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RESQTOOL NEWSLETTER

Dear partners, stakeholders, and followers of RESQTOOL,

I am pleased to present the fourth edition of the RESQTOOL newsletter, which details the significant scientific and collaborative milestones achieved during the project period spanning Month 23 to Month 32. As we progress through the second half of this initiative, the sustained commitment of our consortium continues to reinforce RESQTOOL's critical contribution toward establishing a resilient, circular, and highly sustainable hardmetal industry within the European Union.

The progress made during this reporting period was anchored by our Fifth and Sixth Transnational Meetings. In December 2025, consortium partners convened at the Fraunhofer Institute for Ceramic Technologies and Systems IKTS in Dresden, Germany, to review mid-term technical outputs and coordinate the strategy for upcoming scale-up activities. This scientific exchange was further advanced in June 2026, when the University of Cagliari hosted our sixth meeting in Italy. This gathering allowed partners to critically evaluate the integration of our diverse recycling technologies and systematically plan the final stages of system validation.

On the technical front, the consortium has successfully transitioned several key innovations from pilot-scale demonstration toward robust industrial application. In Work Package 2, our automated, artificial intelligence-driven robotic sorting systems have undergone extensive optimization, significantly improving throughput capacity and classification accuracy for small-sized hardmetal inserts. Concurrently, under Work Package 3, both biochemical and zinc-based recycling processes have demonstrated highly consistent, high-purity recovery rates for tungsten and cobalt, thereby confirming the technical feasibility of these closed-loop reclamation pathways. These physical developments are closely supported by the ongoing Life Cycle Assessment and economic feasibility tasks in Work Package 6, which continue to provide the quantitative empirical evidence required to align our processes with the recycling targets mandated by the European Critical Raw Materials Act.

Beyond these laboratory and engineering achievements, RESQTOOL has actively expanded its dissemination footprint and policy engagement. Building upon our previous participation in high-level symposia and joint clustering initiatives, we have continued to foster academic and industrial dialogue to ensure our research translates into actionable market solutions. Through ongoing knowledge-transfer activities and stakeholder engagement, we remain dedicated to addressing the processing and recycling gaps that currently challenge European raw material autonomy. I invite you to explore the detailed technical updates compiled in this edition and to join us as we continue to advance the scientific boundaries of critical raw material circularity.

Kenan Boz (EPMA), RESQTOOL coordinator

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PREVIOUS NEWSLETTERS

Catch up on past issues! You can download all our previous newsletters directly from our website here:

https://www.resqtool.eu/documents/ or https://zenodo.org/communities/resqtool

ACTIVITY FROM MONTH 23 TO MONTH 32

Dear Readers and Partners, we are pleased to present the latest progress on the RESQTOOL project. This issue is filled with key updates reflecting the collaborative efforts and dedication of our consortium partners, who have successfully finalized several essential deliverables detailed below. This time we have quite a number of deliverables to tell you about, as many were submitted at the same time of the previous issue (issue #3) so it was not possible to include them. Many of these deliverables are not public, so you will only get an idea of what has been developed. We invite you to stay tuned as we continue this journey together toward sustainable metallurgical innovation.

D3.1 - WC-CO POWDER SAMPLES BY ZINC RECLAIM - TIKOMET

Under Work Package 3, Deliverable 3.1 marks the successful preparation and distribution of recycled Tungsten Carbide-Cobalt (WC-Co) powder samples to consortium partners for characterization and testing. These samples were processed at GTP Finland utilizing both the standard commercial zinc recycling method and a newly developed process where the reaction energy originates from the condensation of zinc vapor. Since hardmetal production is traditionally highly energy-intensive and reliant on critical raw materials, this milestone is highly significant. It demonstrates a viable, direct, and lower-energy recycling technique that successfully recovers valuable elements from scrap, thereby enhancing economic efficiency and reducing import dependency.

D7.3 - DISSEMINATION & COMMUNICATION ACTIVITIES REPORT 1 - EPMA

Deliverable 7.3 is the first report about the Dissemination and Communication efforts carried out by the consortium within the activities of Work Package 7, covering the initial period of the project, until mid-project (November 2025).

D7.5 - TRAINING FOR STUDENTS, YOUNG ENGINEERS AND EXPERTS - EPMA

As for Deliverable 7.3, Deliverable 7.5 reports the activities of the consortium to ensure that the high-value scientific knowledge generated within RESQTOOL is efficiently transferred to students, early-career researchers, and industry professionals, by organizing dedicated workshops (e.g. webinars). It covers the first 24 months of the project.

D7.7 - IMPACT ROADMAP FOR ECONOMIC, ENVIRONMENTAL/SOCIAL IMPACT, TECHNOLOGICAL BENEFITS, KNOWLEDGE PRODUCTION - FIRST PUBLISHMENT -TIKOMET (GTP)

This roadmap outlines the expected impacts across economic, environmental, social, technological, and knowledge domains, and identifies key stakeholders and milestones from pilot deployment to full-scale implementation.

The document outlines expected impacts across economic, environmental, social, technological, and knowledge-sharing domains from initial pilot deployment to full-scale market implementation. By identifying key stakeholders, ranging from hardmetal manufacturers and recyclers to academic researchers and national policy makers, the roadmap provides a structured methodology to track progress. Consequently, it acts as an essential management tool to optimize and quantify the real-world value of RESQTOOL for European industry and its citizens.

D8.1 - CIRCULAR BUSINESS PLAN - FIRST PUBLISHMENT – EPMA

Led by EPMA with contributions from industrial partners, this document outlines the long-term methodology to transition the project's hardmetal recycling technologies from the pilot phase to full-scale European market deployment. Rather than focusing on immediate results, this foundational plan structures the economic and operational feasibility models required to ensure commercial viability and risk mitigation. By defining scalability parameters, the deliverable serves as a commercial roadmap to secure a sustainable supply of secondary raw materials, fostering industrial resilience and supporting Europe's circular economy objectives.

D8.3 - INDIVIDUAL EXPLOITATION PLAN OF THE PARTNERS IN-LINE WITH THEIR BUSINESS AND/OR RESEARCH STRATEGY – FIRST PUBLISHMENT – CERATIZIT

Deliverable 8.3, led by CERATIZIT, presents the preliminary exploitation strategies tailored to the individual business and research goals of each consortium partner. Recognizing the diverse nature of the consortium partners, the document categorizes future activities based on partner profiles, aligning industrial stakeholders with commercial market goals and research institutions with knowledge-transfer objectives. This strategic framework establishes the guidelines for future patent filings, training activities, and technology licensing. By defining how each partner will individually valorize the project's intellectual property, this deliverable ensures that the collaborative innovations generated within RESQTOOL are systematically integrated into the European value chain.

