage in WEEE facilities are covered by the WEEE Directive, and recycling and treatment of batteries are covered by the new Batteries

[107] Regulation (EU) 2024/1252 of the European Parliament and of the Council of 11 April 2024 establishing a framework for ensuring a secure and sustainable supply of critical raw materials (OJ L, 2024/1252, 3.5.2024).
[108] Commission Staff Working Document on the evaluation of the Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators (SWD(2019) 1300 final, 9.4.2019).

Regulation. This ensures a coherent and complementary approach, building upon and further harmonising existing waste management structures.

In addition, the new Batteries Regulation brought improvements aimed at harmonising the two pieces of legislation managing WEEE and batteries. For example, the definition of the term 'producer' was adapted to align it with the WEEE Directive, and a specific definition of 'authorised representative' as it is understood under the WEEE 2 Directive was added. The new Batteries Regulation has developed a concept for online platforms based on the Digital Services Act which could inform the WEEE legislation, particularly regarding platform responsibilities and traceability obligations.

v. End-of-Life Vehicles Directive – proposal for an ELV Regulation

The ELV Directive[109] and the WEEE 2 Directive are generally consistent. However, some issues have been identified, in particular related to their scope. The WEEE 2 Directive excludes from its scope: (a) means of transport for persons or goods, except for electric two-wheel vehicles which are not type-approved (i.e. light means of transport such as e-bikes and e-scooters)[110]; and (b) equipment which is specifically designed and installed as part of a vehicle[111] and can fulfil its function only if it is part of the vehicle (i.e. electronics designed to be integrated into cars). Therefore, both the existing ELV Directive and the new proposed regulation on ELV complement the WEEE 2 Directive.

Additionally, Member States[112] have claimed that there is uncertainty as to whether the WEEE 2 Directive or the ELV Directive applies to electronics in ELVs (such as car keys, vehicle navigation equipment, junction boxes, wire harnesses, seat mechatronics[113]). With increasing technical developments leading to more electronics in vehicles, this ambiguity is expected to grow. To address this issue, the Commission proposal for an ELV Regulation proposes removed car electronics (as described in Annex VII, Part C – entries 10, 11, 12, 19) to be subject to treatment requirements in accordance with the WEEE Directive, i.e. they should be recycled as electronics.

vi. RoHS/REACH/POPs/other chemicals-related legislation

Annex VII to the WEEE 2 Directive sets out the hazardous substances and components that must be removed when treating WEEE. It fosters synergies with legislation such as the RoHS Directive, the POPs Regulation, REACH, the Mercury Regulation, the F-Gas Regulation and the Ozone-Depleting Substances Regulation.

The **RoHS** Directive[114] sets out the rules for the restriction of hazardous substances in all EEE. There are some differences in the scope of these two directives, which may create

[109] Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles - Commission Statements (OJ L 269, 21.10.2000, p. 34).
[110] Pursuant to Article 2(4)(d) of the WEEE 2 Directive.
[111] Pursuant to Article 2(3)(b) of the WEEE 2 Directive.
[112] According to Member State replies to targeted questionnaire.
[113] Eco-Design of Automotive Electrical and Electronic System – The SEES Project, Technische Universitaet Berlin et al.
[114] Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast) (OJ L 174, 1.7.2011, p. 88).

challenges for producers and authorities. In particular, the RoHS Directive applies to EEE that is dependent on electric currents or electromagnetic fields to fulfil at least one intended function, while the WEEE 2 Directive applies to EEE that is dependent on electric currents or electromagnetic fields to fulfil its basic function[115]. Therefore, some EEE that falls within the scope of the RoHS Directive may still be outside the scope of the WEEE Directive. If a product falls within the scope of the RoHS Directive, it will not contain certain hazardous substances, ensuring that even if the product is not collected separately (as it does not fall within the scope of the WEEE Directive), there will be no hazardous substances in it to cause pollution.

The **POPs Regulation**[116] prohibits the manufacturing and use of certain industrial chemicals and unintentionally produced chemicals, and also sets limits for quantities of these substances in waste. For example, WEEE plastics containing brominated flame retardants[117] need to be sorted to avoid a concentration in the recycled material exceeding the limit value in Annex IV to the POPs Regulation. Lowering these limit values influences the recycling of such plastics, leading also to their disposal or incineration. Recyclers of WEEE stated during the targeted workshop that there is a difficult contradiction between the limit values in the POPs Regulation and the requirements to achieve high recycling rates. Plastic sorting practices have always varied greatly between Member States, and stricter POPs limit values make plastic sorting even more challenging, including from a technological perspective.

The **REACH** Regulation[118] applies to all substances on their own, in mixtures or in articles, including substances in EEE within the scope of the WEEE 2 Directive. It aims to ensure that the risks presented by substances are adequately controlled throughout their whole life cycle, including in the waste stream. Therefore, the two pieces of legislation complement each other.

Legislation dealing with **chemical restrictions**, such as the POPs Regulation, F-Gas Regulation, ODS Regulation and Mercury Regulation, complements the WEEE 2 Directive. However, a more explicit reference to the WEEE legislation would create clearer links between the legal acts.

vii. WEEE classification: the 'list of waste', the Waste Shipment Regulation (WSR) and the Waste Statistics Regulation (WStR)

[115] Explanation is provided in the frequently asked questions on the WEEE 2 Directive.
[116] Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (recast) (OJ L 169 25.6.2019, p. 45).
[117] Polybrominated diphenyl ethers (PBDEs): tetraBDE, pentaBDE, hexaBDE, heptaBDE, decaBDE.
[118] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency (OJ L 396 30.12.2006, p. 1).

The categories of WEEE used by the WEEE 2 Directive, the WSR[119] and the WStR[120] are inconsistent, which increases the risks of misreporting and prevents data from being combined and compared.

The list of waste (LoW) includes codes related to WEEE, but there are no specific waste codes for all components that must be separated from WEEE collected in accordance with Annex VII to the WEEE 2 Directive. Annex III to the WStR provides a table of equivalence with the LoW codes. It is considered an issue of inconsistency that specific components must be removed from WEEE and treated separately but cannot be assigned a specific waste code and therefore cannot be fed into waste statistics at this level of detail.

4.2. How did the EU intervention make a difference?

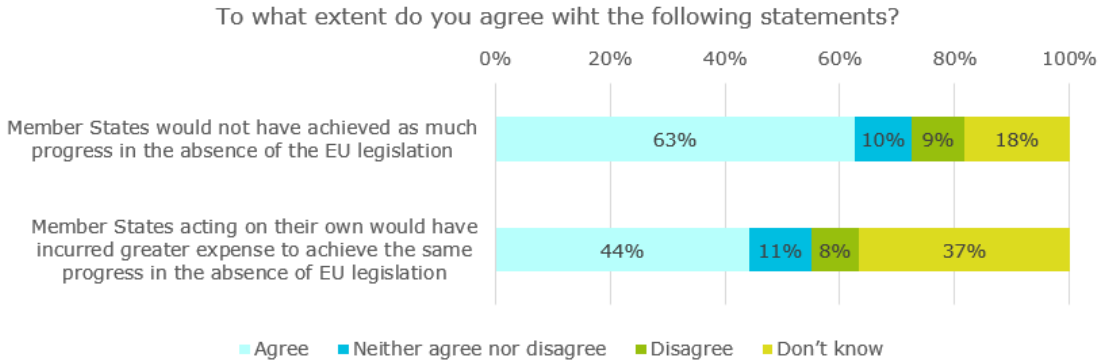
EU added value resulting from the WEEE 2 Directive

The vast majority (95%) of stakeholders from all groups who responded to the public consultation recognise the advantages of having WEEE legislation at EU level.

For example, as presented in Figure 20, more than half of respondents from industry, the majority from civil society and all respondents from public authorities agree that Member States would not have achieved as much progress in relation to the management of WEEE without the EU legislation. This feedback underscores the perceived added value of the Directive in promoting adequate WEEE management across the EU.

Furthermore, almost half of respondents from industry and some from civil society (12 out of 39) agree that Member States acting on their own would have incurred greater expense to achieve the same progress without EU legislation. It is generally agreed that legislation at EU level is necessary to ensure a level playing field.

Figure 20: Responses to the open public consultation in relation to EU added value



Source: Evaluation study.

The analysis of the feedback received from various stakeholders concludes that the environmental problems addressed by the WEEE 2 Directive are still relevant today.

[119] Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (OJ L 190, 12.7.2006, p. 1).
[120] Regulation (EC) No 2150/2002 of the European Parliament and of the Council of 25 November 2002 on waste statistics (OJ L 332, 09/12/2002, p. 1).

Action at EU level continues to be pertinent in the light of not only of the problems but also the measures that were proposed to address them.

The most likely consequences of withdrawing the existing EU intervention would be diverging legal developments over time and further fragmentation between Member States.

In the absence of EU targets and minimum rules for the collection and treatment of WEEE, as well as EU rules on producer responsibility, there is a risk that different levels of environmental protection would emerge across the EU over time. Different national rules for placing EEE on the market could affect the functioning of the EU single market and reduce WEEE collection. This would lead to lower rates of recycling and recovery of valuable and critical raw materials, hampering the efforts of the EU to secure strategic autonomy for such materials.

The WEEE 2 Directive complies with the principles of subsidiarity and proportionality

Overall, the WEEE 2 Directive demonstrates compliance with the principles of subsidiarity and proportionality. It promotes harmonisation of WEEE management practices, sets achievable targets and assigns responsibility to producers, while leaving room to Member States for flexibility, in particular regarding EPR schemes and innovation.

Due to divergent waste management policies and practices among Member States, there is a clear and persistent need to set minimum requirements for WEEE management at EU level to ensure a consistent level of environmental protection and resource recovery across the EU.

Similarly, and in compliance with the subsidiarity principle, the WEEE 2 Directive sets common targets for the collection and recycling of WEEE. It therefore prevents a situation where some countries might have less strict WEEE management practices that could negatively affect other countries.

In addition, and in line with the 'polluter pays' principle, the Directive puts the responsibility for financing the collection and recycling of WEEE on producers of EEE (EPR principle). This approach has fostered a culture of corporate accountability and environmental stewardship, while leaving room for Member States to set up the EPR schemes in a way that is as efficient as possible, taking into consideration national conditions and needs.

4.3. Is the intervention still relevant?

The Directive's primary objectives continue to be relevant given: (i) the significant growth and technological developments in the EEE market; (ii) the presence of valuable and critical raw materials in such equipment; and (iii) the proportion of WEEE that is still not properly collected and treated. This conclusion is shared by stakeholders from all groups.

The use of EEE is unavoidable nowadays, and the market is expected to continue to grow significantly to meet demand. To achieve its objectives, the WEEE 2 Directive: (i)

prohibits the disposal of collected WEEE that has not undergone proper treatment; and (ii) imposes obligations and sets targets for collecting and recycling WEEE.

Current and foreseeable future needs and problems

Data on trends in WEEE generation show a constant increase. In 2021, 19.6 kg/person of WEEE was generated in the EU compared with 15.6 kg/person in 2014[121]. WEEE collection in the EU increased significantly between 2012 and 2020, from 6.7 to 10.5 kg/person. However, as presented in Chapter 3, most Member States still do not reach the collection target set in Article 7 of the Directive.

The figures above show that the overall WEEE recycling rate remained stable from 2012 to 2020. Prevention efforts showed little success, and stakeholders from all groups therefore agree that the objectives of the WEEE 2 Directive require overall alignment with the objectives of the Waste Directive and its **waste hierarchy**. The first priority in that hierarchy is the prevention or reduction of WEEE. Increasing collection and recycling rates for electronic waste from the current rate of less than 40% is also crucial for reducing the environmental impact and securing valuable secondary raw materials.

Regarding the **scope** of the WEEE 2 Directive, it was found that there is a need for clarification and refinement. This particularly applies to the open scope and to new products placed on the market that have electrical and electronic functions but which traditionally were not considered to be EEE, e.g. smart textiles, wearables and furniture. As was stated at the Member States expert group meeting and the final stakeholder workshop, such product groups are not specifically addressed in the EEE categories set out in the WEEE 2 Directive and largely not collected as WEEE, partially because consumers are unaware of their specific characteristics. They are commonly disposed of via the 'classic', established disposal path for relevant waste, e.g. smart furniture via bulky waste collection or smart textiles via textile waste collection.

This issue brings up a more general issue related to the question of whether the **definition of EEE**[122] is still relevant and can sufficiently address the foreseeable future needs, for example, related to **renewable energy technologies**.

Furthermore, in relation to the **categories of electrical and electronic equipment**, it emerged from various stakeholder consultation activities[123] that the current six categories, which are based on the product type and size, do not take into consideration the product lifetime, the material composition of the EEE, the processes applied for the treatment of WEEE, and possible hazards to the environment and human health during the WEEE

[121] Habib, H., Wagner, M., Baldé, CP., Herreras Martínez, L., Huisman, J. and Dewulf, J. (2022) What gets measured gets managed – does it? Uncovering the waste electrical and electronic equipment flows in the European Union. *Resources, Conservation and Recycling* 181, 106222.

[122] According to the definition set out in Article 3(1)(a) of the WEEE 2 Directive, EEE refers to equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields and designed for use with a voltage rating not exceeding 1 000 volts for alternating current and 1 500 volts for direct current. Guidance is provided in the WEEE frequently asked questions under question 4.1. to clarify that 'dependent on electric currents or electromagnetic fields in order to work properly' means that the equipment needs electric currents or electromagnetic fields to fulfil its basic function.

[123] See Annex VII to this report.

treatment process or if the WEEE is not treated properly. However, changes to the categories would place an additional administrative and financial burden on national authorities and stakeholders, who would need to adjust the classification system accordingly.

To ensure the **circular economy**, there is a need to increase WEEE collection, recycling and material recovery and ensure that secondary materials are used again to produce electrical and electronic equipment. This is also in line with the policy objectives defined in:

- the circular economy action plan[124], which prioritises electronics and ICT as a key product value chain, where the potential for improved circularity is high; it also specifically mentions the need to improve the collection and treatment of WEEE;
- the Commission's Communication on a secure and sustainable supply of CRMs[125], which states that it will 'review the [WEEE] Directive to, inter alia, address CRM-rich equipment in provisions relating to information requirements and recovery targets';
- the Circular Economy Act (CEA), which was announced in Commission President Ursula von der Leyen's political guidelines of 18 July 2024[126] to 'contribute to creating market demand for secondary materials and a single market for waste' and thereby result in 'a more circular and resilient economy'; in the President's speech on the confirmation of the new College of 27 November 2024, she asserted that 'developing a competitive circular economy' is part of what is 'crucial to give us more independence. We have paid the price for putting our future in the hands of a single supplier. And we will not make the same mistake again. European sovereignty is not for sale'.

The current **collection and recovery targets** of the WEEE Directive are not considered to be sufficient or appropriate to implement a circular economy model within the EU and to contribute significantly to creating a market for secondary raw materials for the reasons described below.

- The general **WEEE collection** target does not prioritise the collection of specific categories of WEEE that are rich in valuable or critical raw materials[127] and have significant value for the economy.
- The method for the calculation of **recovery targets** does not consider the efficiency of the recycling process, and the targets therefore do not foster high-quality recycling or the recovery of CRMs and other materials contained in small volumes in WEEE. Moreover, deficiencies in sorting and handling waste further hamper the retrieval of

[124] A new Circular Economy Action Plan For a cleaner and more competitive Europe': EUR-Lex - 52020DC0098 - EN - EUR-Lex (europa.eu).
[125] Communication 'A secure and sustainable supply of critical raw materials in support of the twin transition': EUR-Lex - 52023DC0165 - EN - EUR-Lex (europa.eu).
[126] Europe's choice – Political guidelines for the next European Commission 2024-2029: e6cd4328-673c-4e7a-8683-f63ffb2cf648_en.
[127] https://www.sciencedirect.com/science/article/pii/S0921344920300938?via%253Dihub.

valuable materials from WEEE. In addition, the combined targets for preparation for reuse and recycling do not provide enough incentive to prioritise preparation for reuse over recycling and therefore to contribute to resource efficiency by prolonging the life of a product. However, no robust conclusion can be drawn on whether promoting preparation for reuse leads to increased exports of EEE for reuse and therefore considerable CRM losses from the EU[128].

Regarding **recycled content**, the proportion of secondary materials used in EEE or otherwise brought back into the economy is usually unknown, very low or limited to certain product categories or even individual models within a product category. For example, in 2021 around 4.5% of secondary plastics were used for the production of new EEE; that percentage was 3.5% in 2019 and 3.2% in 2017[129]. The ESPR provides the framework for setting out ecodesign requirements for products, including recycled content for materials in EEE. Article 29 of the CRM Actlays down rules on the recycled content of permanent magnets, which are also contained in EEE, contributing to the creation of a market for secondary raw materials.

The WEEE 2 Directive does not specify treatment requirements for all hazardous substances in WEEE and does not include sufficient requirements to ensure a **high quality of recycling** that could also support creating a market for secondary raw materials. Over the period of the implementation of the WEEE 2 Directive, progress has been made on the environmentally sound handling and proper treatment of WEEE. Overall, sufficient capacity has been built up with more than 2 700 WEEE treatment facilities operating in the EU to date. However, as only about 23% of these facilities (630 facilities) implement high-quality standards for WEEE treatment, there is still significant potential for improving the quality of recycling to contribute to the retrieval of valuable secondary raw materials, including CRMs.

New and future challenges and development

In relation to **renewable energy policy objectives**, the WEEE 2 Directive currently does not sufficiently address the needs arising from the expected trends in the use of PV panels and other technologies, such as heat pumps, wind turbines or solar thermal collectors. Taking the example of PV panels, the absence of a distinct category makes it impossible to trace and monitor the actual flows of waste PV panels collected and treated and the quantities of secondary materials produced from such waste. In addition, there are no binding minimum treatment requirements for PV panels in the WEEE Directive that would address the potential waste management hazards (e.g. hazardous substances).

The analysis indicates that the WEEE 2 Directive does not sufficiently address the needs arising from further **digitalisation** in the context of the EU's digital strategy. In particular, the trend of persuasive electronics and their seamless integration into non-electronic

[128] CRMs contained in the 0.6 Mt of used goods exported (2020 estimate) will be lost in terms of secondary raw materials that could have been recovered in the EU (Source: Study supporting the evaluation of the WEEE 2 Directive).

[129] Conversio (2018). Stoffstrombild Kunststoffe in Deutschland 2017. URL: https://www.bvse.de/images/news/Kunststoff/2018/181011_Kurzfassung_Stoffstrombild_2017.pdf (last accessed: 15.7.2023).

products can cause problems for separate collection and WEEE treatment practices. These types of product are most commonly still seen as non-electronics by end users and treated as such.

The analysis has also shown that the needs resulting from the increase in **online sales** are not sufficiently addressed in the WEEE 2 Directive. In particular, the problem of non-compliant producers ('free-riders') is undermining the current system and the EPR schemes in place. No common approach has been implemented across Member States to successfully tackle this issue. Some Member States, like France and Germany, have laid down rules in their national legislation to impose specific obligations on online platforms, while Denmark has introduced a whistle-blower functionality that companies can use to report suspicious products.

In addition, the schemes set up under the WEEE 2 Directive have developed specific collection and recycling flows to ensure the proper treatment of the increasing quantities of electronic waste generated because of growing consumption and digitalisation, including waste from data centres. However, an issue that remains in relation to reuse and preparation for reuse of consumer electronics is that of **data security**. To address data security concerns and ensure that all personal data stored in small consumer electronics is managed and deleted correctly for any subsequent reuse or recovery operation, some take-back schemes are certified as meeting certain data handling standards. Commission Recommendation (EU) 2023/2585 on improving the rate of return of used and waste mobile phones, tablets and laptops[130] addresses this issue and proposes that operators of take-back schemes use certification schemes that ensure all personal data stored in small consumer electronics is managed and deleted properly, and that they inform their customers about this service.

Digitalisation also supported the implementation of the WEEE Directive with regard to information exchange via **online platforms**. A concrete example is the development of the Information for Recyclers (I4R) platform, initiated by producers to comply with the requirements in Article 15 of the WEEE 2 Directive to exchange information with recyclers on WEEE composition. The ESPR identifies a digital product passport (DPP) as key, improving the traceability of products and their components. The DPP would provide information on how the various components can be recycled at end of life and therefore synergies could develop between the I4R platform and the DPP.

Technological and scientific advances

From the various stakeholder consultation activities, there is evidence that the Directive is not flexible enough for technological and scientific advances as described below.

- **New EEE technologies** result in modified WEEE streams with different material compositions. Such products include electronic disposable cigarettes and vapes and other single use EEE, micro-EEE, EEE in furniture and textiles, wearables, 'gadgets'

[130] OJ L, 2023/2585, 20.11.2023.

and products containing active RFIDs They are not sufficiently considered under the EEE categories, while specific treatment requirements may also be needed.

- The **depollution** requirements of the Directive (in particular Annex VII) are not regularly adjusted to technical developments and to the ongoing developments regarding the identification/regulation of new substances of concern under chemicals legislation (REACH, RoHS Directive, POPs Regulation).

- The depollution requirements do not sufficiently reflect the fact that WEEE treatment today is increasingly done by **automated shredding/sorting processes** (as opposed to manual dismantling).

No obsolete provisions in the WEEE 2 Directive

Overall, no obsolete provisions were identified in the WEEE 2 Directive. In the light of the ESPR, Article 4 on product design and some provisions of Articles 14 and 15 on information for users and treatment facilities may need to be further considered as they may become obsolete.

5. WHAT ARE THE CONCLUSIONS AND LESSONS LEARNT?

5.1. Conclusions

This section outlines the main conclusions drawn from the evaluation, focusing on the period 2012-2023 but including more recent developments. The main areas where challenges were identified have been highlighted, along with suggestions for improvement.

The evaluation highlighted that the WEEE 2 Directive has not achieved all its objectives. Costs for its implementation vary significantly among those involved, and national differences add to the overall administrative burden. The Directive is internally coherent but is not always aligned with other EU legislation and strategies. Although areas for improvement are identified, the Directive is still considered to bring unambiguous added value compared to what Member States could have achieved acting independently.

The main data gaps identified concern: (i) the impact on the environment and human health; (ii) economic aspects, such as compliance and enforcement costs and indirect benefits like increased economic activity and employment in the WEEE management sector; and (iii) technological and market trends (e.g. impact of digitalisation on the WEEE sector and the integration of secondary raw materials in new product manufacturing). Combining a literature review, statistical data and stakeholder input with qualitative and quantitative methods to cross-check findings ensured a comprehensive analysis. Despite the data gaps identified, the evaluation conclusions are deemed sufficiently reliable based on the triangulation of data from multiple sources. Stakeholder feedback often supported the conclusions drawn from literature and statistical data, boosting the robustness of the analysis. However, it is concluded that modelling for important data in the area of WEEE is missing and must be developed.

a. Effectiveness

Member States and stakeholders (e.g. PROs, retailers, municipalities) have made significant efforts to increase **WEEE collection** volumes.

However, only three Member States managed to reach the higher 2019 collection targets (65% of EEE placed on the market), with 24 Member States maintaining a stable collection rate close to that achieved in 2016 (average collection rate of 54% achieved in the EU).

Due to this non-achievement of collection targets, the Commission decided in July 2024 to open an infringement procedure against the 24 Member States. The factors hindering Member States from reaching the collection targets include, presumably in this order: (i) economic reasons (as secure collection and storage may entail significant costs); (ii) economic interests of illegal actors (scavenging, shipments to non-EU countries) and insufficient enforcement; (iii) deficiencies in the collection infrastructure, in particular in rural areas; and (iv) a persisting lack of environmental awareness among the general public. Member States also stressed that the calculation methodology based on WEEE placed on a constantly growing market rather than a stable one and the inconsistent interpretation of the scope of the WEEE Directive are also hindering factors. Consequently, large amounts (46%) of the WEEE generated are still not collected separately. This WEEE is illegally

exported (5%), ends up in metal scrap (14%) or residual waste bins (8%), is exported for reuse (5%), or there is no information about it (14%). Cumulatively, this represents a substantive loss of potential secondary raw materials, **includingCRMs**. As the main challenges regarding WEEE collection remain, the discernible conclusion is that the WEEE 2 Directive has not been sufficiently effective.

Regarding **WEEE recycling and recovery**, there was an increase of about 70% in the total WEEE recovered by weight between 2012 and 2021. However, this is mainly linked to the increase in WEEE collection and in EEE placed on the market. The WEEE 2 Directive had little effect on recycling and recovery, including ofCRMs, as well as on diverting WEEE from landfill and incineration. On average, 40% of WEEE is recycled in the EU. If the recycling rate were based on the output of the recycling plants, this rate would be even lower. Recycling remains crucial for protecting the environment and human health and securing valuable secondary raw materials. Ultimately, the **current input-based, non-material specific recycling targets do not encourage the recovery of secondary raw materials, which also entails a loss of potential secondary CRMs**. The rate of recovery of such materials from WEEE largely depends on the recovery method and on the value of the raw materials.

In relation to **EPR**, the WEEE 2 Directive has not been effective in ensuring that all producers fulfil their obligations, in particular online sellers. However, the WEEE 2 Directive brought some positive effects on the performance of all operators and on reducing administration. The Directive has made a successful contribution to awareness raising, knowledge transfer and cooperation within the WEEE sector. The resulting communication chain has promoted the exchange of information across the value chain and among public authorities.

Over the evaluation period of the WEEE 2 Directive, progress has been made on the environmentally sound handling and proper **treatment of WEEE**. However, only about 23% of recycling facilities implement high-quality standards for the treatment of WEEE. Standards are voluntary, and only six Member States have made them mandatory through their national legislation, while another four Member States have introduced specific parts of the standards in their national legislation. This has resulted in disparities in WEEE treatment practices among Member States. Although there has been some progress on the number of facilities working according to the European standards since 2019-2020, it is not likely that the standards will be implemented throughout the EU without further EU action. There is still significant potential to improve the quality of recycling, mainly to contribute to the retrieval of considerable volumes of valuable secondary raw materials, including CRMs.

b. Efficiency

Analysing costs and benefits within the context of the WEEE 2 Directive has been a challenging task due to the **limited availability of comprehensive data**. Information on costs is not always available, mainly due to a lack of data from Member States and PROs, to differences in implementation and to confidentiality issues linked to competition among producers/PROs. As a result, the proposed answers to the evaluation questions are based

on the best available qualitative and indicative evidence. They do not result from a solid quantitative assessment, which would have required a more robust econometric analysis to control for other driving factors.

A dedicated exercise to collect representative data from Member States and PROs could help to address this issue (e.g. targeted questionnaires with sufficient dedicated resources to collect and analyse them). For some specific issues, such as administrative or enforcement costs, only a few and sometimes even only one reference point was available, which does limit the validity of an extrapolation at EU level. More reference points and case studies would need to be identified through such dedicated exercises to allow a statistically sound extrapolation of a great variety of costs associated with the WEEE 2 Directive. The main costs are the direct compliance costs for collection, treatment and logistics, which are borne by producers/PROs. When it comes to the confidentiality issue for PROs, a system would need to be set up to anonymise and/or aggregate the data from producers at national level through PROs.

Based on the available reference points, case studies, EPR fees for collection, transport and treatment of WEEE and several other factors, extrapolations in Annex XII show that the average costs for collection, treatment and logistics per PRO per year are around EUR 1 975. If the administrative costs linked to the development of statistics/reporting on WEEE quantities per year are added to that, the total average compliance costs per PRO per year are EUR 2 449. Concluding to what extent the compliance costs are fully covered by the EPR fees or other market-based instruments, such as taxes or municipal fees, would require more intensive data collection. It is likely that costs incurred are passed on to the public through product costs, taxes or municipal fees.

In addition, the administrative burden calculator shows in Annex XIII that the WEEE Directive 2 has resulted in simplification and reduced administrative burden. Harmonisation of the format for registration represents costs savings of EUR 3 863 100 per year for producers, including SMEs. In addition, harmonisation of the format for reporting represents savings of EUR 7 335 000 per year for producers, including SMEs.

In terms of benefits, the WEEE 2 Directive had a positive effect on CO_2 savings, resource efficiency and depollution. It is difficult to carry out a quantitative analysis of the benefits due to the lack of available data. However, based on extrapolation from virgin materials and other waste streams, Annex XII shows CO_2 eq savings in kilotonnes (kt) for various materials in total recycled WEEE. Recycled steel in WEEE enabled 7 243 kt CO_2 eq savings, recycled aluminium 2 870 kt CO_2 eq, recycled copper 1 405 kt CO_2 eq, plastics 2 030 kt CO_2 eq, palladium 391 kt CO_2 eq and glass 285 kt CO_2 eq. Increasing the collection and proper treatment of WEEE is also essential to reduce the release of hazardous substances and to recover valuable materials, which would reduce the demand for primary resources.

European standards for the treatment of WEEE (EN 50625 series standards) are crucial for harmonising practices across Member States and ensuring high levels of depollution and recycling. Furthermore, the WEEE Directive contributes significantly to achieving several

UN Sustainable Development Goals, particularly those related to environmental protection, health and economic growth.

c. Coherence

The WEEE 2 Directive appears to be internally coherent and has no contradiction or duplication within its secondary legislation. However, uncertainties and legislative gaps have been identified in relation to the definition of EEE, the lack of specific obligations for 'producers supplying EEE by means of distance communication' and online intermediaries. The lack of a separate category for photovoltaic panels (PVs) is also considered to be a gap.

The WEEE 2 Directive is also to a large extent consistent with other EU initiatives with similar objectives (e.g. the Batteries Regulation, , the ELV Directive and the proposal for an ELV regulation, the RoHS Directive) and with relevant international agreements.

Some points of inconsistency with other EU initiatives have been identified. Article 4 of the WEEE Directive is incoherent with the Ecodesign Directive, incoherence which remains with the new ESPR. In addition, in terms of coherence with EU policy on CRMs, the current provisions of the WEEE 2 directive are not sufficient for a circular economy and a green transition. More reuse and recycling of CRMs is required for waste from EEE and renewable energy technologies.

d. Relevance

Given that the amount of EEE placed on the market in the EU grew by around 80% in less than 10 years, the objectives of the WEEE 2 Directive are still relevant and still correspond to the current and future needs within the EU. The two main types of measure set out in the Directive (the collection and recovery targets) are not sufficient to: (i) address the environmental concerns linked to WEEE management and the related design of EEE; or (ii) significantly support implementing a circular economy model and the creating a market for secondary raw materials. Most Member States have not achieved the collection targets, and the recovery targets are not appropriate to ensure a high quality of recycling and the retrieval of valuable and critical raw materials. To address these shortcomings, synergies and appropriate sequencing between the WEEE Directive, the ESPR and the CRM Act – and their related secondary acts – are very important. They can significantly contribute to creating such a market, particularly through better recycling efficiency and recovery of CRMscoupled with EEE design measures. This is in line with wider EU policy goals and priorities, as set out in the forthcoming Circular Economy Act focusing on 'getting the economics right', echoing the arguments developed in the Letta[131] and Draghi[132] reports.

Developments in the policy areas of sustainable production, digitalisation, renewable energy, resource efficiency and CRMs in particular require WEEE policy to adapt to the new circumstances. Even though the WEEE 2 Directive provides for its adaptation to

[131] Enrico Letta - Much more than a market (April 2024).
[132] EU competitiveness: Looking ahead - European Commission.

technological and scientific advances, in practice it has been difficult to incorporate such changes, which also affect depollution and treatment conditions. The current system of EEE classification is still relevant overall. However, it is evident that photovoltaic panels need to form a category on their own (in relation to lifespan, collection and recycling). Other renewable energy equipment with upcoming waste streams in the EU, such as wind turbines, could also be included in the scope, and further assessment of the composition of EEE under each category could be considered.

e. EU added value

The WEEE 2 Directive complies with the principles of subsidiarity and proportionality. As the environmental problems addressed by the WEEE 2 Directive are still relevant today, action at EU level continues to be pertinent. This applies in particular to the regulation of the conditions for producer responsibility, harmonised reporting requirements, and WEEE collection and recycling.

5.2. Lessons learnt

The evaluation stressed that the four major shortcomings of the WEEE 2 Directive were related to the suboptimal collection of WEEE and recovery of CRMs, and a lack of harmonisation of EPR schemes and treatment requirements. This section aims to provide insights for future policymaking.

Definition of EEE

There have been different interpretations of the definition of EEE, and therefore of the EEE falling within the scope of the WEEE 2 Directive, either by Member States or by producers. This has created distortions related to the achievement of the WEEE collection targets and affected the comparability of relevant data. In addition, the definition of EEE being limited to equipment operating under a specific voltage rating restricts the scope and does not sufficiently address future needs related to green and digital policies, such as any type of renewable energy equipment. Therefore, there is a need to reassess the scope by also reassessing the definition of EEE and the possibility to provide additional guidance to harmonise implementation.

Better defining scope – categorisation

The inclusion of photovoltaic panels in the scope of the WEEE 2 Directive from its entry into force was necessary to ensure environmental benefits for upcoming new, CRM-rich waste streams from renewable energy technologies. However, their inclusion in the existing EEE categories has distorted the calculation of collection and recycling rates. Other renewable energy technologies, such as wind turbines, will also become new waste streams in the next decade. Similarly, several challenges are encountered in relation to the collection categories for emerging new products which incorporate electronics. In addition, the categorisation allowed for some ‘compensation’ between categories to achieve the collection target. The EEE categorisation would therefore benefit from a separate category for photovoltaic panels and other renewable energy equipment and from more nuanced categorisation that considers the material composition of EEE product groups, collection methods and applied treatment processes. This would contribute to the circular economy

and zero pollution by enabling more targeted collection, dismantling, sorting and recovery of secondary raw materials, including critical ones, since low collection rates of some WEEE categories imply a high loss ofCRMs.

Making extended producer responsibility fit for purpose

Wide differences were observed in the implementation of the EPR schemes across the EU. There are currently no harmonised requirements for what EPR fees cover in detail and how revenues are considered.

Due to the different reporting and registration procedures, producers are currently required to work with multiple bodies and use different reporting formats depending on PROs and national registers' requirements. Opportunities for simplification lie in further harmonising formats for reporting to PROs, improving information availability, ensuring transparency in registration databases, and fostering coordination between national registers.

There are even more difficulties in complying with the WEEE 2 Directive requirements for producers operating in a different Member State, placing EEE on the market of various Member States, or established in a non-EU country. The aim of providing producers with the possibility to appoint an authorised representative was to reduce barriers to the proper functioning of the internal market and administrative burdens, but this was not fully achieved in practice because the requirements for appointing an authorised representative vary among Member States. Additional opportunities for simplification and cost reduction lie in reforming the authorised representative system to clarify roles, responsibilities and procedures.

Increasing and improving WEEE collection

Despite efforts from all those involved in WEEE (in administration, financing, infrastructure, awareness raising, etc.), most Member States have not met the 2019 collection targets. In that context, new approaches are necessary to provide incentives to increase WEEE collection, to draw up relevant methodology and to refine the responsibilities of producers. It is also important that the obligations of all those involved are clear and that all WEEE, including B2B WEEE, is properly collected and treated. In addition, there is a need to improve the situation with illegal shipments and dumping of WEEE. The success factors or practices that can help Member States to achieve a higher collection rate include:

- developing consumer-friendly systems for WEEE return and incentives to consumers to increase the rate of return both of used EEE and of WEEE;
- involving retailers in the WEEE collection infrastructure, introducing different methods of collection, including door-to-door collection for specific categories of WEEE;
- raising consumer awareness / investing in awareness campaigns;
- providing specific WEEE collection and financial incentives for those involved in WEEE management to achieve high collection volumes;
- enabling close cooperation between stakeholders (authorities, producers, treatment operators, etc.), in particular, through a formal platform.

Developing a secondary raw material market

Currently, the combined target for preparation for reuse and recycling has not contributed significantly to increasing preparation for reuse over recycling and therefore to waste prevention as well. It is important to further strengthen the concept of the waste hierarchy, which promotes waste prevention, preparation for reuse, recycling and recovery of materials in that order, in line with the Waste Directive. Also, the WEEE 2 Directive does not deliver data on the quantities of secondary materials, including CRMs, retrieved from WEEE. Such materials are crucial for the EU market. Furthermore, the Directive does not incentivise the recovery of secondary and critical raw materials because of the current input-based overall recycling/recovery rates, which do not encourage high levels of material recycling. Therefore, reassessing the recovery targets is necessary to support the current needs. The difference between recycling and recovery, the latter including energy recovery, i.e. incineration, should also be taken into account.

Finally, certain important factors for WEEE management will emerge from the evolution of legislation, notably the Ecodesign for Sustainable Products Regulation (ESPR) and the CRM . The possibility to introduce specific design product requirements under the ESPR would significantly contribute to achieving the circular economy model. In any case, the link between the ESPR as product legislation for EEE and the WEEE Directive as waste legislation for WEEE should be clear, and overlaps must be avoided. There will be potential to create synergies with the CRM Act, such as on reporting and on recycling measures, and to contribute to the benchmark on recycling capacity introduced under the CRM Act. The aim is to be able to produce at least 25% of the EU's annual consumption of strategic raw materials by 2030.

Harmonising WEEE treatment requirements

Wide differences exist among Member States in relation to WEEE treatment requirements. The European standards for the treatment of WEEE (EN 50625 series standards) are only mandatory in six Member States. It is important to ensure a level playing field by setting harmonised requirements based, in particular, on the European standards for the treatment of WEEE and on best practices implemented in Member States. These requirements should also reflect the changes in hazardous components used in EEE and the developments in WEEE treatment technology. Such an approach would contribute to ensuring no quality loss during the recycling process in the EU as well as avoiding unnecessary shipments of WEEE and, even more importantly, eliminating illegal shipments of WEEE. When setting such requirements, it is important to consider that they should not place an unnecessary administrative burden on operators of any size, including small and medium-sized WEEE treatment operators.

Circular economy objectives

Imperatively, the Commission is exploring ways to improve the recovery of critical raw materials from WEEE, which is essential for the EU's green and digital transitions. The Commission recognises the need for better alignment between the WEEE Directive and other EU policies, such as the ESPR and the CRM Act, to ensure a cohesive approach to sustainability and resource efficiency. Current provisions of the WEEE Directive need to be revisited to address the growing waste streams from renewable energy technologies,

such as photovoltaic panels and wind turbines. Moreover, in the wider context of pursuing circular economy objectives, it is worth considering the potential to bring prevalent CRMs and other materials which are energy-intensive, such as steel and plastics, into circularity in the EU. This is particularly relevant for large-size EEEs and will serve to catalyse investment in recycling capacity and encourage EU industry to effectively substitute virgin materials. This in turn will boost the EU's competitiveness, decarbonisation and economic security.

ANNEX I: PROCEDURAL INFORMATION

LEAD DG: DG Environment
DECIDE/AGENDA PLANNING REFERENCE: PLAN/2022/460
CWP REFERENCE: COM(2023) 638) – Annex 2, section C, item No 2

1. Derogations granted and justification

No exceptions were made to the Better Regulation Guidelines during this Evaluation.

2. Organisation and timing

An inter-service steering group (ISSG) created in 2022 to support the evaluation of the WEEE 2 Directive. It is set up with representatives from the following Directorate Generals:

- Secretariat General (SG)
- Legal Service (SJ)
- Climate Action (CLIMA)
- Communications Network, Content and Technology (CNECT)
- Competition (COMP)
- Economic and Financial Affairs (ECFIN)
- Employment, Social Affairs and Inclusion (EMPL)
- Environment (ENV)
- Energy (ENER)
- Eurostat- European Statistics (ESTAT)
- Internal Market, Industry, Entrepreneurship and SMEs (GROW)
- International Partnerships (INTPA)
- Joint Research Centre (JRC)
- Justice and Consumers (JUST)
- European Neighbourhood and Enlargement Negotiations (NEAR)
- Regional and Urban Policy (REGIO)
- Health and Food Safety (SANTE)
- Trade (TRADE)

and from the European External Action Service (EEAS).

The group met six times during the evaluation process, first to steer the work related to the launch of the evaluation process, then to steer work related to the evaluation study that was carried out for this evaluation, and finally on the draft evaluation report. The group was also consulted in writing. The members of the group were invited to the final workshop organised in the context of the consultation process described in Annex VII of this report. Details on consultations on the ISSG are provided in the following Table 2:

Table 2: Meetings of the ISSG on WEEE evaluation

Date	Topic of discussion
8 September 2022	•Inform ISSG about the EU legislation on WEEE, •provide the timeline of the evaluation next steps, •consult on the intervention logic, the evaluation questions, the consultation strategy and on the call for evidence. Followed by written consultation.
6 December 2022	Kick off meeting of the evaluation study.
13 February 2023	Evaluation study - Inception report. Followed by written consultation
6 September 2023	Evaluation study - draft interim report. Followed by written consultation
6 December 2023	Evaluation study - draft final report. Followed by written consultation.
18 March 2024	Discussion on draft Commission evaluation report (Staff working document for the evaluation). Followed by written consultation.

A Europa webpage has been set up to provide information on the evaluation process: Waste from electrical and electronic equipment – evaluating the EU rules (europa.eu)[133].

3. Consultation of the Regulatory Scrutiny Board

Following its examination by the Regulatory Scrutiny Board, which issued a negative opinion on 5 July 2024, this report was modified with the following main changes:

[133] Waste from electrical and electronic equipment – evaluating the EU rules (europa.eu).

Table 3: Modifications to the SWD following RSB comments

Comment by the RSB Key Issues	Modification made
(1) The report is not clear on what data the evaluation is based on and whether the evidence basis is robust and comprehensive enough for the assessment and for answering the evaluation questions.	The report has added **five new Annexes** (**IX-XIII**) to this report, making it clear on which data the evaluation is based on. Throughout the report, the evidence base has been explicitly pointed to in the newly introduced segments of the analysis, and references have been added to reinforce the existing analytical excerpts, where applicable. Moreover, **analytical content has been further elaborated throughout the document**. Imperatively, the lineup of the new Annexes provides **ample substance** to make weighed deliberations on the extents of the robustness and comprehensiveness of the evidence. As such, additional analytical points have been introduced throughout the document to argue where the evidence and data *is* adequate for answering evaluation questions and the assessment, and in which cases it is indeed inadequate. The newly introduced annexes are: Annex IX on the WEEE Directive in the wider **circular economy** context; Annex X on **compliance** assurance; Annex XI **comparatively analysing implementation** of the Directive in Member States; Annex XII with an in-depth **cost-benefit analysis**; as well as Annex XIII on **simplification and burden reduction**. Annex IV on benefits and costs has been renamed to **Table on simplification** to better reflect its contents, which have been revised to ensure compatibility with newly introduced Annex XII Costs and Benefits, as well as to ensure there are no duplications between the two Annexes. Similarly, Annex V on reporting requirements and administrative burden has been renamed to only '**reporting requirements**' to better reflect its contents, which have been revised to ensure compatibility with newly introduced Annex XIII Simplification and Burden Reduction, also ensuring there are no duplications between these two Annexes, or unnecessary overlaps. Furthermore, **Annex III** on the state of play of implementation has been **amended** to ensure compatibility with Annex X on compliance assurance. The report has also been enhanced by minor stylistic changes throughout the document, which specifically improve the clarity of statements, references, and arguments.

(2) The report does not sufficiently analyse the effectiveness and efficiency of the Directive. It is not clear why the objectives and targets are not being achieved, how the main measures envisaged by the Directive are performing and why there are large differences among Member States.	Newly added **Annex XI** on the **comparative analysis of implementation** in Member States, which is the most extensive newly introduced Annex in this report and **most in-depth** analysis, reinforces **Chapter 4.1.1** on effectiveness and efficiency. Annex XI focuses in on WEEE collection rates (trends, Member State specific progress), specific problems of collection, recovery target progress, preparing for reuse rate, assessing for specific categories of EEE and Member State specific data, differences in treatment requirements as well as their EPR schemes, mapping out cross checking of which combinations yield which results, culminating in discernible conclusions. The resulting changes present a now meticulous analysis bringing together all the aspects of why the objectives are different between Member States, on every level, including larger and more subtle differences. This feeds in seamlessly to addressing performance of the main measures of the measures envisaged by the Directive are elaborated in detail, with its conclusions and lessons learnt also reflected in **Chapter 5.1** and **5.2** respectively. Moreover, the other newly introduced Annexes also support this, especially **Annex XII** which provides an in-depth analysis on **costs and benefits.**
(3) The analysis of benefits and costs is not sufficiently developed. The report is not sufficiently clear on what the benefits of the initiative are. Information on aggregated costs is not provided. Distributional effects including cost pass-through to consumers as well as administrative burden and simplification potential are not comprehensively assessed.	The analysis of benefits and costs has been markedly refined, including on a more granular level, with its own dedicated new **Annex XII** on **Costs and Benefits**. The Annex's cost section pertains to typology and indirect costs, assessing the information available and information missing, EPR fees, costs of collection and treatment (including EEE category specific), compliance costs of operators, PROs, Member States, including Member State specific scenarios and case studies, as well as a segment dedicated to **distributional effects and costs passed through to consumers**. Then, the Annex's benefits section, linked to endeavours fulfilling the initiative's objectives, entail direct and indirect benefits for consumers, treatment operators, administrators and PROs, and technical analysis on crucial environmental benefits, avoided damages to human health, diverted WEEE flows, and imperatively, the **recovery of critical raw materials** (CRMs), and its contributions to the SDGs. This Annex also compliments Annex IV, which has been modified to ensure compatibility. This is amalgamated by the information on **aggregated costs**, which are explained in Annex XII, considering some extrapolations. These conclusions are also

	reflected fittingly by changes in Chapter 4.1. As the analysis compares the different implementation in each Member State in Annex XI, which includes also costs of EPR schemes, the findings are also reflected also in **Chapter 4.1.1.(g)** on the effects of the WEEE 2 Directive in improving EPR. New **Annex XIII Simplification and Burden Reduction** answers precisely the administrative burdens in the evaluation period, by which entities they are carried, which leads to discernible takeaways. Concretely, the Annex also outlines removed administrative costs, including for SMEs, and sheds light on potential further simplification for SMEs with regard to registration and reporting, as well as assesses economic operator registrations, interplay of the corresponding secondary legislation. References to these additions are introduced in Chapter 4.1 also.
(4) The report's conclusions are not supported by adequate analysis and evidence. The lessons learnt are not clear about why the initiative is not working as intended and thus not provide adequate insight for future policymaking.	The report's conclusions in **Chapter 5.1.** and lessons learnt in **Chapter 5.2**. are the culmination of derived substantive analyses throughout the report, backed by clearly pinpointed evidence which supports it, which have markedly improved the quality of the conclusions. **Each of the newly introduced Annexes** enhances the insight for the conclusions and lessons learnt. Newly introduced assessments and derivable conclusions on compliance have been outlined, which are elaborated by precise additions in Chapter 3, fittingly pertaining to the state of play of implementation, which puts together clearly what Member States and the Commission have done precisely. These are purported by details outlined in new **Annex X** on **compliance assurance**, which focuses in on the pace and quality of transpositions, individual actions undertaken by Member States, setting up of networks for registers and enforcement, Commission follow-up with reports, workshops, initiatives, and the various infringement procedures the Commission has launched against Member States. These have also been seamlessly integrated to overarching conclusions in Chapter 5.1. and lessons learnt in 5.2., and contributes to providing understanding of why the initiative is not working as intended, comparing the levels of compliance to the precise actions of the Member States and the Commission side by side. Annex XII's cost-benefits analyses are reflected also with changes in Chapter 4.1.1.(f) and 4.1.1.(g), elaborating more concretely the cost aspects of EPR, treatment, recycling and

	recovery. Conclusions on simplification and burden reduction, as outlined in Annex XIII and its corresponding updates in Chapter 4.1.1.(f). Newly added Annex XI on the comparative analysis of implementation in Member States, reinforces Chapter 4.1.1.(d) and the conclusions in Chapter 5.1 on collection, as well as the lessons learnt in 5.2 on making EPR fit for purpose. Finally, together with the conclusions from Annex IX, on the **WEEE Directive in the context of the wider circular economy**, which focuses in on specific, general, and operation objectives, how the Directive was expected to work, the evolution of WEEE collection and recycling since 2003 (WEEE 1 Directive), European treatment standards, development of EPR, links to ESPR and **imperative information on CRMs,** complete with current monitoring arrangements and indicators of progress. Some are also referenced in Chapters 3.1., 4.1.1. and 4.1.1.(d). The lessons learnt and conclusions of the report provide insight for future policymaking, which amongst others, hints a limited but real role in the EU's **geostrategic autonomy**.

Comment by the RSB on what to improve	**Modification made**
(1) The report should systematically point to the data and evidence supporting statements and findings. The limitations of the evidence base should be reflected more systematically throughout the analysis, in particular in more nuanced conclusions. When data is missing (e.g. Extended Producer Responsibility fees, employment data, etc.), the report should be explicit about the reasons for this and explain how it addressed the issue. Certain aspects should be better explained and substantiated with evidence e.g. the baseline for health and environment impacts and how things have evolved; the implementation of treatment standards and the evidence that makes it possible to conclude that they lead to positive impacts on environment and health.	Data and evidence which supports statements is now systematically pointed to due to modifications, additions, and improvements **throughout the report**, including with **147 additional footnotes** to ensure no traces of ambiguity and statements particularly reinforced by new Annexes, with a plethora of additional analytical points, throughout the report. In the report's main part, 17 additional footnotes have been added, these are footnotes nr. 21, 23, 26, 30, 45, 63, 72-74, 83, 89, 95-96, 99, 104 and 109-110 in the SWD. Furthermore, another 126 footnotes have been inserted in the newly added Annexes (IX to XIII), which are footnotes nr. 208-338. Additional diagrams and references have been updated to ensure the evidence and data that is pointed to is airtight. Furthermore, please refer to: • Annex XII on costs and benefits, particularly subsection on '**information available on costs**', which reinforces changes throughout the report have ensured that it has been updated to systematically reflect limitations of the evidence base,

	making it immediately clear when an unambiguous assessment is thereby made unachievable; • Chapter 4.1.1.(c) on recycling and recovery of WEEE; • Chapter 4.1.1.(g) on EPR; and • particularly reinforced by Annex XI on the comparative analysis of implementation by Member States, including of these elements and missing information is underlined, where appropriate; • Annex XII on costs and benefits, particularly subsection on **Benefits,** for the baseline for health and environment impacts and how things have evolved now benefits from improved explanations, substantiated with evidence; • which is linked to the general objectives of the initiative, outlined in updated texts in Chapters 2.2 and 2.3; • Annex XI and Chapter 4.1.1.(e) for the implementation of treatment standards and the evidence that makes it possible to conclude that they lead to positive impacts on environment and health is now neatly exhibited. The nuanced conclusions are therefore refined and better purported by the meticulous in-depth analyses, which are reflected throughout the report and culminate in Chapters 5.1 and 5.2.
(2) The report should be clearer about the intervention logic, highlighting not only the amendments brought by the revision, but rather how the Directive in its entirety was expected to work and deliver on its objectives. The general and specific objectives should be clearly identified.	Please refer to: • Newly introduced segments in Chapter 2.1, focusing on ameliorating clarity of intervention logic; • New Annex IX '**WEEE Directive and Circular Economy**'; • Minor changes also in Chapter 1.1. and also referred in Chapter 4.1.1.(d),; • Conclusions relevant for Annex IX have been integrated into Chapter 4.3 focusing on the WEEE Directive in the wider context of the circular economy.
(3) When assessing effectiveness and efficiency, the report should provide a comprehensive explanation based on evidence as to why the objectives and targets are not	Please refer to: • New elements in Chapter 4.1, which focuses on the extent of success and more

being achieved. The assessment should cover all the main components of the initiative, including targets, EPR system, monitoring and enforcement. The analysis of the effectiveness and efficiency of the rules/provisions themselves – including EPR rules - should be deepened, and not limited to analysing how the implementation of the EPR principle could be improved. The report should explain large differences among Member States and success factors that have been identified. When listing potential hindering factors, the report should analyse the reasons for their occurrence and the role these factors have played based on the evidence.	particularly in Chapter 4.1.1, the effectiveness and efficiency across the difference specific aspects of the Directive, and in Annex XII; • Newly added fragments throughout Chapter 3, coupled with newly added Annex X '**Compliance Assurance**' in the backdrop of the levels of compliance, gives an overview of the concrete actions undertaken by Member States collectively and individually and the follow-up of the Commission, giving insight on why objectives and targets are not being met; • Newly added Annex XI on the comparative analysis of implementation in Member States provides for specific differences between Member States, identifying the success factors distinctly; • Similarly, for the hindering factors, the report's analyses of their occurrence and what role these factors have played are outlined also in Annex XI, pinpoint at each stage their evidence base.
(4) The report should provide a sufficient overview of costs and benefits. On benefits, it should explain what these are, in particular as regards health and environment ones, which form part of the general objectives. The report should provide quantitative analysis as far as possible and to indicate the order of magnitude. When it comes to costs, the report needs to be explicit about what information is available (e.g. regarding EPR fees being confidential) and provide clear analysis of the total compliance costs, in particular costs related to collection, treatment and logistics. The report should be clearer about whether and to what extent the costs are covered by EPR fees and other market-based revenues (e.g. from the sales of secondary raw materials) or taxes. It should provide a better explanation of the distributional impacts and of pass-through of the costs (or/and benefits) to the consumer.	Please refer to: • New Annex XII on Costs and Benefits, which extrapolates the costs in its own subsection, and benefits with another, providing comprehensive overviews; • In particular, the health and environmental benefits are outlined in the subsection on benefits; • A segment dedicated to 'distributional impacts and pass-through of the costs to consumer' is in the subsection of costs; • New additions in Chapter 4.1.1, including in Chapter 4.1.1.(d), 4.1.1. (f), 4.1.1.(g), with specific EPR, treatment, recycling and recovery analyses; • Similarly, benefits in Annex XII are intricately intertwined with the general objectives as assessed in both Chapter 2.1 as well as partially linked to Annex IX on the WEEE Directive in the Circular Economy also touches on relevant benefits.
(5) The report should further discuss the administrative burden related to the initiative and be clear about any potential for further simplification and burden reduction. It should	Please refer to: • New Annex XIII on '**Simplification and Burden Reduction**' has been added to

also assess more thoroughly whether SMEs are disproportionally affected by the initiative and whether there is a potential for (further) mitigating measures.	entirely focus on potential for further simplification and burden reduction, as the title suggests, comparing to those actions already undertaken, and elaborate more profoundly the administrative burdens which have been noted, as well as those difficult to quantify; • Added references to Chapter 4.1.1.(f) on improving simplification and burden reduction; • Specific references and assessments pertinent to SMEs in this regard have been added in Annex XIII, particularly its sections 2.(a), 2.(c), and 3.(a), as well as Chapter 1.2, which reinforces pre-existing mentions. • These overlap with costs sections in Annex XII and corresponding Chapter 4.1 sections which specifically pertain to administrative costs.
(6) Given the gaps in the evidence base and the limitations of the cost-benefit analysis, the report should explain if and how it can draw an explicit conclusion about compliance of the initiative with the principle of proportionality.	Please refer to: • New Annex X 'Compliance Assurance', as well as newly added fragments in Chapter 3.1 and 3.2 reflecting Annex X, which enable explicit conclusions to be drawn, which are portrayed in aforementioned segments with side-by-side comparisons of actions undertaken versus compliance levels reached, but also feed into conclusions in 5.1 and lessons learnt in 5.2; • These changes reinforce the existing references to the principle of proportionality in Chapters 4.2 and 5.1, as well as Annex II and VI. • The above-mentioned are also reinforced by the granular analyses in Annex XI on the comparative analyses of how Member States' implementation is undertaken.
(7) The report should substantiate its assessment of coherence and relevance, as regards the interaction with and impact of other related initiatives and show more precisely what role the initiative plays and identify clearly any inconsistencies or overlaps.	Please refer to: • New Annex IX 'WEEE Directive and Circular Economy', • Conclusions relevant for Annex IX have been integrated into Chapter 4.3; • Changes in Chapter 4.1.2 on coherence, both internal in 4.1.2.(a) and external in

	4.1.2.(b), have been inserted to reflect the additional insights in Annex IX; • Some relevance in references in also referenced in Chapters 3.1., 4.1.1. and 4.1.1.(d).
(8) The conclusions should reflect the robustness of the evidence base and not provide course for future policy action or prejudge the legal instrument for the revision. They should instead provide an overview of the reasons for the shortcomings identified and the scale of the problems and the consequences taking into account the limited evidence base. Lessons learnt should also reflect on the inadequate data basis experienced and the adequacy of current monitoring arrangements, including key performance indicators.	The conclusions from the in-depth analysis of Chapter 3 on implementation and compliance are summarised at the end of Chapter 3.2, as is the in-depth analysis on efficiency and effectiveness at the end of Chapter 4.1.1. Furthermore, similarly to the modifications addressing comments in **Key Issues nr. 4**, pertaining to conclusions and lessons learnt, the content of the following address these: • Conclusions in Chapter 5.1; • Lessons learnt in Chapter 5.2;
(9) The report should indicate the relevant Sustainable Development Goals linked to the initiative.	Please refer to: • New Annex XII 'Costs and Benefits', which elaborates, in the Benefits section, a subsection on **contribution of the WEEE Directive in the achievement of Sustainable Development Goals**.

