



POLICY BRIEF

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Urban mines, consumer behaviour and producer responsibility in a circular economy

Summary

- *Sustainable raw materials management, urban mining and WEEE recycling within a circular economy*
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- *Conclusion*

1. Sustainable raw materials management, urban mining and WEEE recycling within a circular economy

Today in the EU, the supply of raw materials, the lifeblood of today's high-tech industry, is increasingly under pressure. The EU could benefit economically and environmentally from making better use of these resources. However, the linear model based on the assumption that resources are abundant, available, easy to source and cheap to dispose of may no longer be optimal. It is therefore becoming increasingly important to shift from this type of economy towards a more circular one: Such an economy would extend the value of products for as long as possible and reintegrate resources back into productive use, cut waste and reduce dependence on raw materials. The European Commission has recently acknowledged the importance of moving towards a more circular economy in its Communication [Towards a circular economy: A zero waste programme for Europe](#).

As waste continues to grow, so does the amount of resources trapped within wasted products, some of them rich in minerals, metals and other valuable materials. Many resource-rich products are consumed and disposed of in urban regions, transforming cities into resource "mines" which could be sourced for secondary resources to be



Recovering raw materials from urban mines to create new products

reintegrated back into the supply chain. With this in mind, a variety of formal and informal actors have begun to reclaim value from these urban mines. The process of reclaiming resources from products, buildings and waste is known as urban mining.

Waste Electrical and Electronic Equipment (WEEE) is one of the most critical resource-rich waste streams, and also one of the fastest-growing ones in the EU, with a growth rate of 3-5% a year.¹ Globally, the estimates from United Nations University (UNU) indicate EEE sales to be growing roughly from 19.5 million tonnes in 1990 towards 57.4 million tonnes in 2010 and 76.1 million tonnes in 2015.² EEE contains copper, aluminium, steel, gold and other precious metals which have the potential of being recovered as secondary raw materials for use in new products, once devices are processed and the materials separated. According to some estimates, up to 30 times as much gold can be found in cell phone circuitry as can be found in the gold ore processed in gold mines, meaning that mining electronic waste really is as lucrative as striking gold.³

The new WEEE Directive sets higher collection targets and an increase in separate collection

Aiming to boost WEEE collection rates in the EU, in 2012, the European Parliament approved the text of the new WEEE Directive 2012/19/EU. Amongst other relevant changes, the collection target for each Member State (MS) from 2019 onwards is updated as 65% of the annual average of EEE placed on the market over the three preceding years or alternatively 85% of the annual average of WEEE generated. The revisions to the Directive aim to introduce MS-appropriate targets and reduce administrative burdens for MS, potentially improving compliance. The Directive also foresees an increase in the separate collection of WEEE, representing a fundamental step towards ensuring a proper and effective downstream recycling chain.

Thanks to EPR schemes, producers play a greater role in WEEE collection and recycling

Producers play a key role in driving WEEE recycling. Indeed, extended producer responsibility (EPR) is mandatory within the context of WEEE, which puts the responsibility for collection, recycling and end-of-life disposal of WEEE on producers. The European Commission is currently evaluating different EPR systems operating along six waste streams, including WEEE, and looking into best practices and options for optimal use of EPR in the EU. The Commission's recent report on [Development of Guidance on Extended Producer Responsibility](#) demonstrates the variety of EPR schemes available.

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http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/key_waste_streams/waste_electrical_electronic_equipment_weee

² Huisman, J., 2012. Eco-efficiency evaluation of WEEE take-back systems. In: Goodship, V., Stevels, A. (Eds.), Part 1 in Waste electrical and electronic equipment (WEEE) handbook. Woodhead Publishing Ltd, Cambridge, UK.

³ <http://cdn.intechopen.com/pdfs-wm/24551.pdf>



At the same time, consumers are increasingly encouraged to participate in end-of-life product management and recycling schemes. This is particularly true for the EEE waste stream, which includes primarily consumer products. Consumer participation in recycling is sometimes incentivised or facilitated through financial instruments such as pay as you throw (PAYT) schemes or accessible collection and take-back programmes.

2. The 2nd COBALT EU Dialogue and stakeholder perspectives on urban mining and WEEE recycling

The 2nd COBALT EU Civil Society-Industry Dialogue, which took place on 6 June 2014, brought together a group of high-level participants for a discussion on the topic of “Urban mining, consumer behaviour and producer responsibility in a circular economy”. The group considered the roles of various key actors – and in particular industry and civil society – in driving urban mining and WEEE recycling, and evaluated the potential for inter-stakeholder collaboration on this topic.

The presentations and discussions which took place during this Dialogue pointed to certain key issues – or wicked issues – which could be considered further.

Wicked issue 1: How can consumers be best involved in WEEE recycling and sustainable management of raw materials in EEE?

Consumers play a key role in the EEE value chain and are increasingly encouraged to participate in the proper discarding of WEEE. Mr. Stéphane Arditi highlighted the need to better involve consumers in decision making surrounding WEEE recycling and the development of WEEE management schemes, and to improve collection practices in order to facilitate consumers' role in recycling. For instance, better-organised take-back and collection systems, including more numerous and more accessible collection points, could help encourage recycling by consumers. “Rewards” for recycling or financial instruments such as pay-as-you-throw or deposit/refund systems may also be effective. Raising consumer awareness is also key to driving recycling.

Moreover, positive change in production and consumption models for EEE (e.g. smarter design and more sustainable consumption patterns) can act as a supportive element for proper management of WEEE by consumers and other actors.

