



Environment • Metals • Energy • Water

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# Outline

GROUP



## COMPANY

Who we are

## TECHNOLOGIES

What we offer



## SOLUTIONS

How we can help

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# Some of our history

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**1994**

Called “EMEW”  
after  
ElectroMetals  
ElectroWinning



**2000**

Invented metal  
powder technology  
for automated  
harvesting



**2006**

First emew  
system for  
pickling line



**2009**

First emew copper-  
arsenide removal  
from refinery  
bleed



**2013**

First emew  
polish for silver  
removal down to  
< 5ppm



**2017**

emew Group  
(emA, emC,  
emI, emX)



**2020**

emew Smart System  
was introduced  
(starting with Ewaste  
recycling)



**2022**

Establishment  
of UAE  
fulfilment  
center



**1992**

Vortex technology  
for copper  
recovery invented  
in Australia



**1999**

Nickel  
Recovery



**2004**

Silver recovery –  
99.99%



**2007**

First emew system  
for refinery bleed



**2011**

First emew  
system for tin  
recovery



**2015**

Expansion into  
wastewater treatment



**2021**

Establishment of  
emew Mexico



**2023**

Establishment of the  
development lab,  
Toronto & Melbourne  
offices

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# Our locations

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# What we offer

TECHNOLOGIES

## Metal Recovery Made Simple

The complete suite of technologies incorporated in the emew System allows us to recover metals from a variety of feeds, including mining ores, electronic waste, silver and copper refining bleed, batteries, solar panels, PGMs, and many more. The output is a saleable metal cathode or powder of the highest purity.



### FINANCIAL RETURNS

through enabling the recovery and resale of high-quality metals from waste products in the presence of impurities.



### OPERATIONAL EFFICIENCY

via a turnkey technology solution that is safe, scalable, and requires minimal human capital maintenance.



