Advanced materials as a key enabling technology in various sectors
Foundation of a *circular* materials technology company

With synergies in mobility businesses

**E&ST**
- **Cobalt & Specialty Materials**
- **Metal Deposition Solutions**
- **Electro-Optic Materials**
- **Precious Metals Refining**
- **Precious Metals Management**

**Recycling**
- **Jewelry & Industrial Metals**
- **Precious Metals Chemistry**

**Catalysis**
- Plating, chemicals, automotive, construction
- Consumer electronics, decorative applications, automotive
- Space, optics and electronics
- Metal recycling and refining industry
- Precious metal consumers (internal and external)
- Jewelry, high-purity glass, chemicals
- Life science, fine chemicals

**Synergies in R&D, metal management**
- Residues from tooling and chemical industries
- Ge bearing residues
- Recycling 17 metals
- Traceability
- Recycling Gold, Silver, Platinum from jewellery and industrial applications
- Closed-loop offering (with PMR)

**Serving demanding high-tech applications**

**Circularity = efficient and sustainable business model**
- Chemicals used in cathode active materials and tires
- Connectors, Printed Circuit Boards
- Pedestrian detection
- ...used in various applications
- Security of supply
- Precursors for automotive and fuel cell catalysts

**Supporting mobility value proposition**

Umicore Capital Markets Day 2022
Electro-Optic Materials

State-of-the-art applications in a sustainable closed-loop model

Reliable supply
Pioneer with 100% sustainable supply as from 2022

Recycling
Close the loop via extensive recycling flows

+50% of supply via Recycling

Today
Mature leader

Tomorrow
Use existing leadership to extend to new applications

Germanium Substrates
Space solar cells

GeCI4
Optical Fiber Cable

IR optics
Industry & Security

Ge substrates for photonics

Precursor for microelectronics

Thermal imaging for ADAS & Smart Buildings

Umicore 2030 RISE
Key take-aways
Supporting our success as a *circular* materials technology company

**Synergy**
- Foundation of Umicore as a *circular* materials technology company
- Supporting our success in mobility

**Technology**
- High-tech end-applications
- Product and process differentiation

**Return**
- ROCE >20%
- Growth opportunities from attractive end-markets
Advanced Materials

Precious Metals Refining
Leadership in sustainable and complex recycling
Agenda

1. World leader in sustainable, complex and low-carbon recycling

2. RISE 2030
Key enabler of low carbon economy

At the heart of Umicore’s closed-loop business model

Complementarity with other activities providing true competitive edge

Recycling reduces carbon footprint of metals in the value chain by ~50%
Unique technology, touching the full value chain

Recovery of 17 metals from more than 200 types of complex waste streams

- Mines
- Complex mining concentrates & residues
- Smelters & refiners
- Smelting & refining residues
- Refiners
- Complex production scrap
- New products
- Industry
- Complex end-of-life materials
- Consumers
- Industrial by-products
- End-of-life materials

Ores & concentrates
Profitable revenue model with significant metal price upside

Precious Metals Refining revenue drivers

- Treatment & refining charges: Determined by the complexity of the materials
- Metal revenue: Contractually agreed recovery rate and potential for extra ‘metal revenue’

Fixed fee
Value of metal revenue
Very attractive market for Umicore
Opportunities with increasing complexity of recycling feed

**Regulatory requirements**
- Recycled content
- Societal needs
- More stringent legislation

**Sustainability**
- Increasing metals scarcity
- Circular economy
- ~ 50% lower GHG footprint of recycled metals

**Economic value**
- Increasing complexity of feeds
- Increasing demand for recycling, regardless of metal price evolution
Leadership in sustainable, complex and low carbon recycling

Where to play

Leverage leadership in sustainable, complex and low carbon recycling
Focus on complex feed from a broad value chain, while maximizing closed-loop benefits

Support adjacencies at Umicore level
Battery Recycling Solutions to greatly benefit from world-class expertise of Precious Metals Refining

How to win

R Reliable Transformation Partner
I Innovation & Technology Leader
S Sustainability Champion
E Excellence in execution
Leadership in sustainable, complex and low carbon recycling

