Introducing Umicore
Who we are

We deliver sustainable solutions to address global megatrends

Our products and services accelerate global mobility transformation, cater for the growing need for advanced materials and enable even greater circularity for critical metals

We are the leading circular materials technology company fulfilling our mission to create sustainable value through materials for a better life
Your global supplier, locally

**COLLEAGUES**
11,565

**PRODUCTION SITES**
44

**R&D | TECHNICAL CENTERS**
15

- **North America**
  - Colleagues: 718
  - Production sites: 9
  - R&D | Technical centers: 1

- **Europe**
  - Colleagues: 6,645
  - Production sites: 17
  - R&D | Technical centers: 7

- **Asia / Pacific**
  - Colleagues: 3,348
  - Production sites: 13
  - R&D | Technical centers: 6

- **South America**
  - Colleagues: 690
  - Production sites: 4
  - R&D | Technical centers: 1

- **Africa**
  - Colleagues: 164
  - Production sites: 1
  - R&D | Technical centers: 1
Our strongly rooted foundations

Unique business model
INTERNAL DRIVER

Supportive megatrends
EXTERNAL DRIVER

Let’s go for zero

Industry leader in sustainability
Accelerating megatrends driving all activities
Megatrends:

Mobility Transformation
Mobility transformation radically accelerating
Uniquely positioned to help the world transition to cleaner mobility

ICE equipped vehicles will remain the dominant clean mobility drive train for the next 10+ years

Internal Combustion Engine
Emission control Catalyst

Plug-in Hybrid Electric Vehicle
Battery active materials and emission control catalysts

Full Electric Vehicle
Battery active materials

Prime electrification path for light transportation

Fuel Cells Vehicle
Electro-catalyst and battery active materials

Prime electrification path for heavy transportation
Automotive Catalysts

Capture peak profitability and maximize value

Umicore catalyst technologies **prevented 2.8 million tons of NOx emissions** from being emitted into the air in 2021

Using average lifetime of 200,000 km including NOx, HC, CO, excluding PM

**R**
Embarking the mobility transformation together with our customers

**I**
Strong technology position in light of upcoming emission legislation

**S**
Long-standing partner in delivering cleaner air with embedded sustainability value through sustainable operations

**E**
Agility mindset and operational agility to manage the transformation
Rechargeable Battery Materials
Capture profitable growth and create sustainable value

Value-creative strategic partnerships across the value chain

Broad technology & IP portfolio covering design-to-performance and design-to-cost applications, incl. next-gen technologies

Pioneering responsibly-sourced materials and becoming the driving force to decarbonize the battery value chain

Step-change in process, operational and organizational excellence

Umicore cathode materials prevented over 9.5 million tons of GHG emissions from being emitted in 2021

Considering recycling, production, processing into batteries and the use of batteries in full EVs
Battery Recycling Solutions

Capture profitable growth in circular battery value chain

Over 10 years of pilot scale experience gives a head start to scale to 150kt capacity units

Supporting our customers with a circular offering from the start and ready to accelerate together

Long-standing materials and process technology know-how

Embedded sustainability value through sustainable recycling operations

Recycled material up to 96% lower CO₂ footprint vs. primary materials

LCA-analyses performed according the ISO14040/44
Fuel Cell Catalysts
Capturing the emerging growth

Umicore PEM catalysts prevented 147,000 tons of GHG emissions from being emitted in 2021

PEM: Proton-exchange membrane
Using average personal vehicle lifetime of 200,000 km

Long-term global leader in PEM fuel cell catalysts at industrial scale

Industry-leading materials in terms of durability, performance and PGM loading

Embedded sustainability value delivering high performance solutions for zero emissions transport

Scaling-up production footprint in most cost-efficient way
Megatrends: Advanced Materials
# Key enabling technology in various sectors

Attractive markets and differentiated technology

<table>
<thead>
<tr>
<th>Serving demanding high-tech applications</th>
<th>Synergies in R&amp;D, metal management</th>
<th>Circularity = efficient and sustainable business model</th>
<th>Key differentiator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt &amp; Specialty Materials</td>
<td>Plating, chemicals, automotive, construction</td>
<td>Residues from tooling and chemical industries</td>
<td>Flexible supply, market and application knowledge</td>
</tr>
<tr>
<td>Metal Deposition Solutions</td>
<td>Consumer electronics, decorative applications, automotive</td>
<td>Residues from electroplating baths</td>
<td>Application knowledge, technical support</td>
</tr>
<tr>
<td>Electro-Optic Materials</td>
<td>Space, optics and electronics</td>
<td>Ge bearing residues</td>
<td>Superior performances through quality and purity, recycling</td>
</tr>
<tr>
<td>Precious Metals Refining</td>
<td>Metal recycling and refining industry</td>
<td>Recycling 17 metals</td>
<td>Ability to process complex streams, customer service</td>
</tr>
<tr>
<td>Precious Metals Management</td>
<td>Precious metal consumers (internal and external)</td>
<td>Traceability</td>
<td>Market knowledge, security of supply</td>
</tr>
<tr>
<td>Jewelry &amp; Industrial Metals</td>
<td>Jewelry, high-purity glass, chemicals</td>
<td>Recycling Gold, Silver, Platinum from jewellery and industrial applications</td>
<td>Application and market knowledge, closed-loop offering</td>
</tr>
<tr>
<td>Precious Metals Chemistry</td>
<td>Life science, fine chemicals</td>
<td>Closed-loop offering (with PMR)</td>
<td>Chemical synthesis of complex metal based molecules</td>
</tr>
</tbody>
</table>
Precious Metals Refining
Leadership in sustainable, complex and low carbon recycling

- Trusted partner for more than 20 years, recovering 17 different metals from more than 200 complex waste streams
- Offering superior metal yields touching the full metal value chain with leading CO$_2$ performance with next generation technology
- Responsibly sourced materials at the heart of our operations
- Enhance operational excellence through digitalization and automation and continuous debottlenecking

1.8 million tons of GHG emissions avoided in 2021 through material input mix & recycling
We Go for Zero Sustainability Champion
Let's Go for Zero

the ambitions behind being a Sustainability Champion

Net Zero
GHG emissions by 2035

Net Zero GHG. Zero regrets.
Endless possibilities.
Net Zero GHG emissions by 2035

- **Scope 1+2**: 792,000 tons CO$_2$e baseline
  - 2019: -20%
  - 2025: -50%
  - 2030: -100%
  - 2035: Net Zero scope 1+2 GHG

- **Scope 3**: 7.1 tons CO$_2$e/ton purchased materials intensity baseline
  - 2025: -42%
Zero inequality

WHERE WE ARE TODAY

11,565
Group employees

25%
Women in management\(^1\)

21.6%
Non-Europeans in senior management\(^1\)

75
Nationalities\(^1\)

WE GO FOR

Gender parity in management as soon as possible, with 35% women in management by 2030

Increased cultural diversity in management teams by 2025

Measuring and disclosing Pay Equality

\(^1\) Figures as at 31 December 2021, pending publication of 2022 Annual report
Zero harm

- Minimizing impact on the environment
- 25% diffuse emissions by 2025 with continuous improvement of other types of metal emissions
- New water stewardship program

Wellbeing @ work

- Zero work related injuries
- Zero excess exposure
- Mental, physical, occupational and social wellbeing at work for all

Sustainable sourcing champion

- Driving positive impact in the value chain
2030 RISE strategy
Growth, returns and cashflows
# Horizon 2020 strategy financial targets

Delivered on financial targets

<table>
<thead>
<tr>
<th>Accelerating profitable growth</th>
<th>2015 – 2020 Targets</th>
<th>2020 Values</th>
<th>2021 Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAGR revenues of 7 %</td>
<td>7 %</td>
<td>9 %</td>
<td></td>
</tr>
<tr>
<td>CAGR adj. EBITDA of 8 %</td>
<td>12 %</td>
<td>18 %</td>
<td></td>
</tr>
<tr>
<td>Double adj. EBIT to € 0.5bn by 2020</td>
<td>Achieved in 2018</td>
<td>Tripled by 2021</td>
<td></td>
</tr>
<tr>
<td>Group ROCE &gt; 15 %</td>
<td>12.1 %</td>
<td>22.2 %</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Delivered on top-line growth ambition</th>
<th>Not at the detriment of margins – double digit earnings growth</th>
<th>Strong value creation notwithstanding ROCE headwinds due to delayed capacity utilization in Rechargeable Battery Materials in China</th>
<th>Record 2021 results with record precious metal prices as accelerator</th>
</tr>
</thead>
</table>

Accelerating profitable growth

- CAGR revenues of 7%
- CAGR adj. EBITDA of 8%
- Double adj. EBIT to €0.5bn by 2020
- Group ROCE > 15%

Delivered on top-line growth ambition

- Not at the detriment of margins – double digit earnings growth
- Strong value creation notwithstanding ROCE headwinds due to delayed capacity utilization in Rechargeable Battery Materials in China
- Record 2021 results with record precious metal prices as accelerator
Horizon 2020 strategy drove step-change
Doubled in size: earnings, capital employed and value

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>STEP CHANGE</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workforce (’000)</td>
<td>8.8</td>
<td>+ 26 %</td>
<td>11.1</td>
</tr>
<tr>
<td>Revenues (€ bn)</td>
<td>2.3</td>
<td>x 1.7</td>
<td>4.0</td>
</tr>
<tr>
<td>adj EBITDA (€ bn)</td>
<td>0.47</td>
<td>x 2.7</td>
<td>1.25</td>
</tr>
<tr>
<td>Average Capital Employed (€ bn)</td>
<td>2.2</td>
<td>x 2.0</td>
<td>4.4</td>
</tr>
<tr>
<td>Enterprise Value (€ bn)</td>
<td>4.5</td>
<td>x 2.1</td>
<td>9.6</td>
</tr>
<tr>
<td>Market Cap (€ bn)</td>
<td>4.2</td>
<td>x 2.1</td>
<td>8.6</td>
</tr>
</tbody>
</table>