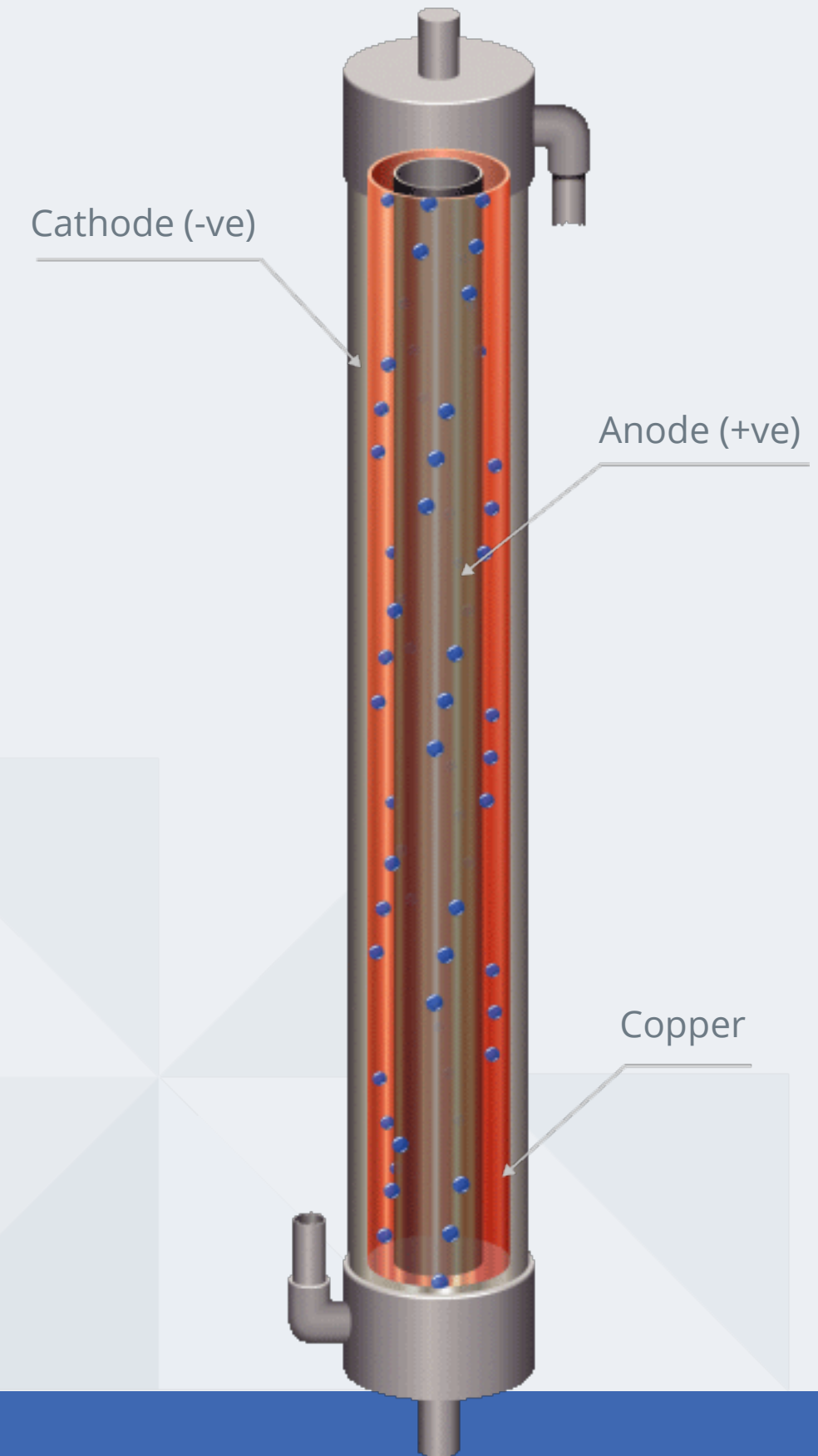
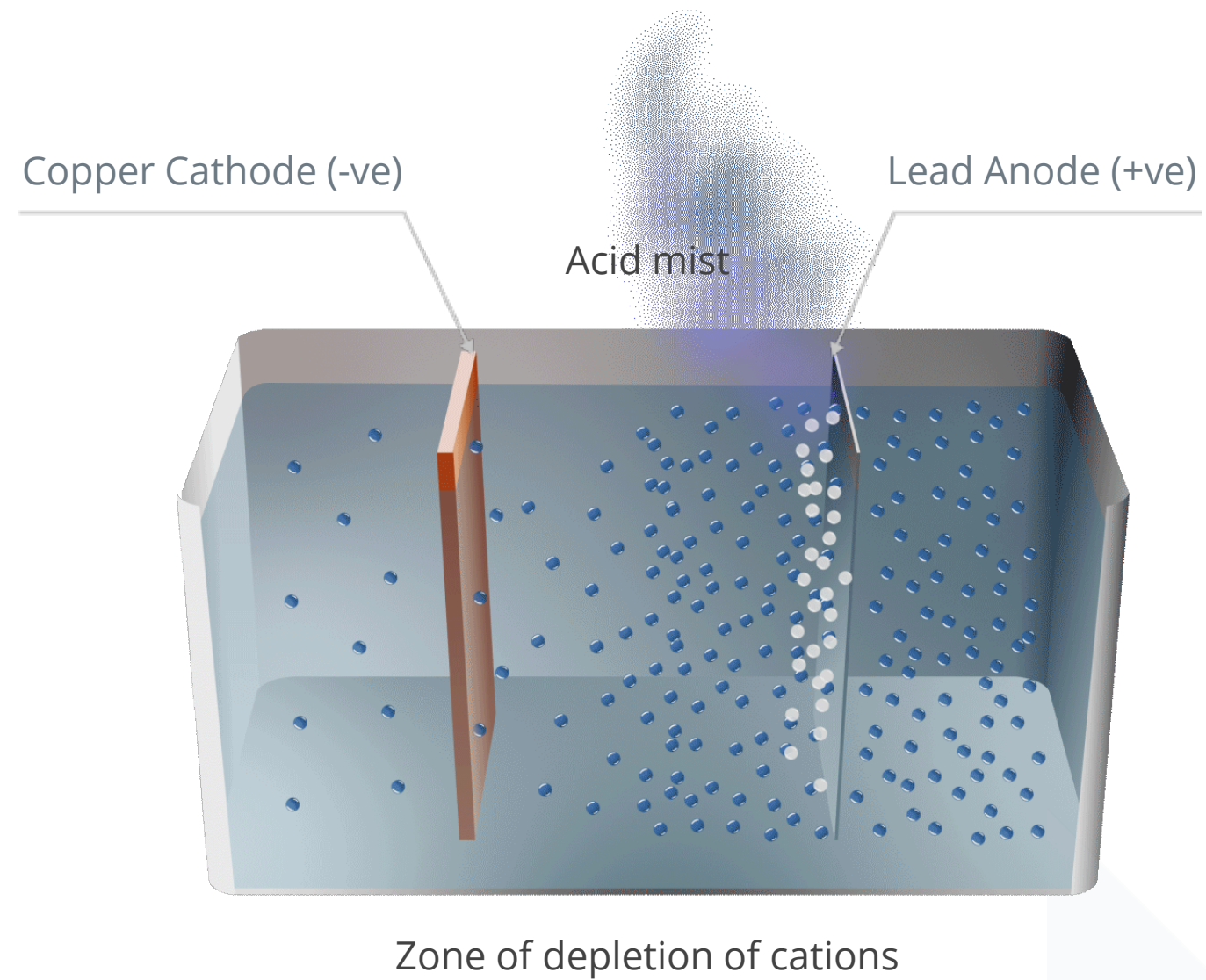
### ESG VALUE