D9.4 - PROJECT DATA MANAGEMENT PLAN - UPDATE AT MONTH 24 – EPMA

Under the coordination of SANDVIK and EPMA, deliverables D9.4 provides the essential update to the project's Data Management Plan. This document serves as the administrative and regulatory backbone of the consortium's research activities, defining how all generated data, ranging from materials characterization to simulation datasets, is handled, stored, and protected. It establishes protocols for data sharing, metadata standards, and repositories in strict compliance with Horizon Europe requirements and the FAIR (Findable, Accessible, Interoperable, and Reusable) data principles. By outlining these security and preservation standards, the DMP guarantees scientific integrity while safeguarding proprietary partner information.

D9.6 - INTERNAL REPORT, MONTH 24 - EPMA

Compiled by EPMA with contributions from the entire consortium, this report evaluates the overall operational progress, staff effort, and task execution against the project's original timelines and planned milestones. By reviewing internal workflow efficiency across all work packages, the exercise enables the project coordinator to monitor administrative compliance and manage the coordination of upcoming cross-consortium meetings, ensuring steady progress, solid alignment with European Commission standards, and operational excellence heading into the final phases of the project.

D2.3 – ASSESSMENT REPORT OF AUTOMATED SORTING AND SEPARATION SYSTEM - PHOENIX

This deliverable marks the success of Task 2.3, which aimed to develop an automated, robotized sorting solution for unmarked hardmetal scraps collected from the EU market. As traditional mechanical methods yield unsatisfactory results, sorting has historically relied entirely on manual labour. To eliminate this manual dependency, the consortium

built a proprietary artificial intelligence vision system from scratch after discovering that standard commercial alternatives could not meet the required performance thresholds. The newly developed technology successfully classifies scrap based on shape, colour, size, and geometry. Assessment results confirm that all Key Performance Indicator (KPI) targets have been achieved. The system operates with exceptionally low power consumption and a minimal physical footprint, and the trial samples have fully met the strict quality and uniformity requirements of processing partners. This successfully demonstrated that the AI-driven solution provides the accuracy necessary to effectively reduce human labour in hardmetal recycling.

D4.1 - RECYCLED POWDER ANALYSIS REPORT - ANALYSIS OF PURITY AND POWDER PROPERTIES OF RECYCLED MATERIALS - CEIT

Under Work Package 4, Deliverable 4.1 establishes a comprehensive characterization protocol to analyse the purity and physical properties of recycled materials. Led by CEIT-BRTA with support from CERATIZIT, SANDVIK, IKTS, and UNICA, this task evaluated powders obtained from various recycling routes, using virgin WC-Co powders as a baseline quality reference. The team proposed a standardized characterization battery optimized for industrial scale-up, which incorporates chemical analyses via ICP-OES and IR spectroscopy, apparent and tap density, flowability, specific surface area (BET), SEM microscopy, and XRD analyses. This deliverable serves as a vital bridge between work packages, taking the optimized powders produced under Work Package 3 (Recycling Technologies Development) and defining the quality control procedures required by Work Package 5 (Re-use & Functionality Assessment) to manufacture the project's case-study demonstrators.

INTERNAL MEETINGS

FIFTH TRANSNATIONAL MEETING OF RESQTOOL (DRESDEN, GERMANY) HOSTED BY FRAUNHOFER IKTS

On 1-2 December 2025, our fifth transnational meeting took place in the historic city of Dresden, Germany, warmly hosted by our partner, Fraunhofer IKTS, at their premises. Passing the official mid-term mark of the project, this gathering served as a critical alignment point to kickstart the second half of the RESQTOOL initiative, set concrete goals for the coming months, and coordinate upcoming efforts. The meeting brought together academic and industrial partners for two intensive days of technical reviews, progress reporting, and strategic planning across all active work packages.

Figure 1 | The consortium partners at the 5th Transnational Meeting in Dresden, December 2025.

Key topics included breakthrough updates in automated sorting and classification (WP2), where discussions focused on automated sorting systems for unmarked scrap, artificial vision and robotics for laser-marked scrap, and a special presentation on the GS1 standard for hardmetal products coding. In recycling technologies development (WP3), GTP Finland shared progress on the Zinc-Reclaim process improvement, while UniCa presented the implementation of bio-based chemical recycling. Meanwhile, in materials characterization and validation (WP4), partners reviewed the analysis of purity and powder properties of recycled materials, paving the way for sustainable tools production.

A major focus of the meeting was the progress of our sustainable reuse and functionality assessment (WP5), led by Fraunhofer IKTS, which highlighted the fabrication of prototypes for the three defined industrial use cases. This was complemented by updates on sustainable product evaluation (WP6), where partners discussed the ongoing LCA data collection and product life cycle modelling.

Beyond the technical sessions, the consortium engaged in strategic discussions regarding the project's circular business model, individual exploitation plans, and IPR management under WP8. The morning session on Dissemination, Communication, and Clustering (WP7) included a highly anticipated joint section with the METALLICO Project, which shares a highly aligned recycling approach with us—specifically regarding critical work on Cobalt (Co) recycling. Sandra Pavón of Fraunhofer IKTS presented the project along with its advanced pilots, which are rapidly becoming a reality and are slated for completion within the next year. We are incredibly grateful for her time and insights, and our consortium will definitely look to get involved in common joint activities moving forward!