Doubled size of the Group
Driven by strong underlying market growth and accelerated by metal prices

Substantial growth investments, yet to generate full payback potential

Strong double digit shareholder returns
(with increased volatility in recent years)

Balanced earnings growth across different business groups

Enterprise Value and Market Cap calculated end of calendar year
TSR = Total Shareholder Return = Market Cap accretion (eoy) + dividend payout
Workforce = fully consolidated entities

CAGR 2015-2021
adj EBITDA

2021 at average 2020 precious metal prices

annual TSR
Differentiated sources of value creation
Balancing growth, returns and cash flows for the Group

Value driver

<table>
<thead>
<tr>
<th>Value driver</th>
<th>Contribution to Umicore’s value creation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings growth (adj EBITDA growth)</td>
<td>Low</td>
</tr>
<tr>
<td>Return-driver (adj ROCE &gt; Cost of Capital)</td>
<td>High</td>
</tr>
<tr>
<td>Free Operational CF generation</td>
<td></td>
</tr>
</tbody>
</table>

- **Attractive earnings growth** driven by Rechargeable Battery Materials & Battery Recycling Solutions
- Group growth rate depends on metal prices
- Group returns above Cost of Capital across the plan despite sizeable growth investments
- Reinvest significant free cash flows of Catalysis & Recycling in E&ST
- Cash flow payback as from second half of decade

Trend vector from 2021-2026 to 2026-2030
Umicore Group earnings growth ambition

Secular earnings growth while maintaining attractive historical margins

**Ambitious 2026 growth plan** with Rechargeable Battery Materials as transformative factor and growth in Catalysis

Growth expected to be non-linear and dependent on metal price trends

Substantial growth beyond 2026 from battery materials, battery recycling and fuel cells

Attractive Group margins in line with historic average (assuming normalized PGM prices)

**Group margin profile**

**Revenues**
- 2021: € 4 bn
- adj EBITDA: € 1.25 bn (31 %)

**2026 ambition**
- € 2.5 bn to € 3 bn vs 2021
- appr. € 1.5 bn
- > 20 %

**2030 vision**
- € 2.5 bn to € 3 bn vs 2026
- > 20 %

Phased growth conditional upon value creative returns from contracts

Double digit CAGR at 2020 rates

**adj EBITDA**
- 2021 actual reported adjusted EBITDA
- 2026 assuming a gradual PGM price normalization scenario

Adjusted 2021 EBITDA includes Corporate EBITDA: from - € 52m in 2021 to appr. - € 75m in 2026 and higher in 2030

All financial KPIs based on current Umicore reporting definitions
Growth investments to accelerate
Over 3/4th of Group capex in battery materials, battery recycling & fuel cells

Capex 2015-2021

- Catalysis
- E&ST
- Recycling
- Corporate

€ 2.8 bn

Capex 2022-2026*

- Catalysis
- E&ST
- Recycling
- Corporate

> € 5 bn

Phased capex and conditional upon value creative returns

- Fuel cell capex as % of Catalysis < 20 %
- Rechargeable Battery Materials capex as % of E&ST > 90 %
- Battery Recycling Solutions capex as % of Recycling appr. 50 %

Total as % of Group total > 75 %

* Net investments incl. co-financing

Bulk of Group capex oriented towards secular growth opportunities

Rechargeable Battery Materials & Battery Recycling Solutions most significant growth projects in 2022-2026

Lower share of capex in Catalysis notwithstanding initial fuel cell growth investments
Capital allocation shift to accelerate
doubling of capital employed subject to value creative returns

Average Capital Employed
- Catalysis
- E&ST
- Recycling

Trend vector 2030 vs 2026

Close to doubling of average capital employed by 2026 (vs 2021) driven by Rechargeable Battery Materials & Battery Recycling Solutions

Catalysis
stable base up to 2026 (incl. fuel cell investments); significantly lower base as from mid-decade; substantial working capital release anticipated

E&ST
grow to appr. 2/3rd of group capital base driven by Rechargeable Battery Materials expansion

Recycling
increase in capital base through large scale Battery Recycling plant & ESG investments in Hoboken

Further growth beyond 2026 depending on growth pace in Rechargeable Battery Materials and Battery Recycling Solutions

E&ST in % of average Group Cap Employed

<table>
<thead>
<tr>
<th>2015</th>
<th>2021</th>
<th>2026</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>~ 1/3rd</td>
<td>~ 50 %</td>
<td>~ 2/3rd</td>
<td>&gt; 2/3rd</td>
</tr>
</tbody>
</table>

Group totals include Corporate. Capital Employed sensitive to prevailing metal prices through NWC. Projections assume gradual normalization of PGM prices and battery material metal prices in line with 2021 average price.
### Capital allocation shift to accelerate

Group returns above cost of capital with some temporary dilution in E&ST

<table>
<thead>
<tr>
<th>Catalysis</th>
<th>E&amp;ST</th>
<th>Recycling</th>
<th>GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROCE</strong></td>
<td><strong>ROCE</strong></td>
<td><strong>ROCE</strong></td>
<td><strong>ROCE</strong></td>
</tr>
<tr>
<td>2015 - '20 average – ~14 %</td>
<td>2015 - '20 average – ~11 %</td>
<td>2015 - '20 average – ~37 %</td>
<td>2015 - '20 average – ~14 %</td>
</tr>
<tr>
<td>Lower capital employed base drives higher returns</td>
<td>Near-term returns dampened by Rechargeable Battery Materials’ growth costs and investments. Above cost of capital shortly after 2026</td>
<td>Highly value-creative returns on higher capital base incl. Battery Recycling; assumes normalized PGM prices</td>
<td>Stay above cost of capital across the plan and create substantial value towards end of decade once mid-decade investments are ramped-up</td>
</tr>
<tr>
<td>2026 ambition ~ 20 %</td>
<td>2026 ambition &gt; 8 %</td>
<td>2026 ambition ~ 30 %</td>
<td>2026 ambition &gt; 12.5 %</td>
</tr>
<tr>
<td>2030 vision &gt; 20 %</td>
<td>2030 vision &gt; 12.5 %</td>
<td>2030 vision &gt; 20 %</td>
<td>2030 vision 15 %</td>
</tr>
</tbody>
</table>

Capital Employed sensitive to prevailing metal prices through NWC. Current cost of capital slightly below 10%.
Operational cash flow profile

Substantial free cash flows in Catalysis & Recycling reinvested into E&ST

Cumulative cash flows 2022 - 2026

- Catalysis
- E&ST
- Recycling

€ 6 - 7 bn

Group free operational cash flow appr. break even

Potential for substantial operational free cash flows after 2026 depending on level of growth investments to accommodate post-2030 growth

Group total includes Corporate
Free Operational CF defined as adj EBITDA – equity accounted contribution – Capex – change in NWC
Net capex includes co-financing

Substantial free cash flows in Catalysis and Recycling Accelerating further beyond 2026

Reinvested in Rechargeable Battery Materials expansion

E&ST cash payback after capacity ramped-up (> 2026)
## Funding levers

From full autonomous funding to co-funding partnership model

**Policy unchanged:**  
Maintain Investment Grade status

### Embedded in group strategy

<table>
<thead>
<tr>
<th><strong>Strong free operational cash flow generation</strong></th>
<th><strong>ESG-focused debt funding appetite</strong></th>
<th><strong>Co-funding partnership model</strong></th>
<th><strong>Joint Venture investment sharing</strong></th>
<th><strong>Grants and other funding incentive mechanisms</strong></th>
<th><strong>Capital Market funding</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalysis &amp; Recycling as strong free cash flow generators</td>
<td>Leverage on growing debt appetite &amp; capacity in the market for ESG- and electrification-focused projects</td>
<td>Customers open to participate in operational funding in return for capacity assurances &amp; technology commitment</td>
<td>Selective strategic JV set-ups allow to share the upfront investment burden in return for sharing the returns</td>
<td>Access substantial support funding for the electrification transformation as an established player with proven technology and industrialization skills</td>
<td>To accelerate Rechargeable Battery Materials expansion, conditional upon business &amp; return visibility.</td>
</tr>
</tbody>
</table>

### Optional

| **Selective strategic JV set-ups allow to share the upfront investment burden in return for sharing the returns** | **Access substantial support funding for the electrification transformation as an established player with proven technology and industrialization skills** | **To accelerate Rechargeable Battery Materials expansion, conditional upon business & return visibility.** |
2022 overview
Key milestones 2022 & Q1 2023
Strong progress in executing 2030 RISE

Customers & Contracts

- LT, strategic 46GWh supply agreement for next generation Hi-Ni CAM with ACC, demonstrating Umicore technology and execution strength
- JV with VW PowerCo for 164 GWh CAM in Europe, a value-creative partnership across the EU battery value chain and a strong signal of recognition of Umicore’s product and process expertise
- MoU with VW PowerCo for 40GWh in North America as recognition of Umicore’s ability to offer a fully integrated battery materials supply chain also for the North American market
- Mercedes-Benz honors Umicore AC with Supplier Award 2022, no better acknowledgment of Umicore’s excellence in performance than when received from its customers

Technology & Innovation

- JDA with Idemitsu Kosan Co to jointly develop high-performance CAM for Solid State Batteries, potential game-changer for the battery industry
- JDA with Nano One on advanced CAM manufacturing, as additional building block of Umicore’s strong innovation and technology ecosystem
- Strong IP creation with more than 70 patents filled in 2022, drivers of our technology leadership
- Start of industrialization of our leading HLM technology, distinctly competitive to other design-to-cost battery technologies
Key milestones 2022
Strong progress in executing 2030 RISE