**Wicked issue:
Consumers
should be better
involved in WEEE
management and
consumer
participation in
recycling should
be facilitated**

Wicked issue 2: How can the WEEE recycling chain as a whole be improved to boost material recovery?

As material recovery occurs towards the end of the WEEE recycling chain, overall recycling chain efficiency, including early stages, is key for successful recovery. Given that EEE is a fast-changing sector which uses



Wicked issue:
The efficiency of the entire WEEE recycling chain is essential for driving material recovery

complex materials, a smart and adaptive recycling industry is necessary to best meet its needs. Robust and flexible processes, which can be effective at handling a variety of both older and newer technologies, are also essential to this sector. Improved collaboration between actors across the recycling chain can help maximize its efficiency and boost material recovery in later stages.

At the same time, the recycling chain is itself dependent on the entire EEE product supply chain. For instance, design choices can have a strong impact on recyclability and on the ease of material recovery. Boosting material recovery from complex products thus calls for technical and organisational improvements along the entire product supply chain, as well as increased dialogue between recyclers and other supply chain actors, such as product designers.

Wicked issue: A “best of both worlds” approach can be leveraged to drive proper WEEE management in developing countries

Wicked issue 3: How can a “best of both worlds” approach be leveraged to ensure that WEEE generated or exported abroad is managed properly?

Some 20% of WEEE generated in the EU is exported abroad. In parallel, WEEE is gaining value in the developing world, with informal collection systems developing around WEEE. Ensuring proper disposal of this WEEE is key for mitigating potential environmental, health and social risks associated with waste dumping. In this context, a “best of both worlds” approach can help ensure proper waste management in the EU and abroad. For instance, such an approach may combine local collection and dismantling of WEEE generated abroad with proper recycling of complex or hazardous fractions in European facilities. At the same time, initiatives are being spearheaded for creating compliant recycling processes directly in the developing world. Leveraging knowledge exchange and a best of both worlds approach will help build local recycling capabilities in developing countries, and facilitate proper waste management abroad.

Wicked issue: Greater visibility should be developed on the informal collection sector for WEEE

Wicked issue 4: What role can the informal sector play in WEEE management?

As WEEE has increasingly been recognised as a valuable resource, both formal and informal collection systems have developed around this waste stream. According to Daniel Seager from HP, only about half of the WEEE collected is currently managed through producer systems and reported. While the informal sector helps boost collection rates, it may be more difficult to ensure quality and meeting of standards amongst informal actors. As producers cannot control these parallel collection flows, policy makers should aim to improve traceability and reporting, and establish rules and standards for alternative actors. Improving understanding of the informal sector could help ensure harmonised standards across the board, and could improve visibility on WEEE collection and flows.

3. Conclusion

The 2nd EU Dialogue reinforced the idea that **effective end-of-life management of EEE can contribute substantially to material recovery**. At the same time, it shed



light on the fact that urban mining and WEEE recycling involves **a multitude of actors, who at times remain fragmented and disconnected from each other** despite operating along a shared value chain. Improved WEEE recycling is therefore dependent not only on organisational and technological advances along the product and recycling value chains, but also on increased collaboration and exchange between different actors.

As discussed in Section 2 above, **technological and organisational improvements to the WEEE recycling value chain** are necessary to ensure that it can adapt to rapidly changing technologies and can accommodate increasingly complex products. Overall efficiency in collection and later recycling stages can help boost material recovery from collected products. At the same time, improved traceability amongst various collection flows, both formal and informal, can help improve visibility and coordination within the sector. Standard setting and enforcement, where appropriate, can ensure consistent quality and address environmental, health and other risks.

Inter-stakeholder exchange and collaboration can help drive these improvements and streamline and optimise WEEE recycling. Each key stakeholder has a role to play in driving WEEE recycling, and core competencies to bring to the table. For instance, industry has an understanding of products and product use, in addition to an overall view of the market, and can work to create positive market incentives for recycling, improve the link between design and recycling and support effective recycling from collection to recovery and beyond. Industry actors can also develop new business models which return products to producers at the end of life and allow for their cost-effective management. CSOs can serve as the link to consumers, raising consumer awareness of end-of-life product management options and driving more sustainable behaviour, while also advocating for greater consumer involvement in the WEEE management dialogue. Finally, researchers can generate and share technical and other knowledge, innovate within the sector and facilitate cross-stakeholder collaboration.

Dialogue participants suggested that successful collaboration between these stakeholders can benefit from various underlying factors, including:

- Open, transparent communication and trust
- Incentives (policy and other) for multi-stakeholder collaboration
- A clear understanding of different actors' goals and visions, and a focus on the core business and strengths of each stakeholder



- Creation of a multi-stakeholder coordination / advisory body
- Improved relevant data collection and availability

While the value of WEEE is increasingly recognised, and while there is a growing understanding of the value of urban mining and of material recovery, there is a need to **improve communication** between stakeholders, to **improve the functionality and effectiveness of the entire recycling value chain**, beginning with collection, and to **address remaining questions and barriers**.

Policy has an important role to play in this transition period. Policy makers can help improve traceability in the informal collection sector and promote comparable recycling practices across parallel collection flows. Policy makers can also use targets and standards to boost recycling rates and ensure quality. Furthermore, they are able to involve other actors, e.g. through producer compliance schemes or consumer awareness campaigns, and to design comprehensive circular economy policy surrounding WEEE recycling, including promotion of design for recyclability and development of markets for secondary raw materials. The European Commission's actions on reinforcing the WEEE Directive and on seeking out best-practice models for EPR schemes, among others, are therefore welcome.

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