4. Use of external expertise

During the evaluation process, feedback has been asked by Member States and stakeholders in the context of consultation activities as described in Annex VII to this report.

In summary:

- a 'call for evidence' was published on 6 October 2022 with a four-week period for stakeholders to give feedback;
- a study to support the evaluation was launched in November 2022;
- a 12-week open public consultation took place between 16 June 2023 and 22 September 2023, targeting the general public and organisations, using the EU Survey tool;
- the evaluation exercise was presented to the members of the expert working group on waste (WEEE), at its meeting of 22 March 2023.

ANNEX II. METHODOLOGY AND ANALYTICAL MODELS USED

This evaluation has been supported by a study undertaken by a consortium of consultants led by Ramboll for that purpose.

The sources of information used for this evaluation have been:

- A review of existing literature, including reports and scientific papers;
- Member States' implementation reports, data from Eurostat and from the European Environmental Agency;
- Stakeholder consultations, to gather additional data and information. This included an open public consultation (OPC), targeted consultations and interviews (with expert stakeholders and with Member States), and a stakeholder workshop. A wide range of stakeholders contributed, including Member State Competent Authorities, Business Associations, Businesses (producers of EEE, recyclers of WEEE, etc.), Non-Governmental Organisations (NGOs), academia, citizens etc.

A summary of the approaches used and an overview of the findings are presented below.

Literature review

To perform a transparent and clearly structured data collection, a standardised approach consisting of the following three main steps has been developed:

1. identification of literature and data sources;
2. assessment of available literature and data sources identifying data gaps and key issues and explaining how they will be addressed; and
3. recording of the results in a database to be constantly refined and updated throughout the evaluation study.

The literature database created includes over 100 academic journals, scientific reports, articles, studies, national reports, policy documents and legal texts. The literature review also covered information reported under the implementation of the WEEE 2 Directive.

All the information collected was screened before being used. For each source, a first check was made to see whether information and data relevant for the five evaluation criteria were included. Data gaps that were particularly highlighted in the literature were also noted in the database.

The literature provided evidence in relation to most of the evaluation criteria (to a lesser extent for the coherence and the EU added value analysis). However, data gaps were encountered, as described in Chapter 1.3 of this report, which affected all evaluation areas. A detailed overview of data gaps was developed in the inception phase of the evaluation, and methods to close them were identified. In most cases, stakeholder consultation was used as a way to close data and information gaps.

Stakeholder engagement

Stakeholder engagement was necessary to ensure that all relevant and interested stakeholders were given an opportunity to express their opinions and to contribute with position papers and sharing their experience regarding the implementation of the WEEE 2 Directive. Furthermore, the consultation of stakeholders was used extensively with the aim of closing existing information gaps. The key

objectives of the consultation activities were to (i) validate the topics and issues covered by the evaluation, (ii) gather the input of a broad representative range of stakeholders such as information, data and experience on the implementation of the WEEE 2 Directive, (iii) solicit views and opinions on the extent to which the Directive has met its objectives and (iv) collect views on the Directive's relevance.

The stakeholder engagement included several activities, namely:

- Call for Evidence,
- Open public consultation,
- Workshop with Member States in the context of the meeting of the Expert Group on Waste (WEEE Directive) and questionnaire,
- Three Member State targeted workshops,
- Targeted consultations, including three workshops with specific stakeholder groups, dedicated interviews and surveys,
- A final stakeholder workshop.

A very brief overview of these consultation activities is presented below and more details are available in Annex VII of this report on 'Stakeholders consultation - Synopsis report'.

Call for evidence

The call for evidence was published on the web portal 'Have Your Say' for four weeks (from 6 October 2022 until 3 November 2022). By the deadline, a total of 106 responses were received and 31 respondents submitted additional written contributions (position papers). Shortly after its official closure, an additional 14 responses from Member States were submitted to the European Commission via email and these contributions were also considered in the analysis.

Open public consultation (OPC)

A 14-week open public consultation took place online between 16 June 2023 and 22 September 2023. It targeted the general public and organisations and was published on the 'Have Your Say' website. The questionnaire was made available in the 24 EU official languages.

131 stakeholders responded to the OPC and 39 respondents submitted additional written contributions/ position papers. They represented 14 EU Member States and 4 non-EU countries[134]. Most of the respondents represented business associations and companies/ businesses, while fewer respondents represented non-governmental organisations and public authorities.

Contributions received through the OPC included both free-text responses and multiple-choice answers. The free-text responses were submitted in various languages and were translated into English. Whenever feasible, opinions expressed in the free-text submissions were aggregated.

Targeted consultation

Expert Group on waste (WEEE Directive) and follow-up survey

[134] USA, Canada, Taiwan, and Norway.

The meeting of the Expert Group on waste took place on 22 March 2023 in Brussels and was attended online and in person by representatives of national authorities of 23 Member States. The aim of the meeting was to identify and discuss main topics, challenges and best practices in relation to WEEE management at national level. Following the meeting, a questionnaire with 22 questions was circulated amongst the experts of the Member States, requesting further data and views on the WEEE 2 Directive implementation. In total, 18 Member States responded to the questionnaire.

Member State targeted workshops

Three workshops were organised with selected Member States with the aim of gathering more detailed information about the national implementation of the WEEE Directive. The first workshop was held in Finland (Helsinki) on 23 May 2023, the second in Portugal (Lisbon) on 30 May 2023 and the third in Poland (Warsaw) on 1 June 2023. All three workshops were attended by the consultants, a representative of the European Commission, representatives of government institutions and national stakeholders (e.g. treatment operators, producers, PROs).

Workshops with specific stakeholder groups

Three online consultation activities were conducted in June 2023, which involved three different stakeholder groups: WEEE treatment operators and their associations, producers of EEE, PROs and their associations and consumer organisations/ NGOs/ research institutions. The aim of the workshops was to close data gaps on specific topics. During the workshop, a structured approach with multiple-choice and open questions, adapted per stakeholder group, was used to maximise effectiveness.

Specific stakeholder interviews/consultation

To close existing data gaps relevant for the evaluation, a questionnaire aimed specifically at producers and PROs was circulated and responses collected. Furthermore, additional interviews were performed with the objective of collecting information on costs.

Final stakeholder workshop

A final stakeholder workshop took place in Brussels in person and online on 19 October 2023. The total number of participants was 107, with 74 participants joining online and 33 in person. The aim of the workshop was to validate preliminary findings from the analysis under the evaluation criteria and collect feedback as well as to close remaining data gaps for the evaluation.

Methodology and tools used to process data

The methodology used for the consultation activities takes due account of the Commission Better Regulation Guidelines[135] and its Toolbox. To inform evidence-based policymaking, the contributions to the consultation activities were analysed and put in context with the evaluation questions. Special attention was given to represent the views of all stakeholders mapped in the initial stage of the consultation strategy development. To this end, where responses from individual organisations appeared to be coordinated, i.e. through a coordinated campaign, the respective statements were cross-checked through further consultation activities and assessed individually. Notable instances of response similarity were identified in the OPC in six cases of duplication and one case of triplication,

[135] SWD (2021) 305 final of 3.11.2021.

wherein both the answers to multiple-choice questions and the content of free-text responses closely mirrored each other. In total, 8 out of the 131 responses, constituting approximately 6%, exhibited substantial similarity to other responses. Still, this was not considered as a 'campaign for public consultations [..]', hence all responses to the consultation activities were taken into account for the analysis and no responses were discarded.

Baseline

The baseline or starting point (T1) of the evaluation is defined by the situation on the date of entry into force of the WEEE 2 Directive. The baseline considers, to the extent possible, the situation as described in the impact assessment that accompanied the 2008 Commission proposal for the recast of the WEEE 1 Directive (T2) and compares it with the current and latest available data (T3).

Where needed and depending on data availability, an additional/alternative point of reference may also be prior to the adoption of the WEEE 1 Directive (T0) in a scenario where no EU legislation was in place for WEEE. For this purpose, the points of comparison described in Figure 7 were considered. A more detailed description of the baseline can be found in Section 2.2 of this report.

Data limitations

The data collected through literature review, stakeholder consultations, and from publicly available Eurostat datasets[136] provided evidence to answer most of the evaluation questions, however for some questions the data obtained proved to be limited. The following table illustrates the extent of the data gaps identified along the each of the five 'better regulation' criteria and evaluation questions.

[136] See Eurostat, waste electrical and electronic equipment (WEEE) by waste management operations [env_waselee]; waste electrical and electronic equipment (WEEE) by waste management operations - open scope, 6 product categories (from 2018 onwards) [env_waseleeos]

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Table 4: Data gaps and limitations per evaluation question

Evaluation questions per criterion	Sub-questions	Data gaps
Effectiveness		
[ES.Q.1] What progress has been made towards achieving the objectives and targets of Directive 2012/19/EU since its entry into force? How has the WEEE Directive helped / hindered this progress?	What progress has been made regarding the prevention of WEEE?	• Evolution of lifetimes: No comprehensive datasets are available on the evolution of lifetimes of EEE. Due to this data limitation, no conclusion can be drawn on whether lifetimes of EEE have increased after the adoption of the WEEE 2 Directive and hence the implementation of the Directive reduced generation of WEEE.
	What progress has been made regarding the separate collection of WEEE?	• There is still a considerable share of WEEE with unknown whereabouts. • The current WEEE categories as defined by the Directive do not make it possible to draw conclusions on the separate collection of specific WEEE types, which are however of particular relevance. This concerns for instance equipment, that will be used at strongly increasing levels in the coming years due to implementing the energy transition (PV panels, heat pumps), equipment, that was included to the scope of the Directive by introduction the 'open scope' (e.g. furniture with electronic elements), and equipment containing relevant hazardous substances (e.g. mercury containing lamps). • Nevertheless, conclusions could be drawn on category level and by considering additional information, for instance on WEEE in residual waste, metal scrap. • Data on collection rates were based on Eurostat database (env_waseleeos). No further corrections were carried out for the transition to the open scope. Effects on collection rates with regard to total WEEE are considered negligible. • Although the separate data reporting on PV panels became mandatory with Commission Implementing Decision (EU) 2019/2193 data is incomplete or is only for some countries.
	Has the Directive supported the availability of sufficient, economically accessible sound and safe WEEE recycling capacity?	• Treatment processes: While there is comprehensive data about the capacities for the initial treatment of WEEE (according to Article 8 of the Directive), no comprehensive information on capacities and treatment processes

		applied for the recycling of specific WEEE materials is available. For some materials conclusions could be drawn, but not for all.
	What progress has been made regarding development of more sustainable products?	• Secondary raw materials: No detailed information is available on the use of secondary raw materials for the production of EEE. • Eco-modulated fees: Insufficient data is available to assess the effect of eco-modulated fees for increasing the sustainability of EEE.
[ES.Q.4] What have been the (quantitative and qualitative) effects of the Directive, in terms of its outputs, results and impacts?	What have been the effects of the Directive on the environment and human health during collection and transport of WEEE?	• Environmental and human health impacts: Comprehensive data on environmental and human health impacts of WEEE collection and transport of WEEE in the EU is not available. Implementing the provisions of EN 50625 by operators was therefore used as a proxy indicator to draw conclusions on the environmental and health impacts of the Directive.
	What have been the effects of the Directive on the environment and human health during treatment of WEEE?	• Comprehensive data on environmental and human health impacts of WEEE collection and transport of WEEE in the EU is not available. Implementing the provisions of EN 50625 by operators was therefore used as a proxy indicator to draw conclusions on the environmental and health impacts of the Directive. • While there is data on human health impacts regarding some hazardous substances contained in WEEE (especially those substances that have been restricted / regulated), such data is not available for all hazardous substances that can be present in WEEE.
	What have been the effects of the Directive on employment within the EU?	• Employment: Comprehensive data on employment in the WEEE management sector is not available. The informal sector plays a certain role in the management of WEEE.
	What have been the effects on research and innovation?	• Research an innovation: Information on research an innovation is available, but too aggregated to draw conclusions on activities directly related to WEEE management.

Efficiency		
[EY.Q.1] What are the costs associated with the implementation of the Directive in different Member States and between different stakeholder groups?	What are the types of costs (direct and indirect) associated with the implementation of the Directive?	• Administrative costs: There is limited availability of comprehensive data on administrative costs from all stakeholder groups. Experts have not been able to provide such data specifically for the administrative costs related to the implementation of the WEEE Directive. • Compliance costs: Incomprehensive data was found in relation to compliance costs. Experts have not been able to provide such data specifically for the compliance costs related to the implementation of the WEEE Directive. • Enforcement costs: Incomprehensive data was found in relation to enforcement costs (for public authorities). Data was made available by few public authorities and the array of costs is considered wide. • Indirect costs: No data on indirect costs was made available by the stakeholders participating in the consultation activities. There is a total lack of data regarding the influence of the Directive on indirect costs from stakeholders and literature.
	Are there significant cost differences between Member States and why?	
	Are there significant cost differences between stakeholder groups and why?	
	What other (external) factors influence the costs?	• Free-riding (non-complaint producers of EEE): there are some estimates of the costs and damages arising due to the issue of free-riding. However, no overarching analysis could be found that would give an insight into the situation for the EU.
[EY.Q.2] Are the costs proportional to the benefits achieved and how does it vary between stakeholder groups and Member States?	Are the costs proportional to the benefits achieved?	• Proportionality of costs: The limited data availability on benefits such as increased economic activity, improved health, and increased employment and on costs makes it challenging to analyse whether costs were proportional to benefits and how the proportionality differed between stakeholder groups and Member States.
	How does costs relative to the benefits vary between different stakeholder groups?	
	How does costs relative to the benefits vary between different Member States?	
[EY.Q.3] What factors influenced the efficiency and what good or bad practices can be identified?	What, if any, good or bad practices in terms of cost-effective implementation of the Directive can be identified in the Member States?	• Factors for efficiency: The lack of adequate cost data and limited comprehensive information on benefits makes it challenging to analyse the factors influencing efficiency and identify good or bad practices.

Relevance		
[RE.Q.3] Is the Directive fit for purpose with the new challenges and developments of today and in the future, such as growing consumption, digitalisation, development of renewables and online sales?	Are the needs caused by further digitalisation (in the context of the EU's digital strategy) sufficiently addressed in the WEEE Directive?	• Implementation of digital solutions: It is unknown to what extent small and medium-sized enterprises of the (W)EEE sector implement digital solutions or are negatively affected by digitalisation. There is no analysis available on the typical skill level of employees in the (preparation for) reuse sector or of workers in the subsequent WEEE treatment facilities.

Regarding data on lifetime of EEE, in the context of the methodology established by the Commission for the calculation of the WEEE generated, such data have been estimated per Member State and presented in the WEEE calculation tools developed for each Member States[137].

To avoid misinterpretation due to data limitations, the limitations were addressed openly, and the assessment was conducted qualitatively, taking into account the potential biases or uncertainties in the available data. This approach ensured transparency and integrity in the analysis process and allowed for a more comprehensive understanding of the results and their implications. In addition, complementary methods such as interviewing experts were used, where possible, to mitigate the impact of these limitations and improve the robustness of the conclusions drawn from the data.

[137] In the context of the common methodology established for the calculation of the weight of EEE placed on the market of each Member State and for the calculation of the quantity of WEEE generated in each Member State, a classification of EEE has been used based on 54 categories of EEE developed by the United Nations University (UNU) and defined as 'UNU-Keys'. The WEEE calculation tools provide data on lifetime for EEE falling under each one of the UNU-keys. This categorisation enables consistent performance comparison between regions and compliance schemes. Most of the UNU-KEYs align with one or more PRODCOM and CN codes enabling a relationship with harmonised and internationally accepted statistical data.

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ANNEX III. STATE OF PLAY OF THE IMPLEMENTATION OF THE WEEE 2 DIRECTIVE

This Annex gives information about the most important milestones in relation to the implementation of the WEEE 2 Directive during the evaluation period. It even goes beyond the evaluation period to make a refence to the amendment of the Directive in 2024 as a follow-up to the judgment of the Court of Justice of the European Union.

Transposition of the WEEE 2 Directive

The deadline for Member States to transpose the Directive was on 14 February 2014. Only seven Member States transposed it by the legal deadline (Bulgaria, Denmark, Estonia, Ireland, Luxembourg, Malta, the Netherlands). The transposition was only completed in 2015, when the last five Member States (Germany, Cyprus, Poland, Romania, Slovakia and Slovenia) adopted the relevant national legislation.

The year 2016 was the first year when all Member States had transposed the WEEE 2 Directive into national law and had set up processes to implement it.

Additional information regarding the transposition of the WEEE Directive is given in Annex X.

Secondary legislation and Commission Recommendation

In 2017, pursuant to Article 7 of the WEEE 2 Directive, the Commission adopted the **Implementing Regulation (EU) 2017/699**[138] establishing a common methodology for the calculation of the weight of EEE placed on the market of each Member State and a common methodology for the calculation of the quantity of WEEE generated by weight in each Member State. The aim of this implementing regulation is to ensure uniform conditions for the calculation of the minimum annual collection rate of WEEE by the Member States. As part of this implementing regulation, electronic tools for the estimation of WEEE generated have been developed, customised for each Member State aiming to assist the application of the common methodologies. The tools are already pre-populated with data on the quantity of EEE placed on the market in each Member State since the 1980s taking into consideration data on the domestic production of EEE in each Member State as well as imports and exports of EEE. These tools are made publicly available on Commission's webpage[139]. and the Commission keeps them updated.

In 2019, the Commission adopted the **Implementing Regulation (EU) 2019/290** establishing the format for registration and reporting of producers of electrical and electronic equipment to the register[140]. Pursuant to Article 16(1) of the WEEE 2 Directive, Member States have developed national registers for all producers, including those supplying EEE by means of distance communication, in order to monitor compliance with the requirements of the Directive. That had led to 27 different approaches for registration and reporting to the national registers and a significant administrative burden for producers placing EEE on the market of several Member States. This

[138] OJ L 103, 19.4.2017, p. 17–21.
[139] https://environment.ec.europa.eu/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee/implementation-weee-directive_en
[140] OJ L 48, 20.2.2019, p. 6–16.

Implementing Regulation introduces a common format for registration and reporting that sets out the key information elements to be requested pursuant to Article 16(2) and Annex X of Directive 2012/19/EU for the registration and reporting by producers or, where appointed, by authorised representatives. The format still leaves some flexibility to Member States as it allows for limited additional information elements to be requested by the Member State. To avoid additional administrative burden, the entries for such additional information requirements are identified in the format.

In 2019, the Commission also adopted the **Implementing Decision (EU) 2019/2193** laying down rules for the calculation, verification and reporting of data and establishing data formats for the purposes of the WEEE Directive[141] complementing the 2018 changes in reporting procedures as well. This Implementing Decision deleted obsolete reporting requirements, benchmarked national reporting methodologies and introduced a data quality check report. In particular aiming to ensure harmonised reporting methodologies, this Implementing Decision introduces under EEE category 4 'large equipment' two sub-categories, namely '4a: Large equipment excluding photovoltaic panels' and '4b: Photovoltaic panels', and requests Member States to report the data on quantities of EEE placed on their markets and of WEEE collected under these two sub-categories. This change also ensures that data on photovoltaic panels are separately reported and thus allows Member States and the Commission to assess how the quantities of PV panels placed on the market affect the annual collection rate, when this is calculated on the basis of the quantities of EEE placed on the market in the three previous years.

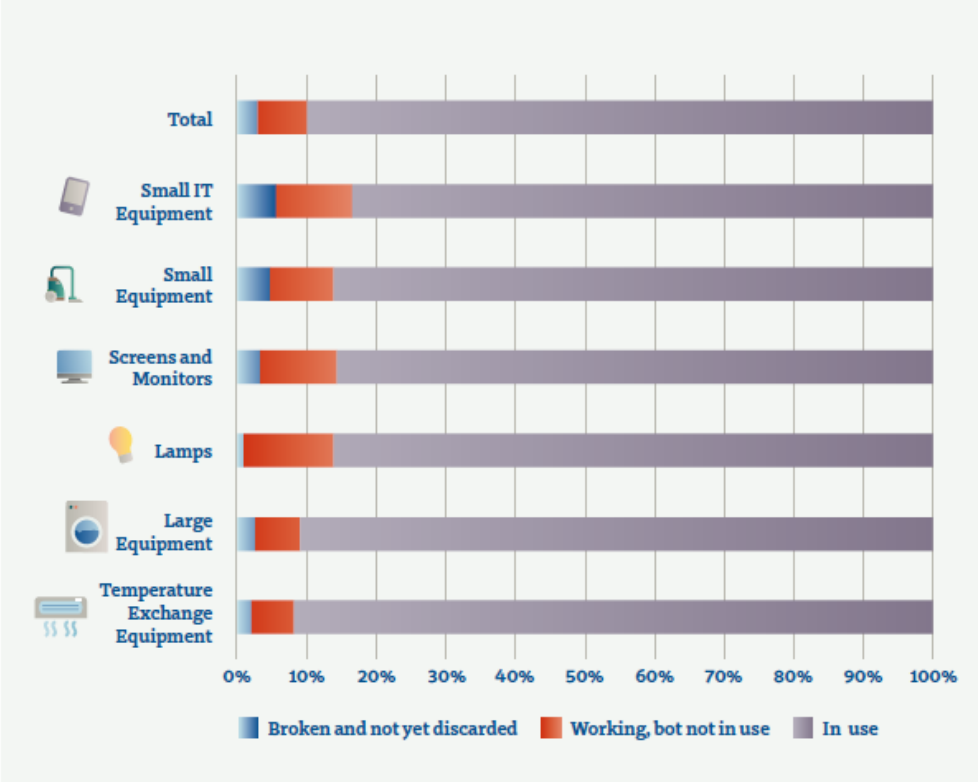
In addition, in 2023 the Commission adopted **Commission Recommendation (EU) 2023/2585**[142] on improving the rate of return of used and waste mobile phones, tablets and laptops to support Member States in increasing the collection rate of these small consumer electronics, which are usually hoarded in households or discarded in municipal waste, and which are rich in critical raw materials (CRMs).

Novel statistics[143] on hoarding – of used EEE and WEEE stored in households – show that households own an average of 74 EEE items (excluding lamps and luminaires), of which 61 items are in use, nine are hoarded but working, and four are hoarded and not working. The total mass of items in households is 90 Mt, of which 7 Mt is hoarded and working, and 3 Mt is hoarded and broken. The small items (including lamps and luminaires) dominate when counted as individual items, whereas large items dominate by weight. The types of EEE or WEEE that are mostly hoarded by comparing the stock in households of that equipment are smaller items, such as small IT equipment (17%) and small equipment (14%). Screens and monitors are third highest at 14% and are comprised of obsolete cathode ray tube monitors, televisions, flat-panels monitors, and televisions replaced by laptops. The lowest hoarding rates are found for category large equipment (9%) and category temperature exchange equipment (8%), which are large in size and therefore often less hoarded when the use phase is over.

[141] OJ L 330, 20.12.2019, p. 72–85.
[142] OJ L, 2023/2585, 20.11.2023.
[143] UNITAR-SCYCLE "Update of WEEE Collection Rates, Targets, Flows, and Hoarding – 2021"

The Recommendation include financial incentives such as discounts, vouchers, deposit-return schemes, or monetary rewards targeting small consumer electronics that still work but remain lying around in households' drawers.

Figure 21: Share of broken, working, and in-use products in the surveyed European households aggregated to WEEE category in 2022 (source UNITAR)



Amendments to the WEEE 2 Directive

In 2018, an amendment to the WEEE 2 Directive[144] consolidated data reporting obligations into a single annual electronic reporting exercise, based on a template established by the Commission. In particular, it was taken into consideration that implementation reports prepared by Member States every three years have not proved to be an effective tool for verifying compliance or ensuring good implementation and were generating unnecessary administrative burdens. Therefore, it was considered appropriate to repeal provisions obliging Member States to produce such reports. Based on this, the obligation of Member States to submit to the Commission, at three-year intervals, a report on the implementation of this Directive on the basis of a questionnaire laid down in Commission Decisions 2004/249/EC[145] and 2005/369/EC[146] has been repealed. The Commission obligation to publish a report on the implementation of the Directive within nine months after receiving the reports from the Member States has also been repealed (Article 16(5) of the WEEE 2 Directive has been deleted). Instead, compliance monitoring has been established based exclusively on the data which Member States report every year to the Commission. Data reported by Member States are essential for the Commission to assess compliance with Union waste law by Member States. The quality, reliability and comparability of data is further improved with the adoption of the Implementing Decision (EU) 2019/2193 mentioned above benchmarking national reporting methodologies and introducing a data quality check report.

In addition, with this amendment Member States are encouraged to make use of economic instruments and other measures to provide incentives for the application of the waste hierarchy.

An amendment to the Waste Directive from the same year[147] established general minimum requirements for extended producer responsibility schemes, including those for WEEE[148]. It also required the modulation of fees paid by the manufacturer or importer to producer responsibility organisations, taking into account Ecodesign aspects, such as durability, reparability, recyclability, and the presence of hazardous substances.

On 25 January 2022, the Court of Justice of the European Union – in its judgment in case C-181/20 – declared Article 13(1) of the WEEE Directive as partially invalid by reason of non-justified retroactive effect. The Directive was amended[149] to align with the Court's ruling, to provide better legal certainty and clarity on the financing of historical WEEE by producers. In addition, with this amendment a new requirement for the review of the Directive by 31 December 2026 has been introduced, including the assessment of the following: i) implementation of the waste hierarchy, ii) provisions that citizens are not burdened with disproportionate costs for collection, recycling and disposal of WEEE, iii) adequate collection targets, iv) prevention of illegal trade of WEEE, v) a potential new photovoltaic panel category and separate collection targets taking into consideration

[144] Directive (EU) 2018/849 of the European Parliament and of the Council of 30 May 2018 amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment (OJ L 150, 14.6.2018, p. 93-99).

[145] OJ L 78, 16.3.2004, p. 56.

[146] OJ L 119, 11.5.2005, p. 13.

[147] Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (OJ L 150, 14.6.2018, p. 109-140).

[148] Directive 2008/98/EC, Article 8a (as modified by Directive (EU) 2018/851).

[149] Directive (EU) 2024/884 of the European Parliament and of the Council of 13 March 2024 amending Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). OJ L, 2024/884, 19.3.2024.

products' lifespan and vi) implementation of producer responsibility. It was also considered that the Commission had committed in the Communication on Critical Raw Materials (CRM)[150] to a review of the WEEE Directive to, inter alia, address CRM-rich equipment in provisions relating to information requirements and recovery targets.

Scope extension

The WEEE 2 Directive, until 2018, utilised the classification system that existed under WEEE 1 Directive consisting of 10 categories of EEE, which helped classifying various types of electrical and electronic equipment based on their functionality and characteristics. However, from 15 August 2018 onwards the scope of the WEEE 2 Directive was widened to include all EEE (open scope) and the classification of EEE changed from 10 product-based categories to six collection-based categories.

During the transitional period, i.e. from 13 August 2012 to 14 August 2018, the scope of the Directive remains the same with the scope of the WEEE 1 Directive with one exemption, the inclusion of photovoltaic panels in category 4 ('Consumer equipment and PV panels'). This means that from the entry into force of the Directive PV panels have been classified in category 4 of Annex I together with consumer equipment. With the implementation of the open scope, PV panels are classified under the general category of large equipment.

Since the inclusion of photovoltaic panels had not been proposed in the Commission's proposal of 2008 on the recast of the WEEE Directive, but it was the co-legislators who decided so, the Commission has carried out a study to assess the impacts of PV panels' inclusion under the scope of the WEEE Directive. That study concluded that the inclusion of PV panel into the scope of the WEEE Directive would have environmental benefits and there would be opportunities for the recovery of secondary raw materials.

The review of the scope of the new WEEE Directive, required under Article 2(5). The Commission in 2017 in its Report to the European Parliament and the Council on the review of the scope of Directive 2012/19/EU on WEEE Directive[151] concluded that there are no significant changes to the scope of the new WEEE Directive as a result of the change to categories of electrical and electronic equipment. The reported concluded that the transition from the 10 to the six 'open' categories is expected to increase legal certainty and bring about greater harmonisation in the implementation of the Directive.

Extended producer responsibility

According to the '**producer responsibility**' principle, producers are required to take responsibility for the management of the waste that will arise from the products that they place on the market when these products reach the end of their life. This responsibility includes also the financing the collection of WEEE arising and the treatment, recovery and environmentally sound disposal of all WEEE collected.

The producer responsibility principle is stipulated in the WEEE 2 Directive under Articles 7(1), 12 and 13. Some additional information for its implementation is provided via recitals (6), (12), (22) and

[150] COM(2023) 165.
[151] COM/2017/0171 final.

(23), the latter clarifying that producers can fulfil their obligations either on their own/ individually or by being part of a collective scheme.

Producers in almost all Member States have established producer responsibility organisations (PROs) to which obligations are delegated and which collect fees from their members and ensure compliance with the relevant EPR requirements. In practice with the fees collected, the PROs set up and cover the costs for the establishment of the collection network, as well as the costs for the treatment, recovery and environmentally sound disposal of all WEEE collected. The number of PROs that has been established in each Member State varies. In some countries, numerous PROs exist, ranging from 2 to 28, while in others, only a single PRO operates. Thus, some Member States have monopolistic systems, which might be the only option due to being a comparatively small Member State, while others have competitive systems. The prevalent model is the competing organisation model. For example, in 2022, 14 Member States implemented the competing organisation model without coordination centre and four Member States with such a centre[152].

Recital (6) states that 'different national applications of the 'producer responsibility' principle may lead to substantial disparities in the financial burden on economic operators'. It is further concluded that the 'essential criteria should be laid down at the level of the Union […]'. In addition to this, the general minimum requirements for extended producer responsibility schemes do apply, as stipulated under Article 8a of the Waste Directive and they have contributed to harmonisation. Even though EPR schemes comply with the minimum requirements set out in the Waste Directive, the implementation of EPR schemes in practice varies greatly among Member States. PROs even in the same country may set different EPR fees for the same category of EEE, they may use different models for the calculation of the fees and they may set up different reporting obligations for producers. For example, PROs may split the six EEE categories under sub-categories, creating thus a significant administrative burden for producers (for example in Greece producers need to report to the PROs the quantities of EEE they place on the market using a classification that consists of 64 categories of product groups).

European standards for WEEE treatment

Pursuant to Article 8(5) of the WEEE Directive, following a mandate by the Commission[153], the European Committee for Electrotechnical Standardization (CENELEC) has developed a series of standards for the treatment of WEEE (including WEEE collection and logistics), and a standard on preparing for reuse (EN 50625 series and EN 50614).

[152] Source: Regulation and competition in the extended producer responsibility models: Results in the WEEE sector in Europe, 2022; WEEE promotion exercise.
[153] Mandate to the European standardisation organisations for standardisation in the field of WEEE M/518, 24 January 2013: Circabc (europa.eu).

Table 5: European standards for the treatment of WEEE developed under the mandate M/518 by CENELEC

EN	Technical specification (TS)
EN 50625-1: 2014 - Collection, logistics & treatment requirements for WEEE - Part 1: General treatment requirements	TS 50625-3-1: 2015 - Collection, logistics & treatment requirements for WEEE – Part 3-1: Specification for de-pollution – General
EN 50625-2-1: 2014 - Collection, logistics & treatment requirements for WEEE – Part 2-1: Treatment requirements for lamps	TS 50625-3-2: 2016 - Collection, logistics & treatment requirements for WEEE – Part 3-2: Technical specification for de-pollution – Lamps
EN 50625-2-2: 2015 - Collection, logistics & treatment requirements for WEEE – Part 2-2: Treatment requirements for WEEE containing CRTs and flat panel displays	TS 50625-3-3: 2017 - Collection, logistics & treatment requirements for WEEE – Part 3-3: Specification for de-pollution - WEEE containing CRTs and flat panel displays
EN 50625-2-3: 2017 - Collection, logistics & Treatment requirements for WEEE – Part 2-3: Treatment requirements for temperature exchange equipment and other WEEE containing VFC and/or VHC	TS 50625-3-4: 2017 - Collection, logistics & treatment requirements for WEEE – Part 3-4: Specification for de-pollution – temperature exchange equipment
EN 50625-2-4: 2017 - Collection, logistics & treatment requirements for WEEE – Part 2-4: Treatment requirements for photovoltaic panels	TS 50625-3-5: 2017 Collection, logistics & treatment requirements for WEEE – Part 3-5: Technical specification for de-pollution - photovoltaic panels
	TS 50625 – 4: 2017 - Collection, logistics & treatment requirements for WEEE – Part 4: Specification for the collection and logistics associated with WEEE
EN 50614: 2020- Requirements for the preparing for re-use of WEEE	

These standards remain voluntary in most Member States. However, six Member States have made the standards obligatory by law, while another four Member States have introduced specific elements of the standards in the national legislation. In addition, there are cases where PROs request compliance with the standards to set up agreements with the treatment facilities.

Table 6: Implementation of the European standards for the treatment of WEEE in the EU-27

Type of implementation	MS
Member States, who made the full EN 50625 series or the corresponding WEEELABEX standards obligatory by law	IE, FR, NL, SI, LT, CZ[154].
Member States with national provisions containing elements of the EN 50625 series, e.g. detailed provisions for treatment of temperature exchange equipment.	AT, PT, ES, SK
Member States having adopted other specific national minimum WEEE treatment requirements going beyond those of the WEEE 2 Directive itself	BE, DE, FR, IE, LU
Member States that did not adopt any minimum treatment requirements going beyond those specified in the WEEE 2 Directive; compliance with EN 50625 is not an obligation.	RO, BG, IT, FI, MT, CY, EE, LV, HR, PL, DK, GR, SE
Member States where all operating PROs request compliance with EN 50625 from the treatment operators under contract (mostly because of the national obligation)	IE, FR, NL SI, GR, LU, BE[155], CZ
Member States where some, but not all, PROs request compliance with EN 50625	DK, DE[156], EE, SE, HU

Source: evaluation study based on submissions by Member States replying to the targeted questionnaire addressed to them, and "Study on quality standards for the treatment of WEEE

To date about 23% of the WEEE treatment facilities established in the EU operate in compliance with these standards, however, the percentage is higher for facilities treating temperature exchange equipment (51%), lamps (53%) and screens (38%)[157].

[154] Since 2023, according to replies to the Member States' questionnaire.

[155] The Belgian PRO Recupel has a market share of 100% for all WEEE categories except for photovoltaic panels.

[156] In Germany, Lightcycle, a collective take-back system set up by producers of lighting equipment with a market share of 75%, requests from its logistic operators to work according to the principles of the CENELEC standards, specifically with TS 50625-4. The producers commissioning recycling operations under the Lightcycle system also request them to work in accordance with the relevant CENELEC standards (see WEEE evaluation supporting study for additional information).

[157] Data gathered in the context of the study supporting the evaluation of the WEEE 2 Directive.

ANNEX IV. TABLE ON SIMPLIFICATION AND BURDEN REDUCTION

Table 7: Overview of simplification and burden reduction

Simplification and burden reduction (savings already achieved)								
	Citizens/Consumers		**Treatment operators**		**Administrations**		**Producers/ PROs**	
	Quantitative	**Comment**	**Quantitative**	**Comment**	**Quantitative**	**Comment**	**Quantitative**	**Comment**
Implementing Regulation (EU) 2017/699 establishing a common methodology for the calculation of the weight of EEE placed on the market of each Member State and a common methodology for the calculation of the quantity of WEEE generated by weight in each Member State					Uniform conditions for the calculation of the minimum annual collection rate of WEEE by the Member States Electronic tools for the estimation of WEEE generated, customised for each Member State[158]			
Implementing Regulation (EU) 2019/290 establishing the format for registration and reporting of producers of electrical and electronic equipment to the register							A common format for registration and reporting to be used in all Member States (by all national registers and for all producers).	
Implementing Decision (EU) 2019/2193 laying down rules for the calculation, verification and reporting of data and establishing data formats					Data on photovoltaic panels are separately reported. This makes it possible to assess how the quantities of PV panels placed on the market affect the annual collection rate, when this is calculated on the basis of the quantities of EEE placed on the market in the three previous years.			

[158] https://environment.ec.europa.eu/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee/implementation-weee-directive_en

Directive (EU) 2018/849 of the European Parliament and of the Council of 30 May 2018 amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment.					Data reporting obligations consolidated into a single annual electronic reporting exercise. Article 16(5) is deleted which brought the following simplifications: 1) for Member States, deletion of the three-year report based on a questionnaire 2) for Commission, deletion of the report on the implementation of the directive		
Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste	Modulation of fees paid by the manufacturer or importer to producer responsibility organisations, considering ecodesign aspects, that eventually leads to better environmental protection					Harmonised general minimum requirements for extended producer responsibility schemes, to: - reduce costs and boost performance. - ensure a level playing field, including for small and medium-sized enterprises and e-commerce enterprises, and avoid obstacles to the smooth functioning of the internal market. - contribute to the incorporation of end-of-life costs into product prices and provide incentives for producers, when designing their products, to take better into account recyclability, reusability, reparability and the presence of hazardous substances. - to overall- improve the governance and transparency of extended producer responsibility schemes.	
Directive (EU) 2024/884 of the European Parliament and of the Council of 13 March 2024 amending Directive 2012/19/EU on waste electrical and electronic equipment						Better legal certainty and clarity on the financing by producers of WEEE resulting from PVs and open scope products	

***Potential* simplification and burden reduction (savings)**								
	Citizens/Consumers		**Treatment operators**		**Administrations**		**Producers/ PROs**	
	Quantitative	**Comment**	**Quantitative**	**Comment**	**Quantitative**	**Comment**	**Quantitative**	**Comment**
Description	n.A.		Minimising changes to reporting frequency is crucial, as even minor alterations can result in significant costs to treatment operators.(MS Submissions to Targeted Questionnaire, 2023)		Implementing a streamlined customs process for checking electrical and electronic equipment, using a unique European company or producer number, can alleviate administrative challenges for monitoring of free-riding producers. (MS Submissions to Targeted Questionnaire, 2023) Minimising changes to reporting frequency is crucial, as even minor alterations can result in significant costs to administrations.(MS Submissions to Targeted Questionnaire, 2023)		Addressing exemptions related to roles and responsibilities, particularly Article 17, Point 1, can reduce confusion and costs.(MS Submissions to Targeted Questionnaire, 2023) Minimising changes to reporting frequency is crucial, as even minor alterations can result in significant costs to producers (MS Submissions to Targeted Questionnaire, 2023)	
					Clear exemptions for small companies and de minimis turnover/amounts, with defined criteria, can reduce administrative burden for both companies and administrations. (Member State Workshop Finland, 2023)			
Type	n.A.		One-off		Recurrent		Recurrent	

ANNEX V: REPORTING REQUIREMENTS

Reporting requirements play a key role in ensuring correct enforcement and proper monitoring of legislation. Their costs are overall largely offset by the benefit they bring, in particular in monitoring and ensuring compliance with key policy measures.

A 'reporting requirement' (RR) is a requirement stemming from EU legislation that obliges Member States authorities, private organisations and/or public organisations to provide (in principle periodically) structured or unstructured data (qualitative or quantitative) to competent authorities at EU or national level. The notion of reporting requirements includes the provision of information from businesses to other businesses or from businesses to consumers, while certification, labelling, permitting, and similar processes are not included.

In the context of the WEEE Directive, eight potential reporting requirements are identified. Of these, one is obsolete and has been already removed (Article 16(5)). Five are foreseen in case Member States would like to go beyond some specific provisions, for environmental reasons or to inform the Commission of amendments of relevant national legislation (Article 5(2)(b), Article 7(1), Article 8(5), Article 22, Article 24(3)). Usually, such provisions are part of the transposition obligation and therefore notified to the Commission once. In such cases the reporting obligations remain relevant only if there is an amendment to the respective provisions. The two remaining ones (in Article 16) are considered proportionate and necessary for the proper implementation of the WEEE Directive: they concern Member State collecting information (Article 16(4)) and reporting to the Commission on an annual basis (Article 16(6)) to comply with the Directive.

Further reduction of requirements for economic operators would only be possible through further harmonisation, which would require a change of legal instrument (from a directive to a regulation). In any case, this would need to be assessed in an impact assessment.

Table 8: Potential reporting requirements

	Article title	***Short description***	***Reporting entity***	***Addressee***	***Frequency***	***Comment***
1	Article 16(5)	Member States' Implementation reports on the basis of questionnaires	Member State	Commission	three-year intervals	Already removed by Directive (EU) 2018/849)

2	Article 7(1)	Member State to report to Commission if they set more ambitious rates for separate collection of WEEE	Member State	Commission		In case Member State goes beyond a specific provision set by the WEEE Directive. Part of the transposition obligation and relevant notification. Reporting obligation applicable if there is an amendment to the relevant provisions.
3	Article 24(3)	Member State to transmit to Commission agreements, with the economic sectors concerned, to transpose provisions of Arts 8(6), 14(2) & 15, and to report to Commission on their results	Member State	Commission		In case Member State goes beyond a specific provision set by the WEEE Directive. Part of the transposition obligation and relevant notification. Reporting obligation applicable if there is an amendment to the relevant provisions.
4	Article 5(2)(b)	Member State making use of derogation from Art 5(2)(b) (return of WEEE to distributor) to inform the Commission	Member State	Commission	When using the derogation (one-off).	In case of derogation of this specific provision. Part of the transposition obligation and relevant notification. Reporting obligation applicable if there is an amendment to the relevant provisions.
5	Article 8(5)	Member State which set up minimum quality standards for treatment of collected WEEE shall inform the Commission thereof	Member State	Commission	When setting up such quality standards	In case Member State goes beyond a specific provision set by the WEEE Directive. Part of the transposition obligation and relevant notification. Reporting obligation applicable if there is an amendment to the relevant provisions.
6	Article 22	Member State to notify Commission of provisions regarding rules on penalties applicable to infringements of the national provisions adopted pursuant to the Directive and notify Commission of any subsequent amendment affecting them.	Member State	Commission	When setting such provisions	Part of the transposition obligation and relevant notification. Reporting obligation applicable if there is an amendment to the relevant provisions.
7	Article 16(6) & (7)	Member States' data on the implementation of the Directive accompanied by a quality check report	Member State	Commission	Each calendar year	Reporting requirement essential for the Commission to assess compliance with WEEE 2 Directive by Member States.
8	Article 16(4)	Member State to collect information on quantities & categories of EEE placed on their markets, collected through all routes, prepared for reuse, recycled & recovered within the Member State, and on separately collected WEEE exported, by weight	Member State	Commission	Annual basis	Reporting requirement essential for the Commission to assess compliance with WEEE 2 Directive by Member States.

ANNEX VI: EVALUATION MATRIX AND DETAILS ON ANSWERS TO THE EVALUATION QUESTIONS (BY CRITERION)

A. Evaluation matrix

The evaluation matrix presented below consolidates information on data collection and the adopted analytical approach. It translates each of the five 'better regulation' criteria into evaluation questions. The matrix describes per question the indicator(s) used to answer the question and what the indicator(s) will measure (either quantitatively or qualitatively), the judgement or success criteria to enable the judgement whether the intervention was successful, the data sources consulted to answer the evaluation questions and the analytical approach.

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
Effectiveness					
[ES.Q.1] What progress has been made towards achieving the objectives and targets of Directive 2012/19/EU since its entry into force? How has the WEEE Directive helped / hindered this progress?	What progress has been made regarding the prevention of WEEE?	Trends in the volumes of EEE placed on the market (tonnes, kg/inh) Trends in WEEE collection (tonnes, kg/inh) Trends in the volumes of WEEE generated (tonnes) Evolution average lifetimes of selected types of EEE (y) Trends in reuse (number of second-hand stores and platforms, repair and refurbishing stores)	Increasing/stagnating/decreasing	WEEE data available at Eurostat WEEE calculation tools Relevant literature Targeted consultation	Quantitative analysis of trends in EEE placed on the market, on WEEE collection and on WEEE generated Quantitative and qualitative analysis of trends in product lifetimes of selected types of EEE
	What progress has been made regarding the separate collection of WEEE?	Trends in overall WEEE collection rates Trends in collection rates for individual WEEE categories Trends in WEEE contents in mixed waste Trends in the numbers of collection points for WEEE from private households	Increasing/stagnating/decreasing trends Increasing/stagnating/decreasing trends Increasing/stagnating/decreasing trends (descriptive)	WEEE data available at Eurostat Relevant literature Targeted consultation (key stakeholders)	Quantitative analysis of trends in collection rates Quantitative and qualitative analysis of trends of WEEE in other (mixed) wastes

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
	What progress has been made regarding the preparation for reuse/recycling/recovery of WEEE?	Trends in recycling rates achieved, 2012 - 2022 Trends in recycling rates of specific materials Trend in separation of WEEE to be prepared for reuse from other separately collected WEEE at collection points Number of collection points which grant access to reuse centres for WEEE to be prepared for reuse	Increasing/stagnating/decreasing trends N/A Descriptive	WEEE data available at Eurostat Relevant literature Targeted consultation	Quantitative analysis of trends
	Has the Directive supported the availability of sufficient, economically accessible sound and safe WEEE recycling capacity?	Numbers of treatment facilities for specific WEEE categories in the MS Relevant types of WEEE for which no specific treatment requirements exist at EU level	Numbers, descriptive N/A Descriptive	Relevant literature Targeted consultation	Qualitative analysis
	What progress has been made in realising environmentally sound handling and proper treatment of WEEE (in and outside the EU) and in using best available techniques for WEEE treatment?	Trend in numbers of treatment facilities working according to the European standards for the treatment of WEEE or comparable requirements Numbers of WEEE treatment facilities working under the regime of the IED	Increasing/stagnating/decreasing trends N/A Descriptive	Relevant literature Desk research Targeted consultation Public consultation	Qualitative and quantitative analysis of treatment facilities working according to European WEEE treatment standards Qualitative analysis of Types of WEEE for which no specific treatment requirements exist on EU level so far
	What progress has been made regarding development of **more sustainable products**?	Trend in the number of countries that have introduced mandatory modulation fees	Increasing/stagnating, descriptive	Relevant literature Targeted consultation	Qualitative analysis Qualitative assessment of legal provisions
[ES.Q.2] Which factors have contributed or hindered the achievement of these objectives?	The question will be evaluated for the main objectives of the Directive as listed above	Type (hindering factor or contributing factor, external factor (outside the scope and control of the WEEE Directive, i.e. trends, policies, legislation) or internal factor (implementation and enforcement issues of the WEEE Directive))	Number and type of identified factors and their relative importance.	Relevant literature Public and targeted consultation	Qualitative analysis of external factors and effects of other EU and international policy
[ES.Q.3] To what extent can the observed achievements or challenges be attributed (causally) to the Directive	The question will be evaluated for all the main objectives of the Directive as listed above	Qualitative description of the role of the Directive	N/A - Descriptive question	Relevant literature Public and targeted consultation	Qualitative analysis

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
[ES.Q.4] What have been the (quantitative and qualitative) effects of the Directive, in terms of its outputs, results and impacts?	What have been the effects of the Directive on the environment and human health during collection and transport of WEEE?	Evidence of potential emissions of pollutants during collection and transport of WEEE Evidence of potential impacts on workers' health and safety at collection points and during transport	Increasing/stagnating/decreasing Increasing/stagnating/decreasing	Relevant literature Targeted stakeholder consultation	Quantitative/qualitative analysis of the evaluation of emissions
	What have been the effects of the Directive on the environment and human health during treatment of WEEE?	Evidence of potential impacts on the environment – Comparison with the potential reduction of emissions during the treatment of WEEE caused by the European standards on WEEE treatment. Trends in the quantities of hazardous substances and components (entries of Annex VII) removed from WEEE Evidence of potential impacts on workers' health and safety during treatment, including recycling, recovery and disposal Potential impacts on workers' health and safety caused by mercury will be compared with potential impacts through other substances (considering also the share of treatment facilities for lamps and flat screens working according to the European standards for the treatment of WEEE)	Increasing/stagnating/decreasing Increasing/stagnating/decreasing Increasing/stagnating/decreasing	Relevant literature Industrial Emissions Portal Targeted consultation	Quantitative/qualitative analysis of emissions and depollution and degree of implementation of European WEEE treatment standards
	What have been the effects of the Directive on the environment and human health during treatment/disposal of WEEE outside the EU?	Trends in the volumes of WEEE leaving the EU (tonnes/year)	Increasing/stagnating/decreasing	Relevant literature Targeted consultation	Qualitative/quantitative analysis using factors from literature to estimate the impacts on the environment and health
	What have been the effects of the Directive on the environment and human health linked to consumption of (primary) resources, including critical raw materials? (through WEEE prevention and recycling of WEEE materials)	Volumes of WEEE materials being recycled (tonnes/year) Volumes of CRM in WEEE sent for preparation for reuse (tonnes/year)	Increasing/stagnating/decreasing Increasing/stagnating/decreasing	Relevant literature Targeted stakeholder consultation	Quantitative analysis of recycled materials (selected materials), including critical raw materials and use of recycled material in new EEE

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
	What have been the effects of the Directive on the functioning of the internal market and competition?	Occurrence of relevant market distortions (incl. emergence of monopolies) Trends in the levels of free-riders	N/A descriptive question (opinion of stakeholders) Descriptive question (opinion of stakeholders) Increasing/stagnating/decreasing	Relevant literature Targeted consultation	
	What have been the effects of the Directive on employment within the EU?	Trends in the numbers of employees in the WEEE collection and treatment sector Trends in the size of the repair and reuse sector Did the Directive have substantial effects on the size of related sectors (technology providers, auditing, PROs etc.)	Increasing/stagnating/decreasing, descriptive question Increasing/stagnating/decreasing, descriptive question Opinion of stakeholders	Relevant literature Targeted consultation	Quantitative/qualitative analysis of trends in size of the sectors possibly affected by the Directive
	What have been the effects on research and innovation?	Number of research projects/studies and funds in MS and at EU level since 2012 Trends in the number of patents for WEEE recycling techniques	N/A descriptive question Increasing/Stagnating/Decreasing Increasing/Stagnating/Decreasing N/A description of opinions	Relevant literature EU Project (e.g. Horizon and Life) databases Public and targeted consultation	Quantitative and qualitative analysis of scientific activities in the field of WEEE management
	What have been the effects on administrative burden?	Evolution in the number and size of reports submitted to the EU that have to prepared by MS under the The number of authorised representatives established in the EU	Increasing/Stagnating/Decreasing	Desk research Relevant literature Targeted stakeholder consultation	Quantitative and qualitative analysis of administrative cost for different stakeholder groups
[ES.Q.5] Beyond its objectives, did the implementation of the Directive lead to any other unexpected and/or unintended results?	What have been the effects on knowledge transfer and cooperation within the WEEE sector?	Relevant guidance documents/standards developed at EU level since 2012 Number of projects and platforms funded in the WEEE sector linked to the implementation of WEEE Directive provisions	N/A Descriptive question (opinion of stakeholders) N/A Descriptive question (opinion of stakeholders)	Relevant literature Public and targeted consultation	Quantitative and qualitative analysis of knowledge transfer activities
	Has the implementation of the Directive helped creating a role model for managing other waste streams?	Waste streams, for which legislation has been adopted taking into account experiences from the implementation of the WEEE Directive	N/A – Descriptive question	Desk search	Qualitative analysis
	Has the Directive influenced/ inspired the development of similar legislation outside the EU	WEEE legislation / guidance in other countries inspired by the EU WEEE Directive	N/A – Descriptive question	Relevant literature	Qualitative analysis and description
Efficiency					