Regional Value Chains & Manufacturing Footprint

- Start of production of the CAM Gigafactory in Nysa (Poland), making Umicore the only company with a complete circular and sustainable battery materials value chain in Europe
- Building a Fuel Cell Catalyst plant in Changshu (China) to capture the fast-emerging growth in fuel cell technology.
- LT supply agreement with Terrafame for low carbon, high-grade Nickel from Finland, covering a substantial part of Umicore’s future needs in Europe
- MoU with Canadian Government, unlocking the North American battery materials market for Umicore compliant with the US Inflation Reduction Act (IRA)

Clean Mobility Ecosystem

- Partnership with ACC on Umicore’s new generation Li-ion battery recycling technologies, leading the way towards a battery circular economy
- Proof of concept Battery Passport milestone towards creating traceability and accountability at each EV battery supply chain stage

ESG Roadmap

- Diversified and extended funding base at attractive conditions with newly issued sustainability linked debt instruments for a total amount of €1,091 million, a strong validation of Umicore’s “2030 RISE” strategy by institutional debt investors
- SBTi validation of Umicore’s 2030 Scope 1/2/3 targets
Key figures 2022
Resilient business performance in a volatile market

<table>
<thead>
<tr>
<th>Revenues</th>
<th>Adj. EBITDA</th>
<th>Adj. Net profit, Group share</th>
<th>Adj. EBITDA margin</th>
<th>ROCE</th>
<th>Free operating cash-flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>€ 4.2 bn</td>
<td>€ 1.2 bn</td>
<td>€ 593 m</td>
<td>27.3%</td>
<td>19.2%</td>
<td>€ 344 m</td>
</tr>
</tbody>
</table>

*Revenue: all revenue elements less the value of the following purchased metals: Au, Ag, Pt, Pd, Rh, Co, Ni, Pb, Cu, Ge, incl. Li, Mn as of 2021.
*Cost inflation = excluding pass-through to customers.

### Revenue bridge (€ m)
- FY 21 restated: 3,791
- Catalysis: 89
- E&ST: 276
- Recycling: 4,155
- FY 22: 1,107

### Adjusted EBITDA bridge (€ m)
- FY 21: 1,251
- Business performance: 154
- FY 22 Sub-total: 1,405
- Cost inflation: -184
- PM impact: -70
- FY 22: 1,151

+12% yoy
-8% yoy
+10% yoy
-11% yoy
+10% yoy
Revenue (excl. metals) steadily increasing the last 5 years, stable on the first year of Covid

- EBITDA margin consistently above 20%,
  - Peak of 32.5% in 2021, benefitting from Umicore good exposure to metal price

1 All revenue elements less the value of the following purchased metals: Au, Ag, Pt, Pd, Rh, Co, Ni, Pb, Cu, Ge, incl. Li, Mn as of 2021
Free operating cash-flow remains strong
Supporting future growth

Cash flow from operations after changes in working capital at € 835 million, driven by higher working capital requirements in E&ST on the back of increased battery metal prices

Free cash flow from operations of € 344 million

- Capex and capitalized development expenses up yoy to € 491 million
- E&ST accounting for more than 60% of Group capex, driven by RBMs European expansion plan

Continued capex discipline for expansion programs

Free cashflow from operations = cashflow generated from operations – capex & capitalized development expenses
Condensed consolidated P&L
Solid net result

<table>
<thead>
<tr>
<th>€ Million</th>
<th>2021</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted EBITDA</td>
<td>1,251</td>
<td>1,151</td>
</tr>
<tr>
<td>- Depr. &amp; Amortization</td>
<td>(280)</td>
<td>(286)</td>
</tr>
<tr>
<td>Adjusted EBIT</td>
<td>971</td>
<td>865</td>
</tr>
<tr>
<td>- Adj net finance cost</td>
<td>(100)</td>
<td>(125)</td>
</tr>
<tr>
<td>- Adjusted Tax</td>
<td>(196)</td>
<td>(145)</td>
</tr>
<tr>
<td>Adjusted net result</td>
<td>675</td>
<td>595</td>
</tr>
<tr>
<td>- Minorities</td>
<td>(8)</td>
<td>(2)</td>
</tr>
<tr>
<td><strong>Adjusted net result Group share</strong></td>
<td><strong>667</strong></td>
<td><strong>593</strong></td>
</tr>
<tr>
<td><strong>Adjusted EPS</strong></td>
<td><strong>2.77</strong></td>
<td><strong>2.47</strong></td>
</tr>
</tbody>
</table>

- Increase in adj. net financial cost, reflecting higher net interest charges, in particular on short term loans, and somewhat higher FX-related costs
- Lower adj. tax charges from lower taxable profit and lower adj. effective group tax rate (20.0% vs 23.1%).
- Limited € -32 million adjustments to EBIT, mainly linked to environmental provisions

| Adjustments to EBIT(DA) | (75) | (32) |
| Adjustments to net result Group share | (49) | (23) |
| **Net result Group share** | **619** | **570** |
In 2022,
• Net financial debt of € 1.1 bn (€ +0.1 bn yoy)
• Leverage ratio of 0.96x LTM adj EBITDA
Stable net financial debt versus end 2021
Leverage ratio of 0.96x LTM adj EBITDA

- Free operating cashflow of €344 million, despite €342 million increase in working capital and €491 million investments
- Funded a combined €517 million cash outflow related to taxes, net interest charges, dividends & net purchase of own shares
Q1 updated guidance for full year 2023 as published on 27 April, 2023

**CATALYSIS**
Adj. EBIT/EBITDA expected somewhat above 2022 record levels, slightly above current market expectations

- Automotive Catalysts to continue to benefit from strong market position in gasoline catalyst applications and a further recovery of the supply chain and the Chinese HDD market.

**E&ST**
Adj. EBIT/EBITDA anticipated somewhat below 2022 level, slightly above current market expectations

- Rechargeable Battery Materials' earnings expected in line with 2022 level
- Normalization of Cobalt & Specialty Materials performance in 2023 compared to exceptional 2022 profitability

**RECYCLING**
Adj. EBIT/EBITDA expected to be in the lower range of current market expectations

- Impacted by lower PGM prices and related, less supportive, supply environment for PGM-rich recyclables
- Taking into account the current outstanding strategic metal hedges

Umicore updated on its Q1 trading conditions and outlook on 27 April 2023
Refer to Q1 press-release and webcast for a full overview

Based on current metal price levels and assuming present market and macroeconomic conditions continue to prevail.
Thank you!

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Should one or more of these risks, uncertainties or contingencies materialize, or should any underlying assumptions prove incorrect, actual results could vary materially from those anticipated, expected, estimated or projected.

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Additional information

01 Business Group Overview
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  01.b E&ST
  01.c Recycling

02 Shareholder structure, financial calendar and leadership overview

03 Financial KPIs

04 Glossary
01. Business Group Overview
Catalysis overview

**Automotive Catalysts**
We are one of the leading producers of emission control catalysts for gasoline and diesel on-road and non-road applications, power generation and industrial processes to meet environmental standards around the world.

**Precious Metals Chemistry**
We are experts in metals-based catalysis for life-enhancing applications. Emission treatment technologies, cancer treatments, the production of fine chemicals and advanced electronics – all are made possible by our organometallic technology know-how.

**Fuel Cell & Stationary Catalysts**
We are a leading player in emissions control catalysis for industrial plants and shipping, and supply state-of-the-art fuel cell catalysts for zero emission mobility and green hydrogen production.
Catalysis
Balancing growth, returns and cash flows

Value driver

Earnings growth
(adj EBITDA growth)

Return-driver
(adj ROCE > Cost of Capital)

Free Operational CF generation

Low
Contribution to Umicore’s value creation
High

Cost of Capital

Fuel Cells

• Capture unprecedented value peak in Automotive Catalysts in the decade
• Prepare growth acceleration in fuel cell catalysts after mid-decade

• Reduction in Cap Empl in Automotive Catalysts to drive high(er) returns
• Initial payback in fuel cells towards end of decade (lower capital intensity)

• High free cash flows over the plan
• Transition from growth to free cash flow focused business model in Automotive Catalysts

Trend vector from 2021-2026 to 2026-2030
Catalysis
Committed to capture medium-term growth while driving efficiency & cash

**Revenues**

<table>
<thead>
<tr>
<th>Year</th>
<th>2021</th>
<th>2026 ambition</th>
<th>2030 vision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>€ 1.69 bn</td>
<td>appr. € 2.0 bn</td>
<td>&gt; 2021 and &lt; 2026</td>
</tr>
<tr>
<td>adj EBITDA</td>
<td>€ 0.40 bn</td>
<td>close to € 0.5 bn</td>
<td>comparable vs 2026</td>
</tr>
<tr>
<td>margin</td>
<td>24 %</td>
<td>&gt; 20 %</td>
<td>&lt; 30%</td>
</tr>
</tbody>
</table>

**Fuel cell catalysts in % of adj EBITDA**

<table>
<thead>
<tr>
<th>Year</th>
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<th>2026 ambition</th>
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</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 %</td>
<td>&lt; 10 %</td>
<td>&lt; 30%</td>
<td></td>
</tr>
</tbody>
</table>

**adj EBITDA**

- 2021 actual reported adjusted EBITDA
- 2026 assuming a gradual PGM price normalization scenario
- at over 2020 PGM prices

**Attractive medium-term growth** from car market recovery, final legislation cycle and HDD expansion

**Maintain margins above historical average** through continued operational efficiency focus

**Substantial free cash flows** accelerating as from mid-decade

**Strong position in fuel cells** with meaningful growth contribution as from mid-decade and material contribution as from next decade

**Double digit CAGR at 2020 rates**

**Mid single digit CAGR 2021-2026**

**Substantial free cash flows accelerating as from mid-decade**


- Double digit CAGR
- Close to € 0.5 bn
- € 0.4 bn
- + 15 % CAGR
- + 12 % at 2020 rates

**Fuel cell catalysts** in % of adj EBITDA

- < 5 %
- < 10 %
- < 30%
Catalysis 2022 | Market context
Subdued global car market over 2022

Annual global passenger car production (all ICE powertrains)