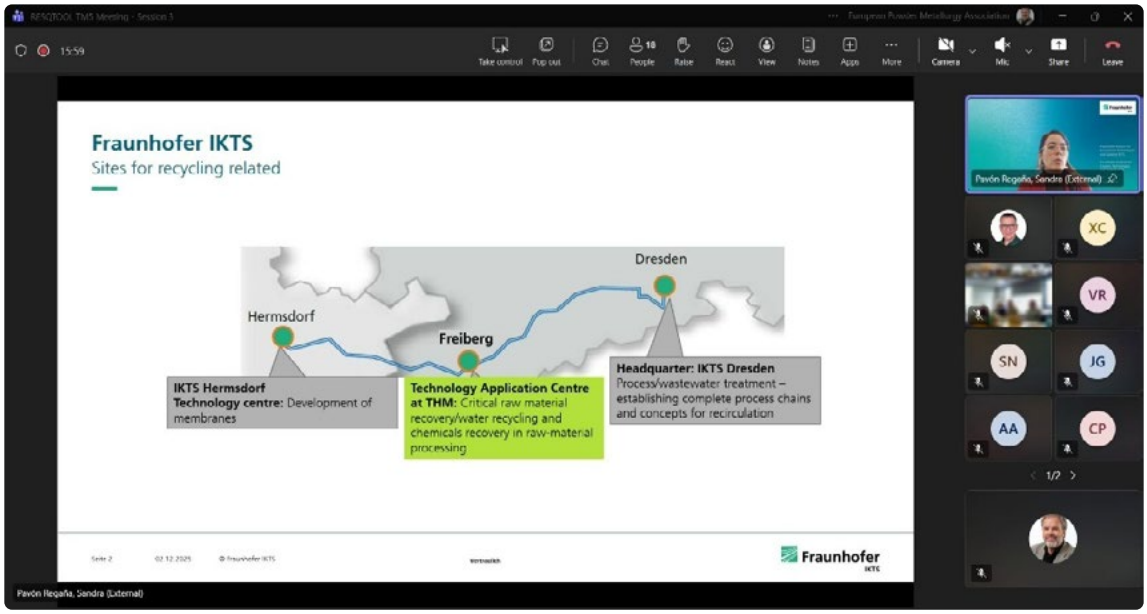

Figure 2 | Presentation of the Horizon Europe project Metallico by Sandra Pavon (Fraunhofer IKTS)

As the consortium looks ahead to the next milestones, the collaborative energy and shared vision demonstrated in Dresden have successfully set a clear, ambitious trajectory for the final phases of RESQTOOL, strengthening our collective drive to close the loop for sustainable hardmetal production in Europe.

SIXTH TRANSNATIONAL MEETING OF RESQTOOL (CAGLIARI, ITALY) HOSTED BY UNICA (UNIVERSITÀ DEGLI STUDI DI CAGLIARI)

On 15-17 June 2026, our sixth transnational meeting (TM6) took place in the historic city of Cagliari, Italy, warmly hosted by our partner, the University of Cagliari (the partner profile can be found in the RESQTOOL Team Tour section issue #2 of this newsletter).

As the project approaches its final stages, this gathering served as a critical alignment point to review our technical milestones, address industrial scaling challenges, and prepare for the final stretch of the RESQTOOL initiative.

The meeting brought together all academic and industrial partners for three intensive days of technical discussions, progress reporting, and strategy alignment in the areas of automated sorting, advanced recycling, and tool traceability. With 25 out of 40 project deliverables already successfully submitted, the consortium demonstrated strong momentum as we head toward the second periodic review scheduled for January 2027.

Key topics included breakthrough updates in automated sorting (WP2), where the AI vision system has successfully transitioned to a «vision-first» classification approach, achieving an impressive 91% code-reading rate on flat inserts while maintaining remarkably low energy consumption. In recycling processes (WP3), GTP Finland shared updates on their upcoming internal heat recovery infrastructure and pilot-scale zinc furnace, while UniCa presented outstanding results from their biochemical leaching pathways, demonstrating highly selective cobalt separation and successful tungsten oxide recovery from oxidized scrap.

A major focus of the meeting was the progress of our industrial use cases (WP5). Partners celebrated a major milestone with the rock and concrete drilling use case (Hilti/Sandvik), where components made with 100% recycled materials showed no statistically significant difference in mechanical performance compared to virgin references, alongside a significantly lower carbon footprint. Meanwhile, honest and vital discussions were held regarding the cold-forming use case (Temsa/Ceit), where a performance drop in initial trials sparked a collaborative, rigorous corrective action plan to move from lab-scale to industrial-scale milling and optimize powder blending ratios.

Beyond the technical sessions, partners engaged in strategic discussions regarding a new ISO standardization proposal for uniform hardmetal product coding and debated the balance of IP protection within the project's digital tracking layers. The event concluded with an engaging site visit, allowing participants to experience the hosting facilities firsthand and further solidify the cross-border collaboration that defines the project.

As the consortium looks ahead to our next face-to-face meeting in Barcelona in January 2027, the achievements and shared problem-solving in Cagliari have marked TM6 as a decisive step toward strengthening European resilience in critical raw materials and closing the loop for sustainable hardmetal production.

Figure 3 | The consortium partners at the 6th Transnational Meeting in Cagliari, June 2026

TS08/ AUTOMATED SORTING PROGRESSES

In our previous newsletter, we highlighted how initial sorting and identification represent the most critical first step toward the efficient recovery of hardmetals. Today, we are excited to share how this vision is rapidly turning into reality.

Phoenix Surowce is currently taking Work Package 2 to the next level. The team is further developing AI-based robotized sorters while simultaneously working on the automated reading of codes directly from used hardmetal tools.

Figure 4 | Exemplary insert with code (the size reference hints at the really small size of the code).

While it sounds straightforward in theory, the industrial reality poses significant technical challenges. What exactly makes reading these codes so complex?

- Extreme Surfaces: Codes are placed on various metallic and highly reflective surfaces.
- Unpredictable Geometries: Sometimes the codes are on flat surfaces, but just as often, they are located on curved, cylindrical, or angled walls.
- Total Randomness: The codes vary wildly in type, size, shape, quality, and placement.

Despite these demanding conditions, our ongoing work is yielding excellent results. The newly developed algorithms and optical setups have proven that reading codes, even on such unpredictable and reflective objects, is not only possible but highly effective.

Figure 5 | Examples of various insert geometries with good quality codes.

The journey toward full automation continues. Our next milestone will be integrating these advanced reading tools into the feeding and automated handling systems to create a seamless, smart sorting pipeline.
The future of efficient, automated recycling is taking shape. Stay tuned for our next updates!

Figure 6 | Sample results of codes reading from inserts with use of developed algorithms and setups on different surfaces and code types.

TS09/ ESTABLISHING THE BASELINE FOR TUNGSTEN CARBIDE PRODUCTION FOOTPRINT

Before identifying opportunities for improvement, it is essential to understand the environmental footprint of conventional tungsten carbide production.

LITERATURE BENCHMARK

Figure 7 presents a benchmark based on published scientific studies[1,2] that describe the production of tungsten carbide (WC) powder from virgin raw materials (Chinese route).

