

Metso

eScrap solutions

Unlock the value of Waste
Electrical and Electronic
Equipment (WEEE)





eScrap solutions

Metso's Outotec eScrap solutions unlock the value of Waste Electrical and Electronic Equipment (WEEE) using Metso's proven smelting, refining, hydrometallurgy, and gas cleaning technologies.

Complete process solutions

We can provide complete process solutions to solve any smelting challenge, covering every step from raw material through to final product. Metso's Outotec eScrap solutions comply with the strictest environmental regulations and can be supported with pilot testing, process guarantees and advisory services.

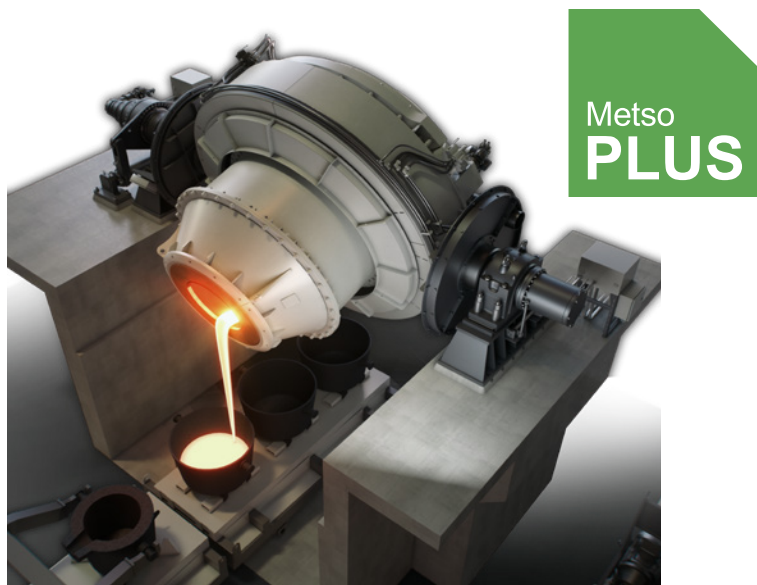
By helping to turn waste into valuable metals, our solutions help to take advantage of the exciting new opportunities being created now for the circular economy of the future.

Why choose Metso?

1. Complete, optimized process solutions for a diverse range of feed materials based on decades of technical expertise.
2. Fully automated smelting solutions enable safe, stable operations leading to high recovery and availability.
3. Minimized investment risk thanks to proven technology.
4. Successful reference projects delivered for customers globally.
5. Proven environmental performance.
6. Technology delivery backed by pilot testing, process guarantees, and advisory services enables fast ramp-up to design capacity.
7. Optimized total cost of ownership.

The Metso eScrap solutions offering comprises the following products:

- Kaldo TBRC process
- Ausmelt® TSL process
- Fire Refining process
- Anode Casting Shop
- Electric Slag Cleaning Furnace
- Peirce Smith Converting process
- Gas Cleaning Plantw
- Electrowinning
- Precious Metals Refinery
- Process Water Recycling Plant



Ausmelt® TSL process

Backed by decades of experience, continuous process development, and more than 60 installations worldwide, Metso's Ausmelt® TSL process is used for treating an extensive range of feed materials, including secondary sources such as e-scrap, copper scrap, slags, sludges, dusts and other reverts.

Central to the Metso Ausmelt® TSL process is the use of a vertically suspended lance submerged in the slag layer of the molten bath. Injection of fuel and process gases (air and oxygen) result in significant bath agitation and mixing, delivering a high-intensity, dynamic smelting process enabling a high production capacity to be achieved using a relatively small diameter furnace.