- Continued global logistic disruptions, shortages of semi-conductors, COVID-19 resurgence (H1 in China)
- Manufacturers reduced production, despite strong global demand
- Lower y-o-y light-duty ICE production in China and EU, offset by strong growth in other regions
- Global light-duty ICE production remained in line with 2021 (+1.5%)

Source: IHS & Umicore
Automotive Catalysts
- Outperformed global car market, significant market share gains especially in China
- Strong operational performance, efficiency gains countering inflation
- Passing through inflation, supporting margins

Precious Metals Chemistry
- Revenues increased vs 2021
- Strong demand, especially for inorganic chemicals in automotive
- Operational excellence and favorable PGM prices

Fuel Cell & Stationary Catalysts
- Revenues flat vs 2021, impacted by H1 COVID-19 lockdowns in China
- Investing in fuel cell catalyst plant in China to capture future growth

Record performance, margins well above historical levels

Information as published in the framework of the 2022 FY results.
Catalysis 2022 | AC revenue composition

AC delivers strong free operating cash-flows in a challenging context

**Strong market position**

- Leading position in LDG segment, with marketshare gains in most global markets in 2022
- Favorable customer and platform mix in major regions in LDV and HDD
- Highly efficient manufacturing system and production footprint, with strong resilience to volume fluctuations

- Final Euro 7 norms for LDG support 2030 RISE ambitions for AC
- Expected Euro 7 value uplift for LDG supporting AC profitability ambitions and its potential to generate a free cash flow of €3 Bn between 2022 and 2030
- Strong portfolio of next generation catalyst technologies, several Euro 7 platforms already acquired in 2022

**2022 Automotive Catalysts revenues per segment**

- Over 80% of AC generated in segments with highest combustion engine longevity (LDG and HDD)

Information as published in the framework of the 2022 FY results.
Zoom in on Automotive Catalysts (AC) and Fuel Cell & Stationary Catalysts (FCS)
Catalysis: capture peak in Automotive Catalysts and emerging growth in Fuel Cells

Fuel Cells: prepare growth acceleration after mid-decade

Automotive Catalysts: extending value capturing through presence in most attractive market segments with right technology

- Strong position in light-duty gasoline; segment benefiting most from upcoming emissions legislation
- Growing share in HDD segment in China and Europe

Continued focus on maximizing business value

- Continued focus on high-capacity utilization (>85%)
- Continued focus on process efficiency
- Technology value pricing as core principle
- Keep capacity utilization high (>85%) and align operations with market evolution
- Annual fixed cost reduction of € 100 Mn in 2030

~ € 3 billion cash delivered between 2022 and 2030
Accelerating mobility transformation
ICE remains dominant powertrain solution in 2030

Light-duty vehicles
Proportion by powertrain in global production
Source: Umicore market model – LDV

Heavy-duty vehicles
Proportion by powertrain in global production
Source: Umicore market model – HDV (incl. medium-duty vehicles, on-road vehicles only)

BEV: battery electric vehicle
FC: fuel cell vehicle
CNG/LNG: Compressed natural gas / Liquefied natural gas
PHEV: plug-in (hybrid) vehicle
ICE: internal combustion engine (gasoline/diesel) only

95% in 2021
66% by 2030
98% in 2021
78% by 2030
Attractive value to capture the next decade
Emission catalyst market moving towards unprecedented value peak

Value growth driven by market rebound and tighter legislation for light-duty and heavy-duty vehicles

Total addressable market in 2030 still exceeding addressable market in 2021

Attractive market profile – Ability to capture peak profitability and afterwards generate significant amount of free cash flow

Source: Umicore market model – LDV and HDV (includes emissionized Heavy-Duty and Medium-Duty Vehicles; on-road only)
Automotive Catalysts – RISE
Capture peak profitability and maximize value

Capture maximum value from market peak
- Maintain strong position in light-duty gasoline catalysts globally
- Continued growth in heavy-duty catalysts in China and Europe

Maximize business value throughout the plan

Throughout period:
€ ~3 Bn total cash delivered and critical talent pool, supporting Umicore growth
ROCE ~20% in 2030 and adj. EBITDA margin ~20%
PEM catalyst market to witness exponential growth towards 2040

Global PEM catalyst demand per application (t)

- 2021: 7 tons
- 2025: 24 tons
- 2030: 90 tons
- 2040: 300 – 400 tons

Source: Umicore market model (HDV incl. MDV)

Strong regulatory support for hydrogen economy in Europe and APAC region

PEM catalyst demand to grow exponentially as of 2025 driven by increasing penetration of fuel cell HDV as well as electrolysis

Global addressable market of 90t for Umicore by 2030
Fuel Cells – RISE

Capture emerging growth as leading fuel cell catalyst provider

Capture near term growth in fuel cells for HDV/MDV and long range LDV

Adjacent opportunities - market potential for green electrolysis

R
Reliable Transformation Partner
BUILDING CUSTOMER COOPERATIONS ACROSS THE VALUE CHAIN

I
Innovation & Technology Leader
BENCHMARK MATERIALS – INNOVATION AND RESEARCH AT THE HEART OF THE FUEL CELL GROWTH STRATEGY

S
Sustainability Champion
KEY PARTNER FOR THE TRANSITION TO ZERO-EMISSIONS MOBILITY

E
Excellence in execution
SCALING-UP PRODUCTION FOOTPRINT IN MOST COST-EFFICIENT WAY

Head start, based on proven technology leadership
Profitable today and value accretive throughout period
Colleague working on the next generation of CAM in Umicore Process Competence Center in Olen.
# Energy & Surface Technologies overview

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rechargeable Battery Materials</strong></td>
<td>We are a pioneer in battery materials and a leading cathode material supplier for rechargeable lithium-ion batteries, giving added range and performance to electric vehicles, and longer battery life for portable electronics.</td>
<td>Ni, Co, Li, Mn</td>
</tr>
<tr>
<td><strong>Cobalt &amp; Specialty Materials</strong></td>
<td>We are experts in sourcing, production and distribution of cobalt and nickel products. Our materials are at the heart of everyday products such as rechargeable batteries, tools, paints and tyres. Our recycling and refining processes, give new life to cobalt and other metals.</td>
<td>Co, Ni, W, Ta, Cu</td>
</tr>
<tr>
<td><strong>Metal Deposition Solutions</strong></td>
<td>We are one of the world's leading suppliers of products for (precious) metal-based electroplating and PVD coating of surfaces in the nano and micrometre range. Our solutions for the highest demands are used in many products of daily use or enable their production in the first place.</td>
<td>Au, Ag, Pd, Pt, Rh, Ru</td>
</tr>
<tr>
<td><strong>Electro-Optic Materials</strong></td>
<td>We are a leading supplier of material solutions for the space, optics and electronics sectors, including products for thermal imaging, wafers for space solar cells, high brightness LEDs and chemicals for fiber optics.</td>
<td>Ge, Pt, Se, Si, Ti, W</td>
</tr>
</tbody>
</table>
## E&ST

**Balancing growth, returns and cash flows**

<table>
<thead>
<tr>
<th>Value driver</th>
<th>Low</th>
<th>Contribution to Umicore’s value creation</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings growth</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(adj EBITDA growth)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Return-driver</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(adj ROCE &gt; Cost of Capital)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free Operational CF generation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Unprecedented transformational growth in Rechargeable Battery Materials**
- **Partial payback by 2026 from high growth investments in Rechargeable Battery Materials; becoming value creative shortly thereafter**
- **Significant upfront growth investments dampen free cash flows; strong free cash flows once new greenfield sites are ramped-up**

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Trend vector from 2021-2026 to 2026-2030
Rechargeable Battery Materials to drive transformative growth

**Revenues**
- **2021**: €1.17 bn
- **2026 ambition**: + €2.5 bn to €3 bn vs 2021
- **2030 vision**: + €2.5 bn to €3.5 bn vs 2026

**adj EBITDA margin**
- **2021**: 22%
- **2026 ambition**: < 20%
- **2030 vision**: higher vs 2026

Non-linear appr. 20% CAGR 2021-2026
or appr. x 2.5

Phased growth conditional upon value creative returns from contracts

**Step-change in revenues & earnings as from mid-decade** driven by Rechargeable Battery Materials

**Robust underlying EBITDA margins** despite impact from substantial upfront growth & start-up costs. Margin increase after 2026

**Material but phased investments** conditional upon value creative returns

**Non-Rechargeable Battery Materials businesses** target selective growth, maintaining +20% adj EBITDA margins
E&ST 2022 | Market context
Lithium price blasts mid-2021

Average 2021 14 €/kg
Average 2022 68 €/kg
30/12/2022 spot price 75 €/kg
E&ST 2022 | Market context

EV sales reached 10% of global new vehicles sales in 2022

- **Mobility transformation** – rapid **acceleration** continues
  - Regulatory push: EU zero-CO₂ target in 2035 and US Inflation Reduction Act
  - Higher customer demand for EVs
  - Car OEMs commit to significant investments to roll out new EV models

- **Energy crisis** – a strong **catalyst for renewable energy** investments in EU

- Shift to e-mobility to increase **Umicore’s addressable CAM market** by x6-7 until 2030

- **Structural undersupply of CAM in Europe and North America** expected until 2030, accelerated by push to regional supply chains

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EV = Full Electric Vehicle
CAM Capacity Development

Structural CAM undersupply

- 2022 - 2030 – NMC pCAM and CAM manufacturing capacity in EU & N-A insufficient to cover local demand
- Supply gap to be only temporarily bridged from Asia:
  - Local content requirements and geopolitical independency for regional subsidy schemes (US IRA, EU NZIA)
  - OEM CO₂ reduction targets (scope 3)
  - Need for robust and reliable supply-chains close to customers

In this undersupply context, Umicore’s fully integrated supply chain and existing / planned CAM manufacturing footprint in EU and N-A America to play important role in supporting regional demand of battery and car OEMs