by contributing to the circular economy, reducing carbon consumption and increasing team member safety



# Conventional vs emew

## TECHNOLOGIES



01 High purity

02 Closed system

03 Quick stripping

▶ Plate

▶ Powder

🔒 Sensors

04 Modular assembly

05 Efficient at low concentrations

06 Closed loop, sustainable reagent regeneration

# Examples of 70+ installations worldwide

SOLUTIONS

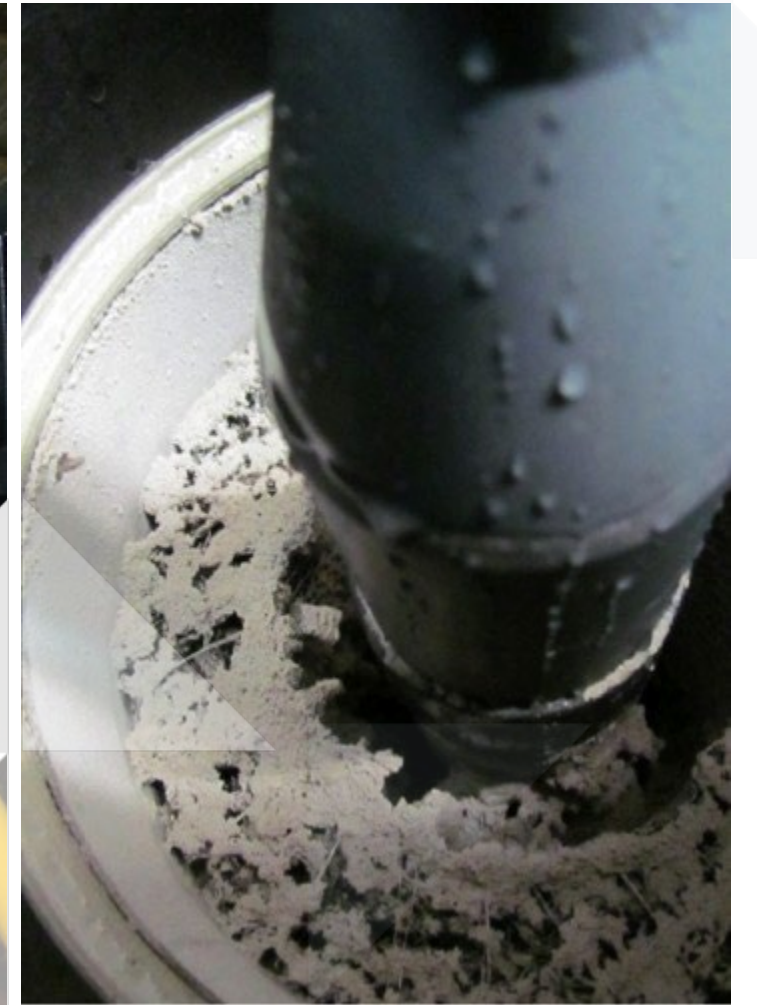
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LOCATION	INSTALLED	METAL
USA	2023	Cu
Australia	2022	Cu, PM
USA	2022	Cu
India	2022	Cu
Mexico	2022	Cu
USA	2021	Se
France	2021	Cu, Ag, PM
Canada	2020	Se
USA	2019	Ni
India	2019	Ag
India	2019	Cu
Slovenia	2017	Cu
India	2016	Cu & Ni
Russia	2016	Ag
USA	2015	Cu
Russia	2015	Ag
Malaysia	2014, 2015	Cu
Mexico	2014	Au/Ag
India	2006, 2012, 2020	Ag
USA	2007	Cu
UK	2006	Ni
USA	2006, 2007	Cu
Chile	2001	Cu