Benefits:

- Excellent flexibility in terms of range of feed materials that can be processed can enable the smelter to optimise its feed blend and economic performance based on market conditions
- The process can be designed to operate in either continuous or batch mode to meet the plant capacity, valuable metal recovery and product quality objectives
- A high production capacity can be achieved with a relatively small plant footprint, that can enable investment requirements to be reduced
- Process off-gas and dust are captured efficiently, providing for environmentally sound plant performance
- High degree of energy efficiency and flexibility in terms of fuel selection enables operating costs to be kept on a low level
- The Ausmelt Furnace can incorporate with intensive cooling for long campaign life

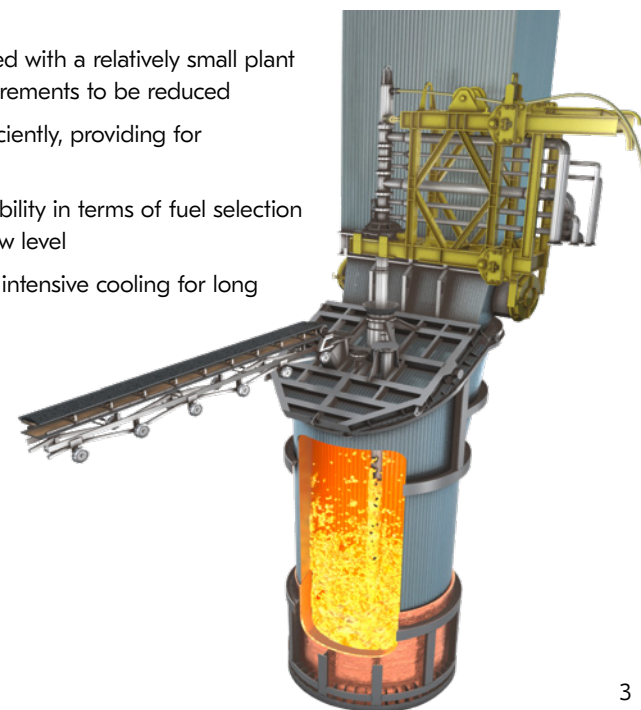
Kaldo TBRC process

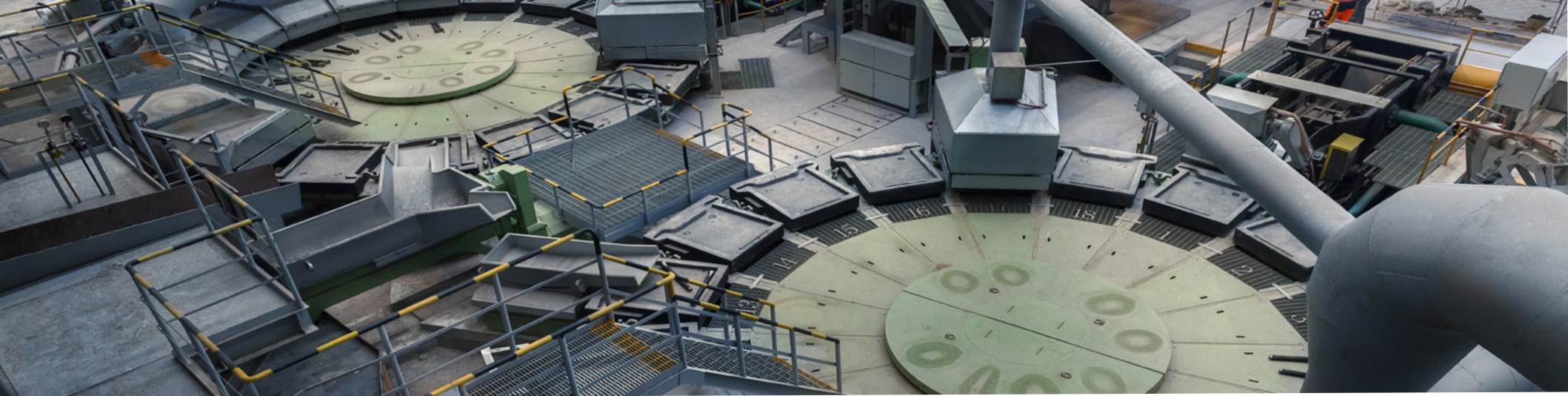
The Kaldo Furnace technology is a flexible and well proven solution for smelting and converting of various primary and secondary raw materials such as concentrates, copper scrap, e-scrap, anode slimes and other precious metals containing materials as well as slag cleaning.