CAM = Cathode Active Material  Source: Umicore and third-party consultant analysis
E&ST 2022 | Performance
Revenues +28%, adj. EBITDA margin at 22.3%

Higher revenues and earnings in RBM and CSM

Rechargeable Battery Materials
- As anticipated, sales volumes of legacy CAM contracts subdued
- Revenues\(^1\) and earnings well up, incl. favorable exposure to increase in lithium price
- Preparations for 2024 ramp-up on track, with good customer traction in 2022
- Intention to group RBM activities within one legal entity within Umicore

Cobalt & Specialty Materials
- Revenues substantially higher
- Exceptionally strong demand and a supportive cobalt and nickel environment and related distribution activities in H1
- As anticipated, normalization of performance in H2

Metal Deposition Solutions & Electro-Optic Materials
- Stable revenues with good operational performance

\(^1\) Li and Mn pass through excluded from revenues as of 2021

Information as published in the framework of the 2022 FY results.
Zoom in on Rechargeable Battery Materials (RBM)
Electrification increasing at fast pace, triggered by regulatory push and OEM commitments

**Light-duty vehicles**
Proportion by powertrain in global car production

Source: Umicore market model

**Medium- and Heavy-duty vehicles**
Proportion by powertrain in global car production

Source: Umicore market model

BEV: battery electric vehicle
FC: fuel cell vehicle
CNG/LNG: Compressed natural gas / Liquefied natural gas
PHEV: plug-in (hybrid) vehicle
ICE: internal combustion engine (gasoline/diesel) only
Umicore chemistries addressing ~75% of total Light-duty EV CAM demand

Global CAM demand (GWh)
LDV only – Chemistry split

Evolving technologies reflecting car OEMs’ need for performance- and cost-focused solutions

NM(C) chemistries (incl. Mn-rich) represent vast majority of EV CAM demand in 2030

Solid-state batteries expected to gain traction based on NMC, with a single digit market share expected towards 2030

Source: Umicore market model
>20% annual market growth across all regions

CAM demand (GWh) across regions LDV only

Europe, China and North America expected to represent ~90% of total LDV CAM demand

Ongoing regionalization of supply chain:
- Geopolitical context
- OEMs’ sustainability considerations
- Security of supply

Source: Umicore market model
# Rechargeable Battery Materials - the plan to 2030

<table>
<thead>
<tr>
<th>Battery chemistry Production at scale</th>
<th>Mid-Nickel</th>
<th>High-Nickel Mid-Nickel</th>
<th>High-Nickel Mid-Nickel HV</th>
<th>High-Nickel HLM Mid-Nickel HV</th>
<th>Solid State CAM Solid State Catholyte</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td>GWh 65</td>
<td>GWh 15</td>
<td>GWh 65</td>
<td>GWh 230</td>
<td>GWh &gt;400</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 1. Pioneering Battery Materials
- Starting of CAM R&D in 1995
- Early move into industrial scale CAM production
- Business-model: **OEM Tier 2** / direct to cell makers
- Technical interface: cell makers

## 2. Re-Shaping
- Market shift to **OEM Tier-1** involvement business models, next to cell makers
- Technical interface: OEM
- Customer and platform diversification
- Pioneering new **OEM co-investment** / partnership model to secure demand and share investments

## 3. Ramping-up
- Expanding **global footprint** to support customer SC needs “from mine to battery”
- Accelerate implementation of **advanced chemistries roadmap & SSB**

## 4. Value creative growth
- **Significant growth** in sweet-spot phase for returns
- Visible impact of Umicore Scope 3 initiative to decarbonize BEV supply chain
- Full roll-out of advanced CAM technologies / SSB

### Battery chemistry
- **High-Nickel Mid-Nickel**
- **High-Nickel Mid-Nickel HV**
- **High-Nickel HLM Mid-Nickel HV**
- **Solid State CAM Solid State Catholyte**

### Production at scale
- **Europe 1/2**
- **Europe 2/2**
- **North America**

### Locations
- **Europe**
- **Korea**
- **China**
- **North America**

### Years
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
- 2030
Cathode active materials crucial for the mobility transformation …

CAM critical component determining electrification success

Key technological lever for battery performance

Biggest single contributor to overall battery cost

Critical driver of long-term cell technology strategy
… requiring critical competences and skills for CAM producers to succeed

Product

High performance and quality product with customized end specs

Joint development with customers and partners

Strong technology and IP portfolio and continuous innovation

Process

Mastering complexity and flexibility of production process

Continuous industrialization and process innovation

Extensive quality and purity control

Supply

Strategic access to raw materials – low carbon intensity, highest ESG requirements

Metal refining expertise enhancing supply flexibility

Regionalized production footprint along value chain

Ample opportunities for differentiation and gaining advantage over competitors
Rechargeable Battery Materials – RISE
Capture profitable growth and create sustainable value

Extend leadership in Europe
—
Enter North America with local production
—
Reinforce market position in Asia

R
Reliable Transformation Partner
VALUE CREATIVE STRATEGIC PARTNERSHIPS ACROSS THE VALUE CHAIN

I
Innovation & Technology Leader
TECHNOLOGY & IP PORTFOLIO COVERING PERFORMANCE & COST

S
Sustainability Champion
KEY PARTNER IN TRANSITION TO LOW CARBON MOBILITY

E
Excellence in execution
STEP-CHANGE IN PROCESS, OPERATIONAL AND ORGANIZATIONAL EXCELLENCE

Sustainable EBITDA growth with margins ~ 20% in 2030
Value accretive after 2026
Recycling overview

**Precious Metals Refining**
We operate the world’s most sophisticated precious metals recycling facility and we are experts in treating the most complex materials. Our refining and recycling technology gives used metals a new lease of life. Our processes help bring value to the circular economy.

**Precious Metals Management**
We supply and handle all precious metals, ensuring physical delivery by using both the output of our precious metals refineries and our network of industrial partners and banks. We offer our customers tailor-made solutions for delivering, hedging and trading precious metals.

**Jewelry & Industrial Metals**
We are experts in developing products and processes based on precious metals such as gold, silver and platinum. Our customers use these materials to make fine jewelry, coins, high-purity glass and industrial catalysts. We provide our customers with sustainable and responsible sourcing of these metals and closed-loop recycling.

**Battery Recycling Solutions**
Our leading technology closes the loop for rechargeable batteries. We use proprietary high-quality recycling processes to recover all valuable metals in an environmentally sound manner. We offer a unique sustainable and circular approach.
## Recycling

Balancing growth, returns and cash flows

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<tbody>
<tr>
<td>Earnings growth (adj EBITDA growth)</td>
<td>Normalizing PGM prices</td>
<td>Stable PGM prices</td>
<td>Battery Recycling</td>
</tr>
<tr>
<td>Return-driver (adj ROCE &gt; Cost of Capital)</td>
<td>Cost of Capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free Operational CF generation</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

- Earnings path to depend on prevailing metal prices
- Initial battery recycling payback second half of decade
- Highly value creative returns across the plan (even with lower metal prices)
- Battery recycling capital investment to somewhat dilute returns
- Significant free cash flows despite important mid-decade battery recycling investments

[Diagram showing recycling trend vector from 2021-2026 to 2026-2030]
Recycling

Strong margins, returns & cash flows and Battery Recycling kicking in mid-decade

- Includes one initial large-scale battery recycling plant, operational by 2026 with full contribution by end of the decade.
- Potential for additional growth + 21% CAGR.
- Normalization well above historical levels.
- High single digit CAGR at 2020 rates.
- Close to €0.5bn.
- Recyclers, Solutions - related development costs up to 2025.
- Substantial free cash flow generation, accelerating as from battery recycling plant commissioning.

Earnings dependent on assumed metal prices but continue to generating superior margins even at normalized PGM prices.

Includes substantial Battery Recycling Solutions - related development costs up to 2025.

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenues adj EBITDA in % of adj EBITDA</th>
<th>2021</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2021</td>
<td>€1.11bn, €0.64bn, 58%</td>
<td></td>
<td>&gt; €1.0bn, close to €0.5bn, &gt; 40%</td>
<td>&gt; €1.0bn, &lt; 40%</td>
</tr>
<tr>
<td>2026</td>
<td></td>
<td></td>
<td></td>
<td>&gt; €1.0bn, &lt; 40%</td>
</tr>
<tr>
<td>2030</td>
<td></td>
<td></td>
<td></td>
<td>&gt; €1.0bn, &lt; 40%</td>
</tr>
</tbody>
</table>

Sizeable additional battery recycling growth potential.
Recycling 2022 | Market context

Volatile precious metal prices

- **Average 2021**: 544 K€/kg
- **Average 2022**: 472 K€/kg
- **30/12/2022 spot price**: 369 K€/kg

Information as published in the framework of the 2022 FY results.
Recycling 2022 | Performance
Stable revenues, adj. EBITDA margin at 48.1%

Excellent operational performance, tempered by inflation headwinds and a less favorable precious metal price environment

Precious Metals Refining
• Revenues close to 2021 levels with solid volumes
• Earnings affected by cost inflation, partially offset through efficiencies
• Limited inflation pass-through options due to global market dynamics
• Pb in blood and emission values end 2022 at lowest average level ever achieved

Battery Recycling Solutions
• Successful implementation of high efficiency flow sheet and high recovery yields
• Good traction: > 5 additional agreements with battery and car OEMs
• Preparations for 150kt battery recycling plant in EU well on track

Jewelry & Industrial Metals
• Revenues up, with strong performance across most product lines

Precious Metals Management
• Earnings slightly below exceptional 2021 level, reflecting less favorable trading conditions, in particular for rhodium

Revenues (€ m)