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
[EY.Q.1] What are the costs associated with the implementation of the Directive in different Member States and between different stakeholder groups?	What are the types of costs (direct and indirect) associated with the implementation of the Directive?	Identification of cost structure and trends. The Better Regulation Framework is used as a starting point and the direct costs will be by: • Adjustment costs • Administrative costs • Enforcement costs • Hassle costs And the indirect costs by: • Indirect economic costs • Indirect social costs	Descriptive question as well as trend analysis based on costs increasing/stagnating/decreasing	Relevant literature Key stakeholder interviews/ Workshops with specific stakeholder groups Open Public Questionnaire	Where relevant quantitative data is available: descriptive analysis with quantitative graphs of relative and total costs Analysis of consultation findings Triangulation of stakeholder views Where possible it will be analysed whether the cost structure have changed over time (i.e. analysis of the trends with respect to the different cost categories)
	Are there significant cost differences between Member States and why?	Evidence of specific examples of cost differences or congruence between Member States, with a graphic display of quantitative results where possible Evidence of the drivers and consequences of cost differences between Member States	Descriptive comparison	Relevant literature Key stakeholder interviews/ Workshops with specific stakeholder groups Open Public Questionnaire	Collection of cost estimates from Member State authorities Analysis of consultation findings Triangulation of stakeholder views Descriptive analysis of stated implementation costs of Member States
	Are there significant cost differences between stakeholder groups and why?	Evidence of specific examples of cost differences or congruence between stakeholders, with a graphic display of quantitative results where possible. Evidence of the drivers and consequences of cost differences between stakeholders	Descriptive comparison	Relevant literature Key stakeholder interviews/ Workshops with specific stakeholder groups Open Public Questionnaire	Collection of cost estimates from stakeholders Analysis of consultation findings Triangulation of stakeholder views

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
					Descriptive analysis of stated implementation costs of stakeholders
	What other (external) factors influence the costs?	Opinion of stakeholders with regard to other external factors influencing the costs	N/A – Descriptive question	Relevant literature Key stakeholder interviews/ Workshops with specific stakeholder groups Open Public Questionnaire	Analysis of consultation findings Triangulation of stakeholder views Desk review
[EY.Q.2] Are the costs proportional to the benefits achieved and how does it vary between stakeholder groups and Member States?	Are the costs proportional to the benefits achieved?	Opinion of stakeholders whether the costs of the Directive are justified by the benefits delivered Assessment of cost structure and volume based on the indicators above	Benefits exceed costs	Triangulation of findings from previous data collection listed above	Comparison between the benefits and the costs estimated in the actual and baseline scenarios through application of scoring system (described above)
	How does costs relative to the benefits vary between different stakeholder groups?	Assessment of cost structure and volume based on the indicators above based on different stakeholder groups Opinion of stakeholders whether the costs of the Directive are justified by the benefits delivered	Most stakeholders agree that the costs are justified by the benefits	Relevant literature Key stakeholder interviews/ Workshops with specific stakeholder groups Open Public Questionnaire	Comparison between the benefits and the costs estimated in the actual and baseline scenarios through application of scoring system for each stakeholder group
	How does costs relative to the benefits vary between different Member States?	Assessment of cost structure and volume based on the indicators above based on different Member States Opinion of representatives from Member States whether the costs of the Directive are justified by the benefits delivered	Most Member States agree that the costs are justified by the benefits	Relevant literature Key stakeholder interviews/ Workshops with specific stakeholder groups Open Public Questionnaire	Comparison between the benefits and the costs estimated in the actual and baseline scenarios through application of scoring system for each Member State
[EY.Q.3] What factors influenced the efficiency and what good or bad practices can be identified?	Are there differences in efficiency related to the characteristics inherent to different categories of EEE?	Description of specific examples of differences in costs and benefits of the Directive among different categories of EEE Reasons for differences between categories of EEE	Identification of cost differences between different categories of EEE	Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Relevant literature	Analysis of consultation findings Triangulation of stakeholder views

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
	If there are significant cost/benefit differences between Member States or stakeholder groups, what is causing them?	Qualitative assessment of differences and drivers of the differences based on stakeholder/Member State opinions	Identification of common factors identified through the data collection	Relevant literature Key stakeholder interviews/ Workshops with specific stakeholder groups	Triangulation of information gained from data collection
	What, if any, good or bad practices in terms of cost-effective implementation of the Directive can be identified in the Member States?	Qualitative descriptions of good and bad practices emerging from Member State consultations	Practices in the implementation of the Directive described by Member States emerge as overly costly, or on the contrary, particularly efficient	Interviews/ Workshops with specific stakeholder groups	Analysis of consultation findings Triangulation of Member State views Assessment of the efficiency of the Directive elicit examples of good or bad practices in implementing, complying or enforcing the Directive
[EY.Q.4] Is there potential to reduce inefficiencies and strengthen implementation of the WEEE Directive?	N/A	Stakeholders indicate simplifications to address regulatory burden and complexity Description of most relevant example of simplifications to address regulatory burden and complexity, creating unnecessary regulatory costs	Elements of the Directive that could be simplified or are superfluous are identified	Desk research Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups	Analysis of consultation findings Triangulation of stakeholder views Assessment of the feasibility to implement simplifications reducing unnecessary regulatory burden or complexity identified by stakeholders
Relevance					
[RE.Q.1] Are the current and foreseeable future needs and problems still sufficiently addressed by the objectives, scope and measures of the WEEE 2 Directive	Are the provisions of Article 4 of the WEEE 2 Directive (Product design) still relevant?	Product design of EEE, technological developments of major product groups	Stakeholders' opinion	Stakeholder consultation	Analysis of consultation findings
	Are the collection and treatment requirements of the WEEE 2 Directive still adequate to contribute to zero pollution and resource efficiency objectives?	Composition of arising WEEE (material composition including critical raw materials and hazardous substances, changing contribution of specific WEEE types).	Significant changes in the WEEE composition Stakeholders' opinion on the appropriateness of the current collection and treatment requirements	WEEE composition data (ProSUM database, FutuRaM) Stakeholder consultation	Desk research Analysis of consultation findings

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
	Do advancements in waste treatment technologies require amendments of the objectives, scope and measures of the Directive?	Trends in the technical advancements (waste treatment, recycling)	Evidence of treatment technologies not addressed in existing requirements Stakeholders' opinions on whether the Directive (in)sufficiently reflects treatment reality and relevant substances	Literature Stakeholder consultation	Desk research Analysis of consultation findings
	Do (quantitative) changes regarding generation, collection and treatment of WEEE require amendments of the objectives, scope and measures of the Directive?	Significant changes in the generation, collection and treatment of WEEE	Identified continued generation, collection and treatment of WEEE Stakeholders provide evidence that the Directive requires amendments of the objectives, scope and measures	Eurostat, Literature, Stakeholder consultation	Desk research
[RE.Q.2] Does the WEEE Directive help enhance the efficient use of resources, retrieve valuable secondary raw materials and establish a well-functioning single market for waste treatment services and secondary raw materials within a more circular EU economy?	Do the current recycling targets help retrieving valuable secondary raw materials?	Trend in recycling rates Trends in the use of secondary raw materials in EEE Stakeholders' perception on the appropriateness of the current recycling/recovery targets	Identified performance concerning recycling rates Identified continued use of primary materials compared to secondary raw materials Stakeholders provide evidence that the recovery of raw materials is still a main concern and possibly done inadequately, justifying the continued need for the Directive	Eurostat data Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Public consultation Literature on use of secondary raw materials	Desk review (analysis of trends) Analysis of consultation findings Triangulation of expert/stakeholder views
	Does the Directive help establish a well-functioning single market for secondary raw materials?	Trends concerning availability of secondary raw materials Stakeholders' perception on functioning of the single market for secondary raw material	Availability of secondary raw materials in comparison to primary raw materials Stakeholders provide evidence that the single market for secondary raw materials functions (in)adequate.	Literature findings Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Literature on use of secondary raw materials	Desk review (analysis of trends) Analysis of consultation findings Triangulation of expert/stakeholder views
[RE.Q.3] Is the Directive fit for purpose with the new challenges and developments of today and in the future, such as growing consumption, digitalisation, development	Are the needs caused by further digitalisation (in the context of the EU's digital strategy) sufficiently addressed in the WEEE Directive?	Literature findings concerning the consequences of digitalisation on the collection and treatment of WEEE Stakeholders' perception of future needs and how they are met	Evidence found for needs cause by digitalisation. Stakeholders provide evidence that digitalisation and advancements cause by it are (in)adequately addressed in the directive.	Literature findings Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Literature on use of secondary raw materials	Desk review (analysis of trends) Analysis of consultation findings Triangulation of expert/stakeholder views

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
of renewables and online sales?	Are needs caused by increased popularity of online sales sufficiently addressed in the WEEE Directive?	Expected trends in the online sales market (within the EU and from third countries) Stakeholder perception of how online sales impact current and future needs of the EU	Statistics on the online sales market Evidence provided by stakeholders (e.g. in regard to enforcement and checks in the online sales market)	Reports on European E-commerce sector Eurostat (e.g. code [isoc_ec_esel n2]) Stakeholder consultation	Desk review (analysis of trends) Analysis of consultation findings Triangulation of expert opinion and stakeholder views
[RE.Q.4] How well adapted and flexible is the Directive to technological and scientific advances	How flexible is the Directive to scientific advances and technical progress, including recent developments in treatment/recovery technologies for WEEE (materials), recent developments regarding minimum treatment requirements, new EEE technologies resulting in changed WEEE streams with different material compositions as well as scientific evidence regarding substances of concern used in EEE?	Development and technical advances in the treatment of WEEE Development of new EEE technologies resulting in changed WEEE streams with different material compositions as well as scientific evidence regarding substances of concern Stakeholders' perception of the degree of flexibility allowed within the Directive to adapt to technical and scientific progress	New trends in the collection and treatment of WEEE New hazardous substances in EEE or Technical and Scientific developments that should affect the scope of the Directive have been addressed Stakeholders provide evidence that scientific advances and technical progress are (in)adequately addressed in the directive.	Desk research Key stakeholder interviews/ Workshops with specific stakeholder groups Targeted survey Public consultation	Analysis of trends in the development of technical advances and new substances and their consideration by the Directive Analysis of consultation findings Triangulation of expert/stakeholder views
[RE.Q.5] Are there obsolete provisions in the Directive?	Are there any provisions in the Directive that are deemed obsolete also due to changing needs of markets or technical progress?	Literature findings highlighting obsolete provision Stakeholders' perception	Stakeholders provide evidence that provision are outdated or obsolete Evidence found in literature suggestion obsolete provision	Desk research Key stakeholder interviews/ Workshops with specific stakeholder groups Targeted survey	Analysis of literature Analysis of consultation findings Triangulation of expert/stakeholder views
[RE.Q.6] How relevant is the WEEE Directive with regard to EU circular economy, raw materials and climate actions / renewable energy policy objectives?	Are the current non-material and input-based recycling/recovery rates appropriate to implement a circular economy within the EU	Comparison of actual material recycling with policy objectives	Distance to objectives	Desk research	Analysis of literature Analysis of consultation findings
	Is promoting preparation of reuse a hindrance to keep CRM in the EU	Volumes of WEEE prepared for reuse leaving the EU	Share of WEEE prepared for reuse leaving the EU compared to overall EEE market in EU	Eurostat data Consultation	Analysis of literature Analysis of consultation findings

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
	Are the needs caused by the expected trends in the collection and treatment of PV panels and other renewable technologies in scope in view of a shift to greater renewable energy production sufficiently addressed in the WEEE Directive?	Expected trends in the collection and treatment of PV Stakeholders' perception of future needs and how they could be met	Evidence found for need of further actions cause by the shift to renewable energy	Literature findings Eurostat data on PV Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Literature on use of secondary raw materials	Desk review (analysis of trends) Analysis of consultation findings Triangulation of expert/stakeholder views
Coherence					
[CO.Q.1] To what extent is the WEEE Directive coherent with other EU environmental policy objectives (in particular the transition to a circular economy, environmentally sound waste management, recovery of precious and critical raw materials, reduction/ substitution of hazardous substances in electrical and electronic equipment, the Plastics Strategy) and to other interventions with similar objectives (Restrictions of hazardous substances in EEE (RoHS) Directive, Waste Directive, Batteries Directive, End-of-life Vehicles (ELV) Directive, Waste Shipments Regulation, Ecodesign Directive and the proposed Ecodesign for Sustainable Products Regulation, CRM Act, F-gas Regulation)? Are there any particular strengths, efficiencies,	-	Number and objective of environmental policies Number of and objectives of other waste streams policies/ objectives Existence of contradictions, overlaps or conflicts with other EU environmental policy objectives and to other interventions with similar objectives	There are no contradictions, overlaps or conflicts	Legal, policy and technical sources Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Public consultation	Legal analysis of the Directive Desk review Analysis of consultation findings Triangulation of expert/stakeholder views

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
synergies, weaknesses, inconsistencies, overlaps, contradictions, etc.					
[CO.Q.2] To what extent is the Directive coherent with wider EU policy objectives (e.g. renewable energy policies, digital transition, EU Green Deal, CEAP, Climate Targets, Fitfor55, etc.)?	Does the WEEE Directive conflict with overarching EU legislation, or are objectives, restrictions, obligations defined differently or in contradiction?	Number of and objectives of wider EU policy objectives Existence of contradictions, overlaps or conflicts with overarching EU legislation	There are no contradictions, overlaps or conflicts	Legal, policy and technical sources Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Public consultation	Legal analysis of the Directive Desk review Analysis of consultation findings Triangulation of expert/stakeholder views
[CO.Q.3] To what extent is the WEEE Directive internally consistent and coherent? Are there any provisions in the WEEE Directive that are not consistent and coherent?	To what extent is the WEEE Directive´s internal structure and content coherent? Are there any gaps, contradictions, overlaps or missing links within the WEEE Directive?	Existence of gaps within the Directive Existence of contradictions, overlaps or missing links within the Directive	There are no gaps within the Directive There are no contradictions, overlaps or missing links within the Directive	Legal, policy and technical sources Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Public consultation	Legal analysis of the Directive Desk review Analysis of consultation findings Triangulation of expert/stakeholder views
[CO.Q.4] To what extent is the WEEE Directive consistent and coherent with relevant international policies and instruments (e.g. Basel Convention, Sustainable Development Goals, etc.)?	-	Number and objective of relevant international environmental policies Existence of contradictions, overlaps or conflicts with other international environmental policy objectives and to other interventions with similar objectives	There are no contradictions, overlaps or conflicts	Legal, policy and technical sources Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Public consultation	Legal analysis of the Directive Desk review Analysis of consultation findings Triangulation of expert/stakeholder views
EU added value					
[EU.Q.1] What is the added value resulting from the Directive compared to what Member States could have reached acting alone, at national, international and regional levels, and applying different national rules for	What have been the costs and benefits of the WEEE Directive compared to what could be achieve by Member States on a national level?	Baseline scenario: situation where there is no EU Directive and Member States implement relevant legislation at national level Opinion of stakeholders on the additional value (e.g. higher level of ambition, less administrative costs) of the Directive compared to what could reasonably have been achieved at national level	Stakeholders identify the advantages and disadvantages of the Directive in terms of higher benefits, lower costs, evidence/ examples of additional value Advantages and disadvantages linked to elements of the Directive i.e. to common procedures and common requirement for collection and proper treatment	Public consultation Key stakeholder interviews/ Workshops with specific stakeholder groups Relevant literature Stakeholder conference	Comparative analysis of costs and benefits in the baseline scenario compared to the current situation Triangulation of stakeholder views Baseline analysis

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
the management of WEEE across the EU?		Evidence/examples of advantages and disadvantages of having a common approach for WEEE under the Directive compared to what could reasonably have been achieved at national level			
	To what extent do the issues addressed by the WEEE Directive continue to require action at EU level?	Opinion of the stakeholders on whether the issues addressed by the Directive continue to require action at EU level Evidence/examples that the issues addressed by the Directive continue to require action at EU level	Stakeholders agree that there is a need for regulating hazardous substances in EEEs at EU level	Public consultation Key stakeholder interviews/ Workshops with specific stakeholder groups Relevant literature Stakeholder conference	Analysis across all evaluation criteria Triangulation of stakeholder views
[EU.Q.2] To what extent does the initiative comply with the principles of subsidiarity and proportionality?	To what extent does the WEEE Directive comply with the principle of subsidiarity?	Opinion of the stakeholders on whether the objective of the action could not be achieved sufficiently by the Member States Evidence/examples that the objective of the action could not be achieved sufficiently by the Member	The number of provisions of the Directive complies with the principle of subsidiarity	Legal, policy and technical sources Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Public consultation	Desk review Analysis of consultation findings Triangulation of expert/stakeholder views
	To what extent does the WEEE Directive comply with the principle of proportionality?	Opinion of the stakeholders on whether the Directive is proportionate to the type of intervention, the importance of the objective, and the magnitude of the expected or observed impacts Evidence/examples that the Directive complies with the principle of proportionality	The Directive complies with the principle of proportionality	Legal, policy and technical sources Targeted survey Key stakeholder interviews/ Workshops with specific stakeholder groups Public consultation	Desk review Analysis of consultation findings Triangulation of expert/stakeholder views
[EU.Q.3] What would be the consequences of withdrawing existing EU intervention?	What would be the most likely consequences of stopping or withdrawing the existing EU intervention?	Baseline scenario: situation where there is no EU Directive and Member States implement relevant legislation at national level Opinion of stakeholders regarding the likely consequences of stopping or withdrawing the Directive Evidence/examples that stopping or withdrawing the Directive would have positive /no/negative consequences	A majority of stakeholders identify negative consequences linked to stopping or withdrawing the Directive	Public consultation Key stakeholder interviews/ Workshops with specific stakeholder groups Relevant literature Stakeholder conference	Analysis across all evaluation criteria Triangulation of stakeholder views
	Is the WEEE Directive responsible for any barriers,	Opinion of stakeholders on whether the EU single market for EEEs is fully functioning	Stakeholders agree that the EU single market is fully functioning	Public consultation	Analysis across all evaluation criteria

Evaluation questions	Sub-questions	Indicator	Judgement criteria	Data sources	Analytical approach
	which prevent trade of (W)EEE?	Evidence/examples that the EU single market for EEEs is fully functioning/ not functioning Evidence/examples of barriers that prevent trade of EEEs and waste EEEs	Evidence/examples that the EU single market for EEE is fully functioning/ not functioning are identified Lack of evidence/examples of barriers that prevent trade of EEEs and waste EEEs	Key stakeholder interviews/ Workshops with specific stakeholder groups Relevant literature Stakeholder conference	Triangulation of stakeholder views

B. Brief answers to the evaluation questions (EQs) and details of the evidence base

In the following, questions and their respective factual answers are reported by evaluation criterion. The coverage allocated to each criterion varies depending on its importance and the depth of the evidence/analysis presented Chapter 4 of this evaluation report. Details of the evidence base are reported where relevant for ensuring a clear understanding of the answer.

Effectiveness

[ES.Q.1] What progress has been made towards achieving the objectives and targets of Directive 2012/19/EU since its entry into force? How has the WEEE Directive helped / hindered this progress?

Answer:

The WEEE 2 Directive has had limited success in waste prevention efforts, with the volumes of EEE placed on the market and WEEE generated steadily increasing. Repair of EEE has seen growth in specific sectors, primarily household appliances.

Despite increasing collection rates achieved by Member States, only three Member States met the collection target by 2020 and only two in 2021. About 46% of WEEE generated in the EU is not separately collected, but either illegally exported, or discarded in metal scrap, or there is no information about it (unknown whereabouts). It is likely that the collection target of the Directive contributed to the improvements.

The measures of the Directive have not significantly increased preparation for reuse, recycling, or recovery of WEEE materials. While preparation for reuse has slightly increased, it remains low at less than 2%, and the overall recycling rate has plateaued between 80% and 84% from 2012 to 2021. Challenges remain in achieving high-quality recycling for various materials, particularly plastics and glass.

Overall, it is concluded, that the Directive – via EPR - has supported the availability of sufficient capacities for WEEE treatment according to its Article 8. However, the provisions of the Directive did not provide enough incentives to establish recycling processes for all WEEE materials. Recycling of specific (critical raw) materials from WEEE is mainly economically driven.

The implementation of environmental sound handling and proper treatment of WEEE in the EU has been successful to a certain extent and is also linked to the implementation of the European standards for the treatment of WEEE developed following a Commission's mandate.

The Directive's measures have not been sufficient to curb the uncontrolled export of WEEE from the EU, with the share of uncontrolled exports increasing from 22% in 2010 to 25% in 2020.

The WEEE Directive was hindering further progress by the following main factors: The recycling targets set by the WEEE 2 Directive and enhanced targets adopted in 2018 seem not sufficiently ambitious. Realising environmentally sound handling and proper treatment of WEEE throughout the whole Union is currently hindered by the fact, that there is not a level playing field regarding the WEEE treatment requirements applied in the Member States and the implementation of the European standards for the treatment of WEEE, which are not mandatory at the EU level. The Directive´s requirements related to inspection and monitoring of its implementation under Article 23 are not extensive.

Details of the evidence base:

Following the entry into force of the WEEE 2 Directive in 2012 and its transposition in national law in 2014, the **amount of EEE placed on the market (PoM)** is still increasing. The amount of EEE PoM within the EU (EU-27) was around 7.5 m tonnes in the years 2012 and 2014. However, by 2020, this number had surged by more than 60% to exceed 12 m tonnes. An increase in EEE PoM can be observed throughout the EU-27. The only exception is Malta, where the amount of EEE PoM had decreased between 2012 and 2020 by 20%.

In Figure 22 the development of EEE PoM in kg per capita within the EU-27 is depicted. The evaluation of the trends in the volumes of EEE PoM between 2012 and 2020 shows an increase from 17.3 kg EEE PoM/capita in 2012 to 27.7 kg EEE PoM/capita in 2020. Furthermore, considering the standard deviation[159] derived from individual data provided by each Member State, a consistent and reliable trend, which is subject to little fluctuation, can be observed.

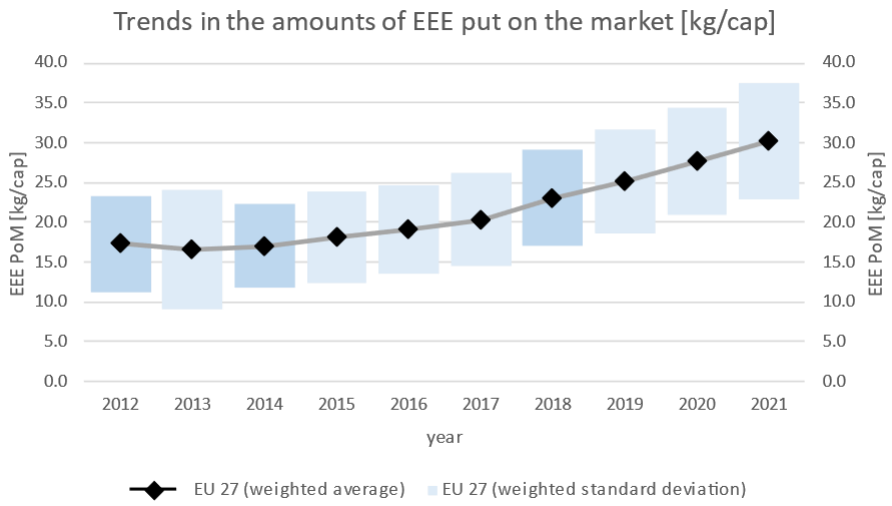


Figure 22: Trends in the amounts of EEE placed on the market between 2012 and 2020, geographical scope=EU-27. Data for 2021 contains estimates. Given in kg per capita. Based on Eurostat (2024); database ENV_WASELEEOS

[159] Standard deviation is a statistical measure that quantifies the amount of variation or dispersion in a set of data points, indicating how closely data points cluster around the mean.

In the EU-27[160], **WEEE separately collected** and reported increased from around 3 m tonnes in 2012 to 4.7 m tonnes in 2020 and about 5 m tonnes in 2021, representing an increase of almost 67% over the evaluation period. Throughout all countries the amount of WEEE collected increased in this period. One exception is represented by Sweden, where the amount of WEEE collected decreased by >10% between 2012 and 2020[161].

On average, in the EU-27, WEEE collected per capita increased from 6.7 to 10.6 kg/cap between 2012 and 2020. The respective trend line is depicted in Figure 23 showing a stable rise in WEEE collected.

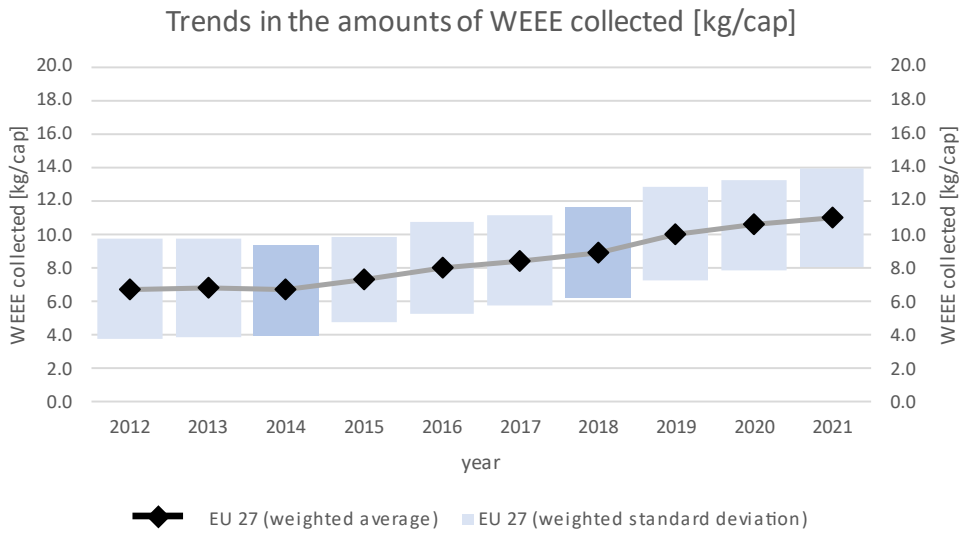


Figure 23: Trends in the amounts of WEEE collected between 2012 and 2021, geographical scope=EU-27. Given in kg per capita. Data for 2021 contains estimates. Based on Eurostat (2024); database ENV_WASELEEOS

Figure 24 below depicts the collection rates per Member State in 2021. Only Bulgaria and Slovakia have met the collection target of 65%[162]. Previously, also Bulgaria, Croatia and Finland had reached the collection target in reference year 2020.

[160] Data is presented for EU-27 as today (i.e. excluding UK).
[161] The Swedish Environmental Protection Agency explains the decrease in WEEE collected with a decrease in cathode ray tube (CRT) products. In the years leading up to 2010, flat-screen televisions and monitors rapidly dominated the Swedish market within a short span of time. However, the disposal of CRT products persisted for several years thereafter. Presently, the number of CRT products in possession of consumers has become nearly zero. Consequently, there is no longer an accumulation of 'bulky' waste stemming CRT products.
[162] In accordance with Article 7(3) of the WEEE 2 Directive, there are nine Member States that made use of the possibility to derogate from the deadline set in the Directive regarding the WEEE collection targets: Bulgaria, Czechia, Latvia, Lithuania, Malta, Poland, Romania, Slovenia and Slovakia.

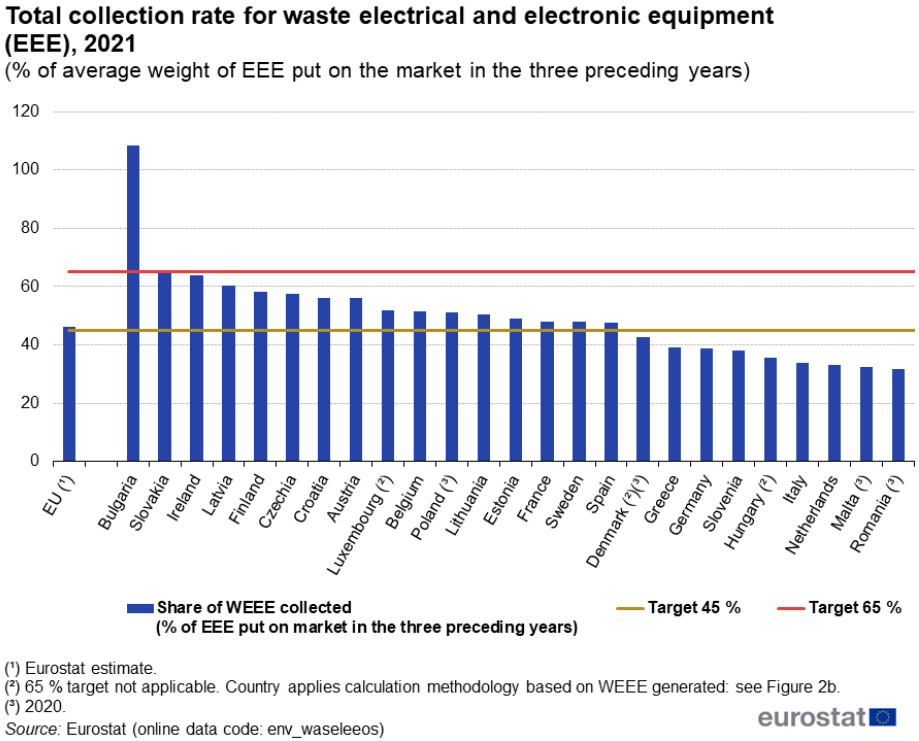


Figure 24: Total collection rate for WEEE, 2021 (% of the average weight of EEE put on the market in the three proceeding years (2018-20120)) (Eurostat, 2023b)

WEEE flows, that are not separately collected represent 46% of WEEE generated. Baldé et al. (2020) estimates that in 2018 1.4 ± 0.5 kg/cap of WEEE end up in waste bins, 2.1 ± 1.3 kg/cap of WEEE are disposed of as metal scrap, 0.5 kg/cap are exported as used EEE and 0.5-1.4 kg/cap are illegal WEEE exports from the EU. Baldé, Iattoni, et al. (2022) present a comparison of estimated WEEE flows between 2010 and 2020. For the reference year 2010, there is a lack of distinct information on the final destination of WEEE that is not separately collected. Values are presented in Figure 25 . It should be noted that the figures for 2020 have been also updated.

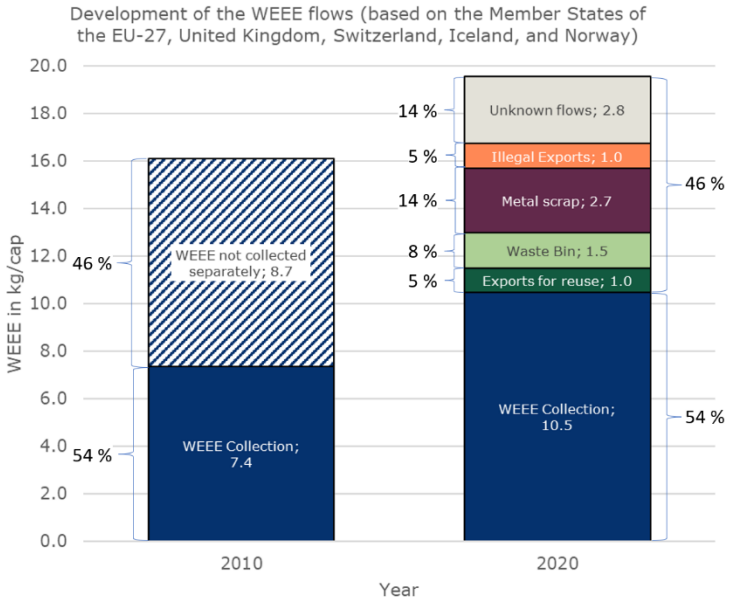


Figure 25: Development of WEEE flows between 2010 and 2020 according to Baldé, Iattoni, et al. (2022)

On average, the **preparation for reuse rate** across the EU-27 was between 0.6% and 1.7% from 2012 to 2020.

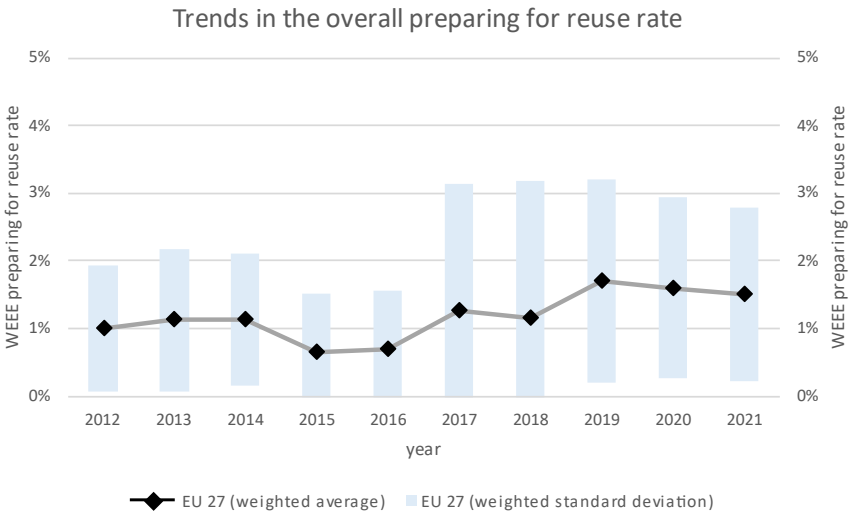


Figure 26: Development in the WEEE preparing for reuse rate between 2012 and 2021, scope=EU-27. Data for 2021 contains estimates. Based on Eurostat (2024); database ENV_WASELEEOS.

The evaluation of WEEE data shows that recycling and recovery rates have remained stable between 2012 and 2020. The European (EU-27) average recycling rate lays consistently between 80-85%. The average recovery rate (excluding recycling operations) was between 6-8%.

Figure 27: Development in the WEEE recycling and recovery rate between 2012 and 2021, scope=EU-27. Data for 2021 contains estimates. Based on Eurostat (2024); database ENV_WASELEEOS. Recycling/Recovery rates= Amount of WEEE entering a recycling/recovery facility divided by the amount of WEEE collected.

In 2019/2020 in total 2 724 facilities **for the initial treatment of WEEE**, with a minimum capacity of about 3 m t/a, operated in the EU-27. A summary of the facilities per WEEE category is provided in Table 8 below. According to feedback by Member States during the evaluation study the overall number did not significantly change since then (2 711 facilities in 2023). The table includes also information in which countries no/insufficient capacities exist.

Table 9: Overview on treatment capacities for the initial treatment of WEEE (Source: Tesar et al. 2021; Member States' consultation within the evaluation study)

	Cat 1 Temperature exchange equipment	Cat 2 Screens	Cat 3 Lamps	Cat 4 Large equipment	Cat 4 PV panels	Cat 5 Small Equipment	Cat 6 Small IT and telecommunication equipment
Number of facilities in the EU-27	108 68 (step II*)	149	50	min. 940	25	min. 681	min. 657
MS with missing/insufficient capacities	EE CY IE LU LV MT SI PT	LU NL DK CZ CY RO***	AT EE LU NL SI BG**		ES LT HU NL DK	DK CY	DK CY
** Step II treatment = shredding of the insulation and recovery of the blowing agents*							
***no information for Bulgaria, *** no information for Romania,*							
CAT 1: Temperature exchange equipment; CAT 2: Screens: CAT 3: Lamps; Cat 4 (a): Large equipment / PV; Cat 4 (b): PV panels; CAT 5: Small equipment; CAT 6: Small IT and telecommunication equipment							

The WEEE 2 Directive mandated the development of **European standards for the treatment of WEEE** reflecting the present state of the art. On this basis, the European Committee for Electrotechnical Standardization (CENELEC) has developed a series of European standards for the treatment of WEEE.

Table 10: Standardisation deliverables developed under the mandate M/518 by CENELEC

EN	Technical specification (TS)
EN 50625-1: 2014 - Collection, logistics & treatment requirements for WEEE - Part 1: General treatment requirements	TS 50625-3-1: 2015 - Collection, logistics & treatment requirements for WEEE – Part 3-1: Specification for de-pollution – General
EN 50625-2-1: 2014 - Collection, logistics & treatment requirements for WEEE – Part 2-1: Treatment requirements for lamps	TS 50625-3-2: 2016 - Collection, logistics & treatment requirements for WEEE – Part 3-2: Technical specification for de-pollution – Lamps
EN 50625-2-2: 2015 - Collection, logistics & treatment requirements for WEEE – Part 2-2: Treatment requirements for WEEE containing CRTs and flat panel displays	TS 50625-3-3: 2017 - Collection, logistics & treatment requirements for WEEE – Part 3-3: Specification for de-pollution - WEEE containing CRTs and flat panel displays
EN 50625-2-3: 2017 - Collection, logistics & Treatment requirements for WEEE – Part 2-3: Treatment requirements for temperature exchange equipment and other WEEE containing VFC and/or VHC	TS 50625-3-4: 2017 - Collection, logistics & treatment requirements for WEEE – Part 3-4: Specification for de-pollution – temperature exchange equipment
EN 50625-2-4: 2017 - Collection, logistics & treatment requirements for WEEE – Part 2-4: Treatment requirements for photovoltaic panels	TS 50625-3-5: 2017 Collection, logistics & treatment requirements for WEEE – Part 3-5: Technical specification for de-pollution - photovoltaic panels
	TS 50625 – 4: 2017 - Collection, logistics & treatment requirements for WEEE – Part 4: Specification for the collection and logistics associated with WEEE

Regarding **treatment facilities,** as of 2019/2020 approximately **627**[163] out of the about 2 724 WEEE treatment facilities in the EU-27 were operated in compliance with EN 50625. Table 10 shows the situation with regard to the individual WEEE categories/streams. Most widely applied are the standards for the treatment of temperature exchange equipment containing VFC/VHC and for lamps (53%, respectively 51% of the facilities), followed by the standards for the treatment of screens (38% of the facilities). As regards **collection and transport** of WEEE, only few operators or collection systems in 2019/2020 worked in compliance with the Technical Specification 50625 – 4 '*Collection, logistics & treatment requirements for WEEE – Part 4: Specification for the collection and logistics associated with WEEE*'.

Table 11: Overview on EU WEEE treatment facilities working in compliance with EN 50256, in 2019/2020; based on Tesar et al. (2021)

	Lamps	Screens	Temperature exchange equipment	Large equipment	Small equipment	Small IT and TC equipment
Number of facilities	50	149	108/68 (step II)	940	681	657
Share of facilities compliant with EN 50625	53%	38%	51%	10%	20%	18%

The overall numbers of facilities working in compliance with the European standards for the treatment of WEEE were updated based on the feedback from Member States. Compared to 2019/2020 some changes occurred. For example, the number of treatment facilities in France increased considerably; all of them working in accordance with the EN 50625 now. In Lithuania, which had made the standards obligatory in 2021, the number of compliant facilities increased from 2 to 20. In Italy, the number of compliant facilities decreased from 58 to 43. Some other countries reported some minor changes. The overall situation, however, seems to remain stable.

[ES.Q.2, ES.Q.3] Which factors have contributed or hindered the achievement of these objectives and to what extent can the observed achievements or challenges be attributed (causally) to the Directive?

Answer:

A series of factors currently **hinder** the achievement of the objectives of the Directive:

- First, there are economic reasons. Producers are interested in the marketing of EEE, and product innovations are not necessarily sustainable ones, which is hindering effective waste prevention and recycling. In many Member States high costs for repair make purchasing a new product cheaper than repair. A significant market for second-hand EEE in non-EU countries, and lower treatment costs in countries with lower environmental standards are hindering the achievement of sufficiently high levels of separate collection and treatment of WEEE within the EU;
- Furthermore, deficits in implementation exist. For instance, the collection infrastructure in rural areas and deficits in the efficiency of waste shipment procedures between Member States, can impede recycling of materials where no or insufficient domestic recycling capacities exist;

[163] Thereof, 180 facilities hold a certificate of compliance issued by the WEEELABEX organisation (WEEELABEX organisation is the only institution accredited for issuing such certificates as of 2020, https://www.weeelabex.org/operators-list/, last attended on 28.11.2019). The remaining facilities are considered working in compliance with the standards either based on conformity attestation by an external auditor or by self-declaration.

- Several legislative issues, including standardisation, were observed. The current lack of requirements for repairability and recyclability under the ecodesign criteria for EEE impede waste prevention and recycling of WEEE. The waste shipment rules under the Basel Convention and the Waste Shipments Regulation, turned out to be not restrictive enough regarding specific WEEE components and materials holding problematic characteristics, which were not subject to the procedure of prior informed consent. The 'plastics amendments' and the 'e-waste amendments' under the Basel Convention, however, will limit uncontrolled shipments of these waste to non-OECD countries. Requirements in chemicals legislation including RoHS Directive and POPs Regulation lead to challenges with material recycling, for instance of plastics and glass;
- Limited resources for inspection activities in the Member States lead to deficits in enforcement, in particular regarding compliance checks with collection and treatment requirements and inspections of cross boarder shipments.

Factors that **contributed positively** towards the achievement of targets and objectives of the Directive include the following. Firstly, in many Member States legislative and operational measures have been launched by producers and administrations aiming at more separate collection from private households, including collection campaigns, establishment of more take-back possibilities etc. Secondly, producer associations in particular, with the WEEE Forum ahead, jointly developed successful approaches for WEEE management in many topics, including consumer awareness, the set-up of appropriate take-back networks, the development of the *European standards for the treatment of WEEE* and procedures to monitor the achievement of collection and treatment targets. Furthermore, research on treatment and recycling technologies was organised. Research on the recovery of critical raw materials (CRMs) from WEEE has also been supported by the European CRM policy. Several Member States adopted minimum treatment requirements going beyond the WEEE 2 Directive and some PROs require compliance with European standards for the treatment of WEEE by their treatment partners. Substance restrictions under the RoHS Directive and other chemicals legislation contributed to a lower hazard potential of WEEE, reducing also the potential of negative impacts on environment and human health during their management.

Details of the evidence base:

Not relevant.

[ES.Q.4] What have been the (quantitative and qualitative) effects of the Directive, in terms of its outputs, results and impacts?

Answer:

The effects of the Directive on the environment and human health during **collection and transport** of WEEE are minor. The collection and transport conditions of separately collected WEEE are often still not in line with the requirements of the WEEE 2 Directive. When WEEE is damaged during collection and transport on the one hand, easily releasable pollutants, such as ozone-depleting gases used in temperature exchange equipment or mercury, can be emitted. On the other hand, broken devices impede manual dismantling and separation of materials, e.g. rare earth elements in fluorescent powders can get lost. Preparation for reuse activities are also impeded. Furthermore, workers are at risk through enhanced exposure to hazardous substances, injury, electrocution, and fire, in particular caused by lithium batteries.

The approach taken by the WEEE 2 Directive, i.e. mandating the European standardisation organisations to develop European standards for the treatment of WEEE, which should also cover collection and transport conditions, had not much effect in terms of improved collection and transport conditions. Although within the EN 50625 series[164] a technical specification (TS) specifically addressing collection and logistics was published[165], this specification is by far not implemented that frequently as other elements of the EN 50625 series. Only about 40 collection and logistics operators - out of thousands - were certified to this TS in 2023.

[164] *Collection, logistics & treatment requirements for WEEE.*
[165] TS 50625-4, Collection, logistics & treatment requirements for WEEE: Specification for the collection and logistics associated with WEEE.

The effects of the Directive on the environment and human health during **treatment of WEEE** are particularly linked to the degree to which the European standards for the treatment of WEEE have been implemented by treatment facilities in the Member States.

The measures of the WEEE 2 Directive were not sufficiently effective in reducing the volumes of WEEE leaving the EU in an uncontrolled manner and in consequence the manifold negative impacts on environment and human health during **treatment/disposal of WEEE outside the EU** in - mostly developing - countries persist. The criteria to distinguish between WEEE and used EEE (Annex VI) introduced with the WEEE 2 Directive are considered helpful in cross-border controls. The criteria were developed on the basis guidance developed in 2007 by the waste shipment correspondents and are among the strictest globally. Quantitative effects on reduction of illegal WEEE exports are, however, considered low, which is mostly caused by limited resources for inspection of cross boarder movements of the Member States.

While there are some positive instances of progress towards **sustainable products**, the overall advancement in this direction is deemed to be limited. The analysis indicates that the WEEE 2 Directive makes a very modest contribution, as it predominantly addresses the waste stage and lacks substantial incentives for sustainable product design. Despite high expectations, eco-modulation has not proven to be notably effective in practice under its current implementation. Several factors hinder the development of more sustainable products.

The impact of the WEEE 2 Directive on the **internal market and competition** is diverse, with stakeholders expressing varying opinions. While the Directive establishes guidelines and common targets for WEEE management, it often results in fragmented practices among Member States, leading to uneven playing fields for market players.

The influence of the Directive on **employment** is challenging to directly quantify. However, there are indicators of a positive impact on jobs in the EU, with the repair sector experiencing a slight growth, employing 104 204 people in 2019, reflecting an 11% increase since 2012. Social enterprises engaged in WEEE management, especially in collection and refurbishment, contribute significantly to job creation, particularly for marginalised communities.

Regarding **research and innovation**, the sector remains innovative over the years. While the collection and recovery targets of the Directive may have stimulated the need for new technologies, stakeholders express ambivalence in attributing specific research and innovation activities to the WEEE 2 Directive.

Administrative burdens, mainly on producers and Member States, result from provisions of the Directive, such as fragmented EPR schemes among Member States. Secondary legislation, like Implementing Regulation 2019/290, has reduced administrative burdens to some extent.

Details of the evidence base:

Not relevant.

[ES.Q.5] Beyond its objectives, did the implementation of the Directive lead to any other unexpected and/or unintended results?

Answer:

The WEEE 2 Directive is likely to have made a successful contribution towards the **enhancement of knowledge transfer and cooperation** within the WEEE sector. This progress has also been facilitated by the Directive's distinct stipulations concerning the mutual exchange of data amongst stakeholders. The resulting communication chain has promoted the interchange of knowledge across the value chain, thereby inducing an impact on coordination and knowledge transfer within the WEEE sector. Over the years, several networks have been established on various topics within the sector. These include enforcement, take-back and recycling, circular business models and registration of producers. In terms of cooperation between the various market participants, developments vary. In some cases, there are very positive examples of cooperation between competitors and across different stakeholder groups. On the other hand, some aspect such as a competitive PRO environment have encouraged competition, which typically reduces willingness to cooperate.

There are many examples, where the WEEE 2 Directive has inspired WEEE legislation in other countries, including EU candidate countries. Furthermore, several international standards/guidelines related to WEEE management, such as the *E-Stewards Standard for Responsible Recycling and Re-use of Electronic Equipment* developed by the Basel Action Network and the *Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention*' contain substantial elements of the WEEE 2 Directive.

There is no direct evidence on whether the WEEE 2 Directive has served as a **role model for managing other waste streams**.

Details of the evidence base:

Not relevant.

Efficiency

[EY.Q.1] What are the costs associated with the implementation of the Directive in different Member States and between different stakeholder groups?

Answer:

The costs from implementation of the WEEE 2 Directive include compliance costs such as administrative costs, and adjustment costs, it also includes enforcement costs and lastly indirect costs. The analysis specifically focuses on three groups: public authorities, producers, and recyclers on whom the WEEE 2 Directive poses obligations which would result in costs related to the implementation of these obligations by these stakeholder groups. Analysing compliance, enforcement, and particularly indirect costs within the context of the WEEE 2 Directive has proven to be a challenging task due to the limited availability of comprehensive data.

Public authorities face administrative costs for implementing and operating producer registers of EUR 26 000 per year to EUR 100 000 per year for implementation and EUR 2 m to EUR 8.9 m per year for operation respectively. Differences in Member States' cost partially can be attributed to the administrative design of the registers, i.e. overseeing EPR obligations for single waste streams or multiple waste streams and to country sizes. Authorities furthermore face administrative costs for government campaigns to promote compliance amongst importers/ manufacturers/ producers and PROs of WEEE falling between EUR 3 000 per year – EUR 10 000 per year. Administrative costs for producing statistics on EEE and WEEE and reporting such statistics to the PROs/ Registers/ Member State authorities respectively fall upon all relevant stakeholders and make up around 7-12% of costs for PROs, whereas for public authorities only one value of EUR 25 000 per year for producing statistics based on the obligations of the WEEE 2 Directive was made available. Treatment operators face administrative costs for complying with reporting obligations stemming from the WEEE 2 Directive of 1-5 FTE depending on the actor and Member State. Further administrative costs for treatment operators stem from the obligation to obtain CENELEC certification set out in national implementation of the WEEE 2 Directive in certain Member States, however certification is not directly mandated by the WEEE 2 Directive itself, and amount to on average EUR 11 700 per year or EUR 5 000 per waste stream certified.

Limited data was available for enforcement costs. In the OPC more than 60% of the respondents' state that enforcement costs, linked to the implementation of the initiative have increased to some extent or have increased significantly, only 11% argued that the enforcement costs did not change or were even lowered by the implementation of the WEEE 2 Directive. It can be assumed that public authorities spend EUR 80 000-150 000 per year for overseeing and enforcing compliance with existing legislative framework and further EUR 4 000 for use of technology and equipment for effective enforcement. No indirect costs were identified or indicated in the stakeholder consultation activities.

Details of the evidence base:

Although data gaps remain, the conclusions drawn regarding the costs associated with the WEEE 2 Directive do suggest an increase in costs for all stakeholder groups. In the OPC, approximately 60-65% of respondents affirm that compliance and enforcement costs have either increased to some extent or have significantly risen. Data gaps were identified for quantifying all cost categories: compliance, enforcement, and indirect costs. Thus, analysing costs in this context proves challenging due to limited comprehensive data availability. Regarding the influence of the Directive on indirect costs, no data could be found.

[EY.Q.2] Are the costs proportional to the benefits achieved and how does it vary between stakeholder groups and Member States?

Answer:

It should be noted that any costs incurred by some actors, may be revenues to others. It should be further noted that quantifying direct and indirect benefits was not possible due to lack of data, hence the assessment of benefits is done qualitatively.

Since the implementation of the WEEE 2 Directive an increase in separate collection and treatment of WEEE can be observed and analysed regarding costs and benefits associated with such trends. Assigning a specific figure to the potential material value generated by increased WEEE collection and treatment rates is challenging, however the overall number of WEEE initial treatment facilities, which can serve as an indicator for increased economic activity, has not significantly increased since the implementation of the WEEE 2 Directive. Regarding the distribution of costs and benefits among stakeholders, 47% of respondents to the OPC feel that WEEE management costs are adequately covered by producer financing, while 35% believe they are only partially covered. Treatment costs for WEEE are theoretically covered by EPR fees, and material revenues. However, treatment operators report facing economic risks due to fluctuating market prices for commodities, and some highlight indirect costs like fire risks from lithium-ion batteries not covered by EPR fees. Similarly, some stakeholders indicated that the expenses incurred by municipalities for the collection of WEEE are not comprehensively covered by existing EPR fees, which might lead to costs being passed on to citizens through local taxes, user fees, and service fees.

Producers and PROs incur costs from producers in the form of EPR fees, typically ranging from EUR 100 to EUR 250 per tonne, depending on the WEEE category. In some instances, higher fees, reaching up to EUR 1 000 per tonne, have been observed for example in France and the Netherlands for certain WEEE. These fees encompass collection, handling, and treatment costs. The adoption of higher treatment standards may result in increased costs for specific WEEE categories and material fractions, however the lack of available data on costs for treatment and infrastructure to achieve higher treatment standards compared to the baseline prior to the implementation of the WEEE 2 Directive poses a challenge in the assessment of the cost effectiveness of establishing improved treatment standards.

Since compliance costs are deemed indispensable due to legally mandated requirements, assessing the cost efficiency of measures aimed at ensuring compliance across all stakeholders proves challenging. The paramount benefit of such efforts lies in supporting the effective functioning of a unified EU market. They furthermore ensure a level playing field for all actors concerning their financial and operational responsibilities outlined in the WEEE 2 Directive.

Details of the evidence base:

The scarcity of information on costs and benefits associated with the implementation of the WEEE 2 Directive hampers a comprehensive assessment. Limited data is available on administrative and indirect costs, hindering an accurate financial analysis. Additionally, quantitative data on related benefits, such as economic activity, improved health, and employment, is insufficient. This data gap poses challenges in evaluating the directive's effectiveness and societal impact.

[EY.Q.3] What factors influenced the efficiency and what good or bad practices can be identified?

Answer:

The efficiency of the WEEE 2 Directive can be measured by its impact on the financial burden. The OPC survey revealed mixed opinions, with 14% confident the Directive did not result in unnecessary costs and 49% believing it led to unnecessary expenses. The change in the classification system brought about by the WEEE 2 Directive from 10 to 6 categories resulted a long-term decrease in administrative

burden but initially incurred costs to producers, PROs, public authorities, and treatment operators alike for its implementation, hence changes in the classification and reporting formats should be reduced to a minimum. Variations in interpretation and transposition across EU Member States call for a Regulation to ensure consistent implementation. Inconsistencies in reporting formats of PROs create additional administrative burden for producers operating across different Member States, especially for high mix, low-volume producers, leading to significant administrative costs.

Details of the evidence base:

The lack of adequate cost data and comprehensive information makes it challenging to analyse the factors influencing efficiency and identify good or bad practices. Points raised in the analysis have been backed by multiple stakeholder inputs, however no quantitative data could be identified.

[EY.Q.4] Is there potential to reduce inefficiencies and strengthen implementation of the WEEE Directive?

Answer:

Member State representative raised a need to further harmonise definitions such as producer, PoM, and distance selling across waste related legislation (as further laid out in Coherence section) to reduce inefficiencies for public authorities and producers alike. Also, the lack of harmonisation between requirements in the waste management sector for WEEE from private households (B2C) and for WEEE from users other than private households (B2B) poses significant challenges for producers, PROs, and collection points. To reduce the inefficiency experienced by producers faced with different reporting formats to PROs, it would be beneficial to mandate PROs to also comply with the Implementing Regulation regarding the format of reporting.

The distinction between category 6 (small IT) and category 5 (small equipment) was mentioned to create inefficiency in reporting due to the widespread inclusion of IT functionalities in nearly all EEE which makes it a challenging task for producers to allocate small EEE to the correct category. On the treatment operators' side, the distinction between category 6 and 5 poses a different challenge for reporting of WEEE streams, due to the widespread collection of both categories as one waste stream based on their similar size. Addressing these issues related to registration and reporting processes, category differentiation, and subcategory harmonisation is considered to contribute to a more effective and efficient management of WEEE in compliance with the Directive.

When evaluating the extent to which the WEEE 2 Directive has succeeded in ensuring that responsible producers finance the costs associated with managing WEEE, the OPC results reveal that 74% of the respondents believe it has not been successful. One of the major concerns raised by respondents is the detrimental impact of online free-riders. More robust measures and strategies should be implemented to effectively curb the activities of these non-compliant actors creating an unfair competitive environment. Better monitoring and enforcement of compliance can be achieved by establishing accessible and comprehensive producer register databases at the national level. Lastly, defining criteria for a 'small company' exemption and setting thresholds for 'de minimis' turnover/amounts to be excluded from EPR requirements, including registration, reporting, and financing, can greatly alleviate administrative burden for all stakeholders and public authorities.

Details of the evidence base:

Although some data gaps remain, the conclusions regarding the potential to reduce inefficiencies of the WEEE 2 Directive are considered sufficiently reliable since they are backed by stakeholder consultation input from all relevant stakeholder groups.