Metso's Kaldo Furnace, equipped with advanced charging and off-gas systems allowing a very compact plant layout and operational flexibility. Feed material can be charged by lance, chute, boat or skip hoist allowing maximum flexibility in raw material feed mix.

Benefits:

- High recovery of metals
- Extremely flexible process
- Lowest possible fixed inventory and shortest processing time
- Ultra-low emissions
- Burner fuel type can be selected according to customer requirements.
- Compact equipment
- Long equipment lifetime
- High throughput in a small furnace
- Patented equipment design





Fire Refining process

In Metso's Outotec Fire Refining Process, the hot raw copper is charged into an anode furnace for purification. The refining is carried out in batches where the necessary oxidation and reduction stages are used to purify the copper.

Through high refining efficiency and low energy consumption the process enables smaller environmental emissions and increased operational flexibility.

Benefits:

- Optimized energy consumption with low operational and maintenance costs
- Lowers energy consumption
- More efficient refining - decreases batch cycle time
- Cleaner off-gases
- Increased flexibility - capable of handling raw copper that contains impurities (e.g., arsenic, antimony)
- Improves scrap melting capacity

Anode Casting Shop

Ensure continuous operation and material flow in your smelter while getting a high return on capital investment with the flexible, modular Metso's Outotec Anode Casting System.

Benefits:

- Minimizes rejection rates through high reliability and anode quality
- Uses accurate and reliable self-adjusting operation
- Results in a fast and flexible material-handling chain
- Gives you safe and simple operation due to easy monitoring and robust control system
- Improves safety with new systems that are available without hydraulics

Electric Slag Cleaning Furnace

Reduce your environmental footprint and lower your investment costs with the compact Metso's Outotec Electric Slag Cleaning Furnace.

With Metso's Outotec Electric Slag Cleaning Furnace, the cleaning of smelting furnace slag is carried out using surface coke reduction in an electric furnace. The circular or rectangular electric furnace is operated in batches and equipped with three or more Söderberg electrodes.

Benefits:

- Adapts to your process needs and treats a large variety of materials
- Offers easy, safe, and efficient operation with Metso's intuitive process control system
- Improved campaign lifetime provided by state-of-the-art cooling and suspension system of the crucible
- Minimizes air leakage into the furnace, as well as dust emissions from the furnace

Peirce Smith Converting process

The Peirce Smith (PS) Converting process is the leading method for copper production and is employed in both primary and secondary copper smelters. Metso's Outotec PS Converting process improves on conventional technology with a vessel structure that leads to better efficiency and minimal emission by coupling the Converter Hood System.

Benefits:

- Relies on proven, well-known technology with hundreds of references
- Flexible technology for smelting and converting matte, black copper, scrap and reverts
- Highly automated process enables optimised PS Converter sequencing and processing
- Low gas dilution and maximum gas capture

The PS Converting process is typically conducted as a batch with two process stages, slag blow and copper blow. For primary smelters, with matte feed, black copper and other scrap can be added in solid form as coolant. In secondary copper smelters, the PS Converter may be dedicated to treating liquid black copper together with scrap and other revert additions.

After converting, the blister or crude copper is sent to fire refining and the slag from the converter is usually sent to slag treatment for copper and other valuable metal recovery. The off-gas is collected via Converter Hood System and sent to cleaning and to acid production, in case of primary smelter.

Slag Granulation

Furnace slag granulation compliments a high-availability eScrap smelting concept. The slag handling time is minimized due to wet granulation directly from a tapping launder that is then followed by a dewatering line. The asymmetric granulation water jet is designed to produce granules in the desired particle size at varying slag tap rates. Metso's Outotec Granulation System minimizes the dust emissions created in slag handling, caters for an off-gas cleaning system and minimizes water consumption.