<table>
<thead>
<tr>
<th>Year</th>
<th>Precious Metals Refining</th>
<th>Battery Recycling Solutions</th>
<th>Jewelry &amp; Industrial Metals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>300</td>
<td>626</td>
<td>83</td>
</tr>
<tr>
<td>2019</td>
<td>368</td>
<td>681</td>
<td>112</td>
</tr>
<tr>
<td>2020</td>
<td>440</td>
<td>836</td>
<td>143</td>
</tr>
<tr>
<td>2021</td>
<td>652</td>
<td>1.108</td>
<td>404</td>
</tr>
<tr>
<td>2022</td>
<td>537</td>
<td>1.107</td>
<td>257</td>
</tr>
</tbody>
</table>

Adjusted EBITDA (€ m) & EBIT(DA) margin

<table>
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<tr>
<th>Year</th>
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<tbody>
<tr>
<td>2018</td>
<td>31,1%</td>
<td>21,5%</td>
<td>83</td>
</tr>
<tr>
<td>2019</td>
<td>36,8%</td>
<td>27,6%</td>
<td>112</td>
</tr>
<tr>
<td>2020</td>
<td>43,3%</td>
<td>50,8%</td>
<td>222</td>
</tr>
<tr>
<td>2021</td>
<td>57,7%</td>
<td>51,7%</td>
<td>404</td>
</tr>
<tr>
<td>2022</td>
<td>48,1%</td>
<td>41,8%</td>
<td>257</td>
</tr>
</tbody>
</table>

Information as published in the framework of the 2022 FY results.
Zoom in on Precious Metal Refining (PMR) and Battery Recycling Solutions (BRS)
Recycling: Precious Metals Refining as solid platform to enable success in Battery Recycling

EBITDA

Precious Metals Refining
Undisputed leader in complex precious metals recycling with minimized carbon footprint

<table>
<thead>
<tr>
<th>Year</th>
<th>Battery Recycling:</th>
<th>2022</th>
<th>2026</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pioneer in Europe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leverage 10kt plant and recycling know-how to establish strong position</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prepare high-volume plant in EU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Battery Recycling:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scale-up in Europe and prepare entry in North America</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Launch 150kt plant in 2026 as pioneer in Europe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Umicore Pyro/Hydro technology best in cost and sustainability</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Recycling Business Group maintaining superior returns despite normalizing PGM prices, investing in battery recycling and sustainability
Precious Metal Refining

Largest and most complex precious metals recycling operation in the world

Leading refiner of 17 different metals

Processes more than 200 different types of raw materials

World class environmental and quality standards
The value chain of metals

- Ores & concentrates
- Complex mining concentrates & residues
- Refined metals
- Smelting & refining residues
- Industry
- Complex production scrap
- New products
- Complex end-of-life materials

Industrial by-products

End-of life materials
Revenue Drivers

Main revenue drivers

Treatment & refining charges

Treatment charges are determined, among other criteria, by the complexity of the materials

Metal yield

Umicore assumes the risk of recovery above or under the contractually agreed recovery rate
Metal price exposure

Direct:
through metal yield

Indirect:
through raw material availability

Managing the effects of metal price movements on earnings

Systematic hedging of transactional exposure

Depending on market conditions hedging of (part of) structural metal price exposure through contractual arrangements

Impact on working capital is mitigated by toll-refining – metals remain property of the supplier during treatment
Umicore has unique technology

Umicore is unique due to its proprietary complex flowsheet that combines three metallurgical streams.

This enables:

- Flexibility to treat a broad range of input materials
- Recovery & valorization of the most metals
- Ability to optimize feed and therefore profitability
- Scope to broaden to new types of materials in future

- Umicore technology guarantees environmentally friendly processing, a high yield and a more competitive cost
- Umicore introduced its unique Ultra High Temperature technology for Battery Recycling more than 5 years ago
Production scrap primary source of supply towards 2030

End-of-life EV batteries and production scrap available for recycling (kMT, global)

Continuous startup of battery plants expected to produce significant pre-consumer scraps

Diverse and complex input feed mix

Diversified, flexible and robust recycling technology crucial

Source: Umicore forecast data
Importance of tuning offering for the different regional markets

End-of-life EV batteries and production scrap available for recycling – per region (kMT, global)

From 2030 end-of-life expected to become the vast majority of supply feed

Regional markets expected to emerge with specific dynamics (differentiated applications and battery technologies, regulation,...)

Importance of tuning offering for the different regional markets

Source: Umicore forecast data
Recycling is crucial for the mobility transformation...

- **SECURING RAW MATERIALS**
  - Recycling as critical additional source of supply

- **MAJOR ESG ADVANTAGES**
  - Multiple use of minerals versus single use of fossil fuels
  - Upcoming recycled content targets for new battery production
  - Proven and traceable sustainably sourced metals (battery passport)
  - Enabling regional supply chains and critical material price visibility
  - Mandatory End-of-Life battery recycling
  - Reduces the need for primary natural resources
  - Recycled material up to 96% lower CO2 footprint vs primary materials
...requiring critical competences and skills for battery recyclers to succeed

**Process**
- Effective volume & mass reduction at massive scale (> 100kt/y)
- High metal extraction yields
- Capable to process complex feed mix
- Sustainable process:
  - Safe elimination of hazardous compounds
  - Manage occupational health exposure risk
  - Low environmental impact

**Product**
- Output of high-quality battery grade materials (no downcycling)
- Realize effective compatibility with existing primary CAM-flowsheet
- Products for high-volume addressable markets

**Services**
- Capability to collect and treat a wide variety of materials (production scrap, off-spec components, end-of-life batteries, modules, cells, black mass)
- Closed-loop operating system offering our partners a user-friendly interface and compliancy information
- Competence center with integrated offering – “design for circularity”
Battery Recycling Solutions – RISE
Capture profitable growth in circular battery value chain

Scale up as frontrunner in Europe and prepare industrial presence in North America

Leverage the optimal pyro-hydro balance as differentiating technology

Attract multiple sources for short- and long-term feed

Establishing Battery Recycling Solutions as key enabler for a circular and low-carbon battery value chain
02. Shareholder Structure, Shareholder structure, financial calendar and leadership overview
Shareholder structure
Worldwide presence with mixed investor styles shareholders

Share – Geographical and investment style distribution

- United Kingdom: 35%
- United States: 25%
- RoW: 14%
- Norway: 12%
- Netherlands: 7%
- France: 8%
- Remainder: 7%
- GARP: 12%
- Growth: 42%
- Value: 19%
- Index: 21%

Key shareholders

<table>
<thead>
<tr>
<th>Firms</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groupe Bruxelles Lambert S.A.</td>
<td>15.98%</td>
</tr>
<tr>
<td>Baillie Gifford &amp; Co and Baillie Gifford Overseas Ltd.</td>
<td>9.91%</td>
</tr>
<tr>
<td>BlackRock Inc.</td>
<td>5.43%</td>
</tr>
<tr>
<td>Norges Bank</td>
<td>5.30%</td>
</tr>
<tr>
<td>APG Asset Management</td>
<td>3.00%</td>
</tr>
<tr>
<td><strong>Remainder</strong></td>
<td><strong>39.62%</strong></td>
</tr>
</tbody>
</table>

(1) Based on 31/12/2022 public data - GBL excluded
(2) Per transparency declaration received up to 28 February 2023

- 246,400,000 total shares issued (240,200,659 outstanding)
- Component of Belgium’s benchmark stock market index since 1991; listed on Euronext Brussels Stock Exchange
- High free float with large international and diversified shareholder base
- GBL largest shareholder with one representative on the Board of Directors
Financial calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 March 2023</td>
<td>Annual report 2022</td>
</tr>
<tr>
<td>27 April 2023</td>
<td>AGM 2022</td>
</tr>
<tr>
<td>02 May 2023</td>
<td>Ex-dividend trading date</td>
</tr>
<tr>
<td>03 May 2023</td>
<td>Record date for the dividend</td>
</tr>
<tr>
<td>04 May 2023</td>
<td>Payment date for the dividend</td>
</tr>
<tr>
<td>28 July 2023</td>
<td>Half-year results 2023</td>
</tr>
</tbody>
</table>
Umicore Leadership overview

Mathias Miedreich
Chief Executive Officer

Wannes Peferoen
Chief Financial Officer

Frank Daufenbach
Chief Strategy Officer

Géraldine Nolens
Executive Vice-President ESG & General Counsel

Bart Sap
Executive Vice-President Catalysis

Ralph Kiessling
Executive Vice-President Energy & Surface Technologies

Denis Goffaux
Executive Vice-President Recycling
03. Financial KPIs 2022
<table>
<thead>
<tr>
<th>Financial KPIs</th>
<th>2021</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>24,054</td>
<td>25,436</td>
</tr>
<tr>
<td>Revenues (excluding metal) (*)</td>
<td>3,791</td>
<td>4,155</td>
</tr>
<tr>
<td>Adjusted EBITDA</td>
<td>1,251</td>
<td>1,151</td>
</tr>
<tr>
<td>Adjusted EBIT</td>
<td>971</td>
<td>865</td>
</tr>
<tr>
<td>of which associates</td>
<td>21</td>
<td>16</td>
</tr>
<tr>
<td>EBIT adjustments</td>
<td>(75)</td>
<td>(32)</td>
</tr>
<tr>
<td>Total EBIT</td>
<td>896</td>
<td>832</td>
</tr>
<tr>
<td>Adjusted EBIT margin (*)</td>
<td>25.1%</td>
<td>20.4%</td>
</tr>
<tr>
<td>Effective adjusted tax rate</td>
<td>23.1%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Adjusted net profit, Group share</td>
<td>667</td>
<td>593</td>
</tr>
<tr>
<td>Net profit, Group share</td>
<td>619</td>
<td>570</td>
</tr>
<tr>
<td>R&amp;D expenditure</td>
<td>245</td>
<td>316</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>389</td>
<td>470</td>
</tr>
<tr>
<td>Net cash flow before financing</td>
<td>787</td>
<td>153</td>
</tr>
<tr>
<td>Total assets, end of period</td>
<td>9,045</td>
<td>9,942</td>
</tr>
<tr>
<td>Group shareholders’ equity, end of period</td>
<td>3,113</td>
<td>3,516</td>
</tr>
<tr>
<td>Consolidated net financial debt, end of period</td>
<td>960</td>
<td>1,104</td>
</tr>
<tr>
<td>Gearing ratio, end of period</td>
<td>23.3%</td>
<td>23.6%</td>
</tr>
<tr>
<td>Net debt / LTM adj. EBITDA</td>
<td>0.77x</td>
<td>0.96x</td>
</tr>
<tr>
<td>Capital employed, end of period</td>
<td>4,377</td>
<td>4,716</td>
</tr>
<tr>
<td>Capital employed, average</td>
<td>4,384</td>
<td>4,511</td>
</tr>
<tr>
<td>Return on capital employed (ROCE)</td>
<td>22.2%</td>
<td>19.2%</td>
</tr>
<tr>
<td>Workforce, end of period (fully consolidated)</td>
<td>11,050</td>
<td>11,565</td>
</tr>
<tr>
<td>Workforce, end of period (associates)</td>
<td>2,589</td>
<td>2,664</td>
</tr>
<tr>
<td>Accident frequency rate</td>
<td>3.70</td>
<td>4.87</td>
</tr>
<tr>
<td>Accident severity rate</td>
<td>0.12</td>
<td>0.16</td>
</tr>
</tbody>
</table>