SUSTAINABLE VALUE CREATION FOR CUSTOMERS

- **Superior processing flexibility** to treat a broad range of input materials in line with changing market demand and customer needs
- **Trusted partner** for more than 20 years, returning high metal value to customers through superior sampling and metal yield
- **Reliability** in precious metals transactions and in value consignment
- **Enabling customers** in their journey towards lower carbon footprint and higher recycled content
Leadership in sustainable, complex and low carbon recycling

INNOVATIVE METALLURGY AND CHEMISTRY

Leverage our unrivalled pyro and hydro expertise to further improve yields and expand input streams

Leading CO₂ performance with our “NextGen” technology: becoming the world-leading low carbon precious metals recycler
Leverage our unrivalled pyro and hydro expertise

Recycling metals from complex waste streams cannot be done in one single process step

Best flowsheets are built from a combination of pyro- and hydrometallurgy steps

Pyrometallurgy: liberating valuable metals for further refining

Hydrometallurgy: refining to pure metals or compounds

<table>
<thead>
<tr>
<th>Process</th>
<th>Fire</th>
<th>Water</th>
<th>Fire/Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of chemical reactions</td>
<td>High</td>
<td>Low</td>
<td>Optimized</td>
</tr>
<tr>
<td>Metal selectivity</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Robustness to impurities</td>
<td>High</td>
<td>Low</td>
<td>High</td>
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<tr>
<td>ESG</td>
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<tr>
<td>GHG biggest impact</td>
<td>Scope 1</td>
<td>Scope 3</td>
<td>Optimized</td>
</tr>
<tr>
<td>Physical footprint</td>
<td>Small</td>
<td>Large</td>
<td>Optimized</td>
</tr>
</tbody>
</table>
“Next Gen” technology to reach our decarbonization goals

Avoid emissions

The right investments will be required

Replace emission sources

Use synergies between feeds to improve overall efficiency

Substitute fossil fuels by electricity

Capture GHG

Capture remaining emissions

1

2

3
Leadership in sustainable, complex and low carbon recycling

KEY PARTNER FOR THE CIRCULAR ECONOMY

Maximizing closed-loop benefits
• Majority of input mix from secondary sources
• Conflict-free and responsible sourcing certified operations

Sustainable co-existence with the neighboring communities
• Committed to minimizing environmental impact of operations
• Building a green zone in Hoboken
Maximizing closed-loop benefits

> 90% of Platinum Group Metals coming from secondary materials

Responsibly sourced materials at the heart of our operations
- Certified conflict-free smelters
- LBMA Gold & Silver accredited
- LPPM Platinum & Palladium sponge certified
- Responsible Minerals Initiative (RMI) conformant smelters and refiners

1.8 million tons of GHG emissions avoided per year through material input mix & recycling
Sustainable co-existence with our neighbors

Minimizing impact

Using best available technology

Full encapsulation of lead refinery and encapsulation of storage areas

Smart logistics based on wind speed and direction

Real-time measurement of dust emissions composition

Continuous reduction of metal emissions (kg/y)

5-hectare green zone planned between the Hoboken plant and the residential area

Onsite 1-hectare green zone
Leadership in sustainable, complex and low carbon recycling

**STRONG FOCUS ON OPERATIONAL EXCELLENCE**

*Enhance operational excellence:* safety, process efficiency, sampling & assaying, high yields through digitalization and automation

*Continuous debottlenecking* to further reduce breakeven point in a context of high inflation and volatile metal prices
Continuous debottlenecking and value creation

Debottlenecking

Conscious focus on value over volume

Year 2010 to 2018

Year 2019 to 2021
1. World leader in sustainable, complex and low-carbon recycling

2. RISE 2030
Precious Metals Refining – RISE
Leadership in sustainable, complex and low carbon recycling

Leverage leadership in sustainable, complex and low carbon recycling

Support adjacencies at Umicore level

R
Reliable Transformation Partner

SUSTAINABLE VALUE CREATION FOR CUSTOMERS

I
Innovation & Technology Leader

INNOVATIVE METALLURGY AND CHEMISTRY

S
Sustainability Champion

KEY PARTNER FOR THE CIRCULAR ECONOMY

E
Excellence in execution

STRONG FOCUS ON OPERATIONAL EXCELLENCE

Strong competitive position allowing to keep EBITDA margins <40% and ROCE ~20% throughout the plan, at normalized PGM prices
materials for a better life