Relevance

[RE.Q.1] Are the current and foreseeable future needs and problems still sufficiently addressed by the objectives, scope and measures of the WEEE 2 Directive

Answer:

Overall, the objectives and measures of the Directive are still relevant to improve the environmental performance of the EEE sector. At the same time comprehensive amendments and additions are needed to improve effectiveness and efficiency of the Directive with regard to resource efficiency and zero pollution, and to sufficiently anticipate current and foreseeable needs and problems. There is the need for the overall alignment of the **objectives** of the WEEE 2 Directive with the objectives of the Waste Directive, particularly the waste hierarchy. Prevention of waste from EEE is, although described in recital 6 as a first priority to contribute to sustainable production and consumption, not clearly set as an objective of the WEEE 2 Directive. With regard to the **scope** of the Directive the current 6 EEE categories do not sufficiently consider the material composition of EEE product groups, their hazards and product lifetimes, as well as the applied treatment processes. Categorisation taking into account these aspects would, however, contribute to zero pollution (specific categories could be subject to stricter control) and to efficient recovery of secondary raw materials including of critical raw materials.

Cooperation between producers and recyclers as required under Article 4 on **product design** is still considered highly relevant in the light of the wider current EU policy objectives and the legislative advancements. The legislative advancements (Ecodesign Directive and the Ecodesign for Sustainable Products Regulation) addressing Ecodesign requirements for EEE – be it horizontal or specific on–- and rules how to enforce such requirements, need to be considered, so that overlaps are avoided.

The current **collection and treatment requirements** are not sufficient to increase overall collection, to increase (high-quality) material recycling, to improve information on the recycling of specific materials such as precious metals and plastics and to reduce any negative impacts on the environment and on human health during collection and treatment of WEEE. An impactful and ambitious collection target is still considered indispensable to ensure that the needed efforts to increase separate collection are taken by all actors. This is also supported by most stakeholders. There is also a need for additional requirements on EU level, such as minimum requirements for the collection infrastructure (e.g. maximum distance), additional requirements for operators collecting WEEE (e.g. as specified in EN 50625) and additional requirements to increase the separate collection of small WEEE, for instance based on the *Commission Recommendation on improving the rate of return of used and waste mobile phones, tablets and laptops*[166]. Recovery targets, in general, are still needed to promote WEEE treatment following the waste hierarchy. However, there are examples where the recovery targets are conflicting with **zero-pollution** objectives. This concerns for instance the obligation to remove brominated flame retardants from WEEE plastics. Furthermore, the current non-material-based recovery targets do not foster the recovery of materials contained in small amounts and where recycling is not yet economically viable.

The depollution requirements of the Directive (Article 8, Annex VII) are considered too unspecific and outdated. They do not sufficiently reflect a) the changes in hazardous components used in EEE and b) the developments in WEEE treatment technology including the increased use of mechanical/automated sorting, use of material markings etc. Annex VII focuses on removal of hazardous substances, whose use has partly been restricted, while removal of other hazardous substances that are not (yet) restricted but occur at increasing levels in contemporary WEEE are not addressed (e.g. ITO[167] in LCDs, arsenic in screen glass, organic substances in capacitors, phosphorus-based flame retardants).

The European standards for the treatment of WEEE already anticipate several of the mentioned aspects: Possible hazards and risks due to any new hazardous substances occurring in WEEE have to be identified by means of a risk management process by the treatment operator. Setting maximum residual concentrations of (not easily releasable) hazardous substances in materials reflects the use of mechanical treatment options.

Details of the evidence base:

Not relevant.

[166] Commission Recommendation of 6.10.2023 on improving the rate of return of used and waste mobile phones, tablets and laptops (C(2023) 6618 final).

[167] The emission of slightly soluble ITO from waste LCD panels seems to reveal cytotoxicity as well as the risk leading to interstitial lung damage (Tanaka, 2004, Vchirawongkwin et al., 2014). Subsequently, it has been reported that ITO could cause lung disease and cancer in some accidents (NTP, 2001, Chou et al., 2009.

[RE.Q.2] Does the WEEE Directive help enhance the efficient use of resources, retrieve valuable secondary raw materials and establish a well-functioning single market for waste treatment services and secondary raw materials within a more circular EU economy?

Answer:

Based on the available data, there is currently no indication that the Directive contributes specifically to the establishment of a **market for secondary raw materials**. Comprehensive data on recycling rates of specific WEEE materials is not available. Deficits in the quality of secondary raw materials including glass and plastics are described frequently in literature and by stakeholders. Regarding critical raw materials, the current (too unspecific) WEEE collection categories and the overall, non-category-specific collection target of the Directive are also hampering their recovery. Deficits in separate collection (sorting and handling) further hamper retrieving valuable materials from WEEE.

Details of the evidence base:

Not relevant.

[RE.Q.3] Is the Directive fit for purpose with the new challenges and developments of today and in the future, such as growing consumption, digitalisation, development of renewables and online sales?

Answer:

The needs caused by further **digitalisation** (in the context of the EU´s digital strategy) are currently not adequately addressed or referenced within the Directive itself. The trend to persuasive electronics and the seamless integration into non-electronic products can cause problems for current separate collection and WEEE treatment practices. There are some positive developments in regard to information exchange via online platforms (such as material composition and dismantling information). In this regard, the Directive is not hindering this development, but also not fostering it. On the other hand, it should be mentioned, that the Directive does not currently appear to have any problems with the rapid increase in data centres and the resulting WEEE. Data security should be investigated further, particularly with regard to its impact on reuse and preparation for reuse. In the context of preparation for reuse of IT&T equipment, EN 50614 already addresses data erasure procedures.

The problems associated with the growth of **online sales** are a prevalent example. The WEEE 2 Directive has not managed to keep up with this development. In particular, the deficient and lacking registration of sellers from non-EU countries leads to negative consequences in the financing and take-back of WEEE. While the problem is known for several years and despite efforts made, the problem still persists. Member States tested different measures to improve the situation. These solutions, however, originate from Member States initiatives and not from the WEEE 2 Directive itself.

Details of the evidence base:

Data storage and security concerns has also been highlighted in the 'Study on options for return schemes of mobile phones, tablets and other small electrical and electronic equipment in the EU'[168] from 2022 published by the EU Commission. It is reported that concerns regarding sensitive and personal data found on one's device once it was handed over to end-of-life operators led more people to ask the operators to physically destroy the device.

Several indicators show the **increasing usage of the internet and the share of purchases online** in comparison to traditional (offline) purchases. Internet purchases by individuals increased by 25% from 2012 to 2022, with a significant increase during the Corona pandemic[169].

Table 12: Development of internet purchases by individuals (Source: European E-commerce Report 2022)

Indicator	2012	2014	2018	2022
Internet purchases by individuals[170] (EU-27, % of population) – at least once in the last three months	30.86%	36.24%	45.79%	56.05%

Evidence-based data on the extent of **free-riding** is still scarce. Based on a 2019 study conducted by the UK WEEE Scheme Forum, the proportion of unregistered EEE within the overall UK market ranges from 8% (for washing machines and dryers) to 88% (for fitness watches) (WEEE Forum, 2019). The authors of this study assume that similar shares of unregistered EEE exists in the other EU Member States.

Table 13 Overview of compliance checks conducted by the UK WEEE Scheme Forum in 2019 (table from (WEEE Forum, 2019))

	Tablet PC	Power tools	Fitness watches	Display screens	LED lightbulbs	Electric hair care	Washing machines & dryers
Products checked	70	70	50	25	120	113	120
Products potentially unregistered	28	38	44	3	91	57	9
% product unregistered	40%	54%	88%	12%	76%	50%	8%

A multinational study conducted by EucoLIGHT (2023) evaluating compliance of EEE placed on the EU market with national WEEE requirements highlights the relatively high share of non-compliance across various EEE product groups and across EU Member States.

[168] URL: https://op.europa.eu/en/publication-detail/-/publication/f049cf4f-ed23-11ec-a534-01aa75ed71a1/language-en.
[169] European E-commerce Report 2022 (2023), URL: https://ecommerce-europe.eu/wp-content/uploads/2022/06/CMI2022_FullVersion_LIGHT_v2.pdf (last accessed: 12.7.2023); Percentage of individuals who purchased online in the last three months – values do not need to sum up to 100%.
[170] Eurostat online data code: ISOC_EC_IBUY and ISOC_EC_IB20.

[RE.Q.4] How well adapted and flexible is the Directive to technological and scientific advances?

Answer:

The Directive contains several elements, providing for its adaptation to scientific advances and technical progress. Its Article 19 empowers the Commission to adopt delegated acts concerning the amendments necessary in order to adapt Annexes IV, VII, VIII and IX to the Directive to scientific and technical progress. More specifically, Article 8, provides for the option to adopt implementing acts laying down minimum quality standards based in particular on the European standards for the treatment of WEEE[171]. However, this opportunity has not been taken so far. Regarding the evaluation of recovery targets foreseen by Article 11, such a re-examination was performed in 2015. It had come to the conclusion, that the targets should remain unchanged.

Specific aspects, where the Directive is seen as not flexible enough include:

- EEE categories according to Annex III of the Directive are too inhomogeneous with regard to treatment processes and hazards.
- New EEE products, such as wearables or smart furniture, are not sufficiently considered in the EEE categories and treatment requirements.
- The depollution requirements of the Directive (in particular Annex VII) are not regularly adjusted to the ongoing developments regarding the identification / regulation of new substances of concern under chemicals legislation (REACH Regulation, RoHS Directive, POPs Regulation). Furthermore, the depollution requirements do not sufficiently reflect that WEEE treatment is done at increasing levels by automated shredding/sorting processes (compared to manual dismantling).

Furthermore, a lack of flexibility was identified regarding the (calculation of) the collection targets. Relevant aspects as the impact of the quickly growing renewable energy sector (PV panels, heat pumps) and increasing reuse are not adequately reflected.

Details of the evidence base:

Not relevant.

[RE.Q.5] Are there obsolete provisions in the Directive?

Answer:

Provisions of the WEEE 2 Directive being as such obsolete were not identified. In the light of the future ESPR and the introduction of a digital product passport, Article 4 related to product design and some provisions of Articles 14 and 15 related to information for users and for treatment facilities might get obsolete.

Details of the evidence base:

Not relevant.

[171] EN 50625 series.

[RE.Q.6] How relevant is the WEEE Directive with regard to EU circular economy, raw materials and climate actions / renewable energy policy objectives?

Answer:

The current non-material specific recovery targets of the WEEE Directive (in combination with the current collection target) are considered not sufficient/appropriate to **implement a circular economy within the EU**. First, the combined preparation for reuse and recycling targets do not provide enough incentive to prioritise preparation for reuse over recycling – according to the principles of the waste hierarchy. Second, the target does not differentiate between 'high-quality recycling' and 'downcycling' options. Third, the non-material specific, targets do not foster the recovery of CRMs and other materials contained in small volumes.

Whether promoting **(preparation for) reuse** represents a hindrance to keep **critical raw materials** in the EU could not be assessed quantitatively. From a general perspective, CRMs contained in the 0.6 Mt of used goods - that were estimated to be exported in 2020 - will be lost in terms of secondary raw materials. Comprehensive data on the share on second-hand EEE leaving the EU and the concerned product types is not available. Stakeholder consultations, however, suggest that some current practices, including the export of second-hand medical devices and of used PV panels, would justify further critical monitoring of CRM losses from the EU through used EEE. At EU level, there are currently no measures in place to improve data about export of EEE for reuse. At national level, measures to close the data gap were launched in some cases. Luxembourg for example, has adopted the obligation for producers to report on EEE that are exported as second-hand goods (after refurbishment).

The **expected trends in the collection and treatment of PV panels and other renewable technologies** are not sufficiently addressed within the WEEE 2 Directive. Given the current and expected rapid increase in the installed volumes in combination with the long lifetimes of this equipment, makes the PoM method (which relies on the volumes placed on the market in the three preceding years) inapplicable in to determining whether a high level of collection has been achieved. Apart from that, the lack of a distinct category for PV panels is making it impossible to trace and monitor the actual behaviour of PV panel flows. Binding minimum treatment requirements for PV panels addressing the potential waste management hazards (hazardous substances, risk of fire etc.) are currently missing in the WEEE 2 Directive. The European standard[172], however, sets some depollution requirements. As in general, the non-material specific recycling targets of the Directive do not foster the recovery of CRMs from PV panels, which however contain considerable amounts of silicon, indium, gallium and silver.

Details of the evidence base:

The recovery targets are determined based on the collected volumes of WEEE and are thus limited by what is collected. The Directive requires 85% of WEEE generated to be collected separately, or 65% of EEE PoM within the three preceding years. The European Court of Auditors in its recent review of EU actions and existing challenges on electronic waste (European Court of Auditors, 2021) concluded, that even if the EU were to achieve the minimum collection target of 65% for each of the six WEEE categories, a large part of WEEE would still neither be recycled nor prepared for reuse. Figure 28 below illustrates the findings of such a hypothetical scenario. It shows that for all categories the share not being recovered nearly 50% or even higher.

[172] EN 50625-2-4, TS 50625-3-5.

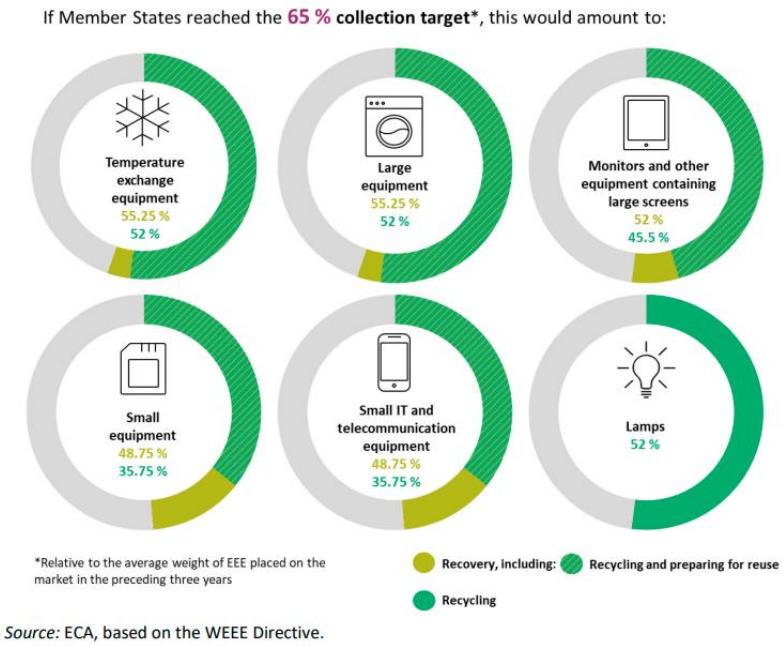
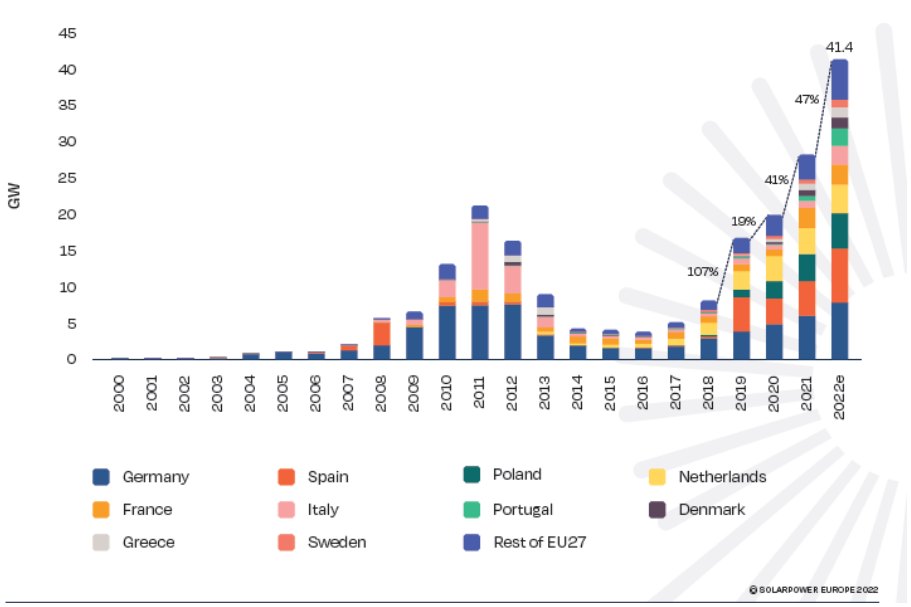


Figure 28: Recovery, recycling and preparation for reuse based on a 65% collection rate. (Source: European Court of Auditors, 2021)

Given the shortcomings of determining separate collection based on PoM volumes, the same consideration can be made with the 85% of WEEE generated target. If the EU were to collect 85% of WEEE generated, between 28 and 36% of WEEE generated would remain, that neither needs to be prepared for reuse, nor recycled, nor recovered.

Following the EU's ambition to become the first climate-neutral block in the world by 2050, there is an increase in installation of PV capacity as shown in the Figure 29 below.



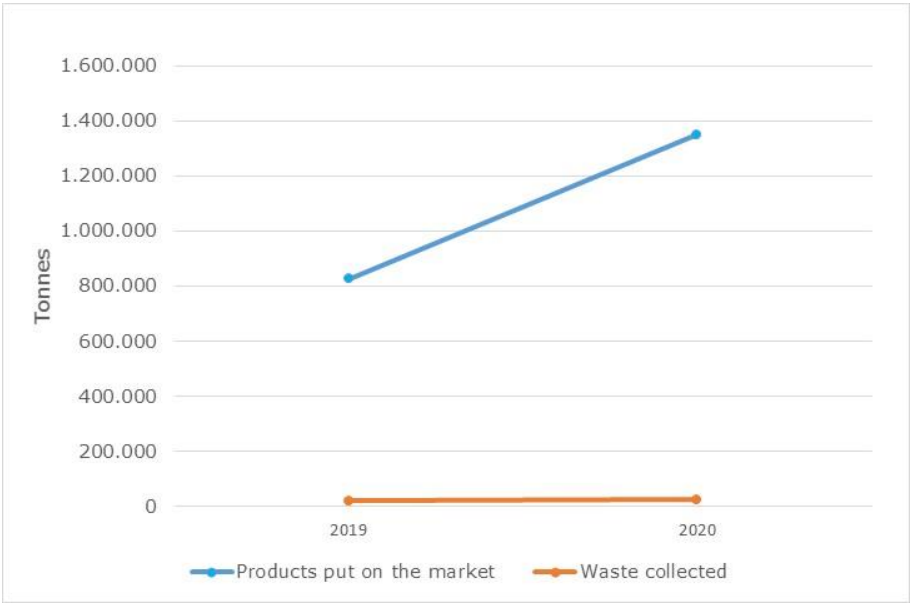


Figure 29: Annual Solar PV installed in the EU-27 in capacity (GW) for 2000 to 2022 (SolarPower Europe, 2022, p. 13) and Quantities of PV panels placed on market and collected (Eurostat, 2024)

The quantities of PV panels placed on the market and waste PV panels collected until 2019 were reported to Eurostat under category 4 and it was only voluntarily for Member States to separately report them. However, from the reference year 2020, which was the first year of the implementation of Commission Implementing Decision (EU) 2019/2193, Member States had to separately report this data (data for the reference year 2020 was reported in 2022). An estimate on the rise in quantities of PV panels placed on the market compared to the quantities of waste PV panels collected is indicated in the graph shown above.

Coherence

[CO.Q.1] To what extent is the WEEE Directive coherent with other EU environmental policy objectives and other interventions with similar objectives? Are there any particular strengths, efficiencies, synergies, weaknesses, inconsistencies, overlaps, contradictions, etc. ?

Answer:

Questions on possible inconsistencies with other EU legislation, particularly the Ecodesign Directive have been raised because the method of the calculation of the WEEE collection rate that is based on the quantities of EEE placed on the market takes into consideration EEE placed on the market during a three-year period while the Ecodesign Directive's goal is to maximise EEE lifespan. However, the WEEE 2 Directive provides for an alternative method for the calculation of the WEEE collection that is based on WEEE generated in each Member State and this method already addresses the issues raised concerning the PoM method.

RoHS and WEEE 2 Directive scope discrepancies for example regarding PV panels rather create synergies between these two directives ensuring that even if PV panels are not in scope of the RoHS Directive, there is proper treatment of the waste PV panels, because PV panels fall within the scope of the WEEE 2 Directive.

Alignment issues also persist between the CRM Actand the WEEE 2 Directive, creating questions on a possible gap in specific recovery requirements.

The WEEE 2 Directive aligns with the Waste, Batteries, ELV, and Industrial Emissions Directives. However, room for improvement exists in definitions, scope overlaps, and a stronger emphasis on reuse and waste reduction. In particular, the WEEE 2 Directive even though it incorporates the waste hierarchy (recital 6), it does not include more specific provisions for example on waste prevention. Complementary legislations addressing chemicals and hazardous substances could benefit from explicit mentions in the WEEE 2 Directive.

Details of the evidence base:

Due to its subjective nature, the criterion of coherence was assessed based on qualitative statements collected through stakeholder consultation and literature research and put into perspective considering the relative number of mentions of individual identified aspects of coherence across sources. Although the assessment of coherence is based on qualitative statements and subjective stakeholder input, the conclusions reached are considered sufficiently reliable.

[CO.Q.2] To what extent is the Directive coherent with wider EU policy objectives?

Answer:

The WEEE 2 Directive aligns with EU circular economy strategies, the Green Deal, Circular Economy Action Plan, Chemicals Strategy, Sustainable Products Initiative, and the Clean Energy Transition. Some misalignment has been observed with the Zero Pollution Strategy and the efforts of circularity. Overall, the Directive contributes to the green and digital transition by promoting sustainable design, resource efficiency and waste reduction, even though stronger emphasis could be given to the latter. Synergies could further enhance the recovery of critical raw materials.

Details of the evidence base:

The analysis of external coherence with wider EU policy objectives was performed by comparing existing strategy documents with the WEEE 2 Directive. Few external literature giving answers on the matter of coherence was identified. Little stakeholder input and lacking statements in literature suggest that there are no major concerns regarding the WEEE 2 Directive and its coherence with wider EU policy objectives. Although the information on the external coherence with wider EU policy objectives is scarce and only anecdotal, the reliability of analysis is deemed sufficient.

[CO.Q.3] To what extent is the WEEE Directive internally consistent and coherent? Are there any provisions in the WEEE Directive that are not consistent and coherent?

Answer:

The WEEE 2 Directive exhibits internal coherence, but legislative uncertainties or gaps exist in certain areas. Products associated with another group by consumers, like furniture with integrated electrical and electronic equipment, often evade disposal as WEEE. Definitions, notably of the authorised representative, lack clarity, demanding improved descriptions of roles and responsibilities.

Details of the evidence base:

Due to its subjective nature, the criterion of coherence was assessed based on qualitative statements collected through stakeholder consultation and literature research and put into perspective considering the relative number of mentions of individual identified aspects of coherence across sources. Although the assessment of coherence is based on qualitative statements and subjective stakeholder input, the conclusions reached are considered sufficiently reliable.

[CO.Q.4] To what extent is the WEEE Directive consistent and coherent with relevant international policies and instruments?

Answer:

Global conventions, such as Basel, Minamata, Stockholm and Montreal, find reflection and support in EU legislation, ensuring harmony with the WEEE 2 Directive's objectives. The international agreements complement the WEEE 2 Directive, reinforcing global alignment with EU legislation.

Details of the evidence base:

The analysis of external coherence with international policies and instruments was performed by comparing the international instruments with the WEEE 2 Directive. Few external literature giving answers on the matter of coherence was identified. Information on the external coherence with international policies and instruments is scarce and only anecdotal. During the stakeholder consultation activities, no statements were raised concerning the international policies and instruments. Although the analysis is based on qualitative statements and subjective stakeholder input, the conclusions reached are considered sufficiently reliable.

EU added value

[EU.Q.1] What is the added value resulting from the Directive compared to what Member States could have reached acting alone, at national, international and regional levels, and applying different national rules for the management of WEEE across the EU?

Answer:

The WEEE 2 Directive fosters harmonisation across the European Union in comparison to what could be expected if Member States would have acted alone. This harmonisation, while still showing several areas of inconsistency between national transpositions, streamlines regulatory processes, reduces administrative complexities, and creates a more level playing field for businesses operating across different Member States. Additionally, the common framework facilitated information sharing and collaboration among Member States, enabling the exchange of best practices and lessons learnt. The evaluation results suggest that the costs of the EU intervention are similar or even lower to what could have been expected to be the case if the Member States would have acted alone. The existing fragmentation between Member States transpositions and national requirements, such as for EPR schemes, causes costs that are considered by some stakeholder (especially internationally acting companies of the sector) as unnecessary burden.

Feedback on the OPC underscores the perceived added value of the Directive in promoting adequate WEEE management across the EU. The consensus among stakeholders reflects a belief in the important role of EU-level coordination in driving positive outcomes and addressing challenges related to WEEE, highlighting the significance of the Directive in fostering collective progress.

Furthermore, on an international scale, the EU, acting collectively, can have a more influential voice in global discussions on WEEE standards and sustainable practices. In summary, the added value of the EU WEEE Directive lies in its ability to promote efficiency, consistency, and collaboration, ultimately leading to more effective and sustainable waste management practices across the EU.

Details of the evidence base:

Answering this evaluation question requires the analysis of a hypothetical scenario (the Member States acting alone), limiting the evidence base to stakeholder opinion and qualitative assumptions.

Addressing this hypothetical scenario requires acknowledging the inherent limitations in predicting the precise ramifications of legislative withdrawal. Without access to empirical evidence or historical precedents directly related to such a circumstance, the analysis relies on assumptions and estimations. It is crucial to underscore the speculative nature of this discussion and emphasise that any insights provided are based on informed conjecture rather than on verifiable data. The experience made by the United Kingdom after leaving the EU was used as reference. While the UK's post-Brexit regulatory framework may not precisely mirror the hypothetical scenario of withdrawing the WEEE Directive across all EU Member States, it does offer valuable insights. The UK's experience provides a practical illustration of the adjustments and developments that can occur in the absence of EU legislative oversight, shedding light on potential challenges and opportunities.

[EU.Q.2] To what extent does the initiative comply with the principles of subsidiarity and proportionality?

Answer:

Overall, it can be concluded that the WEEE 2 Directive complies both with the principles of subsidiarity and proportionality. It aligns with the subsidiarity principle by instituting unified EU-wide objectives concerning the collection, treatment, and recycling of WEEE. It imposes minimum standards binding on all Member States, fostering a uniform level of environmental protection and resource recovery throughout the EU. While some inconsistencies were highlighted between national transpositions of the EU initiative, it still provides some level of harmonisation between the Member States. The evaluation has further shown that the underlying issues stemming from the WEEE still persist and that coordinated action at EU level is still required to tackle the problems adequately and to provide necessary cross-border solutions.

The Directive also aligns with the principle of proportionality, as it allows for flexibility in implementing the requirements on national level and as Member States can chose their own path on achieving the objectives of the Directive.

Details of the evidence base:

While the evaluation of this question is purely qualitative, the conclusion reached is considered sufficiently reliable. Feedback from stakeholder clearly showed that the EU intervention does not impose unnecessary or excessive regulatory burden onto the Member States. Source of stakeholder input were the call for evidence, input received during the workshops and answers to the OPC.

[EU.Q.3] What would be the consequences of withdrawing existing EU intervention?

Answer:

As per the conducted analysis, discontinuing or withdrawing the current intervention by the EU would likely lead to the following consequences:

(1) Initially, national transpositions are likely to persist with minimal alterations, emphasising that this continuity is anticipated to be a short-term scenario. Sudden changes can have a significant impact on the industrial sector and lead to considerable problems in the continuation of existing business models. This is particularly the case in sectors such as the electrical industry, whose value chain is international and often includes stakeholders from different countries. It is therefore reasonable to assume that the Member States would refrain from a quick departure from existing regulations, even if these are no longer stipulated at EU level.

(2) Over the course of time, diverse national interests and disparate experiences with EU legislation may give rise to distinct legal developments, fostering increased fragmentation among Member States. The absence of centralised EU targets and coordination heightens the risk of divergent levels of environmental protection across the EU, potentially influencing the operational efficiency of the European single market as a result of varying national regulations. The varying degrees of progress in achieving current targets also gives rise to the assumption that the abolition of centralised regulation will lead to very different regional adjustments and legal developments in the long term. This in turn could have an impact on the waste stream within the EU and possibly lead to more WEEE being treated in regions that may have to comply with less stringent environmental regulations and standards.

Details of the evidence base:

Addressing this hypothetical scenario requires acknowledging the inherent limitations in predicting the precise ramifications of legislative withdrawal. Without access to empirical evidence or historical precedents directly related to such a circumstance, the analysis relies on assumptions and estimations. It is crucial to underscore the speculative nature of this discussion and emphasise that any insights provided are based on informed conjecture rather than on verifiable data. The experience made by the United Kingdom after leaving the EU was used as reference. While the UK's post-Brexit regulatory framework may not precisely mirror the hypothetical scenario of withdrawing the WEEE Directive across all EU Member States, it does offer valuable insights. The UK's experience provides a practical illustration of the adjustments and developments that can occur in the absence of EU legislative oversight, shedding light on potential challenges and opportunities.

However, it is essential to exercise caution when drawing parallels, as each Member State within the EU possesses unique characteristics, regulatory environments, and economic structures. In addition to this, input received via the different stakeholder consultation activities was used to have a broader foundation for making necessary assumptions. Especially feedback on the OPC, as well as during the workshops, provided additional expertise.

ANNEX VII. STAKEHOLDERS CONSULTATION - SYNOPSIS REPORT

This Annex provides an overview of the stakeholder consultation activities carried out in line with the consultation strategy for the evaluation of Directive 2012/19/EU on waste electrical and electronic equipment (hereinafter referred to as WEEE 2 Directive, repealing the WEEE 1 Directive 2002/96/EC), as well as the responses and results received.

Disclaimer

The opinions and information received from stakeholders during the consultation activities and in the context of the public consultation published on the 'Have Your Say' web portal are purely theirs and cannot be regarded as the official position of the Commission and its services and thus does not bind the Commission nor can they be considered as a representative sample of the EU population.

Consultation strategy

The consultation strategy for the evaluation of the WEEE 2 Directive has been described in the call for evidence[173] and was further elaborated during the inception phase of the evaluation study.

The key objectives of the consultation activities were to (i) validate the topics covered by the evaluation, (ii) gather the input of a broad representative range of stakeholders such as information, data and experience on the implementation of the WEEE 2 Directive, (iii) solicit views and opinions on the extent to which the Directive has met its objectives and (iv) collect views on the Directive's relevance.

The geographical scope of the consultation activities covered all EU-27 Member States. Stakeholders affected by and/ or playing a role in the implementation of the WEEE 2 Directive were identified:

1. Producers / manufacturers and their organisations,
2. Competent authorities (incl. Member States authorities, enforcement authorities and their European network),
3. Retail sector,
4. Producer responsibility organisations (PROs) and their associations,
5. Treatment operators (sorting, recycling, preparing for reuse) and their associations,
6. Repair, refurbishment, second-hand sale and reuse sector,
7. National registers and their network,
8. Environment and consumer associations (incl. environmental NGOs),
9. Research and academia.

The following table provides an overview of the consultation activities conducted. Starting from the above-listed stakeholder groups, the table indicates the method of consultation, objectives,

[173] Waste from electrical and electronic equipment – evaluating the EU rules (europa.eu)

the types of stakeholders involved in each activity and their timing. The results of each of the consultation activities are described in more detail in the following sections.

Table 14: Overview of the stakeholder consultation activities

Consultation method	Objective(s)	Stakeholder group	Timing
Call for Evidence	Collect general information and stakeholder views	All stakeholder groups	October 2022 - November 2022
Open public consultation	Collect public views and evidence for the evaluation from all stakeholder groups	All stakeholder groups	May 2023 - August 2023
Consultation activities with Member States (MS)	Collect evidence and feedback from MS and close data gaps	Expert Group Meeting + Expert Questionnaire	22 March 2023
		MS targeted workshop #1: Finland	23 May 2023
		MS targeted workshop #2: Portugal	30 May 2023
		MS targeted workshop #3: Poland	1 June 2023
Workshops with specific stakeholder groups	Collect evidence and feedback from specific stakeholder groups and close data gaps	Treatment operators and their associations	20 June 2023
		Producers, PROs and their associations	23 June 2023
		Consumer organisations/ NGOs/ Research institutions	28 June 2023
Specific stakeholder interviews/ consultation	Close data gaps through targeted consultation	Targeted consultation #1: Bitkom	27 September 2023
		Targeted consultation #2: WEEE Forum	24 July 2023
		Targeted consultation #3: PRO Leo Donovan, CEO WEEE Ireland	17 October 2023
		Targeted consultation #4: PRO Roman Tvrznik, Chairman of ELEKTROWINN	1 November 2023
Final stakeholder Workshop	Present main findings, collect feedbacks and suggestions	Selected representatives of all stakeholder groups	19 September 2023

Methodology and tools used to process data

The methodology used for the consultation activities takes due account of the Commission Better Regulation Guidelines and its Toolbox. To inform evidence-based policymaking, the contributions to the consultation activities were analysed and put in context with the evaluation questions. Special attention was given to represent the views of all stakeholders mapped in the initial stage of the consultation strategy development. To this end, where responses from individual organisations appeared to be coordinated i.e. through a coordinated campaign, the respective statements were cross-checked through further consultation activities and assessed individually. Notable instances of response similarity were identified in six cases of duplication

and one case of triplication, wherein both the answers to multiple-choice questions and the content of free-text responses closely mirrored each other. In total, 8 out of the 131 responses, constituting approximately 6%, exhibited substantial similarity to other responses. Still, this was not considered as a '*campaign for public consultations [..]'*, hence all responses to the consultation activities were taken into account for the analysis and no responses were discarded.

Contributions received through the open public consultation (OPC) included both free-text responses and multiple-choice answers. Whenever feasible, opinions expressed in the free-text submissions were aggregated. Notable instances of response similarity were identified in six cases of duplication and one case of triplication, wherein both the answers to multiple-choice questions and the content of free-text responses closely mirrored each other. In total, 8 out of the 131 responses, constituting approximately 6%, exhibited substantial similarity to other responses. Still, this was not considered as a '*campaign for public consultations [..]'*, hence all responses to the consultation activities were taken into account for the analysis and no responses were discarded.

Analysis of the key results of the stakeholder consultation

1. Call for evidence

The call for evidence (CfE) was published on the web portal 'Have Your Say' for four weeks (from 6 October 2022 until 3 November 2022). By the deadline, a total of 106 responses were received. Shortly after the official closure of the CfE, an additional 14 responses from Member States were received by the European Commission via email; these contributions were also considered in the analysis. Respondents were based in 20 different countries, including one non-European country and two non-EU countries.

Most of the responses came from companies/businesses (38) and business associations (28), a limited number of responses was received from non-governmental organisations (NGO), public authorities[174], EU citizens and environmental organisations. Most of the contributions reflected on the content of the Articles of the WEEE 2 Directive, depicting the stakeholders' views on the current challenges of the WEEE 2 Directive as well as providing recommendations on how to improve the Directive (i.e. forward-looking), which was not the focus of the evaluation.

The issues addressed by the public authorities were taken into account and are further presented in the results section below.

[174] The following eight public authorities responded to the CfE: 1) Slovakia: Ministry of Environment, Directorate of Circular Economy, Department of Waste Management, 2) Netherlands: Ministry for Infrastructure and Watermanagement, 3) Ireland: Environmental Protection Agency Ireland 4) Germany: German Environment Agency (Umweltbundesamt), 5) Greece: Hellenic Recycling Agency, 6) Lithuania: Ministry of Environment of the Republic of Lithuania, 7) Spain: Ministry of Ecological Transition 8) Norway: Norwegian Environment Agency.

In addition to the responses provided in the CfE, 31 position papers were submitted by associations[175]. The positions expressed were in line with responses received from other actors and touched upon issues of specific relevance to the sectors they represent, including the achievement of recycling and recovery rates, the need to harmonise treatment practices and requirements across EU Member States, adapting the scope of products included under the WEEE 2 Directive (in particular excluding PV panels) and the distribution of responsibilities amongst actors regarding financial risks associated with WEEE treatment (in particular fire hazards).

The main issues raised were related to the following elements of the WEEE Directive:

- **Scope** of the Directive and **classification** of EEE into categories, pointing in particular the administrative costs occurring from any change.
- WEEE **collection rate** and the existing challenges for Member States to reach the relevant targets, questioning the method used for the calculation of these targets, which is based on the quantity of EEE placed on the market.
- Producers' non-compliance with extended producer responsibility (EPR) requirements (**'free-riding' of producers of EEE**) and existing administrative burden for producers placing EEE products on the market across the EU because of non-common EPR requirements in all Member State.
- **Uneven playing field for WEEE treatment facilities across the EU** because of the differences in the level of WEEE treatment required by national legislation.
- Lack of specific requirements to increase **preparation for reuse** of WEEE.
- **Inefficiency of recovery targets** to promote the recovery of valuable and critical raw materials.
- Lack of **harmonisation of implementation of the WEEE 2 Directive** across the EU Member States, in particular regarding the scope (Article 2), the treatment requirements (Article 8) and financing as well as EPR scheme design (Articles 12 and 13).

Several of the comments actually included suggestions for potential changes and future revision (i.e. forward-looking), which is not the focus of the evaluation. These comments were analysed separately and fed into the evaluation where appropriate, keeping in mind that suggestions for changes mean that one sees failures or shortcomings in the current system. In particular, the feedback submitted, and evidence attached in position papers were extracted and assigned to each evaluation criteria and contributed to the evidence base of the analysis and the evaluation matrices. Other forward-looking feedback that could not be used for the evaluation will be used in a follow-up to the evaluation.

[175] PV Cycle, FEDEREC, ASSORAEE, BSEF, CEA, CONEBI, Digital Poland Association, ECOS, DUH, ETIRA, Eurometaux. EuCER, ECI, EERA, ETIRA, European Recycling Platform, EVA, EWEN, EWRN, FEAD, FNADE, MedTech Europe, Repair&Share, Right to Repair Europe, RREUSE, Solar Power Europe, Stichting OPEN, Test & Measurement Coalition, EMP Recycling, VERE e.V., WEEE Forum.

2. Open public consultation (OPC)

2.1. Overview of responses

A 14-week open public consultation took place between 16 June 2023 to 22 September 2023. It targeted the general public and organisations and was published in the 24 EU official languages on the 'Have Your Say' website. The questionnaire developed for the OPC included questions related to the effectiveness, efficiency, relevance, coherence and EU added value of the WEEE 2 Directive. Multiple-choice questions were mandatory for all participants, whereas responses were optional for open-ended questions requesting free text. Participants could also provide written comments (including position papers) and additional data. A total of 131 stakeholders responded to the OPC. To note that while percentages of respondents are presented in this summary, the overall number of respondents is too small to be statistically significant.

Most respondents gave their contributions as business associations (52) and companies/ businesses (32). Fewer participants represented non-governmental organisations (12) and public authorities (8). The table below presents the aggregated number of responses received by the three groups of stakeholders:

Table 15: Number of responses to the OPC per group of stakeholders

Group of stakeholders	Number of responses to the OPC
Industry	84
Public Authorities	8
Civil society	39
Total	**131**

39 participants submitted additional written contributions/ position papers (one containing two documents) alongside the OPC and 3 were received after the closure of the OPC. Responses from **public authorities**[176] were each considered with the same weight as each of the other responses received; like for all respondents, these public authorities responded to all multiple-choice answers. The issues addressed by the public authorities were taken into account and are further presented in the results section below.

Most participants came from Belgium (33), Germany (29), Italy (12) and France (11), while six respondents were from outside the EU (four from the USA, one from Canada, one from Taiwan). Many of the participants are based in Belgium, presumably because Brussels hosts many EU interest groups such as industry associations, non-governmental and consumers' organisations, etc.

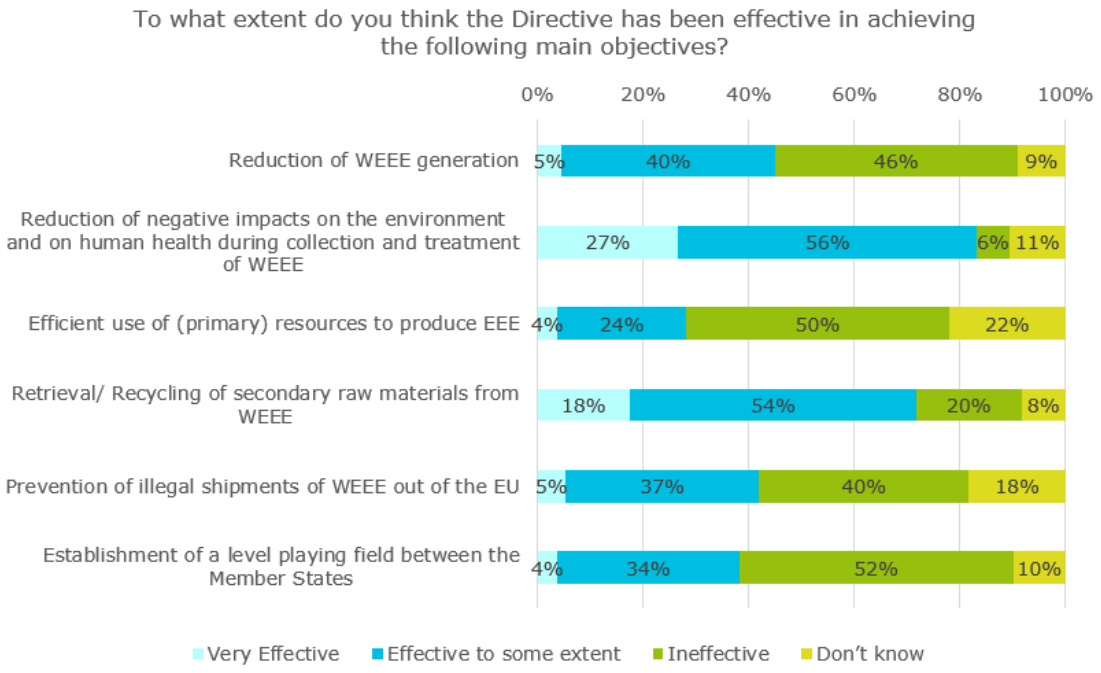
[176] The following eight public authorities responded to the survey: 1) Netherlands: Ministry for the Environment, 2)Germany: Circular Economy Koordinierungsstelle (CEKS), Referat für Klima- und Umweltschutz (RKU), Landeshauptstadt München (LHM), 3) Germany: Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt, 4) Czechia: Ministerstvo životního prostředí, 5) Belgium: Public Waste Agency of Flanders (submitting the agreed point of view of the Region of Flanders), 6) Denmark: The Ministry of Environment of Denmark, 7) Estonia: Kliimaministeerium, 8) Norway: Norwegian Environment Agency
.

2.2. Results and analysis

The **effectiveness** of the WEEE 2 Directive in achieving its stated objectives was assessed by OPC participants. Most respondents (86% of the respondents, 113 out of 131) state that the WEEE 2 Directive has not been effective or only effective to some extent on the reduction of WEEE generation. Similarly, the majority of respondents from industry (57 out of 84), almost all from civil society (32 out of 39) and all respondents from public authorities find the WEEE 2 Directive not effective or only to some extent on the efficient use of primary resources to produce electrical and electronic equipment. A vast majority of respondents from industry (68 out of 84) and civil society (33 out of 39) and all respondents from public authorities think that the WEEE 2 Directive has been very effective or effective to some extent in reducing negative impacts on the environment and human health. Likewise, the majority of respondents from industry (61 out of 84), more than half from civil society (26 out of 39) and almost all respondents from public authorities (7 out of 8) think that the WEEE 2 Directive has been effective to some extent or very effective for the retrieval or recycling of secondary raw materials. For the prevention of illegal shipments of WEEE out of the EU, the majority of the respondents from industry (59 out of 84) and almost all from civil society (34 out of 39) and public authorities (7 out of 8) found that the WEEE 2 Directive has mainly been ineffective or only effective to some extent.

Finally, more than half of respondents from industry, some from civil society (13 out of 39) and almost half from public authorities conclude that the WEEE 2 Directive has not supported) establishing a level playing field among Member States. However, some of the respondents from industry (23 out of 84) and almost half of the respondents from civil society and public authorities believe that a level playing field has been supported to some extent. The respondents indicated that the WEEE 2 Directive is interpreted differently across Member States and is thus transposed differently into national laws and 36 of the respondents (26 from industry, 1 public authority and 9 from civil society) pointed that in the future a regulation may be a more appropriate legal instrument instead of a directive.

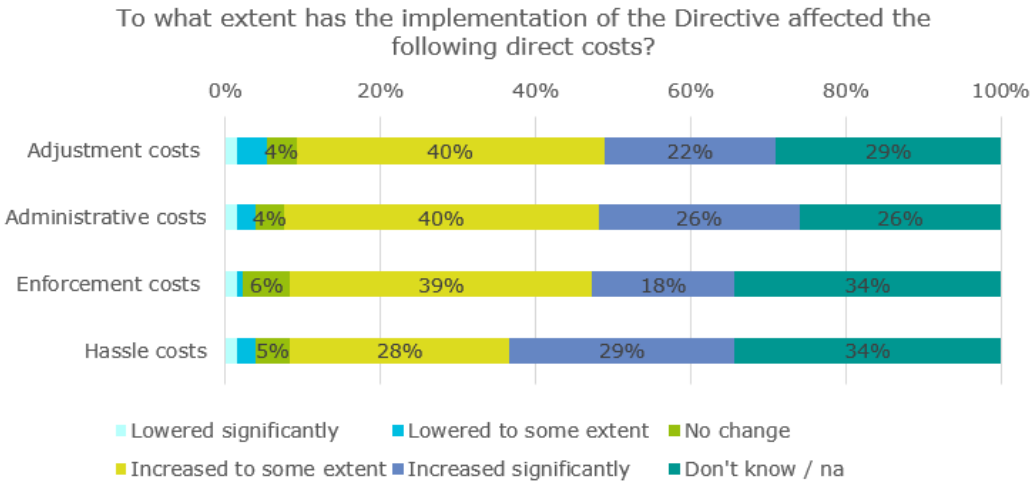
Figure 30: Effectiveness of the WEEE 2 Directive with regard to main objectives (n=131)



The **efficiency** of the WEEE 2 Directive can be measured in terms of financial burden. In the OPC, only of the respondents from industry and civil society but more than half from public authorities (5 out of 8) stated that they feel that the WEEE 2 Directive would not lead to unnecessary costs for EU business, citizens, and public authorities, whereas more than half of the respondents from industry (51 out of 84) but only some respondents from civil society (11 out of 39) and public authorities (2 out of 8) of the respondents felt that it could cause unnecessary costs.

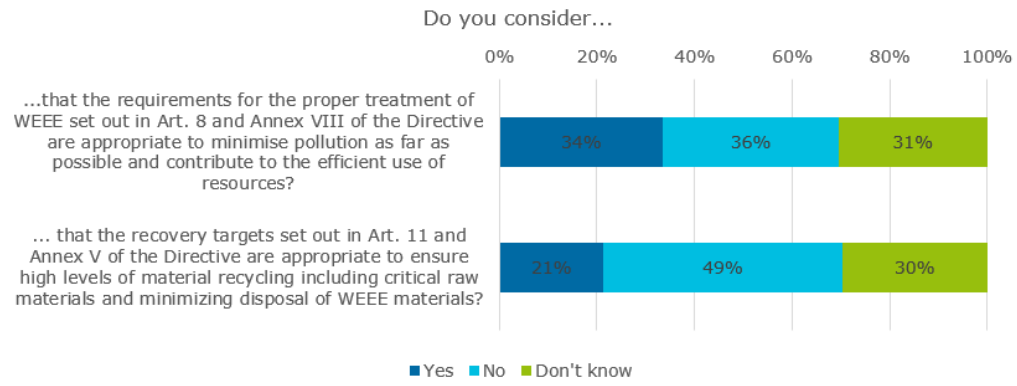
Between 55% and 75% (between 75 and 87 out of 131) of the respondents found that certain categories of direct costs increased because of the Directive: adjustment costs (i.e. investment and expenses to adjust to the requirements of the Directive or national legislation e.g. costs for implementing treatment standards), administrative costs, enforcement costs (linked to the implementation of an initiative such as monitoring, inspections etc.) and hassle costs (e.g. because of deficiencies in the administrative implementation of legislation). Only 7%-9% (between 10 and 12 out of 131) argued that such direct costs did not change or were even lowered because of the implementation of the WEEE 2 Directive. Respondents' answers indicated no clear opinion on whether the costs for management of WEEE were covered by the producer financing obligation.

Figure 31: Effects of the WEEE 2 Directive on direct costs (n=131)



Respondents were also asked about the **relevance** of the WEEE 2 Directive to current and emerging needs. Responses were rather evenly split on whether the requirements for the proper treatment of WEEE are appropriate to minimise pollution as far as possible and contribute to the efficient use of resources. Around half of the respondents from industry (37 out of 84) and civil society (20 out of 39) but almost all from public authorities (7 out of 8) indicated that the WEEE 2 Directive is not appropriate to ensure high levels of material recycling including critical raw materials and minimising disposal of WEEE materials[177], which is opposed by only one fourth of respondents from industry (21 out of 84), few from civil society (6 out of 39) and only one from public authorities that indicate that it is appropriate.

Figure 32: Requirements of the WEEE 2 Directive with regard to minimisation of pollution and material recovery (n=131)



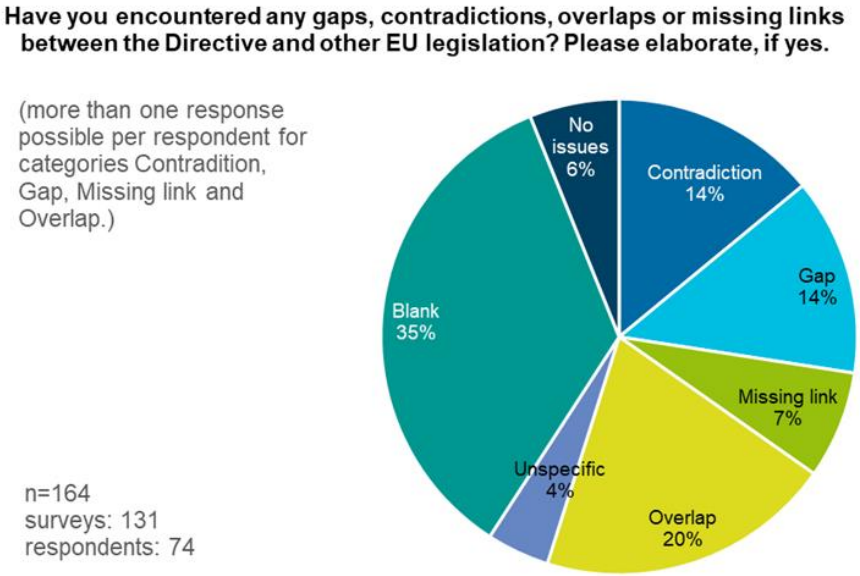
The **coherence** of the WEEE 2 Directive with other EU legislation and within the WEEE 2 Directive itself was deemed as not sufficient. Most text responses described various incoherencies in two free-response questions asking about what 'gaps, contradictions, overlaps

[177] Set out in Article 11 and Annex V of the WEEE 2 Directive.

or missing links' could be found either 'between the Directive and other EU legislation' or 'within the Directive'.

The submitted (lack of) text responses were quantified by splitting them into six thematic issues: gaps, contradictions, overlaps, missing links, unspecific, and no issues. Some of the 74 text responses described more than one issue of coherence and were counted in multiple categories: 64 respondents wrote 97 (sometimes repeated) issues with coherence with other EU legislation. The last 10 of the 74 text responses explicitly stated no issues, while 57 respondents didn't respond in this question ('blank'). Therefore, a total of 164 different thematic responses were counted.

Figure 33: Gaps, contradictions, overlaps or missing links between the Directive and other EU legislation



Contradictions and overlaps between the WEEE 2 Directive and other EU legislation represented about one third of thematic responses (56 of 164) and specifically concerned the right to repair, the waste hierarchy, the European list of waste (European Waste Catalogue), Article 4 of the RoHS Directive on prevention, Article 33 of the REACH Regulation on the duty to communicate information on substances in articles, the POPs Regulation concerning fluorinated gases, and the F-gas Regulation Annex 7[178].

With regard to **EU added value** respondents were asked about the cost and progress of the WEEE 2 Directive. All of respondents from public authorities and the majority from industry (56 out of 84) and two third of civil society agree that Member States would not have achieved as much progress in the absence of the EU legislation, while only few (12 out of 131) disagree. Furthermore, almost half of the respondents from industry (37 of 84) and one third of civil society (12 of 39) agree that Member States acting on their own would have incurred greater expense to achieve the same progress in the absence of EU legislation, while only few (11 out

[178] Regulation (EU) No 517/2014.

of 131) disagree. It is generally agreed that legislation at the EU level is necessary to ensure a level playing field between countries and producers. Finally, almost all respondents (95%, 125 out of 131) agree that the issues addressed by the WEEE 2 Directive continue to require action at the EU level.

3. Targeted consultation

In addition to open consultation through the CfE and OPC, targeted consultation activities with specific stakeholder groups and Member States were conducted.

3.1. Consultation activities with Member States

Four separate consultation activities with Member States and their expert group were conducted from March to June 2023 in chronological order:

1. Member States Expert Group Meeting and questionnaire
2. Member States targeted workshop #1: Finland
3. Member States targeted workshop #2: Portugal
4. Member States targeted workshop #3: Poland

The Member States were selected considering consultation activities conducted in previous studies on WEEE[179] and mindful of representing the EU-27 Member States both geographically and in terms of level of achievement of the WEEE 2 Directive's objectives.

3.1.1. Member States Expert Group Meeting

The Meeting of the Expert Group on Waste on the Implementation of the WEEE 2 Directive took place 22 March 2023 in Brussels and was attended online and in person by representatives of national administrations of 23 Member States[180]. The Member States' experts were asked to identify main topics, challenges and best practices in relation to WEEE management at national level and there was a round table discussion on the identified topics, challenges and best practices.

Member States' experts expressed concerns about the **calculation method** used to determine collection targets and the difficulty of achieving in a given year a 65% target based on the average quantity of electrical and electronic equipment placed on the market in the three preceding years. Issues identified included the calculation method not accounting for the longer lifetimes of some products (e.g. photovoltaic panels) and the rapid increase in quantities of EEE entering the market. Export of used devices, which are not accounted for, and hoarding at home were also noted as challenges. EPR fees were primarily used for treatment, neglecting separate collection. For PV panels, experts suggested a separate reporting category to improve data accuracy and collection targets.