# Types of emew cells

SOLUTIONS



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emew  
clean technologies



# How can we help

## SOLUTIONS

- E-waste**  
Precious and base metal recovery from e-waste
- Industrial wastewater**  
Metal removal and acid regeneration from spent baths
- Precious metals**  
Enhanced recovery and purity of precious metals
- Refinery bleed**  
Advanced liberators for copper refinery & SX/EW bleed
- Battery waste**  
De-copperization of high nickel from Li-ion batteries



29 — Cu COPPER	28 — Ni NICKEL	47 — Ag SILVER
79 — Au GOLD	45 — Rh RHODIUM	34 — Se SELENIUM
27 — Co COBALT	48 — Cd CADMIUM	50 — Sn TIN
46 — Pd PALLADIUM	78 — Pt PLATINUM	82 — Pb LEAD

# The emew plate system

## SOLUTIONS

In 2013, Bosch installed in-house emew Plate system to recover dissolved copper from its manufacturing wastewater at its Australia site.



Approximately 1.2 tonnes/year of high-quality saleable copper recovered



Project targets to eliminate 40 tonnes of manufacturing waste per annum



Treated water recycled back into process as a pH correcting reagent



Reduced total hazardous waste output, salvaged valuable metals, and generated revenue



# The emew powder system

## SOLUTIONS

In 2015, HZL in India installed emew Powder system to recover silver from the bleed stream of the silver refinery.



**HINDUSTAN ZINC LIMITED**

### 01

The highest purity Ag powder and lowest lead content possible; Significantly higher selectivity over dissolved impurities

### 03

Batch process ensures no dead inventory in tank-house; Depletion of Ag <10ppm

### 05

In-situ regeneration of acid to leach the new batch

### 07

20% reduction in capital expenses

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### 02

Ability to produce metal powders with customized densities, particle size distributions (PSD) and microstructures or morphologies

### 04

Automated harvesting ensures zero human contact during the process

### 06

30% reduction in the operational expenses

### 08

Reduction of 30% in labor

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# The emew polish system

## SOLUTIONS

Direct electrowinning is pushed to the extreme with emew Polish system used in conjunction with emew Plate or emew Powder systems.

Using the same concept of high-efficiency emew electrowinning equipped with a sophisticated, proprietary high surface area cathode, this type of emew cell can recover metals down to less than 5ppm. Not possible with conventional electrowinning technology, the emew Polish cell is ideal for recovering metals from dilute concentration bleed streams, wastewater or any industrial process stream with low metals concentration.

### Applications for emew Polish include:

- ✓ Silver refineries looking for an alternative to AgCl to treat bleed streams and spent electrolyte
- ✓ Zinc refineries looking to minimize zinc dust usage to remove copper, cadmium, etc.
- ✓ Any industrial wastewater that is too dilute to be treated by conventional means