Benefits:

- Compact and flexible layout tailored to smelter's needs
- Reliable system
- Only a few moving parts, thus making the slag granulation system simple to maintain
- Granulation and tapping safety system increases operational awareness during each tap
- Tank granulation system minimizes the slag dust emissions
- High grade material selections allow for a very low blowdown rate and minimized water consumption

Gas Cleaning Plant

Find the answer to stricter environmental restrictions with a robust and proven gas cleaning system with virtually zero downtime. The Metso's Outotec eScrap Solutions Wet Gas Cleaning system is specifically designed to minimize formation of dioxins and to increase metal recovery by separating valuable elements captured in the off gas, so that these can be reverted to the furnace with very short lead time.

The gas cleaning system can be equipped with optional add-on's to meet your needs, including a digital process optimization tool, NOx and Sulfur removal. We use our proven expertise to develop the most technologically efficient and economically sustainable solution for your application.

Benefits:

- Process concept developed over decades of wet gas cleaning process experience
- Flexible operation adapting to varying process conditions
- Handle high levels of impurities including dioxins, halides, mercury, and more
- Optimized process and equipment to minimize power and water consumption
- Material carefully selected to increase lifespan
- Parts most susceptible to corrosion are easily replaced
- Engineered for efficient operation and maintenance





Electrorefining

Metso copper refining technology covers the entire process based on highly proven equipment and pre-engineered solutions. Our technology enables sustainable and economically viable copper electrorefining for both new and existing operations.

Benefits:

- Complete copper refinery design covering tankhouse, solution purification and anode slime processing
- Pre-engineered solutions speed up implementation time and proven technology minimizes risk and environmental impact
- Highly proven and integrated tankhouse material-handling system enabling high operational efficiency and cathode quality
- Advanced tankhouse information management for increased process awareness and performance

Electrowinning

Metso's offering for copper electrowinning tankhouses comprises pre-engineered solutions, key equipment, and services to ensure superior process performance, increased safety, and minimized environmental impact.

Benefits:

- Integrated design from leaching to electrowinning optimizes equipment performance
- Pre-engineered solutions speed up implementation time and proven technology minimizes risk and environmental impact
- Safe, reliable material-handling solutions improve operational efficiency
- Advanced automation, process control, and information systems improve efficiency and safety

Precious Metals Refinery

Metso's Outotec Precious Metals Technology is well proven and ensures high recovery, low operating costs, and high-quality products. The recovery and refining processes are highly automated, offering a safe working environment and zero toxic gas emissions.

Benefits:

- Enables high recovery of valuable metals
- Ensures high-quality products (>99.99% for gold and silver)
- Allows a short process time and low inventory
- Results in low operating and maintenance costs
- Enables environmentally friendly operations
- Gives high energy efficiency
- Increases recovery of valuable by-products