[179] Visited during the "WEEE compliance promotion exercise", Bipro (2017): Bulgaria, Estonia, France, Ireland, Italy, Lithuania and Malta; Visited during the "Study on quality standards for the treatment of waste electrical and electronic equipment (WEEE)", Environment Agency Austria (2029): Netherlands, Germany, Czechia, Greece, Spain, Sweden.

[180] Minutes from the meeting of the Expert Group: Register of Commission expert groups and other similar entities (europa.eu).

Member States' experts noted a significant **lack of data** regarding various WEEE flows, including the export of used devices, and legal or illegal (W)EEE export. Also, data on **preparation for reuse** is challenging to obtain, particularly distinguishing between reuse (i.e. second-hand market extending the use of the product before it reaches its end of life) and preparation for reuse (i.e. extending a product's lifetime after it has reached its end of life and been collected as WEEE e.g. through repair and refurbishment) remains challenging in practice. The experts generally agreed that preparation for reuse is minimally practised, and that some producer responsibility organisations do not prioritise preparation for reuse over recycling since there exists no legally binding target for preparation for reuse. The extent of devices leaving the country for reuse remains uncertain, and some countries now require reporting on exported devices.

Most Member States' experts lacked information on recent **enforcement activities** but agreed on the importance of effective enforcement in particular to reduce free-riding.

Experts raised concerns about the methods used by recyclers to calculate **recycling/recovery rate** and about the quality of the reported data. In relation to recovery, a main issue raised was fire risks which could occur if batteries contained in WEEE are non-removable and remain in the WEEE during shredding.

3.1.2. Member States Expert Group Questionnaire

Following the Expert Group Meeting, in May 2023 a questionnaire was circulated amongst the national experts of the Member States, requesting further data and views on the WEEE 2 Directive implementation. The questionnaire contained 22 questions relevant for answering the evaluation questions.

In total, 14 Member States[181] responded to the questionnaire, providing data on national initiatives and legal measures to increase collection (e.g. awareness-raising campaigns, inspection activities), existing treatment plants and their capacities, administrative and enforcement costs, monitoring and compliance activities (e.g. inspections, penalties to infringements of the national provisions), identified coherence issues with other EU legislation, and lastly on additional legal measures taken in the Member States relevant in the light of evaluating the WEEE 2 Directive.

3.1.3. Member States targeted workshop #1: Finland

The workshop in Finland took place on 23 May 2023 and was attended by 10 participants, the consultants and a representative of the European Commission. Of the 10 participants, 5 were representing four different government institutions while 2 representatives of treatment operators for WEEE and metal scraps were present and 3 representatives of PROs. The four regional authorities present were ELY, Centres for Economic Development, Transport and the Environment (responsible for the regional implementation and development tasks of the central government); Tukey, the Finnish Safety and Chemicals Agency Finnish Environmental Ministry; and the Estonian Environmental Management Department. The issues addressed by

[181] IT, DK, BE, EE, DE, CZ, SK, SE, LU, FR, IE, NL, LV, ES.

the public authorities were taken into account and are further presented in the results section below.

Main results

The lack of **harmonisation of definitions** was highlighted, especially between different sectors and pieces of legislation (i.e. Battery Regulation[182], Waste Directive[183], RoHS Directive)[184]. In the context of coherence of definitions, it was also highlighted by several stakeholders the lack of alignment between the European Waste Catalogue (EWC) codes and the data reporting requirements to Eurostat on the basis of data gathered by the PROs, causing inefficiencies and administrative burdens.

Another topic raised by several participants was the WEEE **collection rates**, highlighting the fact that the method that is based on the quantities of EEE placed on the market do not take into consideration that some EEE has long lifetime. Related to the collection rates, the participants raised the issue of professional (business to business, B2B) equipment and metal parts of WEEE not being collected through the formal WEEE routes but through metal scrap dealers, causing distortions in the calculated collection rate.

Regarding the topic of **reuse and preparation for reuse,** it was highlighted by the participants that distinguishing between the reuse of used EEE and the preparation for reuse of waste EEE can present practical challenges. In addition, EEE exported for reuse to another Member State will not become waste in the country where they were placed on the market and will not be available for collection in that country, further distorting the collection rate.

On **reporting obligations** and on the **scope** of the WEEE 2 Directive, the participants agreed that the cost for changing reporting requirements (e.g. through changing product categories) for producers, PROs and treatment operators is high, and that such changes take years to be implemented by all actors. The open scope is now well understood by the actors and has led to an increase in the volumes of EEE placed on the market in Finland by 30%.

Multiple stakeholders highlighted the potential implications of making obligatory the implementation of the European **standards for the treatment of WEEE,** which would require substantial investments of treatment operators, potentially creating monopolies and driving up treatment costs. Participants furthermore suggested that such technical standards should not be part of legislation due to the legal complexities associated with constantly evolving standards.

3.1.4. Member States targeted workshop #2: Portugal

The workshop in Portugal took place on 30 May 2023 and was attended by 15 participants, the consultants and a representative of the European Commission. Of the 15 participants, 2 were representatives of treatment operators for WEEE and metal scraps and 5 representatives of producers and PROs. The three regional authorities present were the General Inspectorate for Agriculture, the Sea, the Environment and Spatial Planning (IGAMAOT); the Portuguese

[182] Regulation (EU) 2023/1542.
[183] Directive 2008/98/EC.
[184] Directive 2011/65/EU.

Environment Agency (APA); and the Directorate-General for Economic Activities (DGAE). The issues addressed by the public authorities were taken into account and are further presented in the results section below.

Main results

In relation to **WEEE collection targets,** the participants highlighted the issue of metal parts of WEEE being collected through metal scrap dealers without licence for WEEE treatment, causing distortions in the WEEE collection rate. The methods used for the calculation of the WEEE collection rate are considered outdated, as the average lifespan of individual categories of EEE is not considered.

It was further presented and argued that the current situation of different treatment levels led to unfair conditions in the market and that mandatory **European standards for the treatment of WEEE** could be implemented to level the playing field. **Enforcement** was also pointed out to be one of the biggest issues to promote a level playing field in the market.

The issue of **non-compliant producers (free-riders)** was also raised, and it was noted that the lack of knowledge and resources especially for micro and small companies and the lack of enforcement activities contribute to aggravating the problem.

The lack of recycling solutions for decreasing volumes of arising cathode ray tube (CRT) leaded glass from WEEE category 2 ‘Screens, monitors, and equipment containing screens having a surface greater than 100 cm’ was mentioned, as well as changes in the composition of WEEE category 3 ‘Lamps’ containing more plastics, both causing difficulties to reach the **recycling targets**.

Regarding the topic of **reuse and preparation for reuse,** it was further stated that the WEEE 2 Directive is not adequately promoting (preparation of) reuse, as currently there is not a separate target for preparation for reuse but only a joint ‘preparation for reuse and recycling target’, and thus does not provide sufficient incentives to new circular economy business models, which often focus on the phases before a product becomes waste.

3.1.5. Member States targeted workshop #3: Poland

The workshop in Poland took place on 1 June 2023 and was attended by 8 participants, the consultants and a representative of the European Commission. Of the 8 participants, 4 were representing government institutions (Ministry of Climate and Environment, Chief Inspectorate of Environmental Protection), 1 represented a national research institute (Institute of Environmental Protection), 1 represented WEEE treatment operators and 2 representatives of producers and PROs. The issues addressed by the public authorities were taken into account and are further presented in the results section below.

The representatives of the Ministry of Post-Consumer Waste Division and the Ministry of Climate and Environment provided background on the **implementation of the WEEE 2 Directive** in Poland and its specificities including the obligation on producers to conduct public education campaigns, the ban on the collection of incomplete WEEE, the obligation to perform an annual audit for PROs and WEEE treatment operators, and the introduction of specific fees

per category of WEEE paid by producers in case they fail to achieve the annual collection, preparation for reuse, recycling, and recovery targets.

Main results

In relation to the achievement of the WEEE **collection targets,** the existing difficulties relate to new technologies/products with long lifetime entering the market (i.e. PV, heat pumps). Several participants pointed out that recent market developments call for a new concept providing more flexibility for product groups/ technologies newly entering the markets (as electric scooters, heat pumps, PV panels) and for products with longer lifetime.

Next to difficulties, the participants also mentioned **benefits associated with the WEEE 2 Directive**, seen mainly in the definition of responsibilities of actors and the provision of requirements for WEEE collection and treatment. Additional benefits named were the ordering of the market, the improved management of WEEE containing hazardous substances, the focus on environmental aspects, and the creation of economic opportunities for SMEs. It was furthermore highlighted that the success of **inspections** can be attributed to the clear requirements of the WEEE 2 Directive. On the other hand, the high number of requirements in the Directive also means a large workload for inspection authorities.

Regarding **reporting**, it was highlighted that challenges were encountered in teaching the different entities to correctly use the national database, as well as coordinating and collecting all data in a proper way.

3.2. Workshops with specific stakeholder groups

Three separate consultation activities with different stakeholder groups were conducted in June 2023. The workshops took place online and participants to each workshop were randomly divided into breakout sessions. The discussions in the breakout sessions were guided by multiple-choice and open questions, adapted per stakeholder group.

3.2.1. Workshop with WEEE treatment operators and their associations

The workshop with the focus on 'WEEE treatment operators and their associations' took place on 20 June 2023 for four hours. A total of 40 external participants took part in the workshop.

The participants agreed that the **collection targets** in the WEEE 2 Directive significantly impact WEEE management. The implementation of the European standards on the treatment of WEEE that were developed by CENELEC is seen as beneficial to treatment processes, but their full benefits may require EU-wide mandatory implementation as currently only approximately 22% of facilities in the EU comply with these standards, creating an uneven playing field. Concerns were raised about insufficient recycling capacities and challenges in recycling of WEEE plastics, since changing EEE material compositions and varied plastics hinder recycling. The majority of participants (61%) indicated that they no longer consider the **recycling/recovery targets** for separately collected WEEE of the WEEE 2 Directive to be adequate to achieve the stated objectives. Changing material composition of appliances were highlighted and the need for better consideration of critical raw material content and hazardous substances was raised.

Regarding **standards for WEEE treatment**, around 34% of participants indicated that their implementation is considered effective and that it contributed to the improvement of the quality of WEEE treatment. In addition, around 29% of the participants responded that the standard for collection and treatment of WEEE helped to reduce negative impacts on the environment and on human health.

Regarding the **classification of EEE into the existing six categories** set out in Annex II of the WEEE 2 Directive, there were diverging opinions on their adequacy and on whether they are fit for purpose.

Most participants agreed that the requirements to **export WEEE for treatment** and the minimum requirements to ship used EEE are not appropriate to guarantee environmental sound treatment and to prevent illegal exports of WEEE out of the EU.

Costs related to compliance were not readily available by the participants and it was highlighted that such should not be compared to non-compliance which cannot be considered an option.

3.2.2. Workshop with producers of EEE, PROs and their associations

The workshop with the focus on 'Producers, PROs and their associations' took place on 23 June 2023 for four hours. A total of 38 external participants took part in the workshop.

Most participants indicated that they do not consider the objective of EPR reached to shift to **more sustainable products** in line with circular economy principles. It was however highlighted that the WEEE 2 Directive is not considered the right framework to work towards more sustainable EEE, clearly pointing that this is the aim of Ecodesign legislation.

Related to WEEE **collection rates** and producers' efforts to increase those, most participants believe that the WEEE 2 Directive was successful in implementing efficient collection schemes. The need for further investigating illegal treatment and for a differentiation between household (B2C) and professional (B2B) equipment was raised as there is a difference in the WEEE available for collection and the WEEE theoretically generated. Most participants consider the legal framework provided by the WEEE 2 Directive beneficial to the development of and investments in better **recycling technologies** for WEEE but also stressed the importance of market dynamics (e.g. metal recycling is very advanced compared to plastics). The need for **mandatory standards** for recycling has been raised since they can be a valid source for improvement in WEEE recycling, especially concerning the quality of recycling.

Furthermore, several examples have been given with regard to relevant developments in the EEE production sector during recent years that are currently not adequately considered in the WEEE 2 Directive (e.g. single use EEE, RFID technology, long-lasting products).

Most of the participants believe that the WEEE 2 Directive was not successful in implementing the development of **reuse and repair** for EEE. It was also highlighted that reuse and repair is mainly promoted through the circular economy action plan and national efforts to promote circular economy.

The topic of non-compliant producers (**free-riders**) was seen by all participants as an urgent issue to be solved and the WEEE 2 Directive is considered not successful as free-riders are undermining the efforts and the finances of compliant producers. The system of the **authorised representative** is deemed a success in enforcement for excluding free-riders, but challenges related to differences in the actual implementation of the requirements of Articles 16 and 17 of the Directive were highlighted.

3.2.3. Workshop with consumer organisations/ NGOs/ research institutions

The workshop with the focus on 'Consumer organisations/ NGOs/ Research institutions' took place on 28 June 2023 for four hours. A total of 5 external participants took part in the workshop.

The participants see the WEEE 2 Directive as most successful in the recovery of secondary raw materials from WEEE with the caveat that some WEEE streams are not being properly treated as WEEE but lost through metal scrap streams or other unaccounted WEEE flows, and that the European standards on WEEE treatment are not broadly applied. The increase in separate collection rates compared to before the EU intervention was considered a success but not yet perceived to be sufficient. Notably, all participants believe that the WEEE 2 Directive was not successful in the development of more sustainable EEE.

All participants consider that the WEEE 2 Directive does not sufficiently address the right goals corresponding to current and expected future needs anymore in particularly regarding **waste prevention.** In line with this it was mentioned that the WEEE 2 Directive's provisions on product design and ease of recycling are not ambitious enough to support the objectives of the Ecodesign Directive and that targets to limit the use of primary materials and ensure the use of recycled/ secondary materials are missing.

To encourage **separate collection** of WEEE and **reuse activities**, clear return obligations for retailers and distributors, and comprehensive information on take-back procedures for customers, including on online sales platforms, were seen to be essential and not yet sufficient. To support the development of social enterprises, the introduction of specific reuse and repair targets into the Directive was mentioned. On one hand, the high costs for specific testing requirements and on the other hand the product design (e.g. built-in batteries in phones) were mentioned as factors hampering preparation for reuse by increasing the costs for such activities.

3.3. Specific stakeholder interviews/consultation

In addition to the structured meetings, such as workshops with specific stakeholder groups and with Member States, informal calls in an interview format were set up with key stakeholders, to fill data gaps.

3.3.1. Questionnaire to 'WEEE Forum' task force on WEEE 2 Directive evaluation

To close existing data gaps relevant for the evaluation, a questionnaire aimed specifically at producers and PROs was developed and shared with the task force on the WEEE 2 Directive evaluation organised through the WEEE Forum on 24 July 2023. The questionnaire comprised seven questions, focusing on WEEE treatment operators and fee development by PROs.

Resulting from the questionnaire, some PROs provided further insights into fee development and agreed to follow-up in bilateral interviews which are further described in the following section.

3.3.2. Interviews with producer responsibility organisations (PROs)

In order to further explore the correlation between fees and costs, two interviews were carried out with representatives of PROs members of WEEE Forum (see Table 14). Each interview lasted 30 minutes and was conducted online.

During the first interview, the different types of costs were explored. Collection appears to be a significant cost in Ireland across all WEEE categories, particularly when smaller, more frequent collections are needed. Processing costs encompass separation and manual depollution processes for large household appliances, with high labour costs and additional expenses for sending materials to the UK from Ireland. Processing costs increased in Ireland also due to investments in sorting and separation technology to enhance recycling and output material quality, resulting in higher material value. However, it has been highlighted that the higher material values do not always fully offset the increased processing costs. Producers' fees can be impacted by market dynamics, including the COVID-19 pandemic, demand fluctuations, and metal price changes. Another cost factor mentioned in the interview was the cost associated with becoming CENELEC approved: compared to WEEE 1 (Directive 2002/96/EC) a significant change has been seen, nevertheless it appears that the benefits outweigh the costs. In Ireland visible fees are used and seen as vital for creating a level playing field among producers.

During the second interview, the annual costs associated with WEEE management for a PROs operating in Czechia were explored in detail, including treatment costs, logistics costs, administrative costs and campaigns/information costs. In Czechia fees are calculated based on the number of devices placed on the market and the average weight, resulting in a cost per kilogram. Fees are often static, with for instance the fee for refrigerators remaining unchanged at EUR 6.5 for almost eight years.

3.3.3. 'Bitkom' working group on environmental regulation

Following a request from the industry association of the German information and telecommunications industry (Bitkom e.V.), on 27 September 2023 a presentation was given by the consultants conducting the evaluation study on the study objectives, the methodology used for the evaluation, and on the timeframe of the evaluation.

Prior to the presentation, a questionnaire was shared with this specific working group and the responses were discussed during the event. According to the participants the tech industry faces challenges affecting the **collection rate** of WEEE. Exports of new equipment aren't registered, causing distortions in WEEE collection rates. Refurbished devices often evade registration as waste in their country of origin, leading to more fictitious product registrations than actual market presence. Long-lasting products and innovative business models like leasing, conflict with achieving the WEEE collection targets. WEEE that is not discarded in authorised collection centres is cannibalised, and metals end up at scrap yards. Expanding **collection**

points, such as through retail obligations, may divide mass flows but doesn't necessarily improve collection rates, resulting in higher handling and infrastructure costs, as experienced in Germany.

3.4. Final stakeholder workshop

The final stakeholder workshop took place in Brussels and online on 19 October 2023. The total number of participants was 107, with 74 participants joining online and 33 in person. The aim of the workshop was to validate preliminary findings from the analysis under the evaluation criteria and collect feedback as well as to close remaining data gaps for the evaluation.

On the 'Effectiveness' criterion preliminary results, the comments included:

- **Treatment standards**: Due to different treatment standards being applied by actors and between Member States, there is no level playing field for treatment operators. The participants raised the need for mandatory standards, however the legal issues of including standards which are not freely available in legislation was raised.
- **Market surveillance and enforcement**: EPR is seen to work well but flaws remain with the market surveillance of illegal collection, export, and treatment activities and enforcement of EPR obligations of actors by Member States.
- **Collection rates**: A major issue related to not achieving collection rates is seen to arise from illegal collection and treatment of WEEE, in particular metal parts. Related to this, informal/ illegal collection of B2B WEEE is considered important. Additionally, the calculation method for collection targets using the PoM method was criticised as it doesn't reflect adequately lifetimes of long-lasting products before arising as waste (e.g. photovoltaic panels).
- **Take-back options:** When considering take-back obligations the importance of complementing widened take-back obligations with enforcement activities to ensure compliance (e.g. by retail) was pointed out.

On the 'Efficiency' criterion preliminary results, the comments included:

- **Reporting system / national registers:** The need for harmonising the reporting system across the EU-27 Member States was raised and any changes to reporting requirements to be avoided since they involve high costs for changing entire data systems (e.g. at producers/ PROs/ authorities).
- **Visible fee:** A visible fee (or 'environmental fee') was seen useful to avoid margins taken by the distribution channel, raise awareness amongst consumers, and involve retailers in the collection of WEEE.

On the 'Relevance' criterion preliminary results, the comments included:

- **Definitions**: Differing definitions in different EPR schemes and legislation were pointed out (e.g. batteries, WEEE, packaging) such as 'placed on a market' and 'distance selling', making supervising compliance of producers difficult.

- **CRMs:** One association highlighted that addressing the CRM challenge would require another approach than a WEEE weight-based recovery target and to extend the scope to include other materials which are not listed as CRMs but are also strategically important like silver. The costs for treatment operators to know which materials are contained inside a product was raised.
- **Recycling:** For PV panels a second-hand market outside of the EU exists and panels exported for reuse are not available for collection. It is therefore important that these quantities are reported and subtracted from the generated WEEE for the calculation of the WEEE collection rate.
- **Reuse:** The need for introducing into the WEEE 2 Directive obligations for all reuse actors for registration and reporting was raised.
- **Embedded electronics in products:** The issue of increasing complexity of products and embedded electronics in products (e.g. textiles, toys) which are now covered by the open scope was raised and the problems regarding collection and recycling of such products highlighted.

On the 'Coherence' criterion preliminary results, the comments included:

- There are different opinions on whether there is a need to have an overarching legislation that gathers all relevant aspects on WEEE, from design to waste or not.
- **Prevention:** The concept of prevention is seen to be not sufficiently taken up by the WEEE 2 Directive, presenting an incoherence with the waste hierarchy set out in the Waste Directive. For some stakeholders, waste prevention is not sufficiently addressed in the objectives of the WEEE 2 Directive.
- **Material quality:** Stakeholders highlighted the need for material quality requirements for (plastics) recycling to ensure that demands for high-quality recycled materials arising from the recycled-content requirements introduced by the Ecodesign Directive and the upcoming Ecodesign for Sustainable Products Regulation (ESPR) can be met by industry.

On the 'EU added value' criterion preliminary results, the comments included:

- **Industry's role**: The notion was raised that current solutions are driven by industry however, with the backing of the existing legislation. National authorities can do better according to the participants (e.g. related to monitoring, data and statistics availability).
- **Heterogeneity**: The heterogeneity of the national implementation of the WEEE 2 Directive was highlighted as an issue to be addressed.

ANNEX VIII. STATISTICS AND INFORMATION ON WEEE PREVENTION

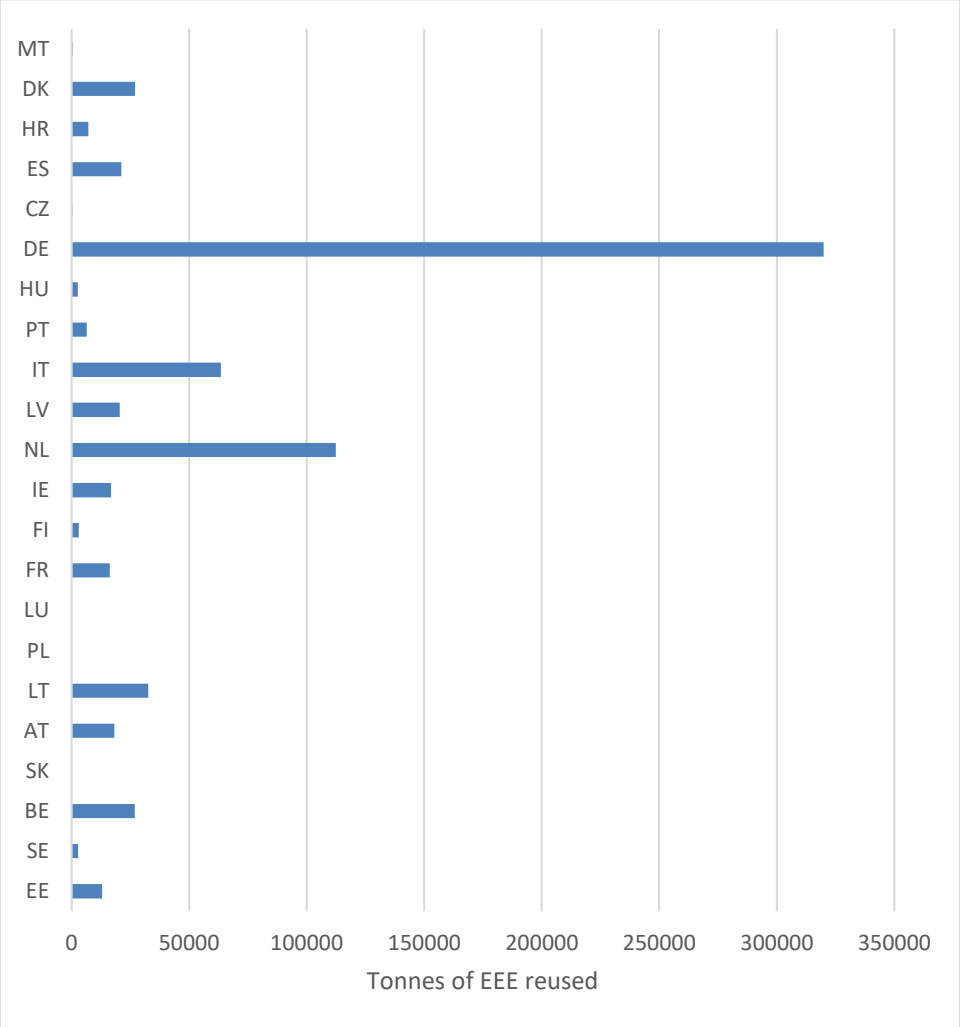
This Annex gives information complementing Chapter 3.2 of this report regarding waste prevention and in particular to present data and information on reuse and repair of EEE.

Reuse

Directive 2008/98/EC lays down an obligation for Member States to take measures to encourage reuse as part of their waste prevention programmes, and to monitor and assess the implementation of their measures on reuse by measuring reuse in accordance with a common methodology established by the Implementing Decision (EU) 2021/19.

The first data on reuse published in March 2024 refer to the reporting year 2021 and according to that 710 642 tonnes of EEE have been reused in 2021. It is remarkable that about 45% of this quantity is EEE reused in Germany. However, not all Member States have reported data. The Figure 34 below gives an overview of the EEE reused in each Member State.

Figure 34: Reuse of electrical and electronic equipment in the EU-27 in year 2021 (Source EEA)

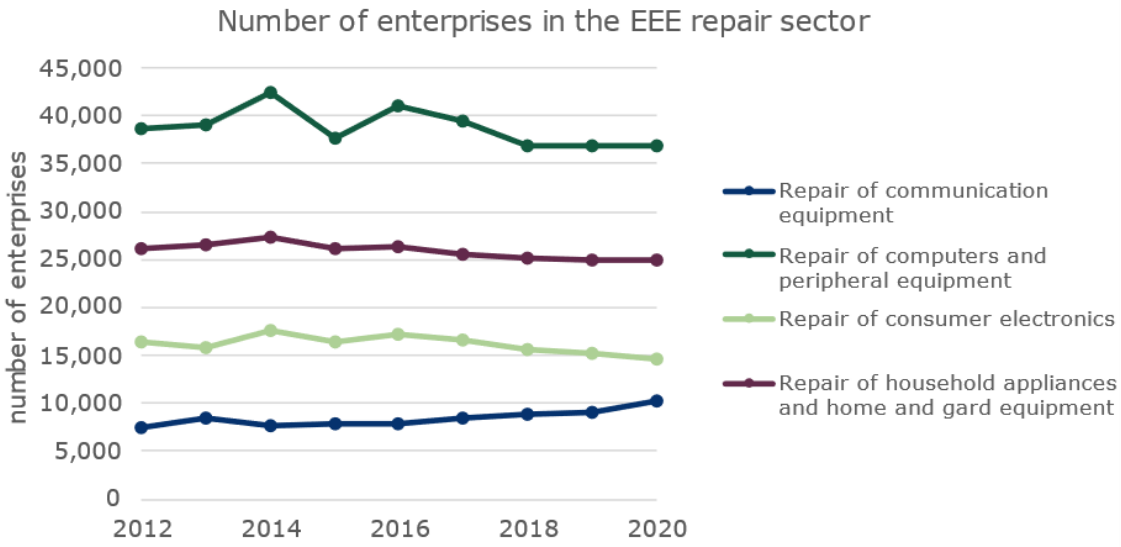


Repair

The repair of EEE can be carried out by commercial repairers, in the context of repair events or by consumers themselves.

According to the information provided in the evaluation study, the repair is more common for the following four product groups: a) communication equipment, b) computers and peripheral equipment, c) consumer electronics and d) household appliances. From 2012 to 2020, there has been a consistent number of enterprises and turnover within all the above-mentioned four categories in the EEE repair sector. Among them, the repair of computers and peripheral equipment has shown the highest number, with approximately 40 000 enterprises throughout the EU, and a peak turnover of around EUR 12 000 million. However, since 2020, the repair market has faced significant challenges due to the impact of the Corona Pandemic. Data beyond 2020 has not become available.

Figure 35: Number of enterprises in the EEE repair sector for different types of EEE (Source: Eurostat; database SBS_NA_1A_SE_R2)

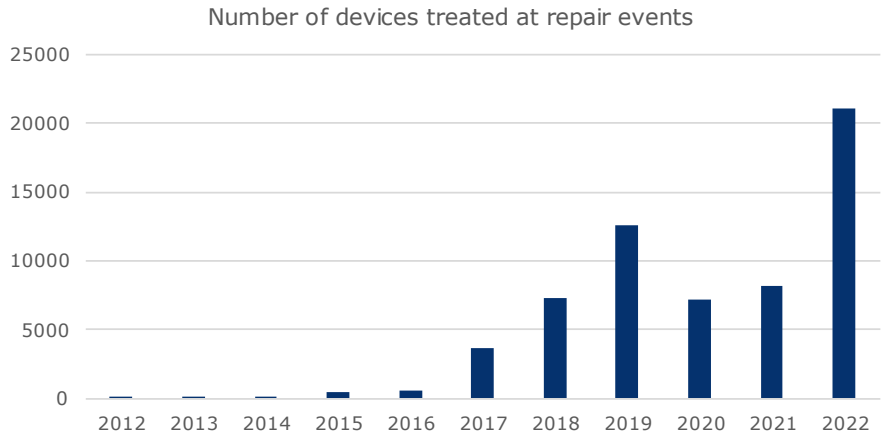


The 'Circularity Gap report, 2024', presents some action that individual Member States have taken actions rolling out a range of policy tools to make repair the new normal: Sweden, for example, has cut VAT rates for repair, while Austria, Germany and France now offer repair bonuses–partial reimbursement for consumers that take this route. In Graz, Austria, both commercial and community repair initiatives are supported, with Repair Cafés eligible for yearly funding, while repair bonus funding in Upper Austria saved around 260 tonnes of e-waste between September and December 2019 alone. France has also rolled out a repairability index for five categories of electronic devices, informing consumers on their options prior to purchase. A mix of both hard regulatory tools – such as those targeting manufacturers – and

softer instruments that tackle cultural barriers and shift consumer attitudes is proving remarkably effective[185].

In addition, regarding the repair events conducted across the EU, the Open Repair Alliance gathers data on the repair of EEE from various organisations, including 'anstiftung,' 'Fixit Clinic,' 'Repair Café Denmark,' 'Repair Cafe International,' 'Repair Cafe Wales,' 'Repair Connects,' and 'The Restart Project'. The data show a significant increase in the number of devices treated at repair events within the EU 27. There was a peak in 2019, with approximately 12 000 devices treated. However, due to the impact of the COVID19 pandemic, the number declined in 2020 and 2021. Encouragingly, in 2022, the number rebounded and reached a new high, with over 20 000 devices treated.

Figure 36: Number of devices treated at repair events and tracked by the Open Repair Alliance (Source: Open Repair Alliance).



One of the main **challenges in relation to** WEEE prevention that Member States face is the lack of sufficient data in particular regarding reuse. In addition, the difficulty to distinguish between EEE for reuse and WEEE for preparation for reuse create additional constrains regarding data availability.

The consumer demand for low-cost electronic equipment plays a significant role in relation to repair. There is disparity between reparability and frequent sales since

higher turnover may be generated with products that cannot be repaired and

higher turnover may be generated with products that have a short lifetime.

[185] The Circularity Gap Report 2024: https://www.circularity-gap.world/2024 .

ANNEX IX: THE WEEE DIRECTIVE AND THE CIRCULAR ECONOMY

Objectives and expected impacts of the WEEE Directive

The overarching objectives and rationale of the WEEE 2 Directive[186], which is subject of this evaluation, have not changed compared to the WEEE 1 Directive[187]. Based on the insights gained from the impact assessment presented in the Commission Staff Working Document (European Commission, 2008b)[188] accompanying the 2008 proposal for a recast of the WEEE 1 Directive, the general objective of the review was to achieve the **objectives** of the WEEE1 Directive more effectively and efficiently, thus optimising benefits for the society as a whole in return for the legislative, administrative and economic efforts required, thereby to contribute to a better regulatory environment that is simple, understandable, effective and enforceable, thus advancing sustainable development and environmental protection while helping businesses to maintain its competitiveness and ability to grow and create jobs.

The **specific objectives** of the WEEE1 Directive were:

- Reduced costs for producers and treatment operators through the removal of all unnecessary administrative burdens, without lowering the level of environmental protection.
- Reduced costs for producers complying with the Directive by elimination of the costs they bear from free-riding by other producers or other distortion of competition.
- Creation of the conditions that lead to the proper treatment of all separately collected WEEE in line with the provisions of the Directive.
- Increased diversion of WEEE from the domestic waste stream.

This led to four **operational objectives** defined as follows:

(1) certainty for economic operators on definitions, scope and categorisation of products;

(2) removal of different requirements for compliance (including reporting and registration) between Member States and reduced duplication of reporting;

(3) creation of adequate incentives for all separately collected WEEE to be treated in line with the Directive, rather than being improperly treated in the EU or illegally shipped to third countries;

(4) provision of incentives for waste to be diverted from the domestic waste stream.

Consequently, the aim of the WEEE1 Directive was to prevent WEEE, and where this was not possible to recycle and recover it to reduce its disposal and to reduce the negative environmental

[186] Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (recast) (OJ L 197, 24/07/2012, p. 38-71).
[187] Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (OJ L 37, 13.2.2003, p. 24-39).
[188] Commission staff working paper accompanying the proposal for a directive of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) (recast) - Impact Assessment {COM(2008) 810 final} {SEC(2008) 2934}.

impacts of WEEE through proper treatment of collected WEEE. It required Member States to ensure that collection and treatment schemes are set up and set minimum collection targets to increase separate collection and made producers responsible for the financing of the WEEE management. The Directive thus enabled market mechanisms and financial incentives in favour of efficient collection, treatment and 'design for recycling'.

The starting point of the intervention logic of the WEEE 2 Directive (see Figure 6 in Chapter 2.1) are the underlying needs that led to the revised WEEE 2 Directive and which stem from the impact assessment that accompanied the Commission proposal for the recast of the WEEE 1 Directive. Examples of needs stemming from this recast are the need to provide further incentive to increase reuse of old EEE or the need to foster separate collection of WEEE.

These needs translate to general and specific objectives, which are an essential part of the Directive.

The **general objectives** of the WEEE 2 Directive are:

i. to protect human health and the environment from detrimental impacts of WEEE generation and management,

ii. to contribute to sustainable production and consumption through reuse, recycling and other forms of recovery of electronic waste, and

iii. to improve the efficient use of resources and the retrieval of valuable secondary raw material from WEEE.

The **specific objectives** provide a more nuanced view and further details on what the Directive is supposed to achieve, and these are to:

i. increase separate collection of WEEE;

ii. ensure and increase proper treatment of WEEE to maximise recovery of secondary raw materials;

iii. improve the effectiveness of EPR for all EEE placed on the market (irrespective of the selling technique- addressing thus the challenges of online trade), increase compliance and reduce /avoid 'free-riding';

iv. raise awareness and improve the environmental performance of actors involved in the (W)EEE value chain;

v. encourage through extended producer responsibility (EPR) product design to facilitate repair, reuse/ preparation for reuse and recycling; and

vi. reduce administrative costs through the removal of all unnecessary administrative burdens, without lowering the level of environmental protection.

Both general and specific objectives are essential for the evaluation as the results of the intervention since its entry into force are measured against them.

This overall objective shall be achieved by:

- Giving priority to the prevention of the generation of WEEE;
- Promoting the efficient use of resources and the recovery of secondary raw materials through reuse, recycling and other forms of recovery; and
- Improving the environmental performance of all actors involved in the life cycle of electrical and electronic equipment.

In order to achieve these objectives, the Directive:

- Requires the separate collection and proper treatment of WEEE;
- Sets targets for separate collection and for recovery and recycling;
- Implements the polluter pay principle through an extender producer responsibility (EPR) System requiring producers to pay for collection, transport and treatment of WEEE;
- Aims at reducing administrative burden by requiring harmonisation of national EEE registers and of the reporting format, thus strengthening the EU internal market.

The activities are derived from the objectives and can be directly assigned to them. They reflect, which events were expected to happen since the WEEE 2 Directive entry into force till today. The output is often a reflection of these and describes them again with a focus on the end result.

Objectives, inputs, activities, and outputs are all elements of the EU intervention itself. The protection of human health and the environment, for example, is highlighted in recital (2) and (3) of the Directive and stipulated in Article 1, which provides the subject matter. The specific objective of proper treatment of all WEEE is reflected, for instance, in Article 8 of the Directive. Other objectives are to be achieved through a combination of provisions and through the Directive as a whole.

Needs, results, impacts, as well as external factors and other EU policies can be seen as an external view on the intervention and in which overarching framework the intervention has to function.

The WEEE 2 Directive was expected to have as main impacts the reduction of WEEE disposal, due to the increase in WEEE collection and proper treatment, the reduction of impacts on the environment and health by increasing and improving the WEEE collection, treatment and recovery and the retrieval of more valuable secondary materials from WEEE.

The inclusion of other EU policies into the intervention logic became more important with the diversification of EU (environmental) law and the revision of other pieces of legislation. There is often a close connection between different legislations, which can impact the success of each other's objectives. Obvious examples for the WEEE 2 Directive are Directive 2011/65/EU on the restriction of hazardous substances in electrical and electronic equipment (RoHS

Directive)[189]. Moreover, the WEEE 2 Directive supports the Ecodesign Directive[190]. The Directive was repealed on 18 July 2024 by the new Regulation establishing a framework for setting Ecodesign requirements for sustainable products (ESPR)[191]. Article 4 of the WEEE 2 Directive, requests Member States to take appropriate measures to promote the design and production of EEE in view of facilitating reuse, dismantling and recovery of WEEE but without setting specific product design requirements. The development of more than 30 EU Ecodesign measures on EEE had a strong impact on the non-implementation of Article 4 of WEEE at national level. Lastly, Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators (Batteries Directive)[192], which's provisions and obligations for players in the market still cause an impact on the WEEE 2 Directive in particular as regards the practical management of WEEE that incorporate batteries. The Directive will be repealed in 2025 by the new Batteries Regulation[193], which provides in particular in its Article 11 for the removability and replaceability of portable batteries and light means of transport batteries and this is likely to make the recycling of WEEE more efficient.

How was the intervention expected to work?

The WEEE 2 Directive was expected to have a (significant) impact on the generation of WEEE and was supposed to lead to a decrease of respective waste amounts generated in all Member States. To achieve these progressive goals, clear, quantifiable targets and expectations were set after evaluating the experiences made with the implementation and enactment of the WEEE 1 Directive and based on the insights gained from the impact assessment presented in the Commission Staff Working Document (European Commission, 2008b, p. 44) accompanying the 2008 proposal for a recast of the WEEE 1 Directive.

The WEEE 2 Directive in order to achieve the objectives of protecting the environment and human health by preventing and reducing the adverse impacts from the generation and management of WEEE, increased the targets compared to the WEEE 1 Directive. To that end, it sets more ambitious targets increasing over time, for collection, combined preparing for reuse and recycling, as well as recovery targets for the different categories of WEEE.

[189] Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 37, 13.2.2003, p. 19-23).
[190] Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast) (OJ L 285, 31.10.2009, p. 10-35).
[191] Regulation (EU) 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products, amending Directive (EU) 2020/1828 and Regulation (EU) 2023/1542 and repealing Directive 2009/125/EC (OJ L, 2024/1781, 28.6.2024).
[192] Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (OJ L 266, 26.9.2006, p. 1-14).
[193] Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 (OJ L 191, 28.7.2023, p. 1-117).

Evolution of WEEE collected and recycled over the years since 2003

The evolution of waste electrical and electronic equipment (WEEE) collection and recycling in the European Union (EU) since the introduction of the WEEE Directive in 2003 shows a significant increase in the quantities of e-waste collected and recycled. However, collection targets and recovery targets remain the two main problems as Member States face difficulties in reaching them, while overall around 40% of electronic waste is recycled in the EU.

Table 16 shows the evolution of the collection targets introduced since the introduction of the WEEE 1 Directive in 2003.

	Annual collection targets
WEEE 1 Directive	4 kg/inhabitant
WEEE 2 Directive up to 2016	4 kg/inhabitant
WEEE 2 Directive from 2016 to 2018	45% (by mass) of all equipment put on the market
WEEE 2 Directive from 2018 and beyond	65 % (by mass) of all equipment put on the market or 85% of waste generated

Table 16: Evolution of WEEE collection targets

Table 17 and Table 18 below show the minimum targets for recovery, reuse and recycling of the WEEE 1 and WEEE 2 Directive respectively.

	Category	Recovery rate [w%]	Reuse and recycling rates [w%]
1	Large household appliances	80	75
2	Small household appliances	70	50
3	IT and telecommunications equipment	75	65
4	Consumer equipment	75	65
5	Lighting equipment	70	50
6	Gas discharge lamps	—	80
7	Electrical and electronic tools	70	50
8	Toys, leisure, and sports equipment	70	50
9	Monitoring and control instruments	70	50
10	Automatic disperser	80	75

Table 17: Minimum targets of the WEEE 1 Directive for recovery, reuse and recycling rates.

	Category	Recovery/reuse and recycling targets [%] in period 1*	Recovery/reuse and recycling targets [%] in period 2**	Recovery/reuse and recycling targets [%] in period 3***
1	Large household appliances	80/75	85/80	
2	Small household appliances	70/50	75/55	
3	IT and telecommunications equipment	75/65	80/70	
4	Consumer equipment	75/65	80/70	
5a	Lighting equipment	70/50	75/55	
5b	Gas discharge lamps	—/80	—/80	
6	Electrical and electronic tools	70/50	75/55	
7	Toys, leisure, and sports equipment	70/50	75/55	
8	Medical devices	70/50	75/55	
9	Monitoring and control instruments	70/50	75/55	
10	Automatic disperser	80/75	85/80	
1	Temperature exchange equipment (e.g. refrigerators and heat pumps)			85/80
2	Screens and monitors (e.g. televisions, LCD, and photo frames)			80/70
3	Lamps (e.g. fluorescent lamps and LEDs)			—/80
4	Large equipment (e.g. washing machines and photovoltaic panel)			85/80
5	Small equipment (e.g. vacuum cleaners, smoke detectors, and sport equipment)			75/55
6	Small IT and telecommunication equipment (e.g. mobile phones, GPS, and personal computers)			75/55

*Period 1: from August 13, 2012 until August 14, 2015.
**Period 2: from August 15, 2015 until August 14, 2018.
***Period 3: from August 15, 2018 onwards.

Table 18: Minimum targets of the WEEE 2 Directive for recovery, reuse and recycling rates.

Here is an overview of the key trends and data points:

i. Introduction of WEEE 1 Directive

a. Early Years (2003-2008)

- Initial Implementation: After the WEEE 1 Directive was adopted in 2003, Member States began implementing national systems for the collection, treatment, and recycling of e-waste. However, the early years saw significant variation in how quickly and effectively these systems were established across different Member States.
- Collection Growth: Initially, collection rates were relatively low, as systems were being set up and public awareness was still developing.

b. Growth and Expansion (2008-2012)

- Increased Collection and Recycling: By the late 2000s, collection and recycling rates began to improve as national systems became more mature and consumer awareness increased.
- Introduction of New Targets: In 2008, the European Commission proposed new targets to further increase the collection and recycling rates. This led to the revision of the WEEE Directive in 2012 (Directive 2012/19/EU), which set higher and more ambitious targets for Member States.

ii. Revised WEEE2 Directive

a. Revised Directive and Its Impact (2012-2018)

- Directive 2012/19/EU: The revised WEEE 2 directive, adopted in 2012, introduced more stringent collection targets based on the amount of EEE placed on the market, rather than per capita, which better reflected the actual consumption and disposal patterns of electronics in different Member States.

- Rising Collection Rates: The new targets prompted significant improvements in collection rates. By 2016, the EU average collection rate was around 45% of the weight of EEE placed on the market. This was a marked improvement from earlier years.

  Recycling Progress: The revision also pushed for higher recycling and recovery rates, with specific targets for different categories of WEEE. Although the establishment of WEEE collection and recycling, as main aim since WEEE1, has been effective, overall recycling of electronic waste remains low with around 40% in Europe.

b. Current state and challenges (2018-2023)

- Increased Ambition: The most recent years have seen the EU continue to push for higher collection and recycling rates. The target set for 2019 required Member States to collect 65% of the average weight of EEE placed on the market in the previous three years, or 85% of e-waste generated. However, the Commission pursued legal action against Member States for failing to comply with their obligations under the WEEE Directive aiming to ensure the proper application of the Directive. With its decisions of 25 July 2024[194], the Commission called on 24 Member States to meet among others the WEEE collection targets and decided to open an infringement procedure by sending letters of formal notice.

- Continued Growth: According to Eurostat, in 2019, the EU collected approximately 4.5 million tonnes of WEEE, representing about 51% of the total EEE placed on the market. While this was significantly below the 65% target, it marked an increase compared to earlier years. Nevertheless, this increase was not enough to reach the targets.

- Recycling rates have improved, with many Member States achieving recovery rates of over 80% for certain categories of e-waste. However, challenges remain, particularly in ensuring uniform compliance across all Member States. Variability across Member States in collection and recycling rates presents ongoing challenges for meeting EU-wide targets.

- The Directive does not incentivise the recovery of secondary and critical raw materials because the current recycling/recovery rates are based on the input to a recycling facility, which do not foster high levels of material recycling and the recovery of CRMs

[194] https://ec.europa.eu/commission/presscorner/detail/en/inf_24_3228

Reuse rates are still very low and overall, only around 40% recycling is achieved in Europe for the time being.

In conclusion, the evolution of WEEE collection and recycling in the EU since 2003 shows steady progress, driven by increasingly stringent regulations and growing public awareness. However, achieving uniform compliance across all Member States remains a challenge. The amount of EEE placed on the market continues to grow, and the current achievements in terms of WEEE collection and recycling do not significantly support the implementation of a circular economy model within the EU, neither contributes to the establishment of a market for secondary raw materials. In that perspective, synergies and timely sequencing between the WEEE Directive and 1) the ESPR as well as 2) the CRM Act- and their related secondary acts - are very relevant and can contribute to the realisation of such a market as these initiatives complement each other.

European standards for WEEE treatment

Pursuant to Article 8(5) of the WEEE Directive, following a mandate by the Commission[195], the European Committee for Electrotechnical Standardization (CENELEC) has developed a series of standards for the treatment of WEEE (including WEEE collection and logistics), and a standard on preparing for reuse (EN 50625 series and EN 50614). An overview of the European standards for WEEE treatment is available in Table 5 in Annex III.

Standards specify how to meet depollution requirements. WEEE contains substances of concern which can be hazardous, for example mercury, polychlorinated biphenyls, cadmium, volatile fluorocarbons and some brominated flame retardants. According to the WEEE Directive (Annex VII), materials and components that contain hazardous substances require dedicated handling and treatment to avoid environmental pollution and the associated health and safety risks. These materials and components are removed in a process that is called depollution. The ENs and the TSs address depollution and clearly define target values for batteries and capacitors, and limit values for concentrations of hazardous substances to be achieved by the end of the treatment processes. A very important aspect in showing compliance with target and limit values is the way WEEE and streams resulting from treatment are sampled and analysed. A substantial part of the standards, especially the TS 50625-3-1, addresses the procedures for specifying the concentrations of the substances of concern. The standards provide tools and protocols that allow treatment operators to assess and design their depollution performance and meet the legal requirements.

These standards remain voluntary in most Member States. Only six Member States have made the standards obligatory by law, while another four Member States have introduced specific elements of the standards in the national legislation. Austria, Portugal, Spain and Slovakia have national provisions in place containing elements of the EN 50625 series, e.g. detailed provisions for treatment of temperature exchange equipment.

[195] Mandate to the European standardisation organisations for standardisation in the field of WEEE M/518, 24 January 2013: Circabc (europa.eu).

Extended producer responsibility (EPR) system

The WEEE 1 Directive was mainly aimed at ensuring a take-back and collection system provided by producers and a correct treatment of the collected WEEE by imposing recycling and recovery targets. The extended producer responsibility (EPR) is a principle that obliges manufacturers to manage product end-of-life costs right from the design phase. EPR is based on the assumption that the producers should be responsible for the environmental impact of their products throughout the product life cycle; by fulfilling this obligation they will try to reduce the environmental impact and account for any associated costs. EPR shifts the responsibility for end-of-life products from public authorities to private industries (producers or producer responsibility organisations) thereby reducing public subsidies associated with waste management and increasing the collection, recycling and recovery of such waste. A mature implementation of EPR is thus expected to impact these steps within the supply chain by favouring an effective and efficient coordination of processes through collaborative strategies so as to turn the costs related to environmental responsibilities into opportunities. However, a variety of EPR schemes exist throughout Europe that can influence the performance of such systems.

On the implementation of the EPR principle, success factors are coordination of producer responsibility organisations (PROs) by central authority, including establishing a clearing house system, developing strong regulatory framework and approval procedures for PROs and their monitoring, awareness campaigns for producers of EEE to reduce the number of free-riders.

EPR systems vary from one Member State to another and drawing conclusions on a successful 'fit-for-all' EPR system is a complex endeavour and probably not feasible because such a system may not exist.

The application of WEEE extended producer responsibility (EPR) in the EU has followed different patterns, with varying intensity of competition among producer organisations responsible for meeting take-back and recycling obligations. See Annex XI.

Links of WEEE II directive with ESPR and CRM Act

1. **Critical raw materials (CRMs)**

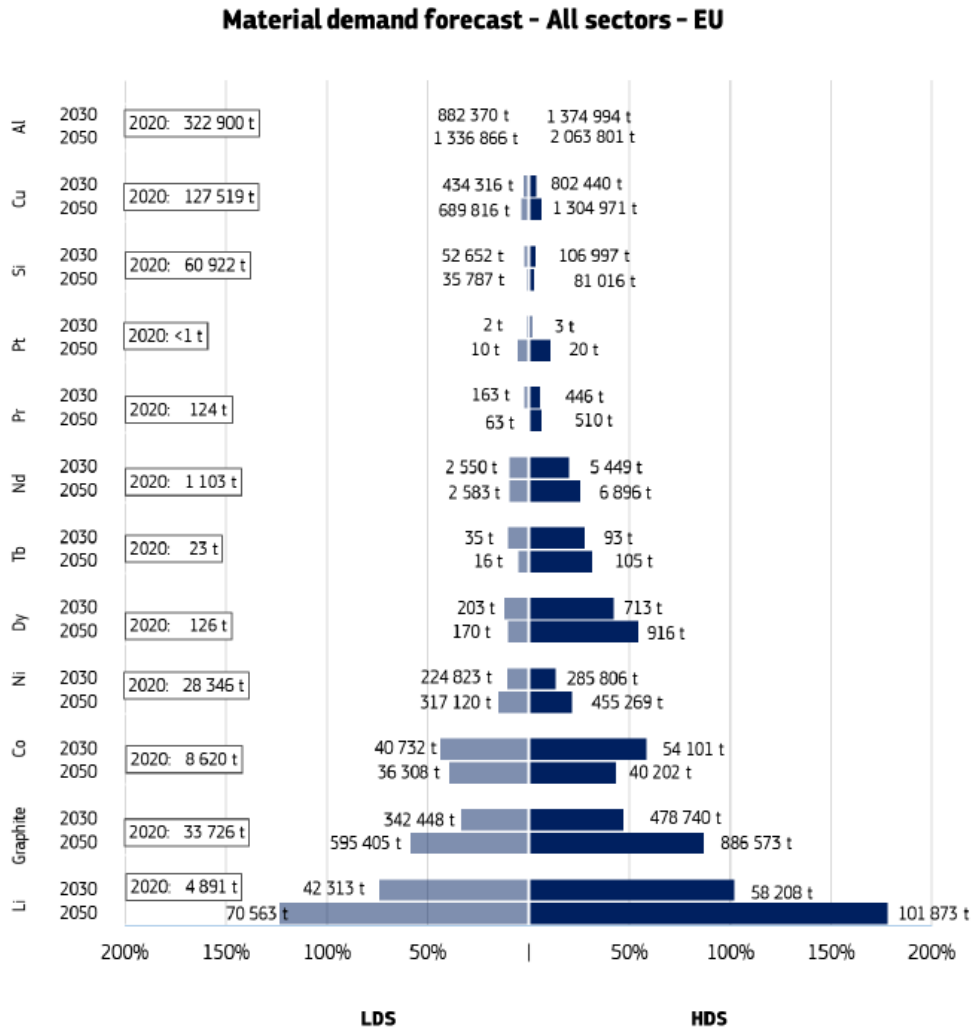
The EU needs access to CRMs and to products which contain them to achieve the ambitious goals set in the twin digital and green transition, the Green Deal Industry Plan and most recently in the European Critical Raw Materials Regulation[196] and the Fifth list of critical raw materials (2023) and also in order to reduce the dependency on China. Access to critical raw materials (CRM) that the European Union (EU) requires for its triple digital, energy and circular economy transition is becoming increasingly uncertain. Critical raw materials are vital to the economy. However, they are either largely sourced from conflict zones or controlled by one or just a few countries. The EU's Critical Raw Materials Regulation outlines that by 2030, none of the third

[196] Regulation (EU) 2024/1252 of the European Parliament and of the Council of 11 April 2024 establishing a framework for ensuring a secure and sustainable supply of critical raw materials (OJ L, 2024/1252, 3.5.2024).

countries from which strategic raw materials are imported should supply more than 65% of the EU's annual demand for each of those strategic raw materials. Furthermore, Member States should implement measures to improve the collection of waste rich in critical raw materials and ensure its recycling into secondary raw materials (SRM). However, as it stands now there is no structured and harmonised knowledge on the availability and recoverability of these critical raw materials within the EU.

It has been forecast that a rapid increase of demand for CRMs is to be expected in the future as a result of economies transition towards digitalisation and decarbonisation. The JRC has predicted a material demand for the following CRM in case of a 'Low Demand Scenario' (LDS) and a 'High Demand Scenario' (HDS) compared to the 2020 status in the EU in tonnes per year (Carrara et al., 2023).

Figure 37: CRM demand forecast for all sector within the EU in tonnes per year. (Carrara et al., 2023)



(Li = lithium, Co = cobalt, Ni = nickel, Dy = dysprosium, Tb = terbium, Pr = praseodymium, Pt = platinum, Si = silicon metal, Cu = copper, Al = aluminium).