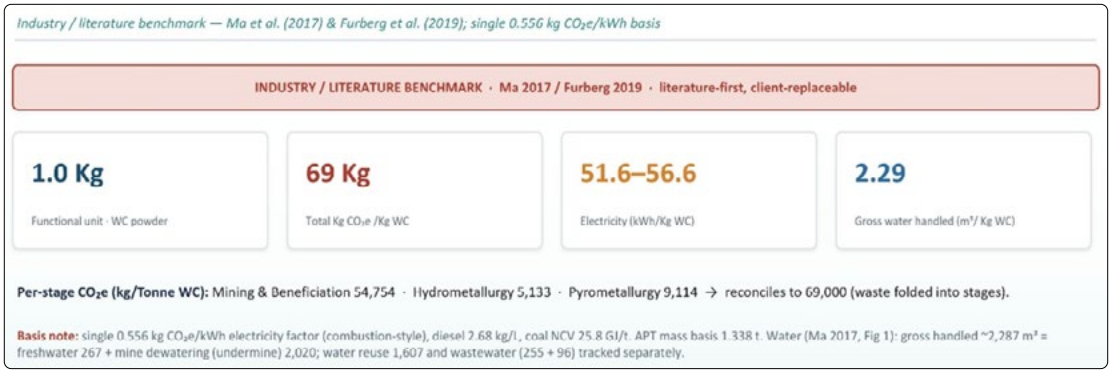

Figure 7 | Literature benchmark summary.

(1) Xiaotian Ma, Congcong Qi, Liping Ye, Donglu Yang, Jinglan Hong, "Life cycle assessment of tungsten carbide powder production: A case study in China", Journal of Cleaner Production, Volume 149, 2017, Pages 936-944, ISSN 0959-6526, https://doi.org/10.1016/j.jclepro.2017.02.184. (https://www.sciencedirect.com/science/article/pii/S0959652617304109)

(2) Anna Furberg, Rickard Arvidsson, Sverker Molander, "Environmental life cycle assessment of cemented carbide (WC-Co) production", Journal of Cleaner Production, Volume 209, 2019, Pages 1126-1138, ISSN 0959-6526, https://doi.org/10.1016/j.jclepro.2018.10.272. (https://www.sciencedirect.com/science/article/pii/S0959652618332992)

The benchmark estimates a total carbon footprint of approximately 69 kg CO_2e per kilogram of WC powder produced. The production process is highly resource-intensive, requiring approximately 51.6–56.6 kWh of electricity per kilogram of WC and handling around 2.29 m^3 of water per kilogram of product.

A closer look at the value chain reveals that the majority of emissions originate at the very beginning of the process. Mining and beneficiation account for approximately 54,754 kg CO_2e per tonne of WC, representing nearly 80% of the total footprint, while hydrometallurgy and pyrometallurgy contribute 5,133 kg CO_2e and 9,114 kg CO_2e per tonne, respectively.

These figures provide an important reference point against which the RESQTOOL assessment can be compared and validated.

BUILDING A MORE DETAILED PICTURE

While published studies provide an excellent starting point, RESQTOOL has developed a detailed bottom-up model to better understand the environmental impacts of tungsten production.

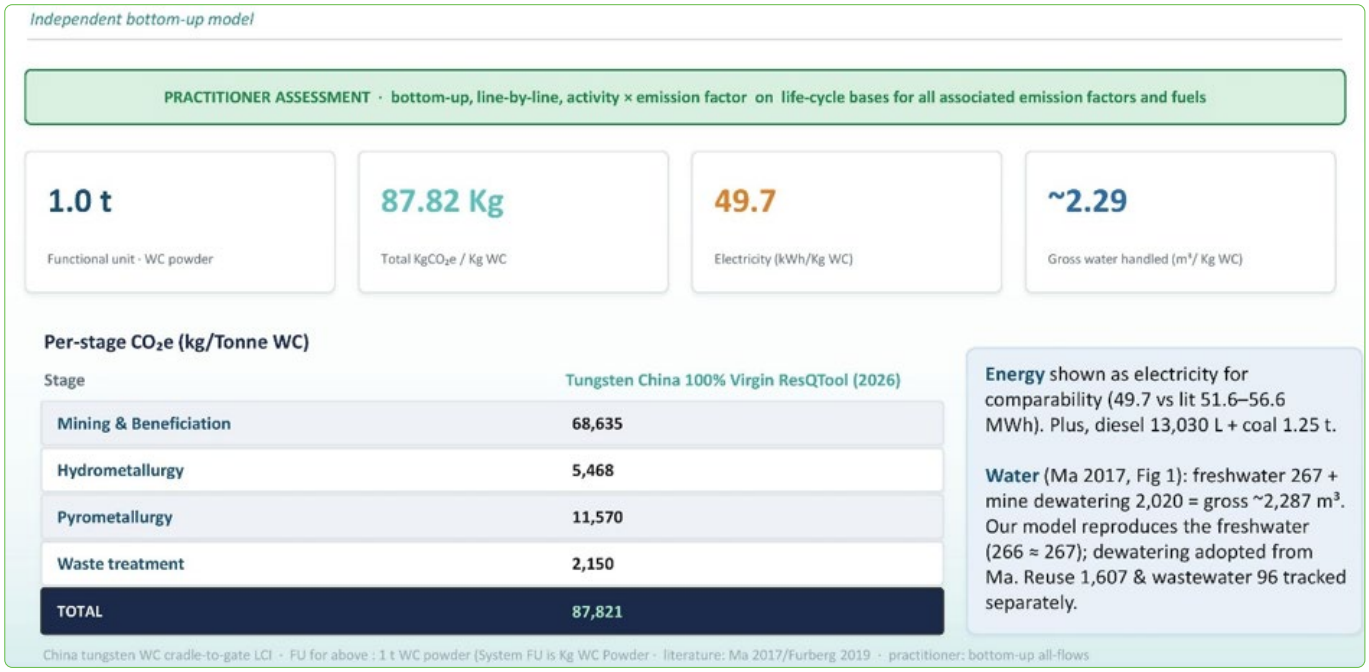

Figure 8 | RESQTOOL's detailed bottom-up model for the Chinese route.

By reconstructing the value chain step by step and accounting for all major energy, material and waste flows through a cradle-to-gate Life Cycle Inventory (LCI), the assessment estimates a total footprint of approximately 87.8 kg CO_2e per kilogram of WC, around 27% higher than the literature benchmark.

Interestingly, electricity consumption remains broadly comparable, at approximately 49.7 kWh per kilogram of WC, while water use assumptions remain similar to those reported in earlier studies.

