Meeting on E-Waste Market Challenges and Defence Collaboration

Overview

The meeting focused on global and UK e-waste challenges, emerging recycling technologies, and opportunities for collaboration within the defence sector. Discussions covered market trends, technology innovation, barriers to commercialisation, and upcoming opportunities for engagement through new UK recycling initiatives.

1. E-Waste Market Challenges and Opportunities

An overview of the e-waste market highlighted rapid global growth—one of the fastest-expanding waste streams—with metal values expected to reach $120 billion globally and $4 billion in the UK by 2030. Despite this potential, only around 20% of e-waste metals are formally recycled. The fragmented market—split between upstream collectors and downstream smelters—limits investment and efficiency.

Defence participants discussed the specific challenges of managing and cataloguing legacy equipment and the need for improved data sharing and transparency to inform policy and industry engagement.

2. Technological Innovations in Metal Recovery

The discussion covered several recycling technologies:

- Smelting remains dominant but is energy-intensive, capital-heavy, and environmentally damaging, designed primarily for copper rather than e-waste.
- Hydrometallurgy offers cleaner alternatives but faces scalability and cost challenges due to solvent management and product variability.
- Ionometallurgy—a salt-based solvent process operating at low temperatures—was presented as a cost-competitive, scalable, and decentralised alternative.
- Bioleaching shows niche potential but currently faces limitations in scalability and processing speed.

3. Barriers to Commercialisation and Investment

Key challenges identified include:

- Scaling from lab to industry, where many technologies fail due to cost, complexity, and technical risk.

- Limited financing for first commercial builds in the UK and EU, as few investors fund early industrial deployment.
- Regulatory uncertainty and talent shortages caused by offshoring and limited domestic expertise in metallurgy and chemical engineering.
  Participants emphasised the need for data transparency, demand generation, and strategic government support to attract investment and foster home-grown industrial capability.

4. Defence Sector Collaboration and Data Initiatives

Ongoing initiatives within the defence sector include:

- Quantifying E-Waste: Efforts to catalogue legacy equipment and materials using advanced identification methods.
- Digital Product Passports: Development of systems to track materials across product life cycles and inform recycling strategies.
- Working Groups: Proposals to define standards and performance metrics for circular economy initiatives.
- Data Sharing: Collaboration with national innovation bodies to guide investment priorities and strengthen UK recycling infrastructure.

5. Descycle Capabilities and UK Demonstration Site

Descycle's technology focuses on ionometallurgy, a salt-based liquid process that enables low-temperature, low-pressure metal recovery from e-waste. The process operates in a closed-loop system, recycling solvents for reuse and achieving cost and energy efficiencies that rival traditional smelting.

The company is constructing a UK demonstration facility at Wilton, Teesside, scheduled to be operational by April next year. This site will host multiple trials with different e-waste streams, testing commercial applications and validating process scalability. The facility represents a key step in developing decentralised recycling hubs across the UK and internationally, aimed at creating sustainable, high-value recycling solutions close to waste sources.

6. Commercialisation and Engagement Opportunities

Descycle's model emphasises partnerships and pilot projects to accelerate adoption of next-generation recycling technologies. Stakeholders were invited to:

- Participate in technology trials at the Wilton demonstration facility.
- Explore collaborative R&D projects to test and validate new waste streams.

- Support the development of localised recycling ecosystems that contribute to UK circular economy goals.

Enabling Actions

1. Defence E-Waste Quantification: Compile and share detailed records of defence e-waste types and volumes.
2. Midstream Capability Mapping: Share UK metals processing information to support programme development.
3. Critical Minerals Directory: Circulate a directory of UK projects and companies to support evidence gathering.
4. E-Waste Technology Trials: Engage with the Wilton demonstration facility to arrange e-waste trials.
5. Circular Economy Standards: Establish a working group to define and agree on performance metrics.