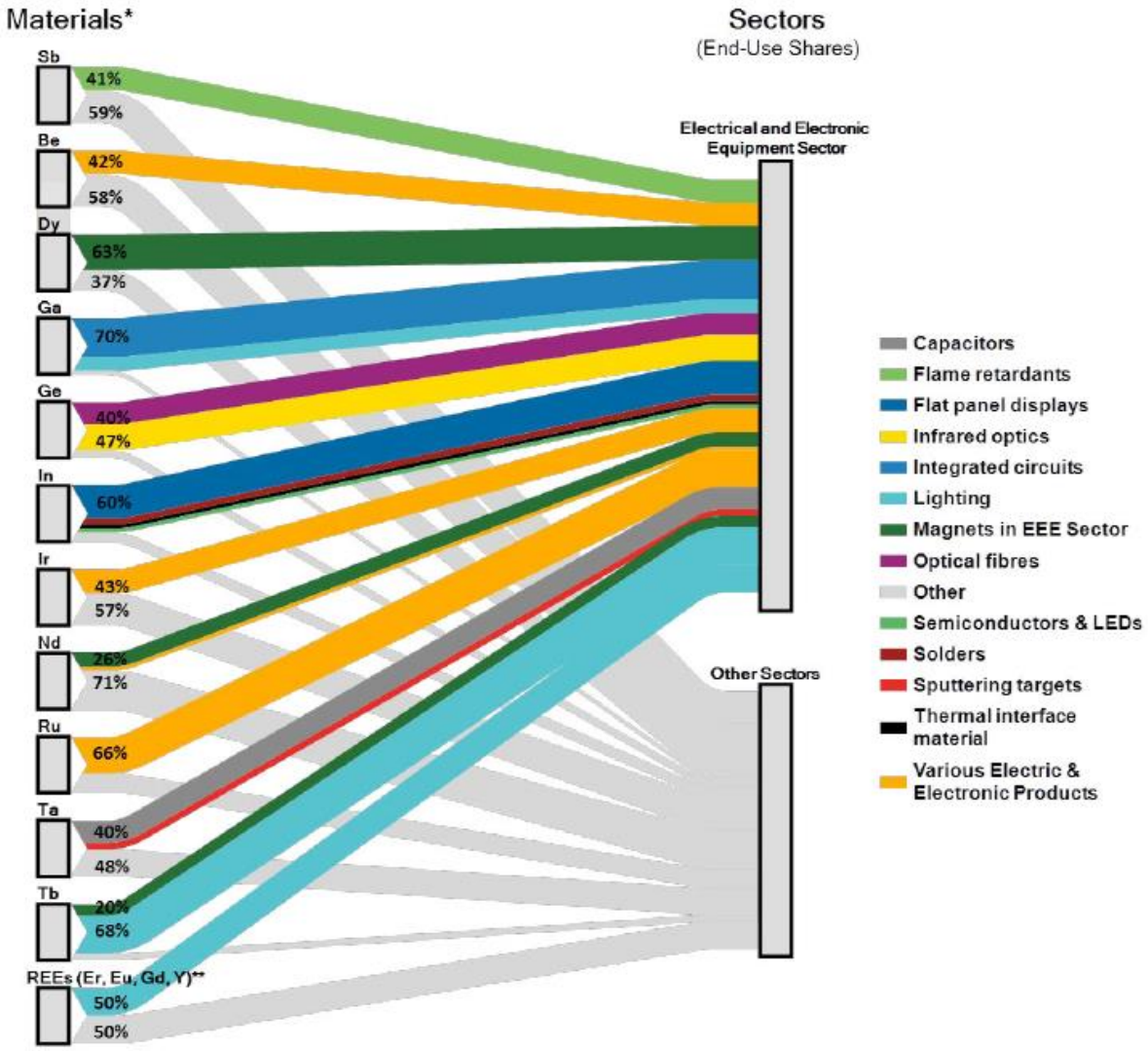
However, this material demand forecast is not EEE-specific. There is only scattered information available on CRMs used in EEE as summarised in the following, based on Manoochehri S. et al. (2021), Gislev et al. (2018), Cesaro A. et al. (2019), R. Williams et al. (2020), WEEE Forum (2022b), the specific CRM fact sheets (drafts of the 2023 edition) prepared under the EU-funded SCRREEN project (SCRREEN PROJECT, 2023) and on stakeholder input which were consulted during this evaluation (call for evidence, 2023; MS Submissions to Targeted Questionnaire, 2023).

EEE contain a variety of material and CRMs including antimony, beryllium, cobalt, germanium, indium, platinum group metals, natural graphite, rare earth elements, silicon metal and tungsten.

An overview on the use of selected CRM in EEE components is provided in Figure 38.

Figure 38: Share of CRMs used in the electric and electronic sector according to the 2017 CRM assessment (Gislev et al., 2018)

****Average share for Er, Eu, Gd, and Y**



WEEE contains approximately 0.01% precious metals: platinum, palladium, gold, silver. For precious metals, the recycling efficiency is very much dependent on the choice in pre-treatment of WEEE. While mechanical treatment will lead to poorer recycling efficiencies, in-depth disassembly can lead to recycling efficiencies as high as ~95%.

WEEE components contain CRMs[197] for example as follows:

- Printed circuit boards from IT and telecommunication equipment (desktop computers, professional IT, laptops, mobile phones, tablets, external CDDs/ODDs):, bismuth, antimony, palladium, gallium, germanium, arsenic, tantalum;
- Capacitors: tantalum;
- NdFeB magnets from hard disc drives (laptops, desktop computers, professional IT), speakers' electrical engines in e-bikes: Rare Earth Elementss;
- Fluorescent powders from cathode ray tubes (CRTs; TVs and monitors) and fluorescent lamps: light REEs;
- PV panels: indium, silicon, , gallium, arsenic;
- Displays: indium, arsenic;
- Additive in plastics: antimony;
- Glass-ceramic cooktops: lithium; and
- LEDs: indium, gallium, arsenic, REEs.

For the following CRMs recovery from WEEE takes place at industrial level, at least to a certain extent.

The recovery of platinum group metals (PGMs), in particular of platinum and palladium from electronic components in WEEE, is current practice given that the WEEE scrap reaches a modern refining facility. Recovery rates for platinum and palladium of over 95% are technically attainable with current state-of-the-art techniques, while for rhodium, iridium and ruthenium the metallurgical yields are somewhat lower but still high. In addition to the technical viability of recycling, secondary production from end-of-life products is attractive from an economic point of view as the PGM, like all precious metals, have a high intrinsic value.

[197] CRMs refer to CRMs as per 2023 list and those materials which were CRMs during the assessment period in the previous versions i.e. 2020, 2017, 2014 and 2011, as well as certain other precious metals which were assessed in the CRM studies.

The same applies for gold and silver from electronic components in WEEE. However, apart from the challenge to separately collect mobile phones and printed circuit boards from WEEE, it is technically very difficult to extract the precious metals from these devices.

Recycling of end-of-life products is an important source of cobalt supply for the EU.

Recycling of rare earth elements (REEs) from fluorescent powders in fluorescent lamps had been practised until 2016.

REEs recycling from NdFeB magnets is technically feasible in principle. As an initial step of recovery of REEs from NdFeB magnets, these components need to be separated from hard disc drives and other equipment to enable their further processing.

The main uses of silicon metal in EEE include silicon semiconductors, in transistors, printed circuit boards and integrated circuits. Silicon is used for the production of PV panels. Silicon solar cells are the most common cells used in commercially available PV panels. In recent years there have been functional recycling plants of Si scrap from wafers and from photovoltaic panels in Europe.

For many other components (large-scale) recycling options are not yet available.

Indium recovery from manufacturing waste is current practice. Indium recovery from end-of-life products, including from WEEE, is practically non-existent, because of minor indium concentrations in consumer products, a lack of appropriate technology, or low economic incentives compared to recycling costs. Very little old scrap (1%) is recycled worldwide. The production of growing quantities of WEEE, especially LCDs and PV installations, can be a future secondary indium source.

Similar it is with gallium, whose major application is in semiconductor devices such as integrated circuits (ICs) and light emitting diodes (LEDs). Current recycling processes of WEEE in which they are contained rather favour the recovery of precious metals or copper, while gallium ends up as an impurity in recycled metals or in waste slags.

Lithium from glass-ceramic cooktops is currently not recycled at industrial scale.

Currently no recovery of selenium from WEEE takes place. It is expected that PV panels based on CIGS cells (copper indium gallium selenide) could in the longer term be an important source for the recovery of selenium.

Germanium is contained in various electronic devices for cutting edge applications at very low concentrations both with other metals and metalloids, therefore its efficient recycling treatment is challenging and only a little quantity of germanium is recovered from post-consumer scrap (old scrap).

While Tantalum is recycled from manufacturing waste, recovery from WEEE is facing several technical bottlenecks.

The following factors are currently hindering recovery of CRMs from WEEE:

- Due to the low concentration of CRMs in products, sufficient volumes of WEEE are needed to make recycling of CRMs economically viable. In addition, there is a lack of information regarding the concentration of CRMs contained in products. However, first there are deficits with the overall levels of separately collected WEEE, and second, especially WEEE containing precious metals, such as gold and silver, are interesting for illegal export. Some CRMs are still locked in assets with a longer lifetime (e.g. PV panels). Stakeholders consulted during this evaluation indicated that special focus should be put on non-household (W)EEE, such as medical devices, which are often exported as use-goods out of the EU. Medical devices are relevant from a CRM perspective, however, due to lacking evidence, no conclusion on the role that legal export of specific EEE for reuse to non-EU Member States plays in CRM losses could be drawn.

- WEEE containing CRMs is usually not collected separately but collected together with other WEEE. In combination with the complex material composition of WEEE, including hazardous materials, (costly) sorting and pre-treatment is required to concentrate CRMs The lack of data and specific markings / labelling regarding CRM components and chemical composition further hinders the sorting process, for instances to separate NdFeB- magnets from other magnets. Additionally, for some components, CRMs are permanently bonded to other materials during manufacturing thereby limiting separability.

- Neither the overall collection target nor the category specific overall recycling targets support retrieval of CRMs from WEEE and the establishing of a CRM-market.

- The lack of information and the available scalable technologies is further thwarted as it takes more than four years to build waste treatment plants and obtain the needed permits. Furthermore, there is a need to develop technical requirements to enable sound collection, sorting, pre-treatment and treatment of equipment containing CRM in order to achieve recycling of CRMs This could also reduce the burdens on recyclers and thereby the cost.

- One factor contributing to the losses during collection and pre-treatment as well as in later recovery stages is the lack of regulation about CRM collection and recovery.

In relation to renewable energy policy objectives, the WEEE Directive failed so far to reduce waste from renewable energy technologies. With demand for renewables continuing to grow in light of decarbonisation, the EU must ensure that the valuable and critical raw materials being used to build the sector are sourced in the most efficient and sustainable way possible. Member States, as part of their obligations to ensure a sound environmental management of WEEE, including waste PV panels, shall make sure that they mobilise the national extended producer responsibility schemes to make strides in this direction and maximise the collection and material reuse, recycling and recovery of the WEEE arising in the Union. The directive currently does not sufficiently address the needs caused by the expected trends in the use of PV panels and other technologies such as heat pumps, wind turbines or solar thermal. For

photovoltaic panels the directive provides that from 15 August 2018, 85% of large electrical and electronic equipment, including photovoltaic panels, should be recovered and 80% should be recycled and prepared for reuse. However, the lack of a distinct category is making it impossible to trace and monitor the increasing flows of waste PV panels collected, treated and the quantities of secondary materials that are produced from such waste. In addition, binding minimum treatment requirements for PV panels addressing the potential waste management hazards (e.g. hazardous substances hindering the marketing of recyclates) are currently missing from the WEEE 2 Directive.

On another increasing renewable energy waste stream, there is no dedicated EU piece of legislation for the management of waste wind turbines and that Member States have to ensure that waste wind turbines, like any other waste stream, are subject to waste management that complies with the WFD, but the Directive only sets a 70% prepared for reuse or recycling rate, including backfilling, which is not sufficient for the circular economy transition. This gap was recognised in the EU Taxonomy Climate Delegated Act[198], which included the following 'Do No Significant Harm' (DNSH) criteria to the circular economy for the activity 'electricity generation from wind power': 'use equipment and components of high durability and recyclability and that are easy to dismantle and refurbish.' However, these DNSH criteria developed in 2020 are qualitative and hard to demonstrate. Additional criteria are crucial to comply with the DNSH principle.

The above examples show that the current provisions of the WEEE 2 directive are not sufficient for a circular economy and a green transition. More reuse and recycling of CRMs is required for waste from EEE and renewable energy technologies.

The new Critical Raw Materials Act[199] aims at securing the supply of CRMs essential for the EU's green and digital transitions. The WEEE Directive and the CRM Act complement each other in the EU's broader strategy for sustainability and resource efficiency. In essence, the WEEE Directive ensures that electronic waste is properly collected, recycled and treated, while the CRM Act aims to ensure that the EU has a secure and sustainable supply of critical materials for among other EEE. However, there are neither CRM recovery nor reporting requirements in the WEEE Directive so that the actual CRM recovery rate is unknown in the EU.

The ongoing FutuRaM project[200] will develop a secondary raw materials knowledge base on the availability and recoverability of secondary raw materials within the EU, with a special focus on critical raw materials in six different waste streams (EEE, batteries, vehicles, construction and demolition waste, slags and ashes mining waste). The work has commenced with WEEE as a priority waste stream. The project research will enable fact-based decision

[198]Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives (OJ L 442, 9.12.2021, p. 1).
[199] Regulation (EU) 2024/1252 of the European Parliament and of the Council of 11 April 2024 establishing a framework for ensuring a secure and sustainable supply of critical raw materials (OJ L, 2024/1252, 3.5.2024).
[200] URL: https://futuram.eu/.

making for the recovery and use of 2RMs within and outside the EU, and disseminate the data generated via an accessible knowledge base developed in the project.

2. Key role of sustainable production and linkage with waste management policy

Central to advancing the circularity agenda is the integration of Ecodesign for Sustainable Products Regulation (ESPR)[201] with waste management policies of such products. The ESPR framework offers a foundational basis to set Ecodesign requirements for a wide array of product categories, aiming to improve circularity, energy performance, and environmental sustainability. Establishing a robust linkage between Ecodesign principles and waste management policy frameworks can more holistically facilitate producers to adopt circular design strategies, minimising the environmental footprint of products throughout their lifecycle and eventually overcoming some of the limitations of current waste management policies. Collaboration between national authorities, industry, consumers and waste management operators is needed to ensure the effective implementation of Ecodesign measures and maximise their impact on circularity goals. As the EU navigates the transition towards a circular economy, the harmonisation of waste management of WEEE and Ecodesign of EEE represents a critical pathway to enhance resource efficiency, reduce waste generation and secure the availability of secondary materials and CRMs

The WEEE 2 Directive shows some incoherences with the Ecodesign Directive, which remain with the new Ecodesign for Sustainable Product Regulation. Article 4 of the WEEE 2 Directive, mirroring the Ecodesign Directive, requests Member States to take appropriate measures to promote the design and production of EEE in view of facilitating reuse, dismantling and recovery of WEEE. Therefore, there is an overlap between Article 4 of the WEEE 2 Directive and the Ecodesign Directive. Article 4 of WEEE 2 has proven not relevant because Ecodesign has been implemented with more than 30 EU implementing measures for EEE products placed on the EU market[202].

In addition, producers of EEE strongly support that product design should be regulated exclusively under the new ESPR and the WEEE Directive should focus on the end-of-life stage of EEE. Other stakeholders (in particular recyclers) though raise the opinion that the design of a product is linked to its end-of-life management and argue that product design and end-of-life aspects are interrelated and should work together pointing that it may still be relevant to have horizontal Ecodesign requirements (removability of certain components and materials, dismantlability, recycled content for materials in EEE) in the WEEE Directive (call for evidence, 2023). However, it should be considered that the ESPR gives the Commission empowerment to adopt horizontal Ecodesign requirements for multiple (EEE) products in one delegated act, for instance on the above-mentioned elements. As the WEEE 2 Directive does not provide for specific requirements on recycled content, ESPR can cover this need. In that perspective, synergies and timely sequencing between the WEEE Directive and the ESPR are

[201] Regulation (EU) 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products, amending Directive (EU) 2020/1828 and Regulation (EU) 2023/1542 and repealing Directive 2009/125/EC (OJ L, 2024/1781, 28.6.2024).
[202] URL: https://ec.europa.eu/commission/presscorner/detail/en/qanda_19_5889.

very relevant and can contribute to the implementation of a circular economy model within the EU and the establishment of a market for secondary raw materials as these initiatives complement each other.

In order to align WEEE with ESPR, the development of a potential mechanism according to which MSs would report specifically on flows of recycled materials for certain usages instead of separate recycling targets could be examined. More targeted requirements at the level of material and product that could come from the Ecodesign measures could be in synergy with reporting requirements under WEEE. In a circular economy approach, recycled content, design for recycling and recycling targets could work together. Reporting requirements and targets on recycled materials for certain usages could also be set. Moreover, ESPR design measures could assess the need for product durability, reliability, reusability, reparability, recycled content, possibility of maintenance, refurbishment, remanufacturing or recycling information for users and treatment facilities on composition, including on CRMs and substances of concern to enable the prevention, reuse and recycling of WEEE.

It should be noted that, although these two pieces of legislation could complement each other to achieve the objectives, ESPR cannot replace WEEE and vice versa.

Current monitoring arrangements and key performance indicators

The impact assessment accompanying the Commission proposal of the recast of the WEEE 1 Directive (European Commission, 2008a) foresees the following monitoring arrangements:

Indicators of progress towards meeting the objectives:

The core indicators for progress towards better environmental and health protection through separate collection and dedicated treatment of WEEE along the lines recommended in this impact assessment are the following:

a. Extent to which administrative burdens are cut at the EU and Member States levels while at least maintaining the present level of environmental protection.

Secondary legislation, amendments to the Waste Directive and to the WEEE 2 Directive have already brought some simplification and burden reduction for Member States, producers and PROs in terms of methodology, reporting format and obligations as well as in terms of legal certainty and transparency (see Annex XIII). In particular regarding the reporting requirements, the Commission has taken action during the evaluation period to reduce administrative burdens as much as possible by repealing the burdensome obligation for Member States to submit to the Commission a report on the implementation of this Directive every three years. Further opportunities for simplification lie in harmonising formats for reporting from producers to Member States, ensuring transparency in registration databases, and fostering coordination between national registers. Additional opportunities for simplification and cost reduction lie through reforming the authorised representative system to clarify roles, responsibilities and procedures. See detailed simplification analysis in Annex XIII.

b. The extent to which Member States and producers effectively achieve the aims set out in the WEEE Directive, including the abolishment of 'free-riding'.

One of the main issues raised during the stakeholder consultation in the framework of the WEEE 2 evaluation was the producers' non-compliance with extended producer responsibility (EPR) requirements ('free-riding' of producers of EEE) and existing administrative burden for producers placing EEE products on the market across the EU due to non-common EPR requirements in all Member State.

c. The extent to which arising WEEE is collected separately and treated at the high environmental and health protection standards required by the WEEE Directive and other relevant EU legislation.

Success factors are the following:

- On WEEE reuse, improvement of the preparation for reuse network and integration of social businesses/NGOs in preparation for reuse of WEEE are relevant.
- On WEEE collection, the consumer-friendliness of systems for WEEE return and incentives to increase the rate of return both of used EEE and of WEEE, involvement of retailers, collection campaigns/ events, introduction of different ways of collection, including door-to-door collection for specific categories of EEE, consumer awareness/ invest in awareness campaigns and financial incentives for actors involved in the WEEE management to achieve high collection volumes.
- On WEEE treatment, setting of requirements to increase the quality of recycling and enforcement actions, including inspections in waste metal operators, are relevant but not sufficient to maximise recovery of secondary raw materials.

The main failure factors are the non-achievement of collection and recovery targets of the WEEE 2 Directive leading to recycling of around 40% of electronic waste in the EU only. The collection targets have not been met by 25 Member States until the end of the evaluation period and the recovery of secondary raw materials has not been achieved sufficiently, including critical raw materials. Moreover, renewable energy technologies reaching end of life such as photovoltaic panels and wind turbines require a revisiting of thee WEEE scope and categories. Also, WEEE treatment requirements, mandatory in six Member States only, should be revisited and further harmonised.

ANNEX X: COMPLIANCE ASSURANCE

This Annex presents information regarding the monitoring and enforcement activities that both the European Commission and the Member States have taken to ensure proper implementation of the WEEE Directive

a. Transposition of the WEEE Directive

Member States had to transpose the Directive by 4 February 2014. However, the transposition was completed at the end of 2015. The Commission launched **18 infringement procedures against Member States based on failure to communicate on time the transposition measures** (BE[203], CY[204], CZ[205], EL[206], ES[207], FI[208], FR[209], HR[210], HU[211], IE[212], LV[213], MT[214], PT[215], DE[216], PL[217], SI[218], RO[219], SK[220]). The Commission in 2015 referred to the European Court of Justice three of these cases based on failure to communicate transposition (DE[221], PL, SI[222]), and withdrew from those court cases after the three Member States in question transposed the Directive. All cases were subsequently closed following communication of the transposition measures.

The delays in the transposition of the Directive have been attributed to a combination of factors, as for example:

- the complexity of the WEEE 2 Directive,
- the fact that there were variations in legal and administrative processes across Member States,
- the need to navigate complex negotiations and consultations with a broad range of stakeholders,
- economic considerations and competing legislative priorities within Member States,
- lack of resources and institutional capacity and any other shortcomings in these areas.

[203] INFR(2016)0586: https://ec.europa.eu/commission/presscorner/detail/en/memo_17_1045.
[204] INFR(2014)0235: https://ec.europa.eu/commission/presscorner/detail/en/memo_14_2130.
[205] INFR(2014)023.
[206] INFR(2014)0243.
[207] INFR(2014)0245; https://ec.europa.eu/commission/presscorner/detail/en/memo_14_589.
[208] INFR(2014)0247.
[209] INFR(2014)0249.
[210] INFR(2014)0252.
[211] INFR(2014)0253.
[212] INFR(2014)0255.
[213] INFR(2014)0260 : https://ec.europa.eu/commission/presscorner/detail/en/memo_14_589.
[214] INFR(2014)0261.
[215] INFR(2014)0264.
[216] INFR(2014)0241 : https://ec.europa.eu/commission/presscorner/detail/en/memo_14_537.
[217] INFR(2014)0262 : https://ec.europa.eu/commission/presscorner/detail/en/memo_14_589.
[218] INFR(2014)0268 : https://ec.europa.eu/commission/presscorner/detail/en/memo_14_537.
[219] INFR(2014)0266 : https://ec.europa.eu/commission/presscorner/detail/en/memo_14_589.
[220] INFR(2014)0270.
[221] https://ec.europa.eu/commission/presscorner/detail/en/ip_15_5054
[222] https://ec.europa.eu/commission/presscorner/detail/en/ip_15_4875

The Commission has also been closely monitoring the correct transposition of the Directive and it has evaluated the quality of transposition for all Member States through conformity assessment studies. On the basis of this analysis, the Commission launched **six infringement procedures based on incorrect transposition of the Directive** (for Estonia, Ireland, Austria, Czechia, Sweden, Romania). **The Commission referred to the European Court of Justice three of these cases** (Austria, Czechia and Sweden), and withdrew from those court cases after the three Member States in question corrected the national legislation transposing the Directive[223].

Some examples[224] of issues of incorrect transposition in these six Member States include the following:

- Estonia[225] had not transposed correctly the definition of WEEE as well as the terms 'medical device' and 'in vitro diagnostic medical device' (Article 3(1) paragraphs (m) and (n)). It also had not transposed correctly Article 7(1) third paragraph referring to the collection targets until 31 December 2015 as the national legislation incorrectly required each producer to achieve the national rate of collection, which was unrealistic in view of the total WEEE production in Estonia.
- Ireland[226] had not transposed Article 11(2) setting out the method for the calculation of the recovery targets and it had not provided for reimbursement to producers as regards EEE that has been placed on the market and then sold in another Member State, as required by Article 12(5) (but only in case of over declaration). The Irish legislation did not contain an obligation to gather all specific information related to the WEEE collection rate, was imprecise about shipment requirements, and lacked provisions on recovery targets of these waste.
- Austria[227] had not transposed correctly the definition of producer (Article 3(1)(f)), the definition of distributor (Article 3(1)(g)), as well as the terms 'medical device' and 'in vitro diagnostic medical device' (Article 3(1) paragraphs (m) and (n)). In addition, Austria had not explicitly prohibited the disposal of untreated WEEE as requested by Article 6(1) of the Directive and had not transposed correctly Article 6(2) of the Directive providing for 'optimal conditions' for preparing for reuse, recycling and confinement of hazardous substances.
- Czechia[228] had not included in the national legislation any measure granting access to WEEE collected for personnel from reuse centres. The Commission after evaluating the information provided by the Czech authorities clarified that mere administrative practices, which by their nature are alterable at will by the authorities and are not given the appropriate publicity, cannot be regarded as constituting the proper fulfilment of

[223] European Court of Auditors, Review No 04/2021: EU actions and existing challenges on electronic waste.
[224] The examples provided are only part of the provisions that were included in each one of the Letters of Formal Notice that had been sent to the specific Member States.
[225] INFR(2018)2364: https://ec.europa.eu/commission/presscorner/detail/en/memo_19_462.
[226] INFR(2019)2017: https://ec.europa.eu/commission/presscorner/detail/en/memo_19_1472.
[227] INFR(2019)2292: https://ec.europa.eu/commission/presscorner/detail/en/inf_19_6304.
[228] INFR(2019)2146: https://ec.europa.eu/commission/presscorner/detail/en/inf_19_4251.

obligations to transpose a directive and requested the correct transposition of the Directive.

- Sweden[229], had not transposed correctly the definition of 'WEEE from private households' (Article 3(1)(h)) and the definition of 'making available on the market' (Article 3(1)(j)). In addition, the Swedish legislation had not included specific arrangements for the management of WEEE that presents a health and safety risk to personnel because of contamination, as requested in Article 5(2)(e) and is imprecise about WEEE shipment requirements, registration requirements for producers and on the manner how to calculate the achievement of targets.
- Romania[230], had not transposed correctly the definition of the terms 'medical device' and 'in vitro diagnostic medical device' (Article 3(1) paragraphs (m) and (n)). In addition, it had not correctly transposed Article 5(2)(e) in relation to the arrangements for the management of WEEE that presents a health and safety risk to personnel because of contamination letter. Romania had not transposed correctly also Article 11(2) setting out the method for the calculation of the recovery targets and Article 12(5) on measures to ensure that appropriate mechanisms or refund procedures are developed for the reimbursement of contributions to the producers where EEE is transferred for placing on the market outside of the Member State

Following the transposition into the national law, there have been numerous national revisions, partly initiated by the WEEE Directive, partly on the initiative of the respective countries. Germany, for example, had a revision of its national legislation transposing the WEEE 2 Directive in 2022 in which, among other things, new take-back obligations were established to supermarkets to increase the collection of WEEE.

Following the amendment of the WEEE Directive in 2018, the Commission in June 2021 called on Belgium, Greece, Finland, Croatia, Luxembourg, Malta and Slovakia to bring their national laws in line with modifications included in Directive 2018/849, amending among other the WEEE2 Directive[231].

b. Infringements and other enforcement actions by the Commission

The European Commission pursued legal action against Member States for failing to comply with their obligations under the WEEE Directive aiming to ensure the proper application of the Directive. With its decisions of 25 July 2024[232] the Commission **called on 24 Member States to meet among others the WEEE collection targets and** decided to open an infringement procedure by sending letters of formal notice to **Belgium** (INFR(2024)2121), **Czechia** (INFR(2024)2137), **Denmark** (INFR(2024)2138), **Germany** (INFR(2024)2122), **Estonia** (INFR(2024)2123), **Ireland** (INFR(2024)2130), **Greece** (INFR(2024)2132), **Spain** (INFR(2024)2147), **France** (INFR(2024)2141), **Croatia** (INFR(2024)2133), **Italy** (INFR(2024)2142), **Cyprus** (INFR(2024)2131), **Lithuania** (INFR(2024)2143), **Luxembourg**

[229] INFR(2019)2029: https://ec.europa.eu/commission/presscorner/detail/en/memo_19_1472.
[230] INFR(2018)2349: https://ec.europa.eu/commission/presscorner/detail/en/memo_19_462.
[231] https://ec.europa.eu/commission/presscorner/detail/en/inf_21_2743
[232] https://ec.europa.eu/commission/presscorner/detail/en/inf_24_3228

(INFR(2024)2124), **Hungary** (INFR(2024)2134), **Malta** (INFR(2024)2135), **Netherlands** (INFR(2024)2125), **Austria** (INFR(2024)2120), **Poland** (INFR(2024)2126), **Portugal** (INFR(2024)2145), **Romania** (INFR(2024)2136), **Slovenia** (INFR(2024)2127), **Finland** (INFR(2024)2140) and **Sweden** (INFR(2024)2146).

The Commission during the evaluation period made efforts to improve the application of the WEEE 2 Directive in the Member States also through **workshops, reports and a compliance promotion initiative**:

- **The Commission organised the following workshops** with national competent authorities and stakeholders to support the implementation of the Directive in specific areas such as WEEE collection and exchange of information:
    i) Workshop on 'All WEEE flows' organised by European Commission and DIGITALEUROPE, which took place on 14 February 2017, to take stock of the Member States' progress towards implementing the requirement set out in Article 16(4) of the WEEE 2 Directive to collect information on the quantities and categories of **WEEE collected through all routes**[233]. The challenge identified for Member States was to ensure that flows of WEEE outside producer responsibility schemes, are properly measured and that all separately collected WEEE undergoes proper treatment. The most significant challenge identified was how to measure the flows of WEEE from users other than households (B2B WEEE). Lastly, the workshop aimed at providing Member States with data and tools to enable them to measure all WEEE flows.
    ii) Workshop for Member States and for experts involved in the European Innovation Partnership on Raw Materials and other key stakeholders on Implementation of Article 15 of the WEEE 2 Directive[234], which took place on 8 September 2015, initiated the dialogue between producers for EEE and reuse organisations and recyclers of WEEE in relation to the information that producers need to share with recyclers to comply with Article 15. The workshop suggested that an industry-led, collaborative initiative on the effective implementation of Article 15 could be developed and actually this initiative has led to the development of the '**Information for recyclers- I4R platform'**[235] to provide information to treatment and recycling facilities about the presence and location of materials and components that need separate treatment (e.g. batteries, printed circuit boards or plastics containing brominated flame retardants). This information is on product category level only (industry averages), and not per brand or individual products, answering to needs from recyclers at this respect. WEEE Forum, the association of WEEE PROs, oversees hosting and day-to-day management of the platform. Producers of EEE, recyclers, preparation for reuse operators and competent authorities can get access to the platform upon simple request.

[233] Workshop report - "All WEEE flows": How can we improve information as regards collection of WEEE through all routes?.
[234] Workshop report- Workshop on Implementation of Article 15 of the WEEE Directive.
[235] 'Information for Recyclers- I4R' platform: https://i4r-platform.eu.

- The Commission has also assessed WEEE policy in several **reports**:
  i) The **report on the implementation of the WEEE Directive for the period 2013-2015** summarised and analysed the replies provided by Member States to the Implementation Questionnaire covering the period 2013-2015, pursuant to European Commission Implementing Decision of 11/03/2004[236]. During the reporting period covered by this report, the WEEE 2 Directive entered into force and Member States were required to transpose it into national law by 14 February 2014. For this reason, most Member States provided two questionnaire responses over the reporting period: one concerning the WEEE 1 Directive that was relevant for 2013 and the beginning of 2014, and one concerning the WEEE 2 Directive that was relevant to the remainder of 2014 and 2015, assuming that Member States have transposed and implemented the 2012 Directive within the deadline[237].
  However, the information provided by Member States in the Implementation Questionnaires has not been fully verified, but only to some extend and this through the WEEE compliance promotion initiative.
  To reduce administrative burden, the obligation of Member States to report to the Commission at three-year intervals has been abolished with the amendment of the Directive in 2018, and therefore, this 2013-2015 triennial report was the last one to be published.

The Commission submitted the following **reports to the European Parliament and the Council:**

  ii) **Report on the review of the scope of the Directive, and of the deadlines for reaching collection targets** and possible setting of individual collection targets for certain categories of EEE listed in Annex III[238]: This report of 2017 concluded that no changes to the scope of the Directive were justified as any change would have been disruptive at a time when Member States were still in a period of transition, adjusting to the new definitions and scope of the WEEE 2 Directive.

  Regarding the deadlines for reaching the collection targets, the report concluded that there was no justification for revising the deadlines for reaching the collection target in the WEEE 2 Directive, or for revising the collection target based on the amount of WEEE generated as this would give rise to a significant administrative burden, when the focus should be on implementation.

  Finally, to assess the impacts and the feasibility of setting individual collection targets for one or more of the six EEE categories, two scenarios were considered: the first scenario, reflecting the provisions of the Directive, with a general collection target of 85% of the weight of WEEE generated, applicable from 2019, and the

[236] Commission Decision 2004/249/EC concerning a questionnaire for Member State reports on the implementation of Directive 2002/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) (OJ L 78/56 of 16.3.2004).
[237] Final Implementation Report for Directives 2002/96/EC and 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE): 2013 – 2015
[238] COM/2017/0171 final.

second scenario, with individual collection targets of 85% of the weight of WEEE generated in each EEE category. The report showed that setting individual collection targets would not lead to higher collection rates overall and despite bringing some economic, environmental and social benefits, it would also bring additional obligations for stakeholders and Member States (e.g. reporting, monitoring) and a significant increase in administrative burden. In addition, changing the target at that moment in time may well have been counterproductive and cause confusion. Therefore, no collection targets per EEE category have been proposed. However, it was highlighted that setting individual targets particularly for categories 5 and 6, would have significant potential benefits because of the critical materials contained in specific products.

iii) **Report on the review of WEEE recovery targets**, possible setting of separate preparing for reuse targets and the calculation method for recovery targets[239]: This report of 2017 presented firstly the results of the assessment with regard to the re-examination of the WEEE recovery targets showing there was no justification for revising the recovery targets with respect to the six new categories of EEE as these targets maintain a similar level of ambition than the targets set out under the 10 categories of EEE.

In addition, regarding setting separate preparing for reuse targets, the report concluded that this action would not be appropriate because setting a separate target on preparation for reuse would create additional obligations for economic operators and Member States (e.g. reporting, monitoring) and a significant increase in administrative burden. The combined preparation for reuse and recycling target applicable from 2015 onwards (Annex V, Part 2 and 3), enables Member States to reach this target by favouring both recycling and preparation for reuse.

Finally, the report summarised the results of the assessment with regard to the re-examination of the method for the calculation of the achievement of the recovery targets showing that there was no overriding justification for replacing the input-based method for the calculation of the achievement of the recovery targets by setting targets on the basis of products and materials resulting from the recovery, recycling and preparation for reuse processes (output-based approach). The main reason provided was the lack of data on materials resulting (output) from the recovery, recycling and preparation for reuse processes ('output-related fractions' or else mentioned as 'material fractions'). Material-based targets, for material fractions where already data is recorded (e.g. ferrous or non-ferrous metals) may only have a limited influence on actual recycling practices. The reason therefore is that these valuable materials are already almost completely recycled due to their economic value.

[239] COM/2017/0173 final.

iv) **Reports on the exercise of the power conferred on the Commission to adopt delegated acts**; the first one on 2017[240] and the second on (2021)[241], where the Commission presented the reasons why it had not exercised the delegated powers conferred to it during the given period.

- The Commission also conducted a '**WEEE compliance promotion initiative'**[242] in 2017, in which it assessed Member States' compliance with WEEE 2 Directive. The aim of this initiative was to identify problems and difficulties that Member States have towards the achievement of the targets that the Directive set, but also best practices and so to allow to learn from each other. The final report prepared in the context of this initiative provided examples of what it considered good practice, such as:
  - free competition among WEEE management operators in Bulgaria, with allocation of collection duties based on their market share;
  - mandatory investment by producers or producer responsibility organisations on information and awareness campaigns in Portugal;
  - mandatory treatment quality requirements in Ireland and France;
  - prohibition of cash payments for WEEE related transactions in France, aimed at improving WEEE traceability and at fighting leakage of e-waste out of the official scheme;
  - eco-labelling in Austria of electrical and electronic equipment designed for easy repair;
  - separation of reusable and non-reusable WEEE in primary and secondary collection points in Flanders (Belgium).

The report also provided recommendations related to issues such as governance and financing of WEEE management, enforcement, illegal activities, awareness raising, data quality, extended producer responsibility, collection infrastructure, reuse and product design to support Member States in their efforts to comply with the Directive.

c. Initiatives and enforcement actions by Member States

Member States have also taken several actions to ensure proper implementation of the WEEE Directive, including penalties, inspections and monitoring actions[243].

In particular,

- In 14 Member States an **inspection plan considering at least WEEE collection and treatment** exists. Three further Member States have such a plan which however does not cover the entire territory or does not include both collection and treatment.

[240] COM/2017/0172 final.
[241] COM/2021/638 final.
[242] European Commission, WEEE compliance promotion exercise – final report, December 2017.
[243] The information provided in this sections is based on information provided by the Member States in the context of the WEEE compliance promotion initiative.

- In 20 Member States **rules on penalties applicable to infringements** of the national provisions on WEEE management are laid down in official documents and publicly available. In Belgium and Denmark there are no such rules, penalties or fines; the penalties are decided by either the police or the court system.

Examples of specific actions by Member States include the following:

French PROs have the obligation to monitor the effective implementation of the WEEE value chain by **auditing their stakeholders**, e.g. PROs control producers about the quantities of EEE placed on the market or PROs carry out regular audits of their treatment contractors PROs in conformity with WEEELABEX/CENELEC requirements.

Regular inspections carried out by the 16 Regional Inspectorates of Environment and Water in **Bulgaria** based on inspection plans. The plans are prepared by each Regional Inspectorates of Environment and Water and presented to the Ministry for approval. In addition, controls of WEEE producers, importers and licensed WEEE recovery organisations (including their treatment facilities/sub-contractors) are carried out.

Malta implemented a set of measures to improve monitoring of WEEE flows that included the introduction of a reporting system with annual reports from PROs and self-compliant producers (approved by a certified auditor), increasing unplanned and pre-planned inspections and a system for monitoring all movements of WEEE.

In 2011, **France** prohibited payments in cash for WEEE related transactions to improve traceability and fight leakage of WEEE out of the scheme, since this will enable a better possibility to control what waste is received and how it is dealt with at scrap metal facilities.

Regarding in particular actions **to decrease the number of noncompliant producers (free-riders):**

Malta increased the number of registered producers in the EPR scheme thanks to the reformation of the producer registration process requesting producers placing EEE on the market to renew the registration annually. This application process is connected to several requirements that producers have to fulfil. Producers who fail to register or renew the registration have to pay a fine (EUR 750 per tonne of EEE they place on the market).

Spain introduced in 2023 customs control of the register of producers importing EEE to Spain from third countries and of the quantities they import: A very effective measure that has increased the number of registered producers by a factor of two in just a few months. However, if it is not implemented at European level, it will probably lead to a change of entry point to the EU market.

Regarding the actions by the Member States to establish a cooperation between national registers, the **European WEEE Registers Network (EWRN)** has been established[244]. The Network provides a forum for the exchange of information with the objective of ensuring a

[244] https://www.ewrn.org/.

common interpretation of the WEEE Directive across the EU and thus also supporting producers operating in more than one Member State. EWRN was established in 2006 because of the need and interest of the national registers and producers to harmonise the interpretation and enforcement of the WEEE 1 Directive. During that period up to 10 national registers participated at annual meetings and in working groups and an online scoping tool was developed as a platform for the national registers to exchange views on whether a specific product falls within the scope of the WEEE Directive and under which category. National registers also discussed common issues related to the WEEE1 enforcement and agreed upon common procedures with respect to enforcement. For example, a first version of the definition of input-weight was developed that was last updated under the WEEE 2 Directive in January 2014. Since 2010 and under the WEEE 2 Directive more Member States continued to join EWRN. This and the continuous publication of guidance documents and position papers as well as the improved online scoping tool for national registers have increased the number of participating national registers. Approximately 18 national registers attend annually meetings, participate in working groups and engage with others via the scoping tool. To date, over 193 scope related decisions have been accomplished with this tool, which provides an easily accessible knowledge base and consistency for national registers for their scoping decisions and secures fair and equal competition in the markets. Furthermore, EWRN published a broad range of guidance documents on its website[245] that are available not just to the national registers but to all stakeholders.

Another voluntary action by Member States to increase cooperation was the establishment of the **European WEEE Enforcement Network (EWEN)** where the national competent authorities for enforcement have joined forces to help each other identify non-compliant producers and prosecute violations of the obligation to appoint an authorised representative more effectively. The German Environment Agency (UBA) initiated the constitutional meeting on 7-8 September 2017, where the representatives from nearly 20 EU countries responsible for the enforcement of the WEEE 2 Directive agreed to cooperate more closely in order to prosecute non-compliant producers who trade across borders more effectively. At the end of 2023, the network consisted of 29 members from 10 ministries and 19 environmental agencies representing 19 EU Member States, UK and Norway[246], which collaborated in line with Article 18 of the WEEE 2 Directive. As first results of this collaboration, the EWEN has developed:

- an internal list with contact details and information about the enforcement structures in Member States and
- standardised complaints forms.

[245] https://ewrn.org/publications-events/publications

[246] Information about the enforcement authorities cooperating under EWEN is publicly available: https://www.umweltbundesamt.de/sites/default/files/medien/2503/dokumente/weee_complaint_form.pdf.

EWEN has also established a cooperation with EWRN to support the competent national authorities that prosecute free-riders to secure a level playing field. For example, the complaint form that has been developed by EWEN is available on the EWRN website[247].

[247] https://www.umweltbundesamt.de/sites/default/files/medien/2503/dokumente/weee_complaint_form.pdf

ANNEX XI: THE IMPLEMENTATION OF THE WEEE DIRECTIVE IN THE MEMBER STATES (COMPARATIVE ANALYSIS)

This annex gives information about how the WEEE Directive has been implemented in the Member States providing a comparative analysis of national implementation of the four targets of the initiative, namely the collection targets, the recovery targets, the treatment requirements and the EPR schemes, based on evidence as to why specific objectives and targets of the Directive are being achieved, respectively not being achieved and explaining the reasons for the differences among Member States. All conclusions are based on the compliance promotion initiative, the literature review and the analysis conducted in the context of the WEEE evaluation.

In summary, this annex presents:

1. An **analysis of the WEEE collection rates** reached by the Member States during the evaluation period, to access the level of compliance and to also present the differences among Member States so as to identify the success but also the hindering factors in achieving the WEEE collection targets. This analysis concludes that in some Member States there have been significant improvements regarding the increase of collection and until 2015 nearly all Member States had achieved the relevant target (4kg of household WEEE/inhabitant/year). Similarly, there were no major problems for most of the Member States to reach by 2016 the relevant collection target of 45% of the average weight if EEE placed on the market of each Member State the three preceding years. However, regarding the increased 2019 targets (65% of EEE placed on the market), most Member States were rather stable to a collection rate close to that achieved in 2016 and only a few managed to reach that higher target.

   The **factors hindering** Member States reaching the collection targets include economic reasons (as secure collection and storage may entail significant costs), economic interests of illegal actors (scavenging, shipments to third countries) and insufficient enforcement, deficits in the collection infrastructure, in particular in rural areas and still a lack of environmental awareness among citizens.

   The following **success factors** or practices that can support Member States in achieving a higher collection rate have been identified: development of consumer-friendly systems for WEEE return and providing incentives to consumers to increase the rate of return both of used EEE and of WEEE, the involvement of retailers in the WEEE collection infrastructure, the introduction of different ways of collection, including door-to-door collection for specific categories of WEEE, consumer awareness/ invest in awareness campaigns and specific WEEE collection and financial incentives for actors involved in the WEEE management to achieve high collection volumes, enabling close cooperation between the stakeholders (authorities, producers, treatment operators, etc.) in particular through a formal platform.

2. An **analysis of the WEEE recovery rates** reached by the Member States during the evaluation period which concludes that most Member States didn't have significant difficulties in reaching the relevant recovery targets. The latest data show that 15 out of the 27 Member States achieved all recovery and combined preparing for reuse and recycling targets. The rate of recovery and the combined rate of recycling and preparing for reuse between 2012 and 2021 is rather stable in all Member States while the preparing for reuse rate had a very little contribution to the combined preparing for reuse and recycling rate of WEEE. The main conclusion from this analysis is that the recovery targets set out in the WEEE Directive are not sufficiently ambitious because they are calculated on the basis of the input material stream at a respective facility and not on the output material, which is used for new products. Therefore, they have no effect neither in increasing the quality of recycling nor on the quantities of specific materials. However, as the WEEE Directive does not set any targets on material recovery neither on recycling efficiency, there is **no data reported on the actual quantities of materials**, including critical raw materials, which have being retrieved from the collected WEEE. Apart from this, additional factors **hindering** the achievement of high levels of material recycling from WEEE include: (i) missing quality standards for recyclates that would promote higher recycling efficiencies and better quality of recycling, (ii) lack of incentives to increase recycling of materials, whose recovery is not commercially viable, (iii) legal uncertainties in the interface between chemicals, products and waste legislation regarding substances in WEEE, (iv) lack of recycling capacity in specific Member States and (v) burdensome waste shipment procedures between Member States.

3. An analysis on the treatment requirements that Member States apply and a description of the practices implementing in the Member States shows that there is no level playing field regarding the WEEE treatment requirements among Member States. The **rules** that the Directive sets out for the treatment, recycling and recovery of WEEE **remain unchanged** since 2002, however a significant development was the adoption of the European standards for the treatment of WEEE (EN 50625 series). Only six Member States have made the standards obligatory by law, while another four Member States have introduced specific elements of the standards in the national legislation and this has as a result disparities in WEEE treatment practices among Member States. In addition, since the WEEE treatment requirements remained unchanged since 2002, they do not reflect the changes in hazardous components used in EEE and the developments in WEEE treatment technology.

4. Analysis of the four main models of the national EPR schemes is presented; namely the four EPR models include: 1) the **State fund (eco-tax) model** (with/without single executing Agency), 2) the **single organisation model** that is applicable only in small countries, 3) the **competing organisation model** (with/without coordination centre or with eco-tax back-up), which is the model applied in most Member States, and 4) the German model that is based on individual producer responsibility and is applied only in Germany. The main conclusion of the detailed analysis provided is that EPR systems

vary from one Member State to another and drawing conclusions on a successful 'fit-for-all' EPR system is a complex endeavour and probably not feasible because such a system may not exist. However, there are some **success factors** (i.e. actions that could support Member States in increasing the WEEE collection) that include i) coordination of producer responsibility organisations (PROs) by central authority, including establishing a clearing house system, ii) developing strong regulatory framework and approval procedures for PROs and their monitoring, and iii) awareness campaigns for producers of EEE to reduce the number of free-riders but also campaigns to increase awareness among citizens.

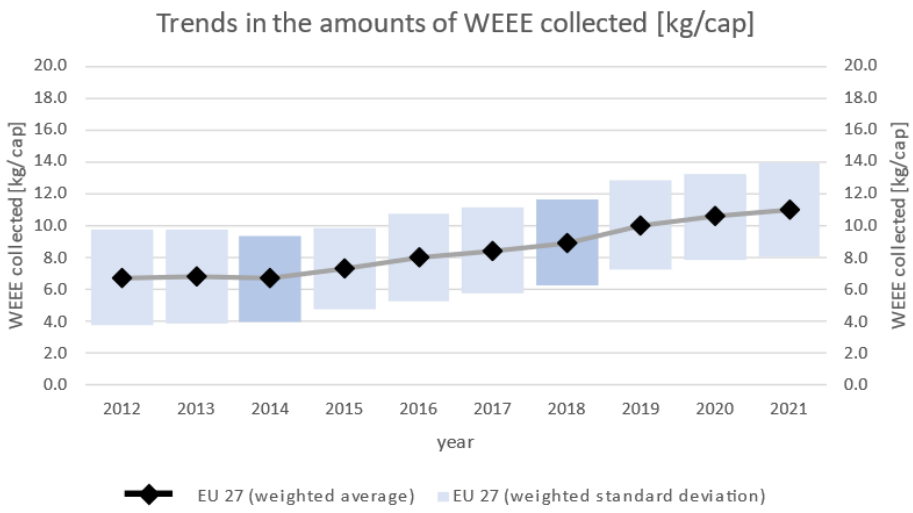
More details about the specific analyses are given in the next sections:

1. **Analysis of the achievement of the collection targets in the Member States**

WEEE collection increased from around 3 million tonnes in 2012 to 5 million tonnes in 2021, representing an increase of almost 68%.

On average, in the EU27, WEEE collected per capita increased from 6.7 to 11.2 kg/cap between 2012 and 2021 following a stable increasing trend.

Figure 39: WEEE collection in the EU-27 from 2012 until 2021



Source: Eurostat database ENV_WASELEEOS

Regarding the compliance with the **2015 WEEE collection target**, from the entry into force of the WEEE 2 Directive until 31 December 2015, EU Member States had to achieve a minimum collection rate of WEEE from private households of 4 kilograms on average per inhabitant per year, which was the target set out in WEEE 1 Directive already since 2006. Data from Eurostat show that **nearly all EU countries had achieved that target by 2015**.

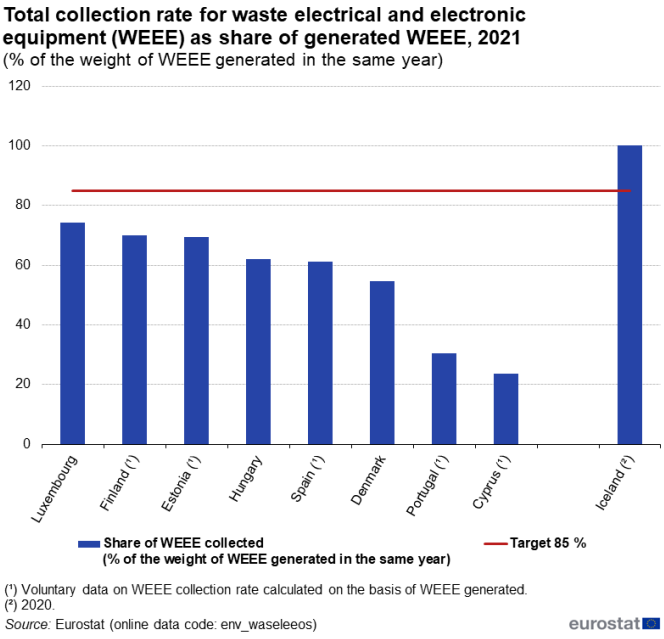
According to the **2016 WEEE collection target**, Member States had to achieve a minimum collection rate of 45% of all WEEE (not only from private households) per year, relative to the average weight of EEE placed on the market in the preceding three years. Bulgaria, Czechia, Latvia, Lithuania, Malta, Poland, Romania, Slovenia, and Slovakia benefited from a derogation

allowing them to achieve a target of a minimum of 40% by August 2016. Hungary didn't make use of this possibility. In 2016, 19 Member States reached the relevant WEEE collection target, and another four Member States were quite close to it (above 40%). This means that, **in 2016, only four Member States were lagging behind.**

To comply with the **2019 WEEE collection targets**, Member States had to achieve a minimum collection rate of 65% of all WEEE relative to the average weight of EEE placed on the market in the preceding three years (PoM method) or, alternatively, 85% of the WEEE generated on the Member State territory (WG method). These targets are equivalent. Bulgaria, Czechia, Latvia, Lithuania, Malta, Poland, Romania, Slovenia, and Slovakia benefited from a derogation allowing them to achieve a 2019 WEEE collection target by August 2021 at the latest**. In 2021**, only two Member States (Bulgaria and Slovakia) achieved the target of collecting 65% of WEEE, based on the amount of such equipment placed on the market in the three previous years. Ireland and Latvia also came close to this target with rates at 63.8% and 60.2%, respectively. For Bulgaria, it is noted that the average weight of EEE placed on market data per capita is the lowest in the EU and this apart from affecting significantly the WEEE collection rate, it also raises concerns regarding the reliability of data on the weight of EEE placed on market that producers report to the Bulgarian authorities.

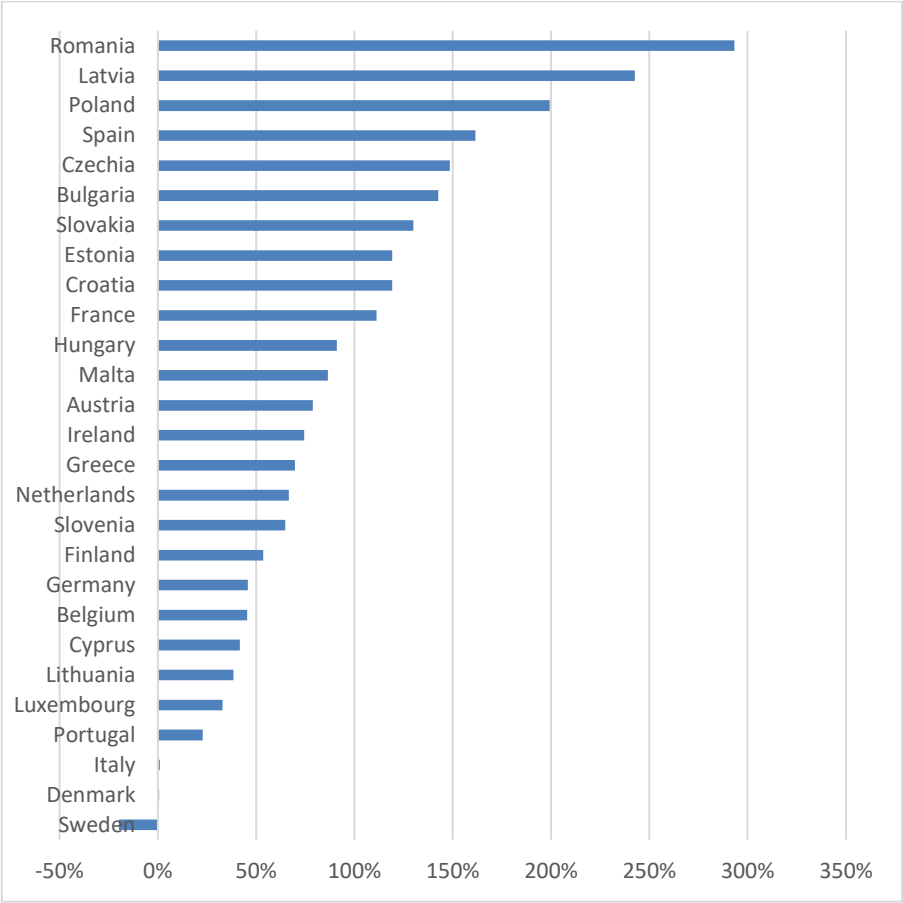
Three Member States, namely Denmark, Luxembourg and Hungary, have chosen to show compliance with the WEEE collection target of 85% of WEEE generated in their territories but none of them reached the target. The Figure 40 below shows the relevant collection rates achieved by these three Member States but also includes data submitted by other Member States on a voluntary basis.