The largest contribution continues to come from mining and beneficiation, which account for approximately 68,635 kg CO_2e per tonne of WC. Hydrometallurgy contributes 5,468 kg CO_2e, pyrometallurgy 11,570 kg CO_2e, and waste treatment a further 2,150 kg CO_2e per tonne.

The 27% increase in Global Warming Potential (GWP) calculated within RESQTOOL is not driven by changes in the production process itself, nor to the foreground inventory, that was retained wherever possible to enable a like-for-like comparison. The observed difference arises primarily from updates to the background life cycle inventory (LCI) data used to calculate environmental impacts.

The most significant changes relate to updated electricity and diesel emission factors. Specifically, the electricity emission factor was updated from 0.5306 to 0.68 kg CO_2e/kWh, while the diesel emission factor was updated from 2.68 to 3.20 kg CO_2e/L. The 3.20 kg CO_2e/L value explicitly represents a well-to-wheel emission factor, capturing upstream fuel production and distribution in addition to direct combustion emissions. By comparison, there remains some uncertainty regarding the precise system boundaries and life cycle stages represented by the 2.68 kg CO_2e/L diesel emission factor reported in the literature Ma et al [11]. Together, the revised electricity and diesel datasets account for the majority of the increase in GWP.

It was noted that the Ma et al used the Chinese Life Cycle Inventory Database (CLCID) as the source of background life cycle inventory (LCI) data [11]. However, the underlying datasets, modelling assumptions and system boundaries for the reported electricity and diesel emission factors could not be fully verified from the published information. To improve transparency, reproducibility and consistency with the parallel European assessment in RESQTOOL, both studies were aligned to a common and internationally recognised background database framework (ecoinvent v3.8 – v3.9.1), while maintaining geographically representative datasets for the Chinese and European value chains.

This update also reflects good LCA practice. Major LCI databases evolve considerably over time as data quality, supply-chain modelling, regionalisation and methodological approaches are refined. For example, the transition from ecoinvent v2 to v3 introduced significant improvements in process inventories and system modelling[3,4] Consequently, when reproducing studies based on data that are nearly a decade old, reviewing and updating background datasets is essential to ensure that emission factors remain representative, transparent and aligned with current LCA methodology. To improve transparency and consistency, the RESQTOOL assessment also harmonised background data using a common, internationally recognised database framework, while maintaining geographically representative datasets for both the European and Chinese value chains. This approach ensures comparable methodology and system boundaries across assessments.

Consequently, the higher GWP reported in RESQTOOL should not be interpreted as a deterioration in process performance nor any fault in previous assessments, rather it reflects the use of more recent, transparent and geographically representative background datasets, providing a more robust and methodologically consistent basis for comparison.

WHY GEOGRAPHY MATTERS

One of the most striking findings of the study is the significant variation in environmental performance across different geographical production systems, that can be seen in Figure 2.

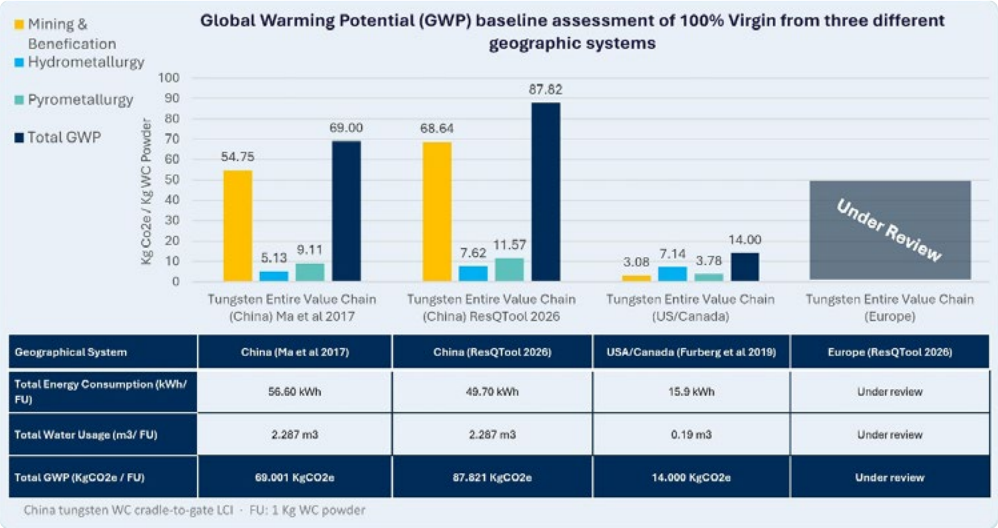

Figure 9 | Comparison of the different baselines as assessed within RESQTOOL.

(3) B. P. Weidema et al., Overview and Methodology: Data Quality Guideline for the ecoinvent Database Version 3, Ecoinvent Report, vol. 3, no. 1. St. Gallen, Switzerland: Swiss Centre for Life Cycle Inventories, 2013.

(4) G. Wernet et al., "The ecoinvent database version 3 (Part I): Overview and methodology," The International Journal of Life Cycle Assessment, vol. 21, no. 9, pp. 1218–1230, 2016

For the literature-based Chinese system, the carbon footprint is estimated at approximately 69 kg CO_2e per kilogram of WC, while the RESQTOOL reconstruction of the same system reports 87.8 kg CO_2e per kilogram. In contrast, the North American benchmark developed in [2] reports a footprint of only 14 kg CO_2e per kilogram of WC.

Resource consumption also varies considerably. Chinese production systems require approximately 50–56 kWh of electricity per kilogram of WC and around 2.3 m^3 of water, whereas the North American system requires approximately 15.9 kWh per kilogram and only 0.19 m^3 of water.

When the full analysis of the European route being developed by RESQTOOL will be available, a further comparison to these baselines will be done. These differences already highlight the importance of regional factors such as mining practices, electricity generation mixes, process efficiencies and supply chain structures. They also demonstrate that environmental performance cannot be assessed independently of geographical context.

IDENTIFYING THE HOTSPOTS

Understanding where emissions occur is crucial for identifying the most effective opportunities for improvement. Referring to the data in Figure 4, this analysis can be made.