(*) Revenues of 2021 and 2022 have been restated to exclude the pass-through value of the purchased lithium and manganese
## CATALYSIS

<table>
<thead>
<tr>
<th>(in million €)</th>
<th>FY 2021</th>
<th>FY 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total turnover</td>
<td>8.155</td>
<td>7.738</td>
</tr>
<tr>
<td>Total revenues (excluding metal)</td>
<td>1.687</td>
<td>1.776</td>
</tr>
<tr>
<td>Adjusted EBITDA</td>
<td>402</td>
<td>419</td>
</tr>
<tr>
<td>Adjusted EBIT</td>
<td>326</td>
<td>342</td>
</tr>
<tr>
<td>Total EBIT</td>
<td>308</td>
<td>331</td>
</tr>
<tr>
<td>Adjusted EBIT margin</td>
<td>19.3%</td>
<td>19.2%</td>
</tr>
<tr>
<td>R&amp;D expenditure</td>
<td>142</td>
<td>139</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>79</td>
<td>67</td>
</tr>
<tr>
<td>Capital employed, end of period</td>
<td>1.551</td>
<td>1.564</td>
</tr>
<tr>
<td>Capital employed, average</td>
<td>1.743</td>
<td>1.622</td>
</tr>
<tr>
<td>Return on capital employed (ROCE)</td>
<td>18.7%</td>
<td>22.5%</td>
</tr>
<tr>
<td>Workforce, end of period (fully consolidated)</td>
<td>3.007</td>
<td>3.080</td>
</tr>
</tbody>
</table>

## ENERGY & SURFACE TECHNOLOGIES

<table>
<thead>
<tr>
<th>(in million €)</th>
<th>FY 2021</th>
<th>FY 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total turnover</td>
<td>3.534</td>
<td>4.974</td>
</tr>
<tr>
<td>Revenues (excluding metal) (*)</td>
<td>1.001</td>
<td>1.278</td>
</tr>
<tr>
<td>Adjusted EBITDA</td>
<td>262</td>
<td>290</td>
</tr>
<tr>
<td>Adjusted EBIT</td>
<td>139</td>
<td>166</td>
</tr>
<tr>
<td>of which associates</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Total EBIT</td>
<td>141</td>
<td>169</td>
</tr>
<tr>
<td>Adjusted EBIT margin (*)</td>
<td>13.1%</td>
<td>12.6%</td>
</tr>
<tr>
<td>R&amp;D expenditure</td>
<td>64</td>
<td>107</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>219</td>
<td>296</td>
</tr>
<tr>
<td>Capital employed, end of period</td>
<td>2.275</td>
<td>2.751</td>
</tr>
<tr>
<td>Capital employed, average</td>
<td>2.198</td>
<td>2.498</td>
</tr>
<tr>
<td>Return on capital employed (ROCE)</td>
<td>6.3%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Workforce, end of period (fully consolidated)</td>
<td>3.836</td>
<td>3.991</td>
</tr>
<tr>
<td>Workforce, end of period (associates)</td>
<td>792</td>
<td>821</td>
</tr>
</tbody>
</table>

(*) Revenues of 2021 and 2022 have been restated to exclude the pass-through value of the purchased lithium and manganese

## RECYCLING

<table>
<thead>
<tr>
<th>(in million €)</th>
<th>FY 2021</th>
<th>FY 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total turnover</td>
<td>15.609</td>
<td>15.338</td>
</tr>
<tr>
<td>Total revenues (excluding metal)</td>
<td>1.108</td>
<td>1.107</td>
</tr>
<tr>
<td>Adjusted EBITDA</td>
<td>640</td>
<td>532</td>
</tr>
<tr>
<td>Adjusted EBIT</td>
<td>573</td>
<td>463</td>
</tr>
<tr>
<td>Total EBIT</td>
<td>529</td>
<td>463</td>
</tr>
<tr>
<td>Adjusted EBIT margin</td>
<td>51.7%</td>
<td>41.8%</td>
</tr>
<tr>
<td>R&amp;D expenditure</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>83</td>
<td>81</td>
</tr>
<tr>
<td>Capital employed, end of period</td>
<td>461</td>
<td>347</td>
</tr>
<tr>
<td>Capital employed, average</td>
<td>345</td>
<td>415</td>
</tr>
<tr>
<td>Return on capital employed (ROCE)</td>
<td>165.9%</td>
<td>111.6%</td>
</tr>
<tr>
<td>Workforce, end of period (fully consolidated)</td>
<td>2.867</td>
<td>2.996</td>
</tr>
</tbody>
</table>
04. Glossary
Glossary

The below definitions cover Umicore’s main financial Alternative Performance Measures (non-IFRS definitions).

**Adjusted EBIT**: EBIT - EBIT adjustments.

**Adjusted EBIT margin**: Adjusted EBIT of fully consolidated companies / revenues excluding metals.

**Adjusted EBITDA**: Adjusted EBIT + adjusted depreciation and amortization of fully consolidated companies.

**Adjusted EBITDA margin**: Adjusted EBITDA of fully consolidated companies / revenues excluding metals.

**Adjusted EPS (Earnings per share)**: Adjusted net earnings, Group share / average number of (issued shares – treasury shares).

**Average capital employed**: For half years: average of capital employed at start and end of the period. For full year: average of the half year averages.

**Capital employed**: Fixed Assets + Working Capital (Inventories + adjusted Trade & Other Receivables – adjusted Trade & Other Payables) – Translation Reserves – Current & Non-Current provisions other than provisions for Employee Benefits.

**Capital expenditure**: Capitalized investments in tangible and intangible assets, excluding capitalized R&D costs.

**EBIT**: Operating profit (loss) of fully consolidated companies, including income from other financial investments + Group share in net profit (loss) of companies accounted for under equity method.

**EBIT adjustments**: Includes adjusted items related to restructuring measures, impairment of assets, and other income or expenses arising from events or transactions that are clearly distinct from the ordinary activities of the company. This includes a.o. adjustments related to the sale of business activities or environmental provisions related to historic pollution and environmental remediation of closed sites.

**Effective adjusted tax rate**: Adjusted tax charge / adjusted profit (loss) before income tax of fully consolidated companies.

**Free cash flow from operations**: Cashflow generated from operations – capex & capitalized development expenses.

**Gearing ratio**: Net financial debt / (net financial debt + equity of the Group).

**Market capitalization**: Closing price x total number of outstanding shares.

**Net cashflow before financing**: Net operating cashflow – net cashflow generated by (used in) investing activities.

**Net financial debt**: Non-current financial debt + current financial debt - cash and cash equivalents.

**Net debt / LTM adj. EBITDA**: Net financial debt divided by adjusted EBITDA of the last 12 months.

**Return on capital employed (ROCE)**: Adjusted EBIT / average capital employed.

**Revenues (excluding metal)**: All revenue elements less the value of the following purchased metals: Au, Ag, Pt, Pd, Rh, Co, Ni, Pb, Cu, Ge and also incl. Li, Mn as of 2021. In order to neutralize distortions from fluctuating metal prices and precious metal prices in particular, Umicore uses revenues excluding the value of purchased metals rather than turnover (which include the value of the purchased metals) to track its performance. This is an industry practice followed by direct peers with similar activities.

**R&D expenditure**: Gross research and development charges, including capitalized costs. The reported R&D figures exclude R&D of associates.
Glossary

The below definitions cover Umicore’s main business & technical abbreviations

**Catalysis Glossary**

**Automotive platform:** A shared set of common design, engineering and production efforts as well as major components over a number of outwardly distinct models of vehicles

**Catalysis/catalyst:** Catalysis is a chemical process whereby one of the elements used in the reaction process, the catalyst, makes this chemical reaction possible, or speeds up this process.

**China / Euro 7:** Chinese / European air pollution emissions standard for light-duty and heavy-duty vehicles, imposing stringent norms in particular for gasoline vehicles and heavy-duty diesel.

**Emission Control Catalyst:** Emission control catalysts constitute an essential part of today’s vehicles powered by internal combustion engines, mitigating the harmful effects of pollutants in the exhaust such as carbon monoxide, hydrocarbons, nitrogen oxides, and particulate matter. Emission control catalysts are made from Platinum Group Metals (Pd, Pt, Rh) which have specific properties (pollutants attach to the metals). Emission control catalysts are highly customized and tailormade to the specific car / truck engine characteristics as well as the applicable emission norms which can differ from one region to another. Umicore’s Automotive Catalysts business unit produces catalysts for transportation, while the Stationary Catalysts activity produces this for power plants, industry.