Figure 40: Total WEEE collection rate (WEEE generated method), 2021



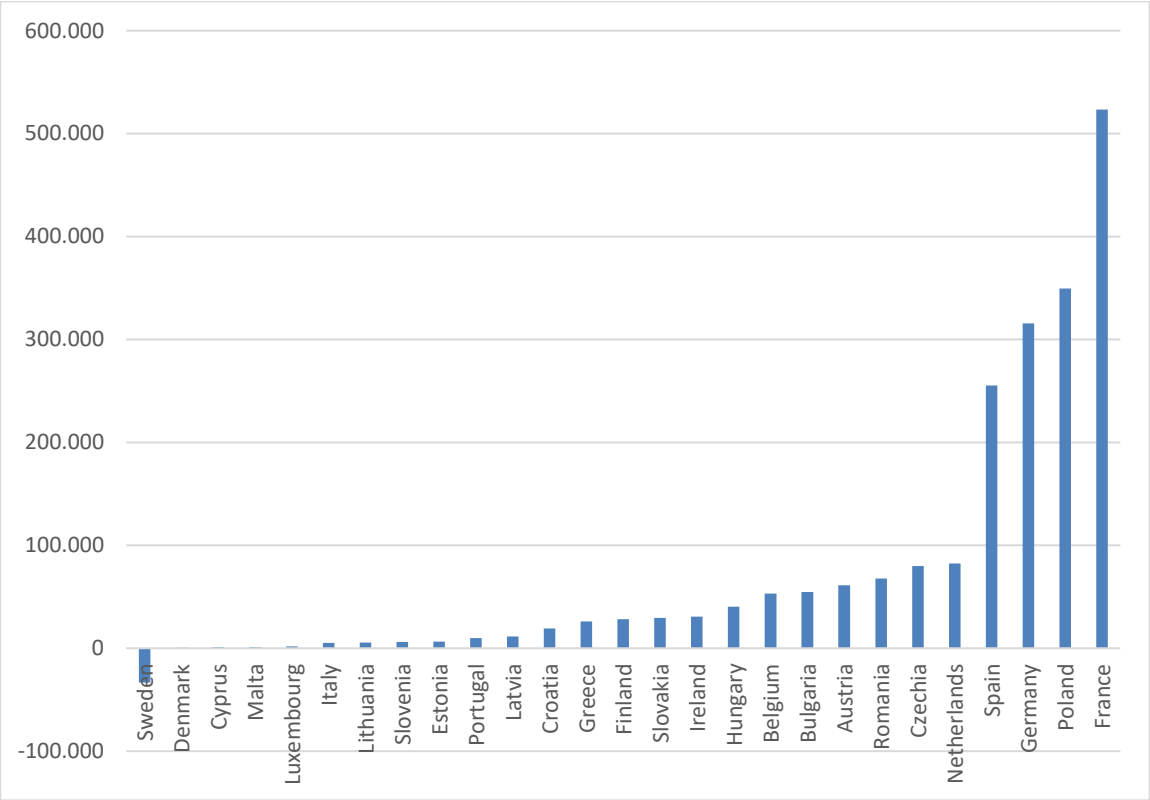
The evolution of WEEE collection has been different in the various Member States. In some Member States the WEEE collection was doubled, tripled or almost quadrupled during the evaluation period while in others it remained rather stable and in one Member State there was a decrease.

Figure 41: Difference in WEEE collection for the evaluation period 2012-2021 for each Member State (%)



The evolution in the real quantities of WEEE collected per Member State needs to be considered as well. The Figure 42 below shows the difference in the quantity of WEEE collected in each Member State over the evaluation period (based on available data for the period 2012-2021). If Germany is taken as an example, the previous Figure 41 show that Germany has an increase in WEEE collection of 46% that in real quantities this means an increase of almost 316 000 tonnes of WEEE. While similarly, if Romania is taken as another example, the 293% increase of WEEE collection corresponds to almost 68 000 tonnes of additional WEEE collected from 2012 to 2021.

Figure 42: Difference in WEEE collection for the evaluation period 2012-2021 for each Member State (tonnes)



As has been presented in the analysis above though, this evolution has not been always sufficient to ensure that all Member States achieve the relevant WEEE collection targets.

The main challenges or factors hindering Member States reaching the collection targets include:

Reporting issues, among these: i) some WEEE 'leak' out of the PROs and hence are not accounted for (e.g. collection of WEEE by non-authorised scrap metal dealers) ii) reporting under wrong waste codes, since some operators may not be aware of correct reporting codes; and iii) as producers of EEE for users other than private households (B2B EEE/ professional equipment such as medical devices or automatic dispensers) often collect the relevant WEEE themselves directly from the users (for example, when they replace a professional equipment with a new one), they may not report the WEEE collected and treated.

Problems regarding the collection network: i) poor density and variety of collection options in some Member States; ii) unclear obligations regarding the set-up of the collection network; iii) collection points are not covered or closed, which leads to degradation of WEEE and allows thefts and iv) distance sellers do not necessarily provide for take-back.

Lack of/Poor consumer awareness in some Member States: i) consumers may not be aware neither of the negative impacts of disposing WEEE improperly, nor of the existing WEEE collection possibilities and ii) small WEEE or lamps are still not identified as waste and thus discarded together with the municipal was causing hazards for the environment.

2. Analysis of the achievement of the recovery targets in the Member States

The recovery comprises various operations, namely preparing for reuse, recycling, and incineration with energy recovery. The recovery targets, set out in Annex V of the Directive are per EEE category and they are split into a combined 'preparing for reuse and recycling' target and a recovery target for each EEE category. In addition, the targets increased by 5% per target from 2012 to 2015 and lamps have only a recycling target that remained unchanged.

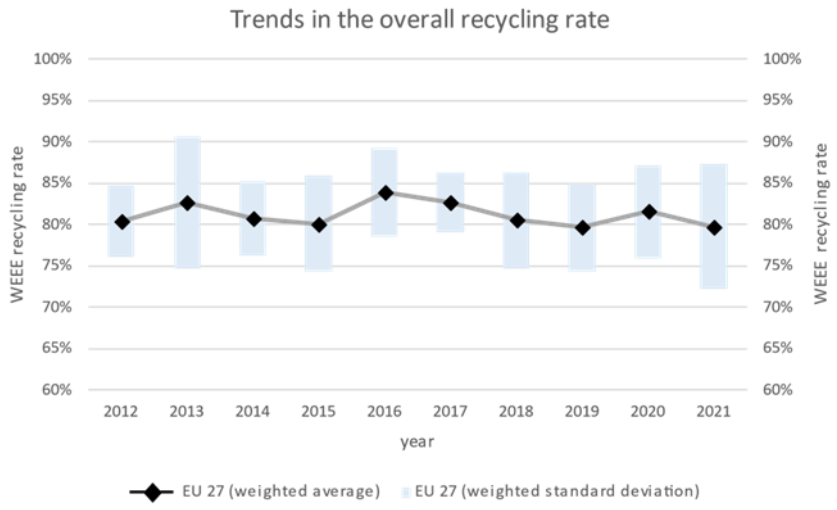
Detailed information about the WEEE recovery rates achieved by the EU-27 Member States during the evaluation period and about the capacity in the EU is presented in Chapter 3.2 of this report.

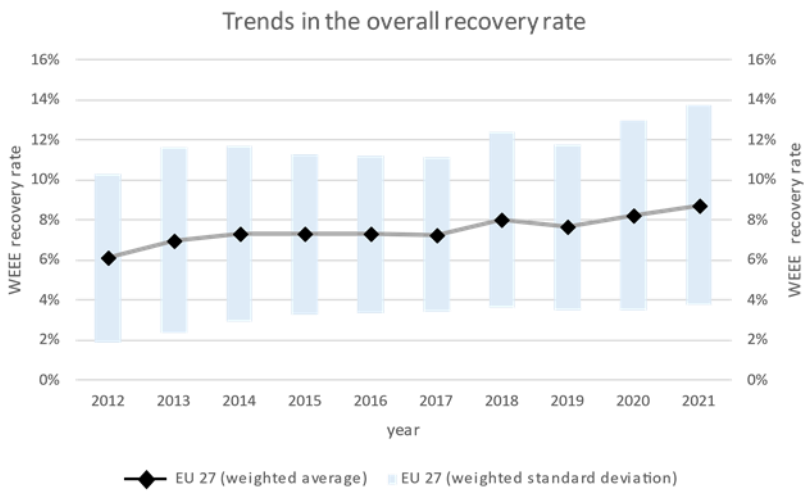
Data from Eurostat show that:

Recovered WEEE increased from 2.6 to 4.4 million tonnes between 2012 and 2021 (+69.8%), and WEEE recycled and prepared for reuse grew from 2.4 to 4.0 million tonnes (+64.8%) from 2012 to 2021.

The rate of recovery and the combined rate of recycling and preparing for reuse between 2012 and 2021 is rather stable; over 80% of the WEEE collected was recycled and prepared for reuse and if on this amount the energy recovery is added this leads to total recovery rate of over 87% during the whole evaluation period.

Figure 43: Development in the WEEE recycling and recovery rate between 2012 and 2021 (EU-27).

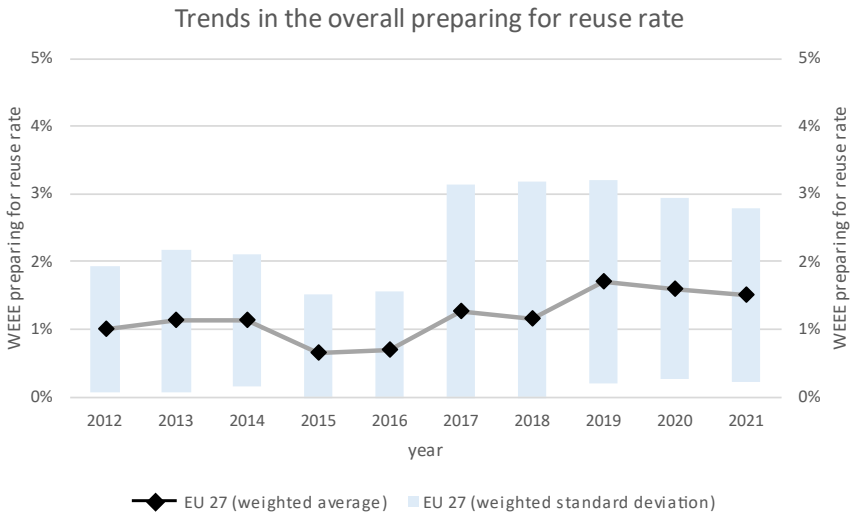




Data based on Eurostat (2024); database ENV_WASELEEOS.

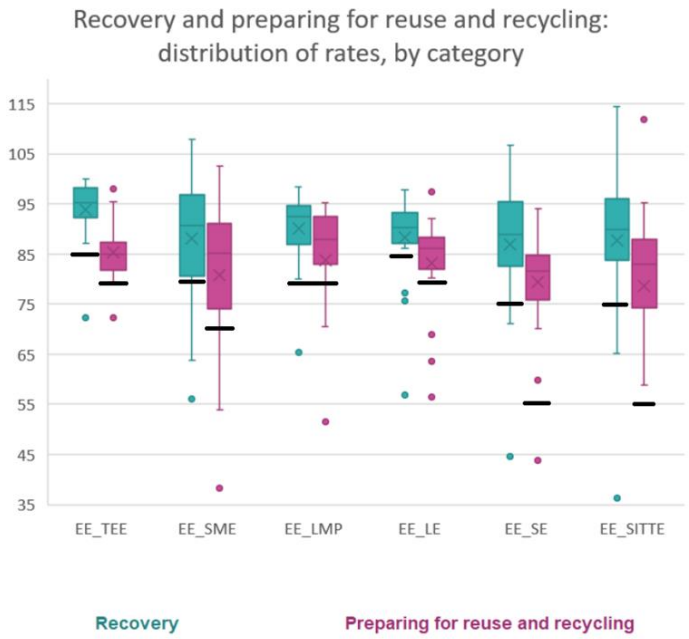
The preparing for reuse rate had a very little contribution to the combined preparing for reuse and recycling rate of WEEE in all Member States. On average, the preparing for reuse rate across the EU-27 was between 0.6% and 1.7% from 2012 to 2020. This leads to the conclusion that the increase in total quantities of WEEE recycled and recovered is the result of the increase in WEEE collection.

Figure 44: Development in the WEEE preparing for reuse rate between 2012 and 2021, (EU-27). Data based on Eurostat (2024); database ENV_WASELEEOS



As the recovery targets are set out per category of EEE, the data per category show as well that there were not significant differences among Member States regarding the level of the rate achieved per category. This confirms the conclusion that the recovery targets because they are calculated on the basis of WEEE collected and take into consideration the quantities of WEEE entering the recovery facilities may not be sufficiently ambitious and do not incentivise further improvement of eh quality of recycling.

Figure 45: Recovery and preparing for reuse and recycling, distribution of rates, by category



Category 1: **EE_TEE -** Temperature exchange equipment
Category 2**: EE_SME** - Screens, monitors, and equipment containing screens having a surface greater than 100 cm^2
Category 3: **EE_LMP** – Lamps
Category 4: **EE_LE** - Large equipment (any external dimension more than 50 cm)
Category 5: **EE_SE** - Small equipment (no external dimension more than 50 cm)
Category 6: **EE_SITTE** - Small IT and telecommunications equipment (no external dimension more than 50 cm)

In 2021, **15 out of the 27 Member States achieved all recovery and combined preparing for reuse and recycling targets** as presented in the Table below. Eight Member States missed one to three targets and four Member States missed four to six targets. Where targets laid out in the WEEE 2 Directive were not achieved, this is indicated by a red background. Values beyond 100% occur when WEEE is collected and stockpiled in one year and treated in the next year. A comparison to previous years, starting from 2012, cannot be drawn, because the WEEE categories changed in 2018.

Reference year: 2021	Recycling and preparing for reuse rate						Recovery rate				
Category:[b]	1	2	3	4	5	6	1	2	4	5	6
Target	**80%**	**70%**	**80%**	**80%**	**55%**	**55%**	**85%**	**80%**	**85%**	**75%**	**75%**
AT	83%	82%	89%	85%	75%	75%	97%	98%	93%	96%	96%
BE	68%	78%	81%	75%	63%	80%	79%	86%	84%	74%	87%
BG	86%	84%	86%	91%	87%	85%	87%	84%	91%	88%	86%
CY	99%	50%	0.3%	80%	58%	91%	99%	50%	80%	58%	91%
CZ	90%	98%	95%	97%	89%	102%	91%	99%	98%	94%	105%
DE	86%	89%	95%	89%	83%	85%	99%	97%	97%	98%	98%
DK	74%	94%	77%	79%	82%	83%	90%	98%	87%	94%	95%
EE	82%	77%	86%	85%	71%	84%	99%	88%	96%	95%	95%
EL	83%	75%	85%	85%	72%	60%	92%	80%	87%	80%	78%
ES	88%	79%	57%	66%	74%	71%	97%	81%	69%	77%	74%
FI	86%	91%	87%	88%	88%	95%	99%	95%	96%	93%	98%
FR	81%	55%	86%	81%	74%	73%	95%	69%	90%	88%	88%
HR	95%	89%	88%	94%	88%	88%	97%	89%	95%	88%	88%
HU	73%	69%	85%	84%	78%	77%	92%	77%	87%	80%	82%
IE	82%	76%	92%	86%	78%	86%	96%	97%	93%	88%	97%
IT	81%	92%	84%	91%	90%	62%	92%	95%	92%	91%	67%
LT	87%	85%	86%	86%	79%	77%	92%	88%	89%	82%	83%
LU	91%	92%	91%	89%	87%	87%	99%	95%	95%	96%	96%
LV	87%	80%	82%	86%	76%	77%	87%	81%	87%	80%	81%
MT	61%	88%	79%	102%	87%	104%	61%	92%	106%	89%	104%
NL	81%	65%	90%	69%	67%	72%	98%	84%	83%	93%	91%
PL	84%	85%	82%	85%	76%	82%	86%	86%	85%	78%	82%
PT	77%	17%	44%	61%	46%	22%	86%	40%	82%	62%	30%
RO [a]	80%	84%	58%	76%	68%	62%	91%	90%	82%	82%	74%
SE	85%	69%	16%	74%	76%	84%	98%	97%	95%	92%	92%
SI	95%	103%	90%	80%	83%	90%	99%	114%	92%	90%	98%
SK	91%	94%	95%	93%	92%	92%	91%	95%	93%	92%	93%

[a] No data is available for Romania for the year 2021 and therefore the data presented in the table refer to year 2020

[b] 1 = Temperature exchange equipment; 2 = Screens, monitors, and equipment containing screens having a surface greater than 100 cm²; 3=Lamps; 4 = Large equipment (any external dimension more than 50 cm); 5 =Small equipment (no external dimension more than 50 cm); 6 = Small IT and telecommunications equipment (no external dimension more than 50 cm)

Table 19: Combined recycling and preparing for reuse rates and recovery rates achieved by Member States per WEEE categories

Source: Eurostat: online data code: env_waseleeos, last update 17/4/2024

However, as the WEEE Directive does not set any targets on material recovery neither on recycling efficiency, there is no data reported on the actual quantities of materials, including critical raw materials, which have being retrieved from the collected WEEE. This has been reported as one of the main factors **hindering** the achievement of high levels of material recycling from WEEE. Additional such factors include:

(i) There are no quality standards for recyclates that would promote higher recycling efficiencies and better quality of recycling.

(ii) There is lack of incentives to increase recycling of materials, whose recovery is not commercially viable and this is in particular relevant also for critical raw materials. An example can be the precious metals that exist in electronics, which are generally separated and recycled because this is economically viable. A number of other materials however (e.g. silicon metal, indium, gallium, germanium, magnesium, tantalum and rare earth elements) are lost in shredding residues or diluted into other recycled fractions[248][249], because their recovery is not commercially viable.

(iii) There are legal uncertainties in the interface between chemicals, products and waste legislation regarding substances in WEEE, e.g. lacking tracking of substances through the supply chain, which could perhaps have been restricted or could be restricted in future.

(iv) In some Member States there is lack of recycling capacity and if this is combined with the burdensome waste shipment procedures between Member States, it does not incentivise Member States and the recycling facilities in these Member States to invest in cooperating with facilities in other Member States that would have able to increase recycling of specific materials.

3. Analysis of the achievement of the treatment requirements in the Member States

Regarding the **rules** that the Directive sets out for the treatment, recycling and recovery of WEEE, they **remain unchanged** since the WEEE 1 Directive. The main change following the adoption of the WEEE 2 Directive was the development by CENELEC of the European Standards for the treatment of WEEE. These standards remain voluntary in most Member States. However, six Member States have made the standards obligatory by law, while another four Member States have introduced specific elements of the standards in the national legislation. In addition, there are cases where PROs request compliance with the standards to set up agreements with the treatment facilities.

[248] (JRC, 2017). Critical Raw Materials and the Circular Economy – Background report. JRC Science-for-policy report, EUR 28832 EN, Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-74282-8 https://doi.org/10.2760/378123 JRC108710.

[249] Chancerel P; Marwede M; Mathieux F; Talens Peiro L. Feasibility study for setting up reference values to support the calculation of recyclability / recoverability rates of electr(on)ic products. EUR 27922. Luxembourg (Luxembourg): Publications Office of the European Union; 2016. JRC101426 https://doi.org/10.2788/901715.

Type of implementation	MS
Member States, who made the full EN 50625 series or the corresponding WEEELABEX standards obligatory by law	IE, FR, NL, SI, LT, CZ[250].
Member States with national provisions containing elements of the EN 50625 series, e.g. detailed provisions for treatment of temperature exchange equipment.	AT, PT, ES, SK
Member States having adopted other specific national minimum WEEE treatment requirements going beyond those of the WEEE 2 Directive itself	BE, DE, FR, IE, LU
Member States that did not adopt any minimum treatment requirements going beyond those specified in the WEEE 2 Directive; compliance with EN 50625 is not an obligation.	RO, BG, IT, FI, MT, CY, EE, LV, HR, PL, DK, GR, SE
Member States where all operating PROs request compliance with EN 50625 from the treatment operators under contract (mostly because of the national obligation)	IE, FR, NL SI, GR, LU, BE[251], CZ
Member States where some, but not all, PROs request compliance with EN 50625	DK, DE[252], EE, SE, HU

Table 20: Implementation of the European standards for the treatment of WEEE in the EU-27

Source: evaluation study based on submissions by Member States replying to the targeted questionnaire addressed to them and 'Study on quality standards for the treatment of WEEE'.

From the six Member States that have made the standards mandatory four of them met all the recovery targets as presented in the table above, however, there is not sufficient data to establish a clear correlation between implementing the European standards and the level of the recovery rate achieved. However, the fact that treatment standards are not universally binding, results in disparities in WEEE treatment practices.

In the EU, there are more than 2 700 facilities that can treat WEEE, with a minimum capacity of about 3 million tonnes per year of different categories of WEEE as shown in the table below. To date about 23% of these WEEE treatment facilities operate in compliance with these standards, however, the percentage is higher for facilities treating temperature exchange equipment (51%), lamps (53%) and screens (38%)[253].

Table 21: Overview on treatment capacities for the initial treatment of WEEE (Source: Study supporting the evaluation of the WEEE Directive)

[250] Since 2023, according to replies to the Member States' questionnaire.

[251] The Belgian PRO Recupel has a market share of 100% for all WEEE categories except for photovoltaic panels.

[252] In Germany, Lightcycle, a collective take-back system set up by producers of lighting equipment with a market share of 75%, requests from its logistic operators to work according to the principles of the CENELEC standards, specifically with TS 50625-4. The producers commissioning recycling operations under the Lightcycle system also request them to work in accordance with the relevant CENELEC standards (see WEEE evaluation supporting study for additional information).

[253] Data gathered in the context of the study supporting the evaluation of the WEEE 2 Directive.

	Cat 1 Temperature exchange equipment	Cat 2 Screens	Cat 3 Lamps	Cat 4 Large EEE	Cat 4 PV panels	Cat 5 Small EEE	Cat 6 Small IT and telecommunication equipment
Number of facilities in the EU-27	108 68 (step II*)	149	50	min. 940	25	min. 681	min. 657
Member States with missing/ insufficient capacities	EE CY IE LU LV MT SI PT	LU NL DK CZ CY RO***	AT EE LU NL SI BG**		ES LT HU NL DK	DK CY	DK CY
** Step II treatment = shredding of the insulation and recovery of the blowing agents*							
***no information for Bulgaria, *** no information for Romania,*							
CAT 1: Temperature exchange equipment; CAT 2: Screens: CAT 3: Lamps; Cat 4 (a): Large equipment excluding PV panels; Cat 4 (b): PV panels; CAT 5: Small equipment; CAT 6: Small IT and telecommunication equipment							

The analysis showed that there is no level playing field regarding the WEEE treatment requirements among Member States and the fact that the requirements in the WEEE Directive as such have remained unchanged since 2002, they also do not reflect the changes in hazardous components used in EEE and the developments in WEEE treatment technology. In absence of harmonised rules (and thus a definition of quality treatment) at EU level, operators that apply presumably higher quality requirements may be disadvantaged on the market. In addition, the lack of playing field is valid not only in the cross-border context but also at national level where standards remain voluntary.

The implementation of quality standards may imply higher cost of treatment as currently applied in some Member States. However, the implementation of standards guarantees proper treatment according to the Directive and therefore a certain level of treatment cost is required.

A challenge that Member States have also to face in relation to the proper implementation of the treatment requirements is how to ensure compliance of the WEEE treatment facilities. Although inspections are in place in most of Member States, the authorities lack resources to target a significant number of operators. In addition, some smaller countries have a lack of WEEE treatment capacities and depend on exports. In such cases it is hard to inspect the receiving facilities and difficult to control the treatment quality of exported WEEE.

4. Analysis of the main models of the national EPR schemes

The application of WEEE extended producer responsibility (EPR) in the EU has followed different patterns, with varying intensity of competition among producer organisations responsible for meeting take-back and recycling obligations.

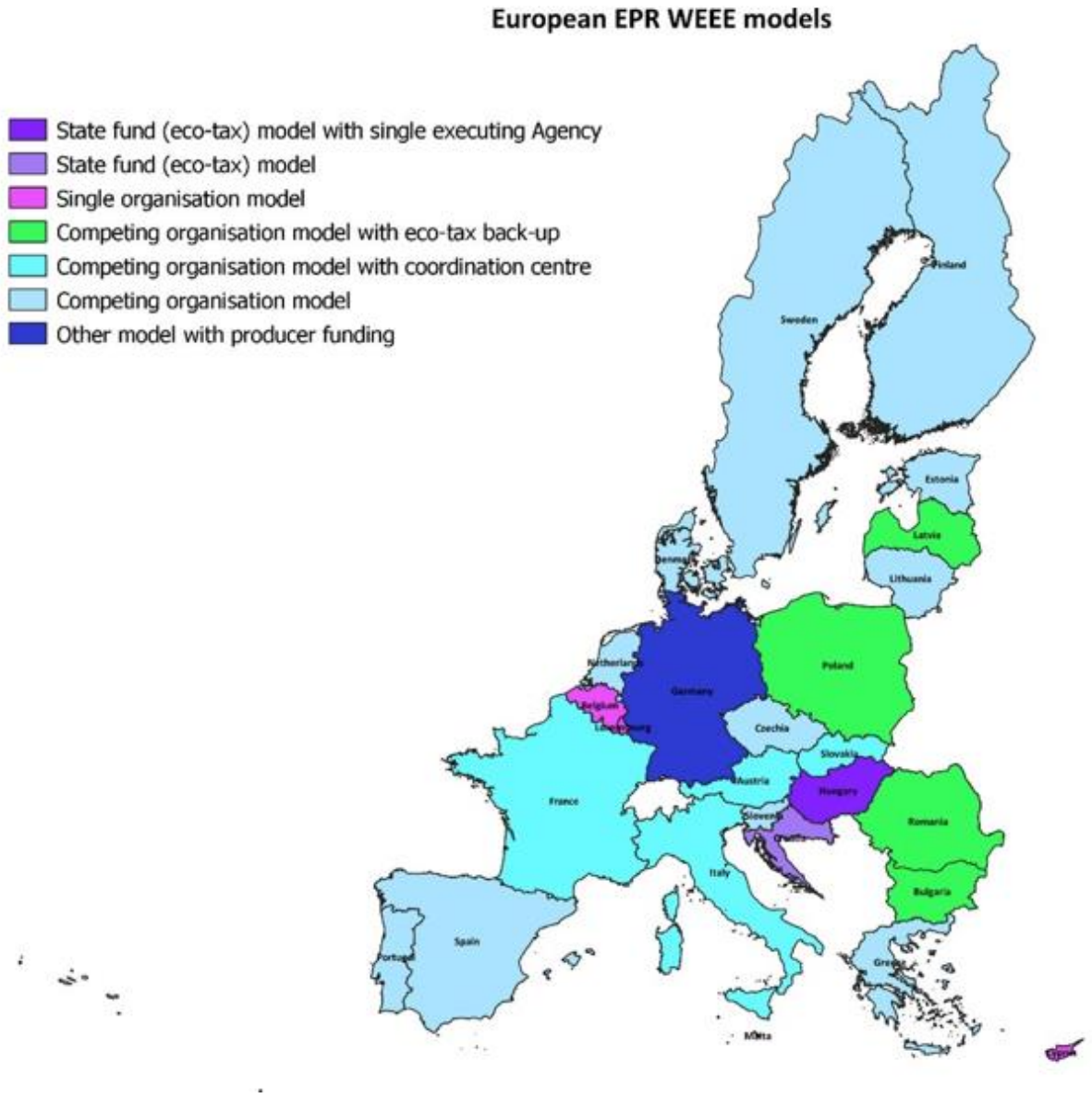
The national WEEE EPR models as established in the Member States can be classified in four different main models:

1. **State Fund (eco-tax) Model** (with/without single executing Agency): producers must pay a fee or a tax to a designated **waste management fund**. Producers are financially responsible for the cost of end-of-life products. In the case of the presence of a 'single executing Agency', a government agency coordinates the waste management programme nationwide. Otherwise, the waste management fund finances private and municipal waste management programmes.
2. **Single Organisation Model**: there is a unique compliance organisation controlled and financed by the industry sector. This model is based on an 'environmental agreement' between the government and the industry sector. The industry organises and funds the waste management system and is responsible for achieving the targets. Usually, there is environmental tax legislation to support the financial aspects, while enforcement is possible if the targets are not met.
3. **Competing Organisation Model** (with/without coordination centre or with eco-tax back-up): the compliance organisations (PROs) assume the take-back obligation of producers. PROs are usually subject to authorisation, and they compete on the fees charged to producers. This model might contemplate a national clearing house: a coordination body that organises the compliance system to achieve the national coverage of the waste collection and to keep a levelled play field among PROs. If the eco-tax back-up applies, producers or PROs on their behalf are charged a fee as a penalty for not achieving the collection targets.
4. **Other models** with producer funding. For example, Germany has adopted a unique model classified as 'model with producer funding' because, in this model, producers had to register to a national organisation (with governmental powers) financed through producer fees set by legislation. In this model, the financing of historical B2C and B2B WEEE is legally an IPR (Individual Producer Responsibility) model. There are no authorised PROs as producers cannot transfer their legal take-back obligations to a third party. The Federal Environmental Agency has entrusted the national register (stiftung ear) as the coordination body for WEEE management throughout the whole country. The duties of the register include the enforcement of registration of EEE producers, control and monitoring of reporting, and the coordination of WEEE take-back allocation to the individual obliged producers.

The main models have been further distinguished into seven models to better represent each national EPR system[254]: state fund (eco-tax) model with single executing Agency, state fund (eco-tax) model, single model, competing organisation model with 'eco-tax back-up', competing organisation model with coordination centre, competing organisation model, and other model with producer funding.

The Figure 46 presents the map of the 27 EU Member States and their dominant WEEE EPR model.

Figure 46: The European EPR WEEE models



[254] *Source:* [Regulation and competition in the extended producer responsibility models: Results in the WEEE sector in Europe](#).

Source: Regulation and competition in the extended producer responsibility models: Results in the WEEE sector in Europe (2022)

The prevailing model is the competing organisation models. The model without coordination centre is present in 13 countries, while four countries have also a coordination centre (AT, FR, IT, SK). The competing organisation model with eco-tax back-up applied to not compliers, is present in four states (BG, LV, PL, RO). The single organisation model is present in Belgium, Cyprus, and Luxembourg, probably due to their small markets. In contrast, the state fund model with eco-tax is applied in Hungary and Croatia. There is also a single executing agency in Hungary, while this is not present in Croatia. Germany has adopted a model classified as 'model with producer funding' because, in this model, producers had to register to a national organisation (with governmental powers) financed through producer fees set by ordinance. In this model, the financing of historical B2C and B2B WEEE is legally an IPR (Individual Producer Responsibility) model. There are no authorised PROs as producers cannot transfer their legal take-back obligations to a third party. The Federal Environmental Agency has entrusted the national register (stiftung ear) as the coordination body for WEEE management throughout the whole country. The duties of the register include the enforcement of registration of EEE producers, control and monitoring of reporting, and the coordination of WEEE take-back allocation to the individual obliged producers, this is the reason why the cost for developing and running the German national register is significantly higher compared to other Member States. This unique EPR system cannot be directly comparable to the other systems.

The table below presents an analysis of the various EPR models presenting in parallel the achievements of the Member States in relation to collection and recovery targets and gives also an overview of the practices applied is each Member State regarding the requirements for the treatment of WEEE. The aim of this analysis is to assess whether there is any correlation between the EPR models and the relevant achievements. However, a comparative analysis was not possible because the economic performance is not straightforward to measure.

Table 22: Analysis of the EPR WEEE models in each Member State

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
State Fund (eco-tax) Model with single executing Agency	Hungary	'State-owned PRO' + 3 PROs[256]	91% (40 264 tn)	35.6% PoM **62.1% (WEEE generated)**		Some PROs request compliance with EN 50625		Group A	Producers 100%	true cost	No WEEE inspection plan
State Fund	Croatia	No PROs[257]	119% (19 291 tn)	56.25%				Group C	Producers 100%		Inspection plan

[255] In the context of the 'WEEE compliance promotion initiative: Member States have been clustered into the following three groups:
Group A: High achievements in quantitative criteria and Implementation of a strong set of qualitative measures.
Group B: High achievements in quantitative criteria and Implementation of several qualitative measures.
Group C: Low/ stagnating achievements in quantitative criteria or Implementation of limited or no qualitative measures.
[256] HUNGARY: National Inspectorate for Environment and Nature, National Waste Management Directorate acts as a coordinating body of the management of waste from products under act on environmental product fee (including EEE). For EEE covered by environmental contribution, producers pay the contribution directly to the State. For EEE not covered by the environmental contribution, producers can get organised in PROs or individually. The financing is through tax similar environmental product fee.
National Inspectorate for Environment and Nature, National Waste Management Directorate is outsourcing, via public procurement (financed from the product fee), waste management activities to waste treatment companies. National Waste Management Coordination and Asset Management Company, a state-owned company responsible for coordinating public waste management service across the country, is in charge of developing the country's public waste management service plan.
[257] CROATIA: Environmental Protection and Energy Efficiency Fund (governmental entity) is the central body having full responsibility to operate and manage the WEEE management system established as per relevant national regulation; responsibilities include:
• managing the WEEE EPR system and cooperation with producers/importers placing EEE on the market,

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
(eco-tax) Model (without single executing Agency)											considering at least WEEE collection and treatment exists.
Single Organisation Model	Belgium	1 PRO for all EEE + 1 PRO on PV panels	46% (53 002 tn)	50.2%	The Walloon Government Decree requires 2% of WEEE to be 'prepared	National additional treatment requirements + all operating PROs request compliance with EN 50625		Group B	Producers 100%		In Belgium, the inspection plan does not cover the entire territory or does not include both

• managing and cooperation with the private operators for WEEE, WEEE financial system management,
• data management for particular waste categories, financing and co-financing of specific projects in the waste management including WEEE and informing the public on separate collection and appropriate treatment importance.
In Croatia, producers pay a contribution to cover costs of collection, transport and treatment; two contributions including:
• producers pay contribution (in EUR/kg of EEE placed on the market) to cover the costs to the Fund for Environmental Protection and Energy Efficiency which finances directly WEEE management (i.e. simply spoken, a PRO organised by the state). The Fund finances the WEEE separate collection costs and treatment – financial incentives are given to the authorised collection companies for collected, sorted and handed over WEEE to the treatment facility; and the authorised treatment facilities are also given incentives for the handed over WEEE by the authorised collectors. Three companies authorised by the Ministry of Environment are in charge of collection and two are in charge of treatment of WEEE
• producers pay contribution for WEEE system management.

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
					for reuse' starting from 2020 onwards. The target covers six categories of waste appliances. Regarding preparation for reuse, in Flanders WEEE to be prepared for reuse is separated at collection points Specific 'preparatio						collection and treatment. In Belgium the penalties are decided by either the police or the court system

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
					n for reuse' criteria has been set by the PRO and the reuse sector in a common agreement.						
	Luxembourg	1 PRO	33% (1 649 tn)	53.8% PoM **74.1%** **WEEE generated**		National additional treatment requirements + all operating PROs request compliance with EN 50625	collection obligations for municipalities as well	Group B	Producers 100%	true cost	No WEEE inspection plan.
	Cyprus	1 PRO	42% (1 048 tn)	28.6%			collection obligations for	Group C	Producers 100%		

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
							municipalities as well				
Competing Organisation Model with eco-tax back-up	Bulgaria	No PRO, 7 WEEE recovery organisations[258]	143% (54 808 tn)	108.3%			In Bulgaria there is free competition among WEEE management operators, with allocation of collection duties based on their market share. Measures applied to increase collection: mandatory for the recovery	Group A	Producers 100%		Inspection plan considering at least WEEE collection and treatment exists. Regular inspections carried out by the 16 Regional Inspectorates of Environment and Water in Bulgaria based

[258] In Bulgaria no PRO exists. Instead producers fulfil their responsibility by contracting one of the seven licensed WEEE recovery organisations (**Greentech, Eltechresource, NOORO, Transins Technorecycling Company, Ecobultech, Electroopol-zotvoryavane, Teneko Recycling**)

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Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
							organisations to spend a budget on information/ awareness-raising campaigns (5% of revenues), pick-up door-to-door collection offered free of charge, collection of WEEE through all routes. Bulgarian EEE producers and retailers can sub-contract licensed				on inspection plans.

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
							organisations for collection and treatment of WEEE to collect the WEEE on their behalf. Thereby the WEEE recovery organisations offer home-pick-up service free of charge, and sometimes households even get paid for handing over an appliance.				

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
	Romania	10 PROs[259]	293% (67 711 tn) (Data 2012-2020)	34.5% (Data for 2020)			In Romania the inspection plan does not cover the entire territory or does not include both collection and treatment. Collection obligations for municipalities as well	Group C	Producers 100%		The inspection plan does not cover the entire territory or does not include both collection and treatment.

[259] ROMANIA: **Environment Fund Administration is** responsible for assessing the achievement of collection rate.
Romanian legislation introduced an "orphan" product status – when producer ceased activity or cannot be identified when the product becomes waste. To avoid financing of treatment of such WEEE by consumers or other producers, every producer is required to provide a bank guarantee / insurance guarantee when putting a product on the market; it covers operations to manage any EEE put on the market. This measure is not required from producers being part of a PRO.

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Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
	Poland	8 PROs	199% (349 426 tn)	63.3%			Obligation for PRO to dedicate 5% of net revenue from previous year for national information campaigns.	Group B	Producers 100%		Inspection plan considering at least WEEE collection and treatment exists.
	Latvia	4 PROs	243% (11 385 tn)	57.5%				Group B	Producers 100%		Inspection plan considering at least WEEE collection and treatment exists.
Competing Organisation Model with	France	4 PROs	111% (523 431 tn)	48.1%		EN standards mandatory + National additional	France prohibited payments in cash to improve traceability	Group A	Producers 100%	true cost	France has developed a strong regulatory framework and approval

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
coordination centre						treatment requirements	and fight leakage of WEEE out of the EPR scheme.				procedures for PROs. French PROs have the obligation to control the effective implementation of the WEEE value chain by auditing both producers and their WEEE treatment contractors.
	Italy[260]	Coordination centre	1% (5 282 tn)	33.8%			The 'Coordination Centre' – a	Group C	Partly covered		No WEEE inspection plan.

[260] ITALY: **The Coordination Centre (CdC RAEE)**: is a consortium made up of all WEEE management PROs serving private households. The tasks and objectives of the coordination centre are: ensure a consistent service for the collection and treatment of WEEE throughout the country, fairly assign WEEE generated by the collection points to PROs, so that they can manage their own WEEE collection share under similar operating conditions, be a single contact for collection points so that they have access to an internet portal for registration, collection and a dedicated call centre, represent the PROs with stakeholders.

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
		for 15 PROs					clearing house - coordinates pick-up of WEEE by PROs from collection points based on their market share. It coordinates field operations by assigning every week collection points to operators in contract with the given PRO. All operators of domestic WEEE must				

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
							be accredited by the Coordination Centre.				
	Austria	5 PROs	79% (61 058 tn)	56.5%		National additional treatment requirements	Collection obligations for municipalities as well.	Group A	Partly covered		Inspection plan considering at least WEEE collection and treatment exists.
	Slovakia	12 PROs	130% (29 469 tn)	65.1%		National additional treatment requirements		Group B	Producers 100%		Inspection plan considering at least WEEE collection and treatment exists.

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
Competing Organisation Model (without coordination centre or with eco-tax back-up)	Ireland	2 PROs[261]	74% (30 634 tn)	63.8%		EN standards mandatory + National additional treatment requirements. The cost for implementing the standards is paid off by the producers of WEEE and included in EPR fees. PROs support facilities by providing trainings to the	Ireland has developed a collection network based on retailers. PROs contribute EUR 1.2 million per year to support the costs associated with providing civic amenity facilities throughout the country.	Group A	Partly covered		Inspection plan considering at least WEEE collection and treatment exists.

[261] IRELAND: **Producer Register Ltd.** (PRL) - is the national register that also verifies contributions of producers and their declarations on market share
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Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
						facilities and training the workers.					
	Greece	2 PROs	70% (25 950 tn)	39.1%		All operating PROs request compliance with EN 50625	collection obligations for municipalities as well	Group C	Producers 100%	true cost	
	Spain	11 PROs	162% (255 299 tn)	47.8%	Since 2015 Spain introduced specific target for preparation for reuse; In the first years it did not perform very well, but now it has boosted	National additional treatment requirements		Group A	Producers 100%		Inspection plan considering at least WEEE collection and treatment exists.

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
					this operation and involved producers as well[262].						
	Portugal	3 PROs	23% (9 998 tn)	26.9%		National additional treatment requirements	Collection obligations for municipalities as well. Producers or PROs need to invest each year a certain amount on information and awareness campaigns (equal to 3%	Group B	Partly covered		No WEEE inspection plan.

[262] Reply by Spain to the targeted to Member States questionnaire.

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
							of its annual revenue) covering all stakeholders				
	Czechia	8 PROs	149% (79 736 tn)	57.5%		EN standards mandatory		Group C	Producers 100%		No WEEE inspection plan.
	Lithuania	2 PROs	38% (5 474 tn)	50.6%				Group A	Producers 100%		Inspection plan considering at least WEEE collection and treatment exists. Obligation on producers to reach a qualitative or a quantitative collection target followed by financial

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
											sanctions if the target is not reached.
	Estonia	2 PROs	119% (6 515 tn)	53.8%		Some PROs request compliance with EN 50625	In Estonia the inspection plan does not cover the entire territory or does not include both collection and treatment	Group C	Producers 100%		The existence of an annual inspection plan led to an increase of inspections carried out. The Environmental Inspectorate in Estonia is responsible for controlling/inspecting producers/ PROs and WEEE treatment facilities. For the case of non-

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
											compliance, penalties and sanctions are set in the Waste Act.
	Finland	5 PROs	54% (28 348 tn)	54.7%				Group A	Producers 100%	true cost	Inspection plan considering at least WEEE collection and treatment exists.
	Sweden	2 PROs	-20% (-33 396 tn)	48%		Some PROs request compliance with EN 50625	Collection obligations for municipalities as well: Municipalities are responsible for enforcement locally, i.e.	Group B	Producers 100%		Inspection plan considering at least WEEE collection and treatment exists.

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
							collection sites. The municipalities inspect for example collection in stores.				
	Denmark	5 PROs	1% (532 tn)	42.7% PoM **54.6% WEEE generated**		Some PROs request compliance with EN 50625	collection obligations for municipalities as well. In Denmark, there were often changes in how the environmental fee was calculated, and there was a significant cost with	Group C	By municipalities		No WEEE inspection plan.

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
							these changes[263]				
	Netherlands	5 PROs	67% (82 307 tn)	33.5%		EN standards mandatory	collection obligations for municipalities as well	Group B	Partly covered		Inspection plan considering at least WEEE collection and treatment exists.
	Slovenia	5 PROs	65% (6 115 tn)	38.1%		EN standards mandatory		Group C	Partly covered	true cost	
	Malta	2 PROs	87% (1 303 tn)	25.6%			collection obligations for municipalities as well	Group C	Producers 100%		Inspection plan considering at least WEEE collection and treatment exists. Obligation for producers to

[263] A comparative study of national variations of the European WEEE directive: manufacturer's view | Environmental Science and Pollution Research (springer.com)

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
											renew registration annually. Producers who fail to register or renew the registration have to pay a fine (EUR 750 per tonne of EEE they place on the market).
Other models with producer funding	Germany	0 PRO	46% (315 659 tn)	38.6% Collection of household WEEE is conducted by the municipalities via many collection		National additional treatment requirements	367 primary treatment plants have a total estimated turnover of about EUR 10 billion and employ	Group A	By municipalities		Inspection plan considering at least WEEE collection and treatment exists.

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
				points, where consumers can deliver WEEE for free. Municipalities also conduct household collection of large goods			about 20 000 people. Collection of household WEEE is conducted by the municipalities via many collection points, where consumers can deliver WEEE for free. Municipalities also conduct household collection of large goods. Body to coordinate				

Type of model	Member State applying the EPR model	Number of PROs	Increase of collection 2012-2021	Collection rate achieved in year 2021	Recovery targets	Treatment Requirements	Comments	Compliance promotion classification [255]	Coverage of the collection costs by producers	Fees based on true cost of waste management	Enforcement actions
							the management of WEEE flows between different PROs and / or producers.				

From the above analysis and the literature review it is noted that:

There is not a specific EPR model that can be characterised as the most successful in terms of enabling all Member States applying the model to reach the targets set out in the WEEE Directive. Member States applying a competing organisation model with eco-tax back-up achieve on average, a higher collection rate but the evidence is not conclusive on whether the EPR model as such is the main reason for this success or other parameters as for example enforcement actions.

The Member States achieving higher collection rates tend to enable close cooperation between public and private stakeholders (authorities, producers, treatment operators, etc.) in particular where a formal platform for stakeholders to discuss issues in relation to the EPR scheme on WEEE has been established in the Member State.

The Member States achieving higher recycling rates tend to:

- emphasise the importance of proper treatment of WEEE and took additional measures to improve compliance with Article 8 in accordance with Annex VII of the WEEE2 Directive:
- include in their waste management plans specific measures in relation to WEEE treatment.
- further specify treatment requirements by either requiring compliance with the European standards for the treatment of WEEE (EN 50625 series) or introducing specific provisions on WEEE treatment in their national legislation.
- have inspection plans specifically covering WEEE.
- set out clear rules on penalties for non-compliance in official and publicly available documents.

The allocation of tasks among producers, retailers, and local authorities is heterogeneous. This is mainly because EPR schemes are linked to Member States' waste management infrastructure rather than European harmonised rules. Typically, the producers of EEE can create their own take-back system or delegate this task to specialised entities that associate many different operators, charging them a fee that compensates the net cost for the management of WEEE. Systems may involve economic incentives of various kinds; national legislation can identify some subjects to which responsibility for the overall achievement of targets is attributed, as well as clearinghouses (i.e. monitoring and coordinating bodies), etc.

In 19 Member States, producers finance 100% of the costs for collection, transport to treatment plants and treatment. For all Member States the costs for transport and treatment

are fully covered; in six Member States however the costs for collection of WEEE as such are not fully covered (AT, IE, IT, NL, PT, SI). In Ireland the retailers and municipal collection points do incur some costs regarding their set up and management, which are not covered by producer fees. In Italy for domestic WEEE, the PROs pay the collection facilities a fixed 'efficiency price' based on an agreement among the producers, the National Association of Italian Municipalities (ANCI) and the Clearing House. This amount does not cover the entire collection-phase costs. In Germany and Denmark, collection as such is financed by municipalities providing and maintaining the collection infrastructure for WEEE from households and producers cover the cost of the collection/ transport, treatment and recovery of these WEEE that has been deposited at municipal collection facilities.

The general minimum requirements for extended producer responsibility schemes established in Article 8a of the Waste Framework Directive also apply to WEEE EPR schemes. Approval procedures for PROs (producer responsibility organisation(s) or other organisations in charge, e.g. registration bodies) are in place in 24 Member States. Denmark and the Netherlands do not implement approval procedures for PROs or other organisations in charge, e.g. registration bodies. In Poland this was started in 2017.

Audits by external service providers or by the competent authorities (going beyond usual inspection practices) for PROs or other organisations in charge, e.g. registration bodies are mandatory in 13 Member States (BE, BG, DE, ES, FR, HR, IT, LT, LU, LV, MT, RO, SI). In the opposite, 14 Member States do not oblige such external audits. In Greece such audits are on a voluntary basis and in Poland this measure was launched in 2017. However, following the amendment of the Waste Framework Directive in 2018 all Member States shall ensure that the PROs put in place an adequate self-control mechanism, supported, where relevant by regular independent audits, to appraise its financial management and the quality of data collected and reported.

In six Member States (FI, FR, GR, HU, LU, SI) the PROs (or other organisations in charge) have been obliged to apply differentiated fees depending on the true cost of waste management even before 2018 when the requirement that the fees do not exceed the costs that are necessary to provide waste management services in a cost-efficient way was introduced in the Waste Framework Directive. This means that in the vast majority of Member States (21) no such modulation on fees have been required, however may have taken place on a voluntary basis. Following the transposition of the amendment of the Waste Framework Directive and the introduction of the requirement of the eco-modulation of fees by taking into account the durability, reparability, reusability and recyclability of products and the presence of hazardous substances, all Member States have to apply these rules.

Regarding **enforcement actions by Member States**, in 14 Member States an **inspection plan considering at least WEEE collection and treatment** exists. Three further Member

States have a plan not covering the entire territory. In Belgium, Estonia and Romania the inspection plan does not cover the entire territory or does not include both collection and treatment. In six Member States no such plan exists (CZ, DK, HU, IT, LU, PT). For four Member States information could not be retrieved (CY, FR, GR, SI).

In addition, in almost all Member States **rules on penalties applicable to infringements** of the national provisions on WEEE management are laid down in official documents and publicly available. Penalties may be further specified to apply to non-complaint producers/ free-riders, to non-complaint distributors, to PROs, when they do not operate according to the rules set out in the national WEEE legislation or when they do not meet the respective WEEE collection targets or to collection and recovery facilities not complying with the rules/ permits for the operation of these facilities. In Belgium and Denmark, the penalties are decided by either the police or the court system.

Once collection and recycling targets are set and penalties for missing them are adequately established and enforced, market forces could be sufficient to motivate the industry to take action. Regulations may have a negative impact if they try to interfere in how industry organises to fulfil its duties, while it may be helpful if it effectively combats free-riding.
As the degree of market concentration and the responsibilities of the key players vary among countries, the WEEE EPR schemes are in most of the cases profit-oriented when competitive, but monopolistic ones tend to stem from cooperative agreements and operate as non-profit organisations. Alternatively, non-competitive schemes are intensely regulated and cannot operate as profit-maximising firms. From the analysis presented above there is no clear correlation between the achievements regarding WEEE collection and the type of PRO (i.e. for profit or non-profit organisations). What has become obvious though is the importance of setting clear roles and responsibilities of all relevant actors involved (including producers, PROs, private or public waste operators, local authorities and, where appropriate, reuse and preparing for reuse operators and social economy enterprises) and the necessity to ensure that irrespective of the type of the PRO, the PRO has the financial and organisational means to meet its EPR obligations. These are requirements already set out in the Waste Framework Directive (Article 8a) and their proper implementation by the WEEE PROs is crucial for the achievement of the WEEE targets.

Where the market is more developed and denser, it is easier and less costly to organise take-back activities, and this also leaves space for more operators to compete. The lower cost may depend on this feature of the local market rather than on the competition itself.
Evidence is inconclusive regarding the effects of competition because of several factors influencing the outcome of a competitive EPR model: degree of competition, existence of a high-level control authority (clearing house), maturity of the recycling industry, size of the market, presence of alternative models dealing with waste fractions. However, evidence presented in literature show that if competition among PROs is possible, then the same target at the macro level can be achieved at a lower cost.

ANNEX XII. COSTS AND BENEFITS

1. Overview of the costs

The costs pertaining to the implementation of the WEEE 2 Directive are both direct and indirect. Direct costs encompass compliance costs and enforcement costs for various actors involved in the process. The main costs are the direct compliance costs for collection, treatment, including recovery and disposal, and logistics of WEEE which are borne by producers/PROs (as per Article 12 of the WEEE Directive)[264] and covered by the EPR fee. Indirect costs are economic, social and environmental ones, observed in related upstream or downstream markets or experienced stakeholders, who are not directly targeted by the Directive. See Table 21 on the typology of cost categories.

Table 21: Typology of cost categories

Type of cost	Relevance to WEEE 2 Directive	Costs by stakeholders
Direct costs		
Compliance cost: →Adjustment costs	Costs arising from changes (such as new obligations, new classification of the categories of EEE (Art. 2), new treatment requirements, etc.) between WEEE 1 Directive and WEEE 2 Directive. Such costs can be: • Implementation costs (e.g. developing new compliance approaches); • Equipment costs (e.g. new machinery); • Direct labour costs (e.g. staff costs directly attributed to achieve compliance with the new regulation); • Etc.	**Producers/PROs:** Costs for collection, treatment, recovery and environmental sound disposal of WEEE. **Treatment operators:** Costs for auditing and certification including cost for batch testing (recurrent). Costs for obtaining CENELEC certification (not mandatory according to WEEE 2) (one-off).
Compliance cost: →Administrative costs	Costs as a result of administrative activities performed to comply with administrative obligations included in the Directive. E.g. registering and reporting as producer in the national register by providing all relevant information reflecting activities in that Member State (Art. 16(1.2)); reporting obligations of the Member States (Art. 16(6));	**Producers/PROs:** Development of statistics/reporting on WEEE quantities. **Treatment operators:** Cost for compliance with reporting obligations (recovery targets). Usually done together with reporting obligations stemming from other directives (Industrial Emission Directive, Waste Framework Directive).

[264] Art. 12 of the Directive lays down financing obligations by responsible producers to at least finance the collection, treatment, recovery and environmentally sound disposal of WEEE from households.

Type of cost	Relevance to WEEE 2 Directive	Costs by stakeholders
	preparation and storage of technical documentation (see e.g. Art. 14 & 15)	**Member States:** Costs for implementation of the Producer Register. Costs for running the Producer Register and national coordination body. Costs for raising awareness and promoting compliance amongst importers/ manufacturers/ producers and PROs.
Enforcement costs	Costs associated with activities linked to the implementation of the Directive such as monitoring, inspections, checks, and litigation.	**Member States:** Costs for inspection and monitoring, general market surveillance, including penalties, etc. Use of technology and equipment for effective enforcement.
Indirect costs		
Indirect economic costs	Economic, social and environmental costs experienced by consumers, government or other stakeholders (e.g. third countries) that are not directly targeted by the WEEE Directive.	**Treatment operators:** *Economic cost* Costs ensuring security measures, acquiring specialised technical equipment, and obtaining adequate insurance coverage. e.g. cost related to fire incidents.
		Citizens: *Economic cost* Costs arising for consumers when purchasing EEE resulting from producers including collection and treatment costs of WEEE in their product prices
Indirect social costs		**Treatment operators:** *Social cost* Jobs lost due to increased costs of compliance
Indirect environmental costs		**Third countries:** *Environmental cost* indirect costs associated with negative externalities e.g. through illegal e-waste exports to countries with weaker environmental regulations.

This table shows that stakeholders bear costs differently. Enforcement costs primarily fall on competent Member State authorities, while compliance costs vary among stakeholders.