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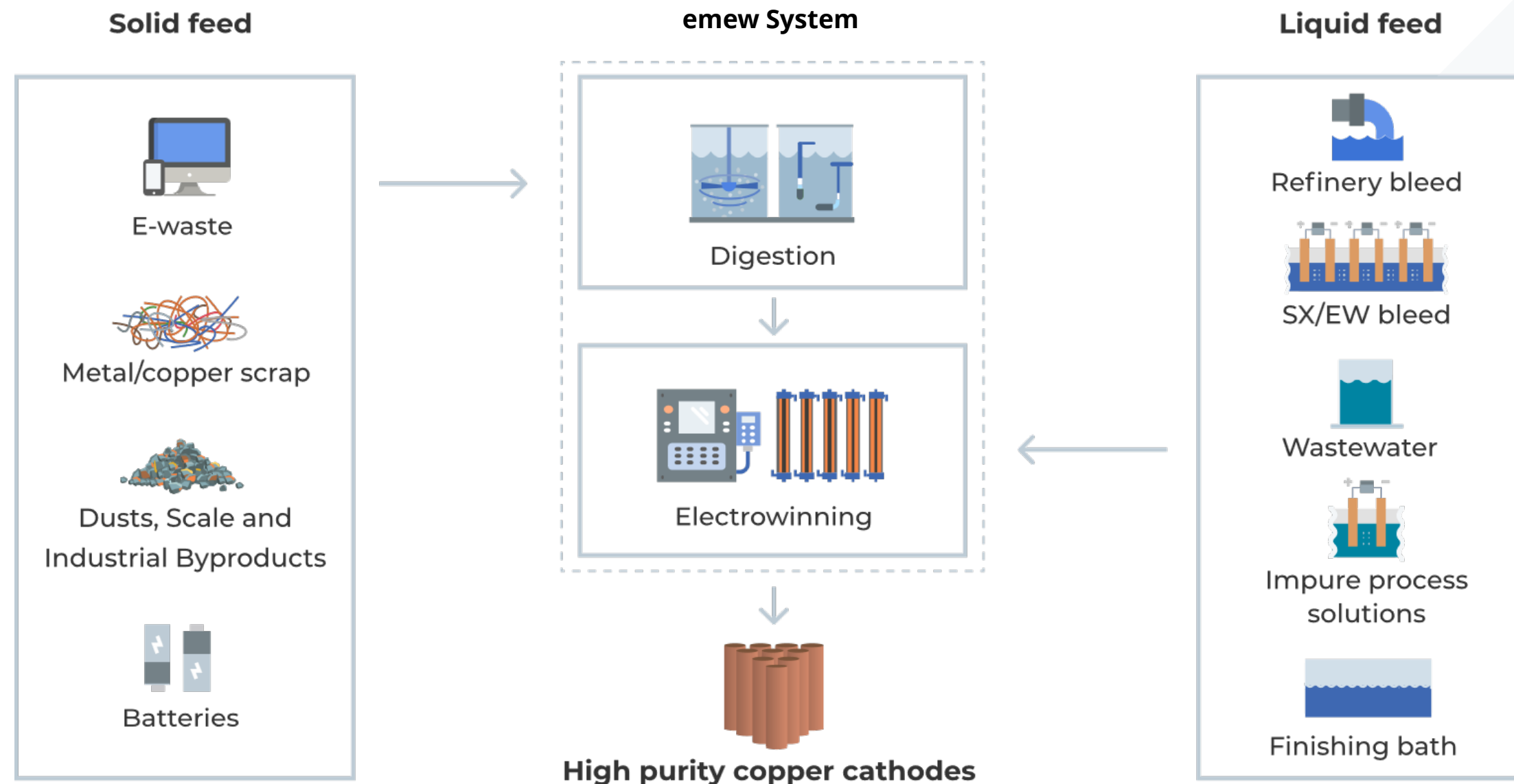
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# Examples of Copper Applications

SOLUTIONS



With emew System, high purity 99.99% copper can be recovered from a variety of feeds, even in the presence of competing metal ions.

The combination of purpose-built process solutions coupled with proven technology enables us to recover valuable metals such as copper from complex, mixed-metal residues, E-waste, metal/copper scrap, industrial byproducts, sludges, slags, oxides, spent Li-ion batteries, and more.