**Emission norms:** Emission standards are the legal requirements governing air pollutants released into the atmosphere. Emission standards set quantitative limits on the permissible amount of specific air pollutants that may be released from specific sources over specific timeframes. Many emissions standards focus on regulating pollutants released by automobiles and other powered vehicles. Others regulate emissions from industry, power plants, small equipment such as lawn mowers and diesel generators, and other sources of air pollution. There are largely three main sets of standards: United States, Japanese, and European, with various markets mostly using these as their base. India, China, and other newer markets have also begun enforcing vehicle emissions standards (derived from the European requirements) as growing vehicle fleets have given rise to severe air quality problems there, too.

**Fuel cell catalysts (FCC):** a fuel cell is an electrochemical cell that converts the chemical energy of a fuel (hydrogen) and an oxidizing agent (oxygen) into electricity. Fuel cells can produce electricity continuously for as long as fuel and oxygen are supplied. A hydrogen fuel cell catalyst eases the reaction of oxygen and hydrogen. These catalysts are made with platinum. Umicore’s Fuel Cell activity produces PEM fuel cell catalysts and it’s a market leader in the transportation.

**Gasoline Particulate Filters (GPF):** Gasoline particulate filters are used to remove particulate matter from the exhaust gas from a gasoline direct injection (GDI) engine. The implementation of Euro 6 and China 6 emission norms in 2018 / 2019 resulted in the introduction of GPF’s in most gasoline direct injection engines in these regions. Heavy duty diesel (HDD): Large diesel vehicles – either on-road, such as trucks and buses, or non-road such as heavy plant and mining equipment or locomotives and agricultural equipment.

**Heavy duty vehicle (HDV):** Primarily heavy-weight trucks (but also off-road heavy transportation). Mostly using diesel (heavy-duty diesel – HDD) but growing use of hydrogen.

**Light duty vehicle (LDV):** Primarily passenger cars – using diesel, gasoline or other fuel.

**Original Equipment Manufacturer (OEM):** In the automotive industry, refers to car manufacturers.

**Platinum-group metals (PGMs):** The six platinum-group metals are ruthenium, rhodium, palladium, osmium, iridium, and platinum. In particular, palladium, platinum and rhodium are key components of emission control catalysts.

**PEM FCC:** Proton-Exchange-Membrane fuel cell catalysts are a type of fuel cells (see fuel cell catalyst)
Glossary
The below definitions cover Umicore’s main business & technical abbreviations

Rechargeable Battery Materials Glossary:

Battery Electric Vehicle (BEV): full electric vehicle

Cathode active materials (CAM): The cathode is the positive side in a (rechargeable) lithium-ion battery. In the charging phase ions are released from the cathode and migrate to the anode (negative side), thereby storing electricity. In the discharging phase, the ions move back to the cathode, thereby releasing electricity. Cathode active materials are composed of lithium and metals and are critical components in batteries, determining to a large extent the energy density, power, price, durability, cyclability, fast charging, thermal stability… of the battery and its end application.

Cathode chemistries: cathode active materials have different characteristics depending on type and ratio of metals. For example, Ni(Nickel) has high capacity, Mn(Manganese) and Co(Cobalt) has high safety and Al(Aluminum) increases power of a battery.

- NMC (Lithium-Nickel-Manganese-Cobalt-Oxide): One of the most successful li-ion cathode formulas developed to date and which has become to go-to powder to develop batteries. It delivers strong overall performance and excellent energy which makes it the preferred option for automotive batteries. NMC powder can be made in a variety of blends (depending on the proportional content of the different metals). Umicore covers the full spectrum of NMC chemistries, and its production lines are entirely flexible between the different types.

- NMC – HV (“high voltage” NMC): step in NMC innovation roadmap allowing high charge voltage

- HLM (High Lithium and Manganese cathode material): a variant within the NMC family, with high lithium and manganese content, which is attracting much attention as it is cost-effective while offering higher energy density than LFP. Not yet commercialized in the industry but in development. Umicore is also actively working on this with customers.

- LFP (Lithium Iron phosphate): is a popular, cost-effective cathode material that is known to deliver excellent safety and long-life span. On the other hand, LFP delivers a lower nominal voltage, which results in lower specific energy when compared to other cathode materials on the market.

- NCA (Lithium Nickel-Cobalt-Aluminum Oxide): within the NMC family, however, replacing the manganese with aluminum. This chemistry has a high nickel content, which contributes to a longer distance that can be covered with a single-time charging. It comes, however, also at a higher cost point which makes it a somewhat lesser preferred chemistry by the automotive industry.

Electrified vehicle (EV): Vehicle (passenger car or other) that runs fully or partially on electricity, rather than on conventional fuel.

New Energy Vehicle policy (NEV): policy to promote electric vehicle deployment in China

Solid State Batteries (SSB): A solid-state battery is a battery technology that uses solid electrodes and a solid electrolyte, instead of the liquid electrolytes found in lithium-ion batteries. Solid-state batteries can provide potential solutions for many problems of lithium-ion batteries, such as flammability, limited voltage, limited cycling performance and strength. As such they are on the roadmap of most car manufacturers to be gradually introduced as of the second half of the decade. Umicore has developed specific NMC cathode materials for solid state as well as innovative, break-through “catholyte” material, which combines the solid electrolyte and cathode materials in one component, hereby offering a strong value proposition.
Glossary

The below definitions cover Umicore’s main business & technical abbreviations

Recycling Glossary:

Closed loop: For Umicore a “closed loop” involves taking back secondary materials from customers (e.g. production residues) or End-of-Life materials (e.g. used mobile phones, automotive catalysts). The recovered metals are then fed back into the economic cycle.

Free metal yield: Surplus metal recovered within a refining and recycling process. This is a significant revenue stream of Umicore’s refining and recycling processes, which is dependent on the metal price evolution.

Hydrometallurgy: Hydrometallurgy involves the use of aqueous solutions for the recovery of metals from ores, concentrates, and recycled or residual materials. Umicore’s Precious Metals Refining and Battery Recycling Solutions activities combine the advantages of both the pyrometallurgical and hydrometallurgical processes.

Raw materials:

Primary raw material: Material which has never before been subjected to use or processed into any form of end-use product (or part thereof) other than that required for its manufacture. In the absence of information from the supplier on the nature of the raw materials supplied, these raw materials are considered as primary. The collected data are expressed in terms of total tonnage of incoming material.

Secondary raw material: Material which has been used and/or processed before and can be reused or processed again into any form of end-use product (or part thereof). Includes both pre- and post-consumer materials.

Secondary pre-consumer raw material: Material resulting from the industrial processes in the value chain before that material has been processed into a product. Please note that this includes waste materials originating from intermediate manufacturing steps in the value chain using primary raw materials as input. In all cases the material should not be suitable for consumption in the intermediate manufacturing steps from which it originates.

Secondary post-consumer raw material: Material resulting from products ending at least one lifetime. Please note that this includes waste materials originating from intermediate manufacturing steps in the value chain using secondary raw materials (pre- and or post-consumer raw materials) as input. This also includes material recovered from waste generated by industrial facilities in their role as end-users of a finished product. In all cases the material should not be suitable for consumption in the intermediate manufacturing steps from which it originates. This also includes material recovered from waste generated by industrial facilities in their role as end-users of a finished product.

Platinum-group metals (PGMs): The six platinum-group metals are ruthenium, rhodium, palladium, osmium, iridium, and platinum.

Pyrometallurgy: Pyrometallurgical processing involves incineration and smelting in a furnace at high temperatures. Has a very high reaction rate which allows to have a quick recovery process, and a large robustness to impurities. Lower physical footprint compared to hydrometallurgy. Umicore’s Precious Metals Refining and Battery Recycling Solutions activities combine the advantages of both the pyrometallurgical and hydrometallurgical processes.
Glossary

The below definitions cover ESG-related Performance Measures

CO2 equivalent (CO2e): The universal unit of measurement to indicate the global warming potential (GWP) of each of the six greenhouse gases, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis.

Energy consumption: the sum of indirect energy consumption (energy from purchased electricity, steam, compressed air and heat) and direct energy consumption (energy from fuel, gas oil, natural gas, LPG, coal, cokes, pet cokes etc.) at our sites. This includes also self-generated energy, for which only the consumption of fuels is taken into consideration to avoid double-counting. Energy that is sold to third parties is not included.

Greenhouse gas (GHG): GHGs are the six gases listed in the Kyoto Protocol: carbon dioxide (CO2); methane (CH4); nitrous oxide (N2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF6). See ‘Kyoto Protocol’.

GHG emissions intensity: total scope 1+2 CO2e market-based emissions divided by the total revenues excluding metals.

Life Cycle Analysis (LCA): LCA measures the environmental impacts of each distinct part involved in creating and using products and services, such as energy used in production, fuel used in transport, and end-of-life ecological costs.


Scope 1 CO2e emissions: A reporting organization’s direct GHG emissions.

Scope 2 CO2e emissions: A reporting organization’s indirect GHG emissions from the generation of purchased electricity, heating/cooling, compresses air or steam.

Scope 3 CO2e emissions: A reporting organization’s indirect emissions that occur upstream and downstream in the value chain, including purchased goods and services, business travel, employee commuting, waste disposal, use of sold products, transportation and distribution (up- and downstream), investments and leased assets and franchises.

Scope 4 CO2e emissions: emission reductions which occur outside of a product’s lifecycle or value chain, but as a result of the use of the product. Also referred to as “avoided emissions”.

Sustainable Development Goals (SDG): The 17 Sustainable Development Goals adopted by the United Nations on September 25 2015 build on the Millennium Development Goals and aim at ending poverty, protecting the planet, and ensuring prosperity for all as part of a new UN sustainable development agenda. Each goal has specific targets to be achieved by 2030.

Task Force on Climate-related Financial Disclosure (TCFD): Recommendations launched in 2017 to improve and increase reporting of climate-related financial information. CDP’s disclosure platform provides the mechanism for reporting in line with the TCFD recommendations.