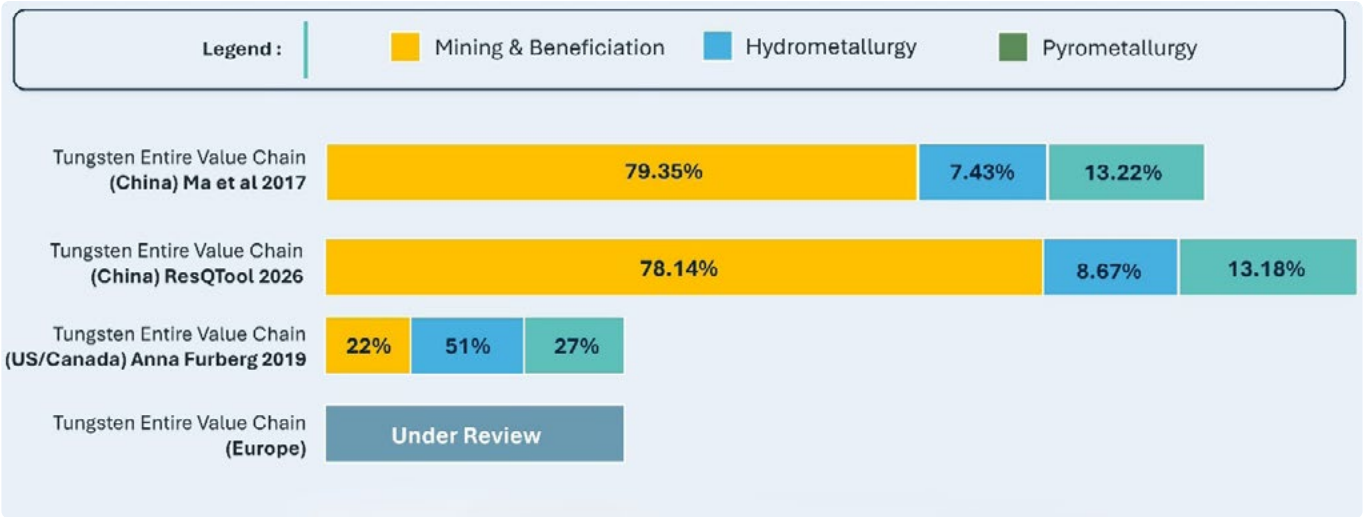

Figure 10 | Baseline scenario comparative models for each geographical specific system.

For Chinese production systems analysed in [1] and by RESQTOOL, mining and beneficiation clearly dominate the environmental footprint. These stages account for approximately 78–79% of total greenhouse gas emissions, while hydrometallurgy contributes around 7–9% and pyrometallurgy approximately 13%.

The North American system of [2] presents a very different distribution of impacts. In this case, mining contributes only around 22% of total emissions, while hydrometallurgical processing becomes the largest contributor at approximately 51%, followed by pyrometallurgy at 27%.

These differences add up to the differences in absolute values, as already shown.

The comparison shows that environmental hotspots are not universal. Different production systems require different decarbonisation strategies, and understanding regional differences is essential when prioritising future sustainability measures.

COMPARING LITERATURE AND PRACTICTIONER ASSESSMENTS

A key objective of the study was to evaluate how closely a detailed practitioner assessment aligns with the scientific literature. The comparison (Figure 5) shows strong consistency in the overall structure of the results. Both approaches identify mining and beneficiation as the dominant emission source, and both highlight the importance of energy consumption throughout the value chain.

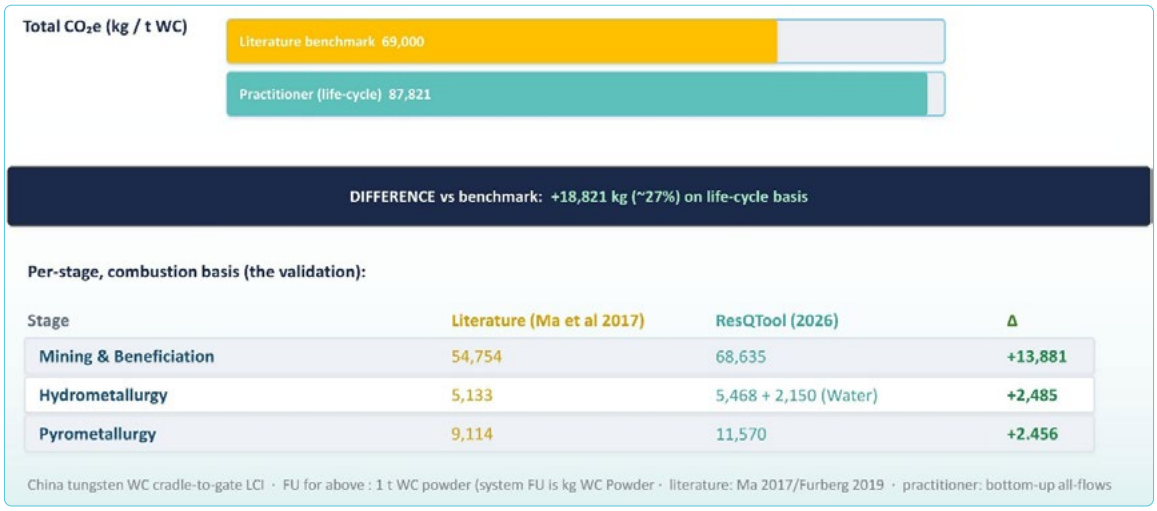

Figure 11 | Literature Benchmark vs Practitioner.

However, as already shown, the overall footprint reported by RESQTOOL reaches 87,821 kg CO_2e per tonne of WC, compared with 69,000 kg CO_2e per tonne in the published benchmark. This represents an increase of approximately 18,821 kg CO_2e, or around 27%.

The largest share of this difference originates from mining and beneficiation, which contribute nearly 14,000 kg CO_2e of the additional emissions. Hydrometallurgy and pyrometallurgy account for roughly 2,500 kg CO_2e each. The discrepancy is driven not by missing process stages but by updated data, improved life-cycle accounting and more comprehensive treatment of emissions throughout the supply chain.

ENERGY: THE SINGLE BIGGEST LEVER FOR DECARBONISATION

Perhaps the most important conclusion from the analysis is that energy use overwhelmingly dominates the environmental footprint of tungsten carbide production (Figure 5).