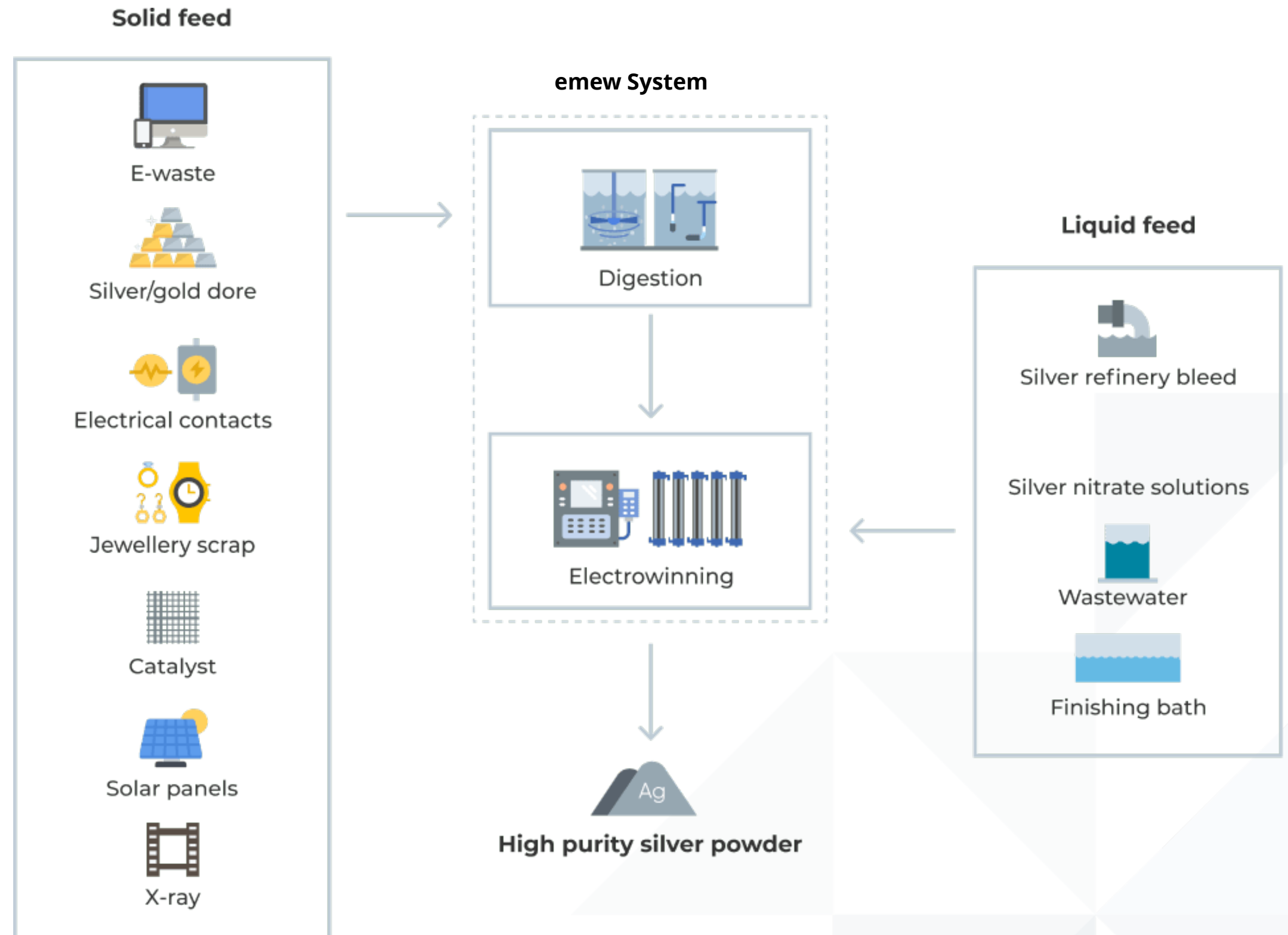
# Examples of Silver Applications

## SOLUTIONS

With emew System, silver can be recovered to a purity of up to 99.999%, even in the presence of base metals.

Impurities such as cadmium, copper, lead, and others are easily rejected. The technology offers the ability to recover high-purity silver from many different solutions including caustic cyanide PLS, nitric acid electrolyte, refinery by-products, bleed streams, effluent streams, low-grade waste materials, scrap and shredder residues, and plating baths.

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# Customer's Journey

SOLUTIONS



## DEVELOPMENT STAGE

- Process evaluation
- Bench testing
- Access to our know-how



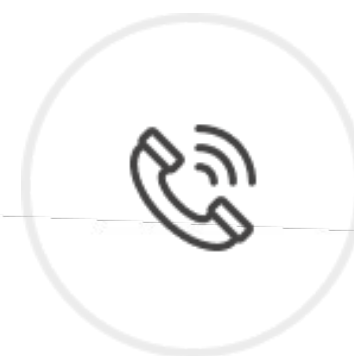
## PILOTING STAGE

- Pilot testing
- Process optimization
- Full scale costing and design recommendation



## LARGE SCALE

- Supervision of start-up and commissioning
- Guaranteed performance
- Comprehensive training



## LONG-TERM SUPPORT

- Service package
- System troubleshooting
- Performance optimization

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