Identifying **indirect costs** resulted to be a challenging task. Results of the OPC show that 35%-45% from all stakeholder groups reported an increase in indirect costs, mainly attributed to indirect compliance costs. However, a substantial 45%-55% expressed uncertainty about the Directive's impact on these costs. This divergence in responses highlights a significant portion of the respondent base expressing uncertainty regarding the influence of the Directive on their indirect costs, emphasising the complexity and varied

experiences. No specific data on indirect costs was made available over the course of the evaluation study[265].

The results of the OPC also show that retailers encounter specific challenges due to insufficient compensation for their role in providing space for WEEE collection in stationary retail. Providing such space for WEEE collection, storage, and handling processes demands approximately 6% of retail space, introducing an extra financial burden for retailers without corresponding fair compensation. An additional indirect cost raised through the OPC by treatment operators was the risk of fires from batteries contained in WEEE which ignite during shredding and cause high costs for treatment operators. Such indirect operational costs are not considered to be covered through EPR fees paid through PROs to treatment operators.

Information available on costs

Analysing costs within the context of the WEEE 2 Directive has been proven to be a challenging task due to the **limited availability of comprehensive data and quantitative ones, in particular.** In addition, in some cases, information is available only at high aggregation level, hindering the possibility to draw specific conclusions.

Three main challenges relating to lack of information available on costs can be stressed here:

1. **Lack of quantitative data for total compliance costs for Member States.** In some questionnaires specifically targeting Member States[266], the following specific question on costs has been asked: 'Which are the costs for public authorities associated with the development and operation of the national register for producers of EEE (including producers supplying EEE by means of distance communication)?'. The feedback from the Member States was a mixture of 'no answer', 'no data available', 'information unknown'. Only a few Member States provided feedback and even less estimates.

2. Obtaining **comprehensive data on EPR fees** paid by producers, as well as the **costs and revenues associated with collection and treatment**, has proven to be challenging due to confidentiality concerns expressed by PROs. It is difficult to get such information due to the highly competitive market for PROs in Europe, leading to a lack of transparency in disclosing their **economic data.** Indeed, PROs, in most cases, operate on a commercial basis, information about the level of fees is usually not publicly available and must be investigated through cumbersome direct inquiries. Some EPR fees are publicly available in eight Member States (see Table

[265] See Section 6.2 on efficiency of the evaluation study.
[266] See Annex 2 of the evaluation study on Member States targeted questionnaire and Open Public Consultation (OPC) questionnaire as well as Annex VII of this SWD on stakeholder consultation and synopsis report.

23 further below) but varies very much from one country to another and from EEE category to category.

3. As explained in Annex XI on comparative analysis, the WEEE Directive is **implemented in a different manner** in each Member State, e.g. when it comes to sub-categorisation of EEE (e.g. more than 50 sub-categories in Greece), EPR schemes (four different models, see Annex XI), status of national registries (public or private) etc. In addition, usually EPR scheme are usually set up not for the WEEE stream only. Due to these distributional effects, it is difficult to isolate costs for the WEEE waste stream, and aggregating, assessing and quantifying costs as well as extrapolating an EU average is not feasible or even suitable. This is particularly valid for indirect costs, such as employment/job losses. Eurostat or OECD data and guidance in that field do not isolate WEEE streams specifically when it comes to how much jobs have been created or lost in a given year. The variation among Member States, as mentioned above in point 1), is also a challenge.

These data gaps and inconsistencies were identified at a very early stage of the evaluation process and were addressed mainly through targeted workshops with the specific groups of stakeholders and through targeted interviews with stakeholders, in order to define a **qualitative approach**. More details on how the evaluation was conducted are available in Annex II of this report.

Total compliance costs for Member States

As mentioned in the section on 'Information available on costs', the answers provided by Member State to targeted questionnaire were limited. The data gathered[267] are the following:

- Estonia: annual cost of approximately EUR 26 000 for the national register;
- Finland: the data system costs for the national register amount to approximately EUR 50 000 to EUR 100 000 annually.
- Germany: the costs to run the national register in 2023 are EUR 10 million in total. For the WEEE tasks it is approximately EUR 8.5 million. Such a high amount is explained by the specificity of the national EPR system.

Case study: EPR and costs encountered by national authorities in Germany[268]

Germany has adopted a unique model to comply with the WEEE Directive, classified as 'model with producer funding' -Individual Producer Responsibility model- where there are no PROs. Stiftung Elektro-Altgeräte Register (stiftung ear) is the German national

[267] See Section 6.2.1.1 of the evaluation study.
[268] See email from 2 October 2024 from Stiftung ear.

register that is competent for WEEE and batteries and constitutes a particular EPR scheme in itself, with no money flow.

In this system, producers need to register with the national register, stiftung ear, for their B2C activities, and they are accountable for their EPR obligations in consideration of the weight of the products they make available on the market in Germany. The register then calculates the monthly market share according to the weight of the products made available on the market for each producer. The higher the market share, the higher are the take-back obligations (EPR obligations) for the producers. In fact, the market share determines the number of collection containers EEE producers are responsible for. As a result of this system, small producers barely bear obligations. Producers sign individual contracts with waste management operators that collect the containers and manage the WEEE (recycling, proper disposal). There is no EPR fee as such.

The German approach has removed any flow of money for the financial contribution of the producer, which reduces administrative burden for both producers and authorities in charge of the monitoring of EPR. To note that this well elaborated system was scrutinised and affirmed by the German antitrust authority and is monitored by a sophisticated algorithm to ensure that competition is fair.

Stiftung ear is also competent for the registration of b2b producers who have to organise possibilities for their customers to return their WEEE.

Stiftung ear has 38 employees. In 2023, Stiftung ear had in total 52 000 EEE producers with 172 000 registrations. The costs to run the national register in 2023 are EUR 10 million in total. For the WEEE tasks it is approximately EUR 8.5 million.

Total compliance costs for treatment operators

Table 21 on the typology of costs show that treatment operators bear some compliance costs, linked to auditing and certification. Cost for compliance linked to reporting obligations cannot be isolated for WEEE waste stream only. Total compliance costs for treatment operators can thus be summarised as in Table 22:

Table 22: total compliance costs for treatment operators

Direct compliance costs for treatment operators– Adjustment costs		
	Quantitative	**Comment**
Recurrent	**EUR 11 700 per year** for surveillance and certification, including batch testing. In addition: - **EUR 8 100 per year** average production loss during batch testing, - **EUR 2 100** costs for analytics per year (EU average)[269]	Average annual costs for treatment operators for auditing and certification (not mandatory according to WEEE 2)
One-off	**EUR 5 000** per waste stream (EU average)[270]	Costs for obtaining CENELEC certification (not mandatory according to WEEE 2)

Total compliance costs for producers/PROs

Most of compliance costs are borne by producers of EEE. Indeed, according to Articles 12 and 13 of the WEEE Directive and in line with the principles of 'extended producer responsibility' and of 'polluter pays', producers of EEE have to cover the costs for the collection, treatment, recovery and environmental sound disposal of WEEE from private households that has been deposited at collection facilities and for WEEE from users other than private households. In practice PROs, through producer's fees, may cover other costs such as awareness-raising campaigns or coordination centres.

To these costs for the collection, treatment, recovery and environmental sound disposal of WEEE, the administrative costs for development of statistics/reporting on WEEE quantities per year must be added.

Many geographic and economic factors affect these costs which vary across the EU to a great degree. This means that for the same product group or EEE category the fees paid by the producers vary across the Member States. In addition, proper treatment of WEEE adds costs to the process as for example specific steps like depollution or removal of CFCs are required to reduce environmental harm. These costs depend on the type of WEEE concerned (e.g. which material will be recycled) and the processes used.

[269] Average costs for surveillance and certification, including batch testing, over a two-year cycle was approximately EUR 23 400 for the reference year of 2019. Operational disruptions during batch testing resulted in an average production loss of three days and around EUR 8 100 across 16 operators. Analytical costs for certification averaged around EUR 4 200 per two-year cycle. (EuRIC (2019)).
[270] EuRIC (2019).

Case study: EPR and costs encountered by PRO in Czechia

The EPR system in Czechia can be considered more or less representative of the EPR schemes in the EU, given that there is competition among several PROs and that registration and reporting of producers is done through these PROs[271].

According to Elektrowinn[272] a PRO in Czechia, treatment costs have been estimated to EUR 3 million per year and collection costs to EUR 4.2 million per year and logistics to EUR 5.5 million per year. On that basis, extrapolations based on several factors[273] show that, on average, the costs for collection, treatment and logistics per PRO per year is around **EUR 1975**. If the administrative costs linked to the development of statistics/reporting on WEEE quantities per year are added to that (which represent EUR 474 per PRO per year on average in the EU), the total compliance costs for PRO per year would on average in the EU **EUR 2449.**

From Annex XI on comparative analysis the following main conclusions can be drawn:

- In the majority of Member States (19), **producers finance 100% of the costs for collection, transport to treatment** plants and treatment. Producers 'pay the total bill'.
- For all Member States the **costs for transport and treatment are fully covered** by producers.
- In eight Member States[274], there are differences in the way the **collection costs** are defined and covered, depending on the Member State and e.g. the use of a the '**compensation mechanism**' sometimes put in place between the municipalities or associations of municipalities and the PROs/producers. This contractual agreement, being negotiated, can include a variety of criteria (e.g. opening hours of collection points to security against thefts) and can be mandatory or not, depending on the Member State.

This variety can be reflected in the following examples:

- In **Ireland** the retailers and municipal collection points do incur some costs regarding their set up and management, which are not covered by producer fees.
- In **Italy** for domestic WEEE, the PROs pay the collection facilities (managed both by Local Authorities and by Retailers) a fixed 'efficiency price' based on an agreement among the producers, the National Association of Italian Municipalities (ANCI), the Association of Retailers and the Clearing House. This amount does not cover the entire collection-phase costs.

[271] See Annex XI on comparative analysis for more details.
[272] See Section 6.2.1.1. of the evaluation study.
[273] i.e. population, WEEE collected in KGs per inhabitant (2021 -Eurostat) and number of producers per Member State.
[274] IT, AT, IE, PT, DK, NL, SI, DE. See Annex XI on comparative analysis for more details.

- In **Germany and Denmark**, collection as such is financed by municipalities providing and maintaining the collection infrastructure for WEEE from households and producers cover the cost of the collection/ transport, treatment and recovery of these WEEE that has been deposited at municipal collection facilities.

It can be noted that, in most countries, the financing modelling between producers/PROs and public authorities has evolved from securing future collection to a more **'pay as you go'** approach, 'translating' directly costs of a specific waste stream collected, handed over to treatment operators. For the part of **collection done by retailers**, mandated by law, often the costs are passed on to PROs as a service, according to a market logic.
According to some stakeholders (PROs/producers), Member States are also passing on to producers **fines/penalties for not reaching the collection target**, as well as financing of **infrastructure** (e.g. in Romania).

EPR fees and producers' costs

Table 23 provides data on the range of fees applicable in the Member States for each category of EEE, which is based though only on data that is publicly available. Publicly available information was found for eight PROs in the EU but also the comparative analysis for all of them was not possible because **they all apply a different model for the classification of EEE into sub-categories developed under the six EEE categories set out in the WEEE Directive**. Almost all PROs use additional sub-categories to calculate the fees per product group as the six categories are very heterogeneous.

Table 23: Range of the EPR fees applicable in the Member States (based on publicly available information from PROs)

Category	Name of category/ subcategory	Fee (euro/tn, excluding VAT)
1	Temperature exchange equipment	from 15 to 600 euro/ tn
2	Screens, monitors, and equipment containing screens having a surface greater than 100 cm^2	from 56 to 350 euro/tn
3	Lamps	from 0.05 to 0.2 euro/ item of from 700 to 900 euro/tn
4	Large equipment	from 13 to 350 euro/tn specific products groups that can go up to 1 200 euro/tn
5	Small equipment	from 25 to 650 euro/tn
6	Small IT and telecommunication equipment	from 13 to 300 euro/tn

Source: Data publicly available from PROs in various Member States		
Eco Tic RO	Romania	https://www.ecotic.ro/en/timbrul-verde/
Ecotrel	Luxembourg	https://www.ecotrel.lu/volumes/files/E-Fee-2024-Ecotrel_2023-09-29-071335_suhs.pdf
EGIO	Lithuania	http://www.eei.lt/wp-content/uploads/2020/08/2020-m-EGIO-ir-GIA-s%C4%85lygos-1.pdf
Electrão	Portugal	https://www.electrao.pt/wp-content/uploads/2024/01/PF-EEE-Electrao-2024_Publicacao-site-1.pdf
Erion WEEE	Italy	https://erionweee.it/en/about-us/financing/
Recupel	Belgium	https://www.recupel.be/en/appliance-list/
Stichting OPEN	The Netherlands	https://my.stichting-open.org/productlist-external
UFH	Austria	https://ufh.at/leistungen/entsorgung-und-entpflichtung/tarife/

For example, category 4 of 'large equipment' includes a variety of products larger than 50 cm, from household appliances like washing machines to big medical devices and PV panels. This is the reason why Table 23 presents such a wide range.

Case study: the Netherlands[275]

If the example of a Dutch PRO is taken, for EEE falling within category 4 the fees start from 13 euro/tn for some ICT and office equipment, to 15 euro/tn for electric bicycles, to 110 euro/tn for washing machines/ dishwashers/ cookers/ microwaves/ vacuum cleaners, to 140 euro/tn for luminaires, to 240 euro/tn for medical equipment, to reach 350 euro/tn for audio and video equipment, while there are also some specific products groups like for example textile processing equipment for which the fee is 1 200 euro/tn.

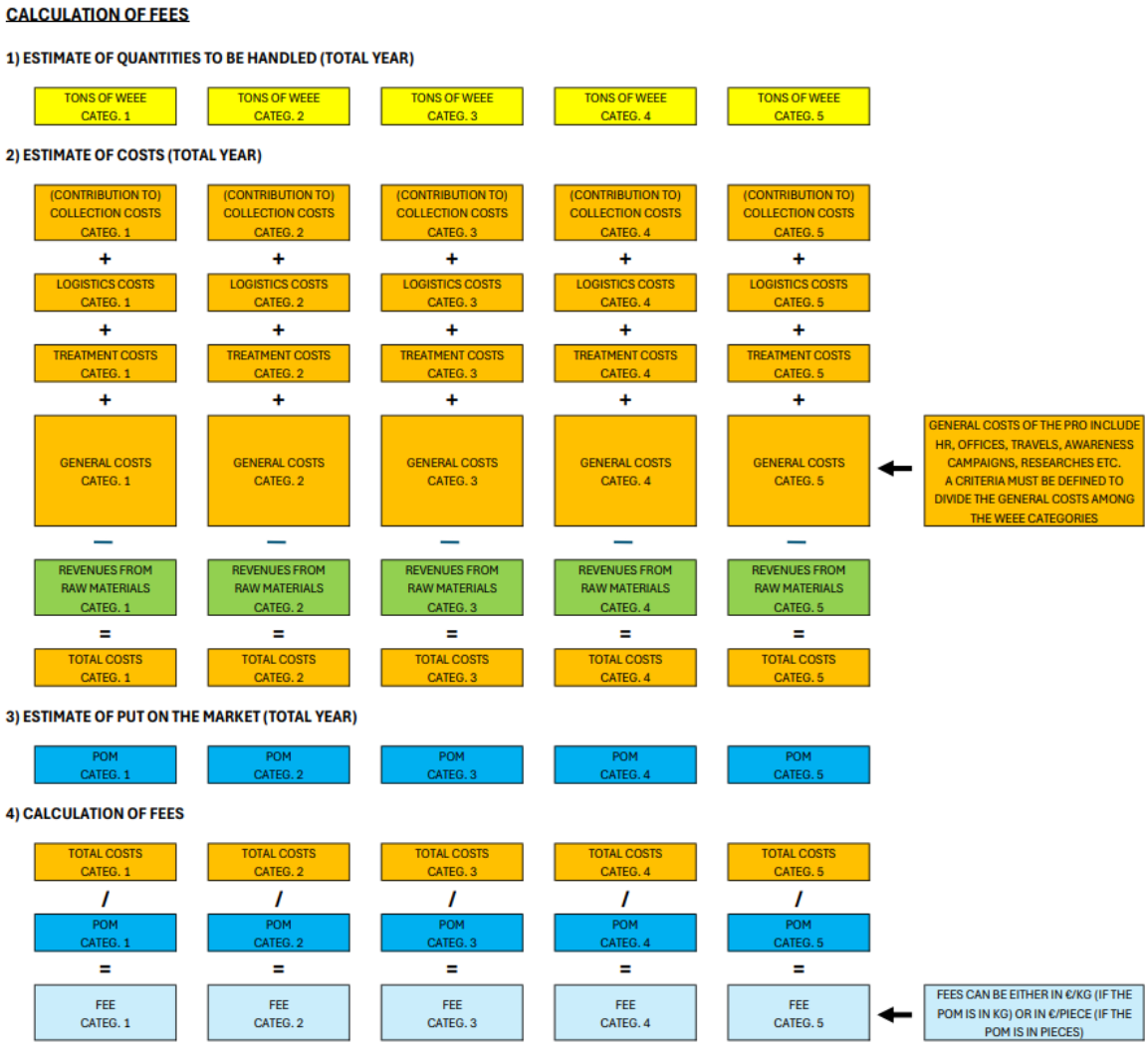
In addition, some PROs calculate the fees per piece of EEE and others per kg/ tonnes of EEE placed on the market.

Also, producer fees are subject to market dynamics like demand fluctuations and metal price changes, requiring periodic adjustments.

The diagram 24 presents in a simplified manner the methodology used in Italy to calculate the EPR fees:

[275] Source : https://my.stichting-open.org/productlist-external.

Table 24: schematic representation of the methodology used in a Member State to calculate the EPR fees276



To be noted that the general costs of a PRO (covered by EPR fee) do include costs beyond transports, collection and treatment costs. They also include overhead costs (e.g. HR, legal), research and innovation and communication costs (e.g. awareness campaign).

To conclude, there are thus multiple ways to handle EPR fees and producers' costs. It differs from Member State to Member State and from EEE category to category. Most of them are not publicly available. In that context, concluding whether and to what extent the compliance costs are fully covered by EPR fees (and/or other market-based instrument) would require some more intensive data collection and granular analysis, which is feasible in a dedicated exercise with the appropriate resources.

[276] Source: WEEE Forum. Information from IT PRO Erion made available through WEEE forum.

Distributional impacts and pass-through of the costs to consumer

Although no evidence could be found, it is likely that incurred costs are passed on to citizens/ consumers through product costs or taxes respectively.

No conclusion could be drawn on whether the costs related to increased separate collection are proportional to the volumes collected, since collection costs per tonne of WEEE collected strongly depend on the WEEE category, regional differences (e.g. population density) and the overall collection infrastructure in place. However, the utilisation of visible fee can be considered as helpful for establishing a level playing field among producers and inform citizens/consumers. Visible fee implies that the fees associated with waste management are transparent and readily apparent to all stakeholders in the industry. According to the Article 14(1) of the WEEE Directive, in the case that visible fee are required by the respective national transposition, producers have to make data about the treatment costs available in the way that it is described in the national law. The visible fee has an environmental purpose and serves to finance the activities carried out by the EPR scheme/ PRO for the sustainable management of WEEE, throughout the value chain.

As literature shows, implementation of visible fee is not harmonised throughout the EU: depending on the country and the category of EEE, the visible fee can be mandatory, voluntary or not used at all.

For example, Table 25 shows how relevant part of the EPR fee, can be passed through VF on 1) from PRO to producers (mandatory), 2) from producers to retailer (very often) and finally 3) from retailer to consumer (never used)[277].

Table 25: schematic representation of the transfer of fees used in Italy

TRANSFER OF FEES

INVOICE FROM	**PRO**	TO	**PRODUCER**	**MANDATORY VISIBLE FEE**
INVOICE FROM	**PRODUCER**	TO	**RETAILER**	**OPTIONAL VISIBLE FEE (VERY OFTEN USED)**
INVOICE FROM	**RETAILER**	TO	**CONSUMER**	**OPTIONAL VISIBLE FEE (NEVER USED)**

In any case, when producer applies a visible fee on the sale price of each EEE, the presence and the amount of the contribution are explicitly indicated in the producer's invoices to its customers (retailers), who in turn can highlight such contribution to the final consumer.

Case study: Romania[278]

In Romania, the visible fee 'timbro verde' (or green stamp) has been put in place since 2007 by the PRO Ecotic. It informs the consumer on the fee intended to cover the costs of

[277] Source:WEEE Forum. Information from IT PRO Erion made available through WEEE forum.
[278] Source: https://www.ecotic.ro/en/timbrul-verde/.

collection, reuse, recycling, valorisation and non-polluting disposal of WEEE and the costs of consumer awareness, activities that must be financed by EEE producers. It also contributes to infrastructure building since the EPR system in Romania is based on competition among 19 PROs with limited public financing.

Case study: Belgium[279]

In Belgium, since 1 July 2008, in accordance with legislation, the Recupel (Belgian PRO) contribution (EPR fee) must always be clearly stated. This means that consumers are always able to see the amount of the Recupel contribution each time they buy a product. On invoices: importers/manufacturers continue to charge the contribution separately to distribution, and they always state this on a separate line on the invoice. The distributor then charges the net contribution to the consumer and clearly inform them about the amount of the contribution that they are paying.

2. Overview of benefits

Benefits of the WEEE 2 Directive are linked to its **general objectives** of protecting human health and the environment by preventing or reducing the adverse impacts of the generation and management of WEEE, to contribute to sustainable production and consumption through reuse, recycling and other forms of recovery of electronic waste, and to improve the efficient use of resources and the retrieval of valuable secondary raw materials from WEEE.

Direct and indirect benefits, by type of stakeholders and quantified ones, where possible are shown in Table 26 below.

[279] Source: https://www.recupel.be/en/appliance-list/.

Table 26: Overview of benefits identified in the evaluation

Direct benefits								
	Citizens/Consumers		Treatment operators		Administrations		Producers/ PROs	
	Quantitative	Comment	Quantitative	Comment	Quantitative	Comment	Quantitative	Comment
Direct benefits (such as improved well-being: changes in pollution levels, safety, health, employment; market efficiency)	n.A.	Increase in convenience from improved collection infrastructure for WEEE	2.03 million tonnes increase in collected WEEE (2012-2021)[280]	Increased availability of WEEE for treatment due to increase of collection rates in the EU-27 from 2012 to 2020 (10% relative collection rate increase)				
Indirect benefits								
	Citizens/Consumers		Treatment operators		Administrations		Producers/ PROs	
	Quantitative	Comment	Quantitative	Comment	Quantitative	Comment	Quantitative	Comment
Indirect benefits (such as wider economic benefits, macroeconomic benefits, social impacts, environmental impacts)	n.A.	Climate change benefits associated with CO_2-eq emissions savings from recycling and changes in pollution levels by avoiding emissions of hazardous substances and reducing exposure of workers to such. Improved resource efficiency has economic, environmental and social benefits for citizens.	0.84 million tonnes increase in WEEE recycled and prepared for reuse (2012-2018)[281]	Increased employment from waste collection, and from preparation for reuse, and recycling activities compared to energy recovery or landfilling	n.A.	n.A.	n.A.	Increased resource efficiency through reuse, recycling, and other forms of recovery.

The direct benefits identified are, for citizens/consumers, increase in convenience from improved collection infrastructure for WEEE and reuse of WEEE, for treatment operators, increased availability of WEEE for treatment, due to increase in WEEE collected by 2.03 million tonnes between 2012 and 2021, and 0.84 million tonnes increase in WEEE recycled and prepared for reuse (2012-2018). The indirect benefits identified are, for citizens/consumers, changes in pollution levels by avoiding emissions to air, water and soil, including of hazardous substances, due to avoided waste disposal or incineration, and reducing exposure of workers to such emissions, and, for treatment operators, increased employment from waste collection, and from preparation for reuse, and recycling activities compared to energy recovery or landfilling. For example, 60-140 jobs can be generated per 1 000 tones collected WEEE within preparing for reuse sector[282].

Moreover, the Directive has **raised awareness** regarding WEEE. It created a legal framework and fostered cooperation of relevant actors (there are many of them, with different interest). However, the objective of the evaluation study to evaluate the effectiveness and efficiency of PV panels' inclusion under the scope of the WEEE 2 Directive, namely that by the inclusion of PV panel into the scope of the WEEE Directive there would be opportunities for the recovery of secondary raw materials for the green transition could not be complied with, as there is no separate WEEE category for PV panels (they are subsumed under large household equipment).

Increasing proper WEEE collection and treatment is crucial for the environment and human health because it reduces the risk of releasing hazardous substances to soil, water and air, such as ozone-depleting gases, mercury, cadmium, lead and others. WEEE not properly treated can cause damage to the environment and human health. The reduction of negative impacts on the environment and on human health during treatment of WEEE is specifically linked to:

- Avoiding emissions of hazardous substances and cross-contamination of recycled materials;
- Reducing exposure of workers to hazardous substances;
- Avoiding risk of injury, fire, explosions, electrocution etc.;
- Avoiding resource depletion and reducing overall environmental impacts of the production sector through increased recycling and preparing for reuse; and
- Saving of CO_2-eq emissions from recycling of materials and reducing climate change impacts.

[280] Data on WEEE collected [kg/cap] in the EU-27. 2012: 2 970 566 tonnes; 2021: 5 002 865 tonnes. (Eurostat database ENV_WASELEEOS).
[281] Data on WEEE recycled and prepared for reuse [kg/cap] in the EU-27. 2012: 2 970 566 tonnes; 2021: 4 057 281 tonnes. (Eurostat database ENV_WASELEEOS).
[282] RREUSE (2021) Job creation in the re-use sector: data insights from social enterprises.

In addition, WEEE collection is the first step and ultimately, enables proper treatment, preparing for reuse and contributes to the recovery of more valuable and critical raw materials, reducing thus the primary material demand. Therefore, collection and proper treatment of WEEE are key in the protection of the environment and human health Sub-standard WEEE collection and treatment practices (e.g. WEEE collected as municipal waste, scavenging or illegally exported) have negative effects to the environment and the health of people involved in the relevant activities. By nature, they are not easy to be documented. The CWIT project[283] determines a rough order of magnitude of economic impacts due to loss in the entire WEEE chain. It dates back from 2012 but is the only available evidence on the matter. According to this project, in total, the intrinsic value of materials not available for compliant processing in Europe in 2012 is between EUR 800 million and EUR 1 700 million, which include:

- between EUR 200 million and EUR 500 million scavenging
- between EUR 300 million and EUR 600 million due to bad disposal behaviour consumers.

The measures of the WEEE 2 Directive were not sufficiently effective in reducing the volumes of WEEE leaving the EU in an uncontrolled manner and in consequence the manifold negative impacts on environment and human health during treatment/disposal of WEEE outside the EU in - mostly developing - countries persist. Quantitative effects on reduction of illegal WEEE exports are considered low, which is mostly caused by limited resources for inspection of cross boarder movements of the Member States.

The benefits of the Directive on the environment and on human health correspond to the material, energy and emission **savings by secondary resources** resulting from material recycling and preparation for reuse of WEEE and hence avoiding consumption of (primary) resources.

The effects of **WEEE recycling** on the reduction of environmental and health impacts caused by consumption of primary resources were described in the impact assessment accompanying the Commission proposal for the recast of the WEEE 1 Directive (European Commission, 2008a). Moreover, a study[284] conducted found, that as volumes of WEEE materials being recovered are assumed to save primary resources, the WEEE 2 Directive can contribute to environmental benefits such as:

- Energy savings (74%),
- Prevention of water and air pollution (86%) compared to primary steel production,
- Considering precious metals, the contribution to reduction of greenhouse gas emissions and to the extraction of primary resources as well as reducing the environmental impacts during primary extraction and production.

[283] Countering WEEE Illegal Trade (CWIT) Summary Report, WEEE Forum (2015).
[284] Study on WEEE recovery targets, preparation for re-use targets and on the method for calculation of the recovery targets, Seyring et al. (2015).

- Concerning plastics, a theoretical energy and pollution saving of up to 80% was reported compared to primary production[285].

By recycling the maximum amount of materials included in WEEE 20.4 Mt of CO_2 emissions could possibly be prevented, which would occur during primary extraction. Additionally, when secondary raw materials are used possible adverse working conditions during mining processes are avoided[286].

Considering **preparation for reuse and reuse**, it was highlighted within the impact assessment accompanying the Commission proposal for the recast of WEEE 1 Directive, that even though reuse has substantial social benefits, it does not greatly reduce the environmental impacts in terms of material and energy consumption.

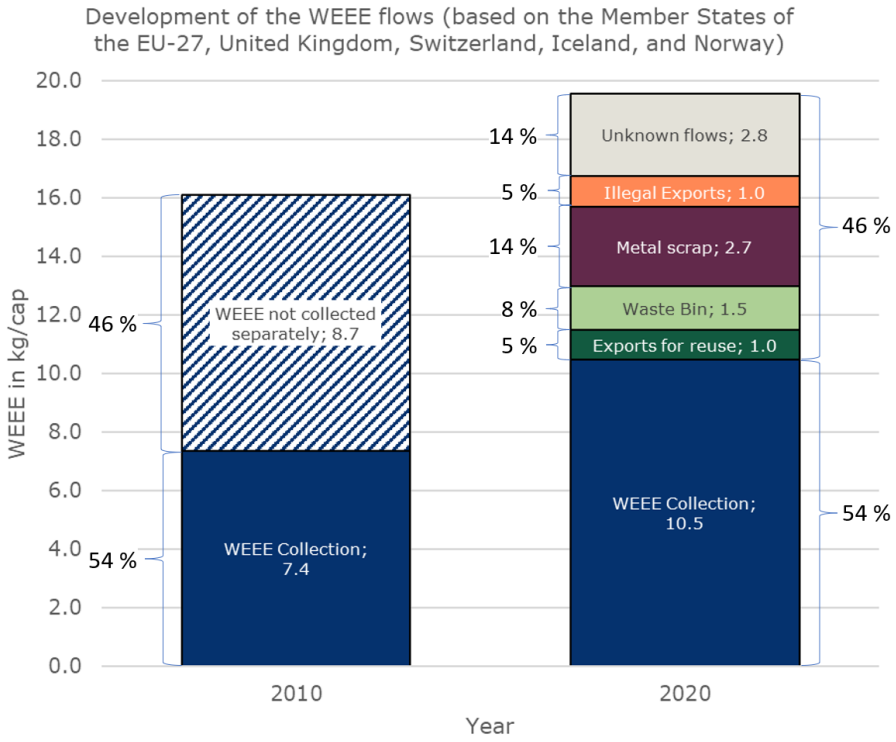
Although the overall recycling rate of WEEE remained stable from 2012 to 2020 and comprehensive data on recovery rates of specific materials is not available, the WEEE 2 Directive contributed to some extend to a reduction of negative impacts on the environment and on human health linked to consumption of primary resources.

The impacts of the Directive on the environment and on human health linked to consumption of (primary) resources and climate change correspond to the savings by secondary resources resulting from material recycling and preparation for reuse of WEEE. Thus, the increased amount of WEEE recycling has led to a reduction of environmental and health impacts caused by consumption of primary resources. Nevertheless, this is not considered sufficient to address the environmental and human health concerns linked to the management of WEEE. An analysis of WEEE flows and climate change benefits by less consumption of primary resources is considered necessary.

The development of WEEE flows is presented in Figure 47.

[285] European Commission. (2023a). Commission Staff Working Document - Impact Assessment Report Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on circularity requirements for vehicle design and on management of end-of-life vehicles, amending Regulations (EU) 2018/858 and 2019/1020 and repealing Directives 2000/53/EC and 2005/64/EC.
[286] Study on WEEE recovery targets, preparation for re-use targets and on the method for calculation of the recovery targets, Seyring et al. (2015).

Figure 47: Development of WEEE flows between 2010 and 2020 according to Baldé, Iattoni et al. (2022)



WEEE flows, which are not separately collected represent 46% of WEEE generated. According to estimations in 2018[287]:

- 1.4 ± 0.5 kg/cap of WEEE end up in waste bins,
- 2.1 ± 1.3 kg/cap of WEEE are disposed of as metal scrap,
- 0.5 kg/cap are exported as used EEE,
- 0.5-1.4 kg/cap are illegal WEEE exports from the EU.

Figure 47 above presents a comparison of estimated WEEE flows between 2010 and 2020. For the reference year 2010, there is a lack of distinct information on the final destination of WEEE that is not separately collected.

Analysing the benefits within the context of the WEEE 2 Directive has been proven to be a challenging task due to the limited availability of comprehensive data and quantitative ones, in particular. There are even limited data available on key WEEE-specific quantification of benefits such as climate change benefits.

[287] In-depth review of the WEEE Collection Rates and Targets: in the EU-28, Norway, Switzerland, and Iceland. United Nations University (UNU); United Nations Institute for Training and Research - (UNITAR), Baldé et al. (2020). URL: https://www.scycle.info/wp-content/uploads/2020/11/In-depth-review_WEEE-Collection-Targets-and-Rates_UNITAR_2020_Final.pdf

WEEE contains many different materials, which may be clustered in the following way[288]:

- Approximately 40% metals: Fe-metals, aluminium, copper;
- Approximately 0.01% precious metals: platinum, palladium, gold, silver;
- Approximately 25% plastics: wide variety of different plastic fractions; and
- Approximately 30% other: glass, concrete, wood, 'contaminants' (capacitors, batteries, …).

Based on literature materials contained in WEEE are treated and recycled as follows:

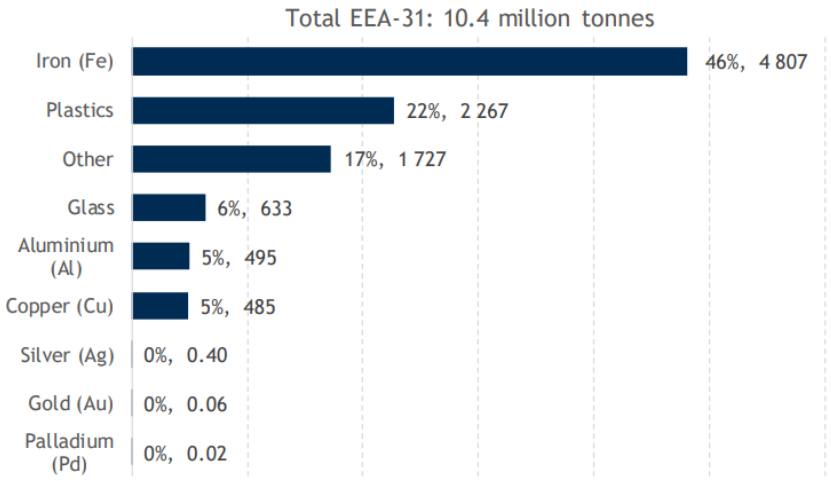
- For **metals** high recycling rates up to **95%** are achieved.
- For **precious metals**, the recycling rate is very much dependent on the choice in pre-treatment of WEEE. A mechanical treatment without disassembly will lead to poor recycling efficiencies, while an in-depth disassembly can lead to recycling efficiencies as high as ~95%[289].
- 44% of **plastics** in WEEE are sent to material recovery and 45% to direct energy recovery. The rest is landfilled. These recycling values appear however relatively high. According to Lindner et al. (2020) only ~24% of collected WEEE plastics in Germany are recycled. Typically, **only 50-60% of the input to a recycling facility for WEEE plastics are effectively recycled**. The rest is sent to incineration[290].

As another example, for flat panel displays, the recycling rate would drop from 84% to 41%, if the **recycling rate is based on the output of the recycling plant instead of the input**[291].

Figure 49[292] shows the main material fractions that make up WEEE.

[288] Study on WEEE recovery targets, preparation for re-use targets and on the method for calculation of the recovery targets, Seyring et al. (2015).
[289] Life Cycle Assessments for the Electric Vehicle Recycling 2020 Project - Key Component Power Electronics: Final report (unpublished), Bulach et al. (2017).
[290] Haarman et al., (2020).
[291] Influence of scope definition in recycling rate calculation for European e-waste extended producer responsibility, Arduin et al. (2019).
[292] EEA report: Emerging Challenges of Waste Management in Europe, Limits of Recycling (2020).

Figure 49: WEEE generated in 2017 in EEA-31 (in% and in kt)

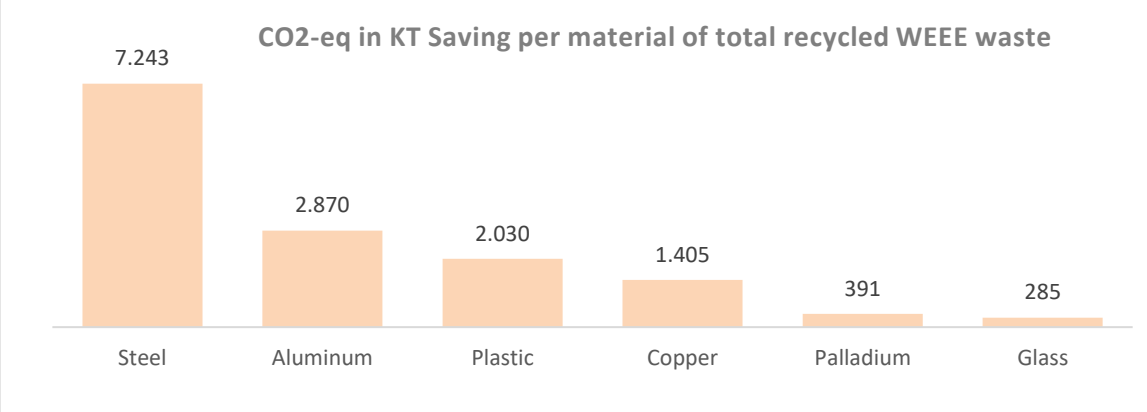


Based on data provided by the JRC and Figure 49 and in the absence of other data available for a quantitative analysis, rough estimations have been performed to calculate the CO_2-eq savings of separate collection and recycling on climate change for steel, copper, aluminium, palladium, plastics and glass. These materials are considered representative for materials recycled from electronic waste.

The CO_2-eq savings for plastic, glass, copper, steel, palladium and aluminium are based on JRC data[293] and are the following (in kg CO_2-eq per tonne treated WEEE): 1 090 for plastic, 562 for glass, 3 320 for copper, 1 860 for steel, 19 563 000 for palladium and 6 780 for aluminium.

The results of the calculations are shown in Figure 50 below.

Figure 50: Climate change impacts of recycled WEEE material streams



[293] Sphera Managed LCA Content, © 2023; https://sphera.com/life-cycle-assessment-lca-database/.

It is worth noticing that although the share of palladium that is recycled accounts only for 0.02 million tonnes, the savings in kg CO_2-eq per kg treated is extremely high.

Benefits of the European standards for the treatment of WEEE on health and environment

In the absence of quantifiable data on WEEE benefits, the estimations in Figure 50 can be complemented by benefits on the environment and human health resulting from the implementation of the WEEE standards, described in Annex IX. These European standards contains requirements applicable to the treatment of all types WEEE. They can be used as a proxy indicator to draw conclusions on benefits, as described below.

- **Depollution of WEEE**

WEEE standards provide details on how to collect, transport, sort and treat waste of electrical and electronic equipment. These standards contain detailed requirements on how to depollute WEEE, making sure that workers and the environment are not exposed to toxic chemicals, as well as facilitate recycling and preparation for reuse.

They seek to ensure that hazardous substances, such as heavy metals, are treated appropriately in order to prevent damage to the environment or health. The standards specify procedures on how to treat such waste and ensure that depollution takes place in the least harmful way. Standards allow operators to improve the traceability of fractions resulting from the treatment of WEEE, including hazardous substances. They also provide clear tools to monitor depollution performance, so operators can control and improve the depollution process to meet legal requirements. They improve due diligence amongst the operators in the value chain. In sum, adherence to standards leads to better compliance.

Improvements at treatment facilities

WEEE standards contain provisions to avoid emissions into water, air and soil[294]. For example, a high share of facilities for the treatment of temperature exchange equipment (51%), lamps (53%) and screens (38%) had so far implemented these standards. In practice this in particular led to reduced emissions of VFC/VHC from temperature exchange equipment and of heavy metals including mercury, to more careful handling of devices and in consequence to lower damage rates, reduced exposure of workers to dust and mercury from lamp and screen treatment and to higher removal rates of plastics containing brominated flame retardants. In general, although no comprehensive quantitative data exists, improvements in material recycling and in removal rates of various hazardous substances are likely as the EN 50625 series requires more detailed monitoring than the WEEE 2 Directive as such. In particular the following elements of the European standards

[294] According to EN 50625-2-3 WEEE in the scope of the standard shall be handled, stored and treated with due care in order to avoid release of hazardous substances into air, water, or soil, as a result of damage and/or leakage at any time.

for the treatment of WEEE[295] were found to result in actual improvements at treatment facilities[296]:

- Requirements related to depollution and its monitoring;
- Requirements related to removal of plastics containing brominated flame retardants;
- Requirements related to decontamination of storage containers;
- Requirements related to monitoring of emissions;
- Requirements related to monitoring of ambient air at workplaces;
- Requirements related to determination of recycling and recovery rates;
- Requirements related to prevention of damage prior to treatment (collection and handling) in particular of screens, temperature exchange equipment (TEE) and small equipment; and
- Requirements related to weatherproof covering at storage for screens, TEE and small equipment.

At the same time, it is important to note, that there is a need to regularly update any further treatment requirements in WEEE standards, given ongoing changes in WEEE composition and development in treatment technologies. In the future these standards could be supported by other standards covering particular treatment requirements for (gas discharge) lamps, flat panel displays, cathode ray tubes (CRTs), photovoltaic panels and other equipment containing volatile fluorocarbons or volatile hydrocarbons and other deliverables on collection and logistics, also reuse.

In addition, environmental sound handling and treatment of WEEE and using best available techniques (BAT) is also driven by the Industrial Emissions Directive[297] (IED); for facilities with treatment capacities exceeding the thresholds as defined in Annex I of this Directive.

- **Recovery of CRMs**

Some of the WEEE standards[298] also contribute to the recovery of CRMs One factor contributing to the losses during collection and pre-treatment as well as in later recovery

[295] EN 50625 series.
[296] Study on quality standards for the treatment of waste electrical and electronic equipment (WEEE), Tesar et al.: Final report.
[297] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (OJ L 334, 17.12.2010, p. 17–119).
[298] The standard TS 50625-5 Specification for the final treatment of WEEE fractions - Copper and Precious Metals - encompasses normative requirements for the final processing and refining of copper, silver, gold and palladium from WEEE fractions.

stages might be a lack of technical requirements enabling sound collection and treatment of WEEE containing key CRMs Only six standards from the 60 analysed by Manoochehri et al. addressed EEE, batteries and ELVs containing CRMs and included specific requirements relating to CRMs[299].

- **Compliance with CEWASTE**

WEEE standards were considered for being the most state-of-the-art WEEE recycling standards because the pilot audits[300] showed that those companies that were complying with these EN standards were also compliant with all management, sustainability and traceability requirements developed in the CEWASTE scheme[301] which focuses on types of waste containing significant amounts of valuable and critical raw materials.

Other benefits

The environmental impacts of mandatory standards for the treatment of WEEE are not only linked to avoiding emissions of hazardous substances and cross-contamination of recycled materials but also to avoiding resource depletion through increased recycling and preparing for reuse. The health impacts of mandatory standards for the treatment of WEEE are specifically linked to avoiding risk of injury due to damaged appliances and to reducing exposure of workers to hazardous substances during handling of WEEE. Standards could also contribute to additional job opportunities. This includes jobs resulting from increased demands for preparing for reuse, manual depollution activities and sorting of WEEE materials, e.g. WEEE plastics.

The development of the WEEE standards through the establishment of the respective certification schemes and the practical implementation by operators was and is a significant opportunity of information exchange within the WEEE management sector. Representatives of producers, treatment operators, technical experts, auditors, scientists and Member State representatives are involved.

In conclusion, the WEEE 2 Directive, by means of the developed European standards for the treatment of WEEE, was effective in reducing negative impacts both on the environment and on human health to a certain extent. However, making such detailed

[299] A contribution to future Critical Raw Materials Recycling: CEWASTE PROJECT FINAL REPORT, Manoochehri S. et al. (2021).

[300] In the framework of the CEWASTE project 20 pilot audits were conducted to test the CEWASTE normative requirements and related assurance system and verification procedures. In addition, the pilot audits also assessed the readiness level of the audited operators against the management and technical requirements for recycling of CRMs The feedback from the audits was used to update and revise the CEWASTE certification scheme.

[301] The voluntary CEWASTE scheme was developed as part of the European Union's Horizon 2020 funded research and innovation programme within the CEWASTE project. The scheme for collection, transport and treatment facilities of key types of waste containing significant amounts of valuable and critical raw materials such as waste electrical and electronic equipment (WEEE) and batteries was validated and launched within the project. URL: https://cewaste.wpenginepowered.com/wp-content/uploads/2021/04/CEWASTE-Final-Public-Raport.pdf (last accessed: 27.11.2023).

requirements mandatory at EU-level would enhance these positive effects significantly, as still only about 23% of the European WEEE treatment facilities do work according to the standards.

Contribution of the WEEE Directive in the achievement of Sustainable Development Goals

The WEEE Directive represents a crucial political effort towards sustainability, and it commonly operates in direct synergy with some Sustainable Development Goals (SDGs) established by the United Nations in 2015. Compliance with EN WEEE treatment standards can be used as a proxy for the protection of the environment and human health. Similarly, some SDGs and their targets, which represent the commitment of signatory countries to implement national actions and international cooperation to enable sustainable development, provide a proxy for WEEE benefits to the environment and human health.

With the adoption of the 2030 Agenda for Sustainable Development, the issue of WEEE management has become part of the broader quest for sustainability, including through sustainable production and consumption and shaping a future that works for all at all stages in the circular economy.

Figure 51: E-waste and its relation to the UN Sustainable Development Goals (Baldé et al.: The Global E-waste Monitor 2017)

The WEEE Directive contributes to the achievement of several goals of the 2030 Agenda for Sustainable Development. It helps address the SDGs related to environmental protection and health. It also addresses employment and economic growth, since the sound management of WEEE can create new areas of employment and drive entrepreneurship. According to the E-waste Monitor 2017[302], E-waste is linked to Goal 3 (Good health and Well-being), Goal 6 (Clean water and Sanitation), Goal 11 (Sustainable Cities and Communities), Goal 12 (Responsible Consumption and Production), Goal 14 (Life Below Water), and Goal 8 (Decent Work and Economic Growth). WEEE, when treated inadequately (e.g. scavenging, discarding unsafely, without complying with any rules or regulations or illegal export to countries where proper recycling facilities are not available), poses serious health issues since it contains hazardous components, including contaminating air, water, and soil, and putting people's health at risk. Dismantling processes that do not utilise adequate means, facilities, and trained people pose additional threats to people and the planet.

The WEEE Directive contributes to the achievement of several SDGs, notably SDG 12 and particularly SDG 12.4 target ('sound management of all wastes throughout their lifecycle') and SDG 12.5 target ('reduce waste generation through prevention, reduction, repair, recycling, and reuse') that has as indicator the national recycling rate and tonnes of material recycled (indicator 12.5.1), where WEEE contributes as well. In addition, given the high raw material demand for the production of EEE, the WEEE Directive also closely relates to the SDG indicators on the material footprint (SDGs 8.4.1 and 12.1.1) and the SDGs on the domestic material consumption (SDGs 8.4.2 and 12.2.2).

In addition to the above the WEEE Directive contributes indirectly to SDGs. WEEE preparation for reuse and dismantling could offer job and income opportunities and less poverty (SDG1); more efficient technologies especially in waste treatment supports good health and reduces casualties (SDG3); upgrading treatment and the banning of highly polluting treatment practices reduce the stress on water systems in developing countries (SDG6); new energy technologies, in particular small scale solar power and energy storage, supports the development of rural areas (SDG7); the creation of jobs and more responsible types of work foster economic growth (SDG8); the recycling industry can be expanded and become more innovative and can provide materials and components for economic growth (SDG9); WEEE collection and preparation for reuse reduces municipal solid waste amounts, environmentally sound management of WEEE mitigates the toxic effects of hazardous waste, and proper treatment reduces air pollution for sustainable cities and communities (SDG11); and finally, reclaiming materials and components replaces mining of primary resources and the control over CFCs from refrigerators, in particular, both reduce CO_2 impact substantially (SDG13).

[302] The Global E-waste Monitor 2017, Baldé et al. (2017), URL : https://collections.unu.edu/eserv/UNU:6341/Global-E-waste_Monitor_2017__electronic_single_pages_.pdf.

ANNEX XIII. SIMPLIFICATION AND BURDEN REDUCTION

1. Background

One of the core objectives of the Commission's WEEE2 Directive proposal was the reduction of unnecessary administrative burdens by clarifying that producer responsibilities are based on a European approach. In line with this, it had proposed **one single registration for all EU obligations**, with interoperability and data transfer between Member State producer registers.

This was not retained by the co-legislators and the associated simplification benefits could therefore not be achieved.

In line with the objective to reduce unnecessary administrative burdens especially for **SMEs** the WEEE 2 Directive provides for distributors with a selling area below 400 square metres to be exempted from requirements to take-back very small WEEE, though distributors with a larger selling area will have such an obligation (Article 5(2).c).

In its first opinion (Ref. IX.1a) on WEEE from 2016, the REFIT Platform recommends that the Commission 'take action in order to implement a common **harmonised reporting and registration system**', that takes enforcement and manageability into account without adding unnecessary burden on the Member States. A study has been finalised on behalf of the Commission in January 2016 on the format for the registration and reporting and the frequency of reporting.

On the basis of the Platform opinion and other evidence gathered, the Commission was planning further simplification and development of reporting and registration arrangements, including a common frequency of reporting by mid- 2018. Supported by the preparatory study, the Commission had relevant consultations with stakeholders, national registers and Member States. **Agreement was however not reached**, given that Member States have different needs in relation to the frequency of reporting, linked to specificities of the national systems which are said to have proven successful, on one hand, and to avoid unnecessary administrative burden by increasing the frequency of reporting as compared to current practice, on the other hand.

The REFIT Platform Government group had acknowledged that the **harmonisation of formats for registering and reporting procedure and the agreement on a common frequency for reporting is very sensitive area of administration** and expressed relevant considerations. It was noted that registers have been introduced in Member States since 2005 and harmonising the existing practices may be challenging.

In its second opinion (Ref. IX.13.b-e) from 2019, the REFIT Platform invited the European Commission to 1) consider the harmonisation of registration and reporting of battery and electrical and electronic equipment producers within the scope of the ongoing evaluation of the Batteries Directive; 2) develop an information exchange system among national

registers, which would ensure that if a company has registered a product in a Member State, it can circulate freely in the internal market without further administrative burden; 3) note and take into account the work that the OECD is currently conducting on extended producer responsibility (EPR) and the impact of online sales.

2. What has been achieved so far?

a. Registration and reporting of an economic operator in/to a Member State

The WEEE2 Directive, as amended by Directive (EU) 2018/849, empowered the Commission to adopt implementing acts establishing the format for reporting. This ensures that the information reported by Member States provides for a sufficient basis for verifying and monitoring the attainment of the targets set out in Article 7(1) and in Article 11(1) and Annex V of Directive 2012/19/EU.

In that context, the Implementing Regulation (EU) 2019/290 established the following:

1) Format for registration of a producer (Annex I part A) and format for registration of an authorised representative (Annex I part B);
2) Format for reporting to the register of a Member State on EEE placed on its market (annex II).

This has **been reducing administrative burdens for producers who sell EEE in different Member States** that are able to use the same format for registration and reporting for all Member States. This concerns also **SMEs**.

According to the administrative burden calculator:

- **Harmonisation of format for registration** represents 3 863 100-euro costs savings per year, for producers including SMEs,
- **Harmonisation of format for reporting** represents 7 335 000-euro costs savings per year, for producers including SMEs.

b. Member States' implementation report

Directive (EU) 2018/849 also removed the **burdensome obligation for Member States to submit to the Commission a report on the implementation of the WEEE2 Directive every three years**, by deleting the following Article 16(5):

'Member States shall, at three-year intervals, send a report to the Commission on the implementation of this Directive and on the information set out in paragraph 4. The implementation report shall be drawn up on the basis of a questionnaire laid down in Commission Decisions 2004/249/EC and 2005/369/EC.

The report shall be made available to the Commission within nine months of the end of the three-year period covered by it. The first report shall cover the period from 14 February

2014 to 31 December 2015.

The Commission shall publish a report on the implementation of this Directive within nine months after receiving the reports from the Member States.'

According to the administrative burden calculator, repealing the obligation for Member States to submit every three years represent 17 208-euro costs savings per year.

c. Total removed administrative costs

Action	Target group	Cost savings in EUR per year
Harmonisation of format for **registration**	Producers including SMEs	3 863 100
Harmonisation of format for **reporting**	Producers including SMEs	7 335 000
Removal of three-year **implementation report**	Member States	17 208
Total		**11 215 308**

In the EU, the total removed administrative costs achieved through simplification is around **EUR 11.2 million per year.**

3. Is there any potential for further simplification and burden reduction?

According to feedback from a Member State and from SMEs[303]there could be **further opportunities** for simplification and reduction of administrative burdens in the following areas:

- **Registration and reporting for SMEs**: compliance with the WEEE 2 Directive's requirements, especially for smaller producers and businesses, can pose a **barrier to market** entry due to the administrative burdens and costs related to the obligation for registration and reporting and, where relevant, for appointing an authorised representative in every Member State, where SMEs place EEE on the market. This might disproportionately affect small and innovative companies, potentially hindering competition and innovation in the market. It may impact competition among producers based on their ability to comply with EPR responsibilities and manage the associated costs. Defining criteria for a 'small company' exemption and setting thresholds for 'de minimis' turnover/amounts to be excluded from EPR requirements could such alleviate administrative burden for all stakeholders and public authorities.

[303] received feedback from targeted workshop with Finland (2023) and feedback received by SMEs through the Europe Direct Contact Centre and the 'Fit for Future' Platform eliciting stakeholder views on simplification.

- **Registration and reporting in general**: Implementing Regulation (EU) 2019/290 has significantly harmonised the format for registration and reporting, reducing the administrative burden. However, some practical challenges remain.
  The analysis of the various systems of registration and of reporting to national registers show some differences in terms of:
    - Who submits the Registration application (producer and/or PRO),
    - How registration is submitted (online or through other mean),
    - Validity period of registration (one year or indefinite),
    - Whether a registration fee is established or not,
    - Who needs to submit the report to the national register (PRO or producer),
    - How report is submitted to the national register (online or through other mean),
    - Frequency of reporting.

Further simplification could lie in fully harmonising registration and reporting from producers and PROs to Member States, ensuring transparency in registration databases and fostering coordination between national registers.