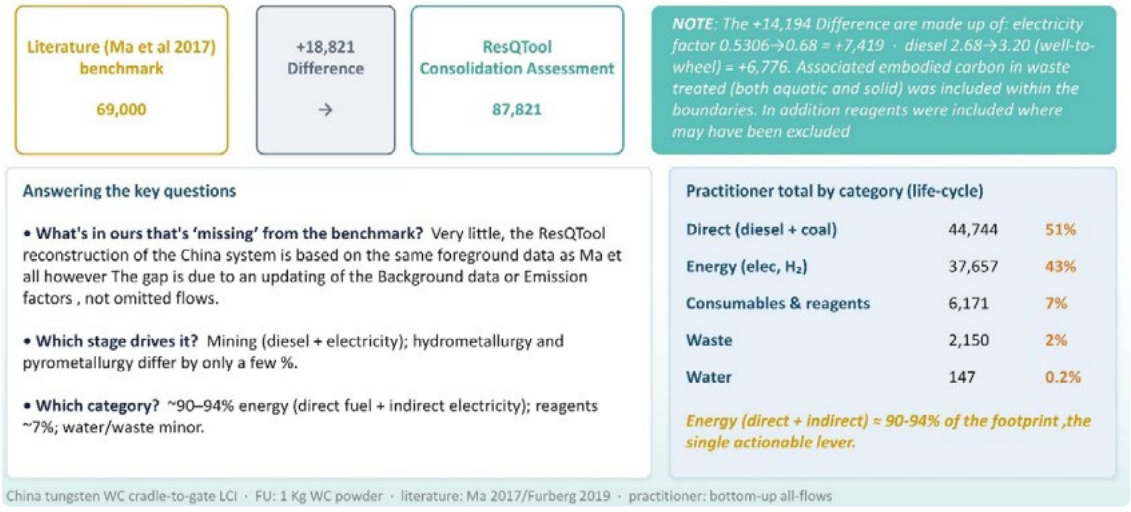

Figure 12 | Impact of Energy environmental footprint on the overall figures.

The study shows that approximately 51% of total emissions originate from direct fuel consumption, mainly diesel and coal used during mining and processing activities. A further 43% is associated with indirect energy use, including electricity and hydrogen. Together, these energy-related sources account for approximately 90–94% of the total carbon footprint.

By comparison, consumables and reagents contribute around 7%, while waste treatment contributes approximately 2% and water-related impacts remain relatively minor.

The analysis also sheds light on why the baseline footprint calculated within RESQTOOL is higher than the literature benchmark. Much of the difference can be explained by updated emission factors, including higher life-cycle emissions associated with electricity generation and diesel fuel production. The inclusion of emissions linked to waste treatment and additional process inputs also contributes to the increase.

The message is clear: if the tungsten carbide sector is to significantly reduce its environmental impact due to the production from primary sources, the greatest opportunities lie in improving energy efficiency, reducing fossil fuel use and increasing the share of renewable energy throughout the value chain.

KEY TAKEAWAY

The RESQTOOL assessment confirms that tungsten carbide production from ores remains a highly energy-intensive process, with mining and beneficiation representing the largest environmental hotspot across most production systems. While regional differences can significantly influence the overall footprint, one conclusion remains consistent across all assessments: energy is the dominant driver of emissions and therefore the most powerful lever for achieving meaningful reductions in the environmental footprint of tungsten carbide production from minerals.

RESQTOOL 1ST FREE TRAINING WEBINAR, 5TH DECEMBER 2025

Following the productive discussions in Dresden, the consortium immediately transitioned from strategic planning to knowledge sharing with the launch of the RESQTOOL technical training series. On Friday, 5 December 2025, the project hosted its highly anticipated first webinar, a technical deep-dive into sustainable recycling within the hardmetals sector. The online event proved to be a resounding success, bringing together nearly 70 participants from across the industry and academia, all eager to engage with the crucial topic of the Circular Economy.

The session featured cutting-edge insights from three of the project's leading experts. Kenan Boz (European Powder Metallurgy Association) opened the training, followed by Teemu Karhumaa (GTP Finland Oy) and Angela Serpe (Università degli Studi di Cagliari), who shared their latest research and practical developments in advanced recycling technologies. For those who were unable to attend the live session or wish to review the technical material, the complete video is available on the official RESQTOOL YouTube channel[5].

Figure 13 | Program of the 1st Free Training Webinar "Hardmetal Recycling Processes", 5th December 2025

(5) RESQTOOL HE Project (2025) FREE TRAINING WEBINAR « Hardmetal Recycling Processes » video (YouTube)
URL: https://youtu.be/SW4mQmhixcg?si=M9hnXXCO14ElCWeM

RESQTOOL 2ND FREE TRAINING WEBINAR, 11TH MAY 2026

On 11 May 2026, the RESQTOOL project held its second training webinar, titled «Boosting circularity in the W and Co supply chains for hardmetals,» to address critical resource efficiency and traceability challenges within the European hardmetal sector. The session focused specifically on establishing sustainable, closed-loop frameworks for Tungsten (W) and Cobalt (Co), both of which are classified as critical raw materials.

The webinar commenced with an introductory overview by Bruno Vicenzi representing the European Powder Metallurgy Association (EPMA). Mr. Vicenzi contextualized the event within the broader strategic goals of the RESQTOOL initiative, emphasizing the urgent industrial and environmental requirements to reduce dependency on primary raw materials through enhanced circularity.

Following the introduction, Aaron Jennings from Irish Manufacturing Research (IMR) presented a technical segment on sustainable data collection and value chain mapping. His presentation detailed the methodologies required to effectively audit and map complex supply networks. Mr. Jennings demonstrated how structured data collection serves as a prerequisite for identifying material leakages, optimizing resource efficiency, and establishing a transparent baseline for sustainability metrics.

The final presentation was delivered by Tove Jensen of Seco Tools, who addressed the practical implementation of traceability mechanisms within the industrial value chain. Ms. Jensen outlined how robust tracking systems act as a critical enabler for the circular transition, ensuring that end-of-life hardmetal products can be verified, recovered, and reprocessed efficiently without compromising material quality.

Figure 14 | Program of the 2nd Free Training Webinar "Boosting circularity in the W and Co supply chains for hardmetals", 11th May 2026

The event successfully aligned technical industrial practices with the broader policy objectives of the European Commission regarding strategic autonomy and the circular economy. By bringing together research institutions and industrial stakeholders, the webinar advanced the deployment of standardized traceability and data frameworks necessary to secure sustainable secondary raw material streams for European manufacturing.

For those who were unable to attend the live session or wish to review the technical material, the complete video is available on the official RESQTOOL YouTube channel[6].

Building on this strong momentum, the consortium is already planning the next training session in the series, which will be announced in the coming months as we continue to disseminate our key findings to the wider metallurgical community.