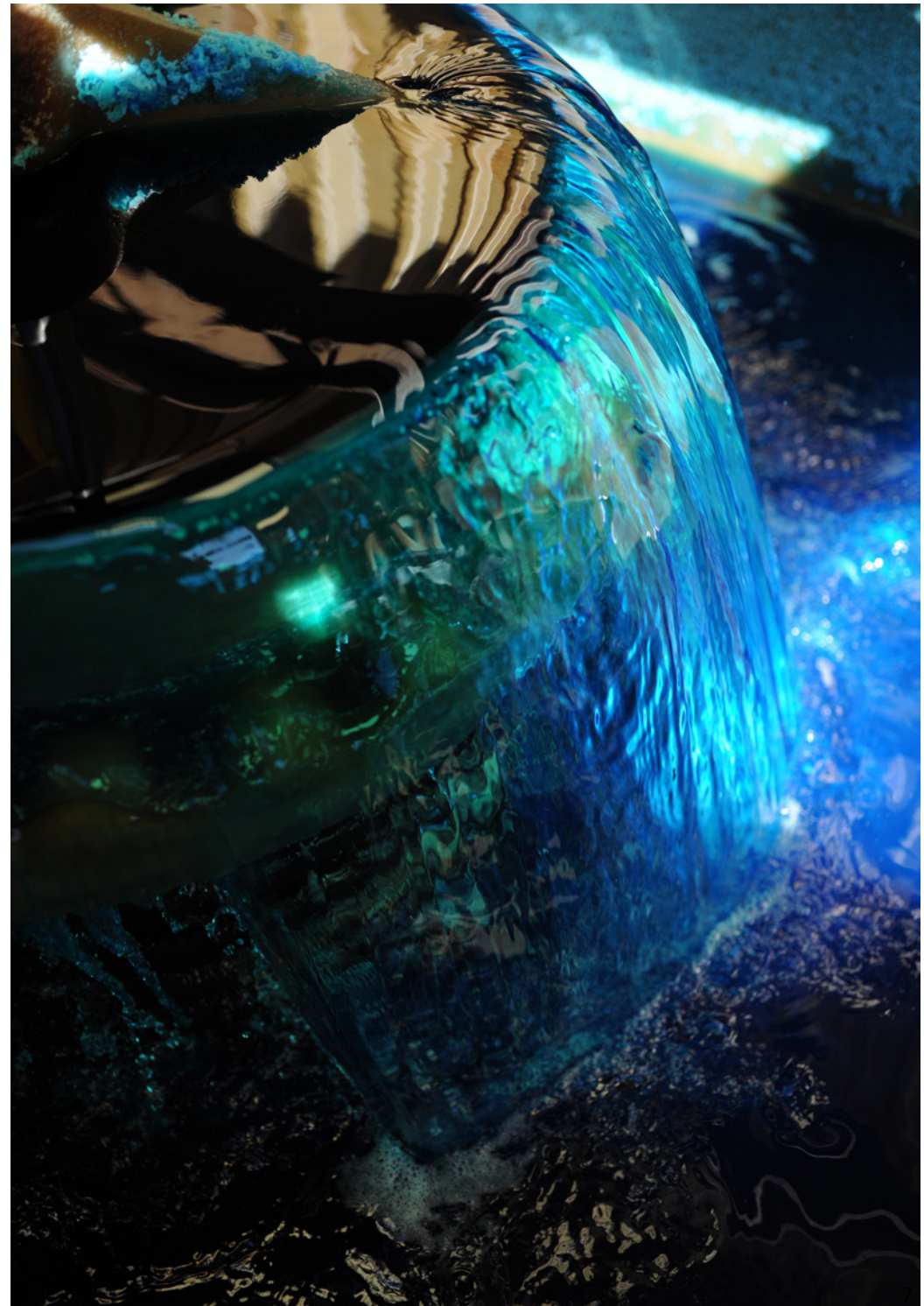
Process Water Recycling Plant

Mining operations are increasingly seeking ways to achieve closed water loops to reduce their consumption of fresh water and minimize effluent. The Process Water Recycling Plant is a fully automated standalone unit that enables recycling of process water by treating the water in a cost-efficient manner.

The plant is specifically designed for concentrator plants, which dewater tailings and recycle water back to the process. It enables undisturbed process performance by treating recycled water and removing accumulated substances to achieve the desired level of quality for the various duty points of the concentration process.

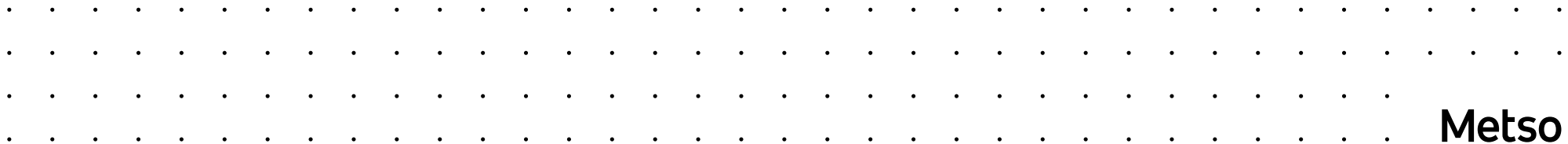
Benefits:

- High and stable flotation recovery with the right quality water
- Increased water recovery with lower fresh water usage index
- Different quality recycled water can be produced according to wthe customer needs
- Low operating costs with a fully automated process



Metso is a frontrunner in providing sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing and metals refining industries globally. By helping our customers increase their productivity, improve their energy and water efficiency and environmental performance with our process and product expertise, we are the **partner for positive change**.

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