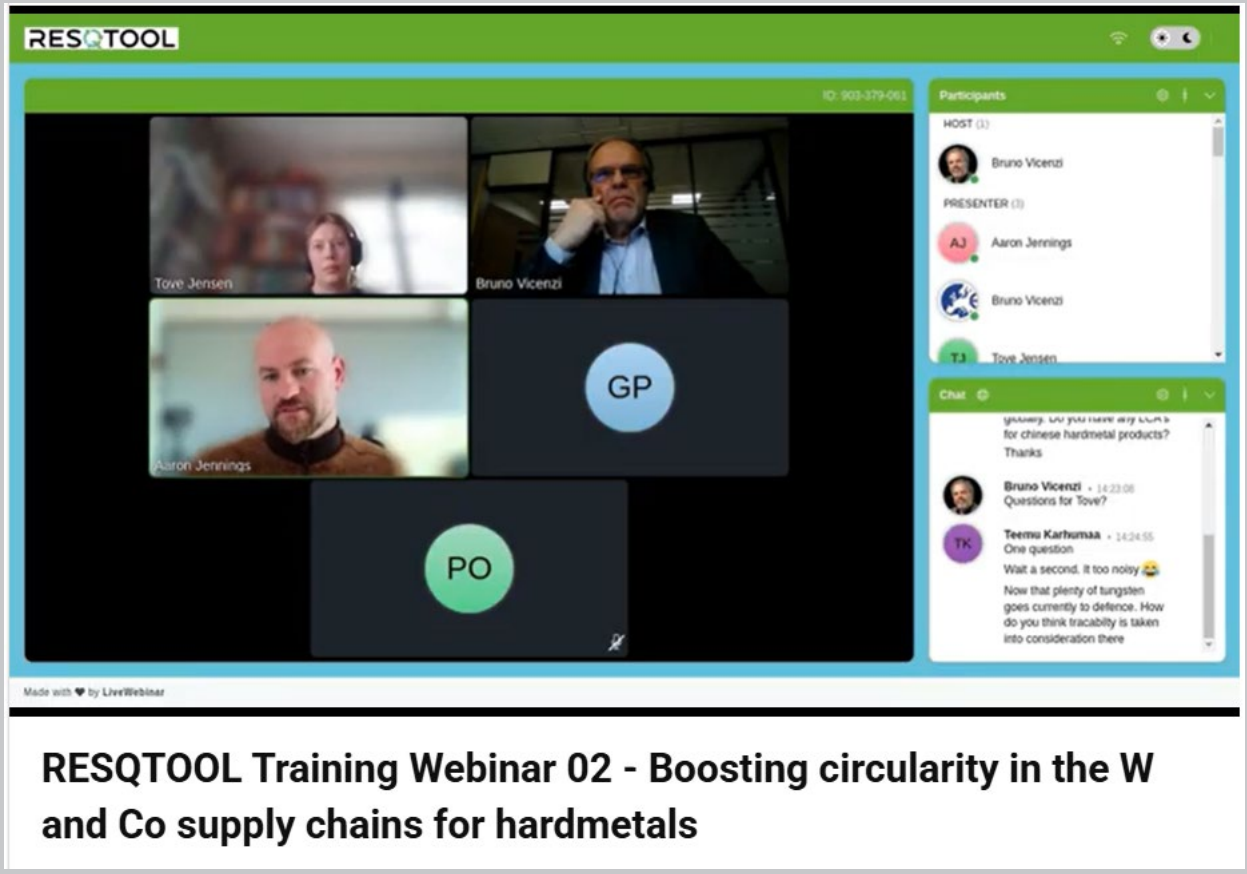

Figure 15 | Excerpt from the 2nd Free Webinar "Boosting circularity in the W and Co supply chains for hardmetals". Question session for the speakers

(6) RESQTOOL HE Project (2026) FREE TRAINING WEBINAR «Boosting circularity in the W and Co supply chains for hardmetals» video (YouTube) URL: https://youtu.be/TwbAn2E1K78?si=8pwPJctE6J3XmzJP

RAW MATERIALS WEEK 2025 SIDE EVENT

"Crossroads of Innovation: Shared Challenges and Joint Solutions in Raw Materials"

Figure 16 | Official banner of Raw Materials Week 2025, Brussels

As promised in the previous newsletter, we come back to this event that was co-organised by us in November 2025, but so close to the publication that we could not include it in that issue.

The RESQTOOL project participated in Raw Materials Week 2025[8] in Brussels, as it is one of the leading events on the subject of Raw Materials and offers the chance of making aware of the project a large variety of stakeholders, from policy makers to social entities.

In addition to attending the main conference, RESQTOOL joined forces with ten other Horizon Europe projects to co-organise and co-fund a dedicated clustering side event focused on innovation, collaboration, and Critical Raw Materials. Addressing common challenges faced by all these EU-funded innovation projects across the CRM value chain, RESQTOOL co-hosted the interactive workshop **"Crossroads of Innovation: Shared Challenges and Joint Solutions in Raw Materials"**, together with the REESOURCE project[9] (leading the organisation) and nine other Horizon Europe initiatives.

The workshop served as a collaborative platform to connect innovation efforts, develop actionable solutions, and accelerate Europe's transition towards a resilient, sustainable, and strategically autonomous CRM supply system. The event aimed to:

- Share practical solutions developed within Horizon Europe projects
- Identify common barriers to scale-up and market deployment
- Foster cross-project synergies and collaboration opportunities
- Support the translation of innovation results into policy-relevant impact

(8) https://single-market-economy.ec.europa.eu/sectors/raw-materials/week_en
(9) https://www.reesource.eu/crossroads-of-innovation-raw-materials-week-2025/

In fact, after the event the work continued and under the leadership of REESOURCE a Policy Brief on the bottleneck in the implementation of the Critical Raw Materials Act has been compiled and distributed (see the relevant chapter later in this newsletter).

The workshop was split in two parts, one dedicated to primary raw materials and another to secondary raw materials. RESQTOOL contributed directly to the "Secondary Raw Materials – Waste to Value" session through a keynote presentation delivered by Teemu Karhumaa (GTP Finland Oy) entitled "RESQTOOL – boosting the recycling of EoL cutting tools saving W and Co", followed by his participation in the round-table discussion on secondary raw materials. The presentation showcased RESQTOOL's approach to increasing the recovery of valuable tungsten and cobalt from end-of-life cutting tools through advanced collection, sorting, recycling, and reprocessing routes. It highlighted the project's efforts to establish efficient circular value chains and improve resource efficiency, supporting Europe's strategic objectives in critical raw materials supply and sustainability.

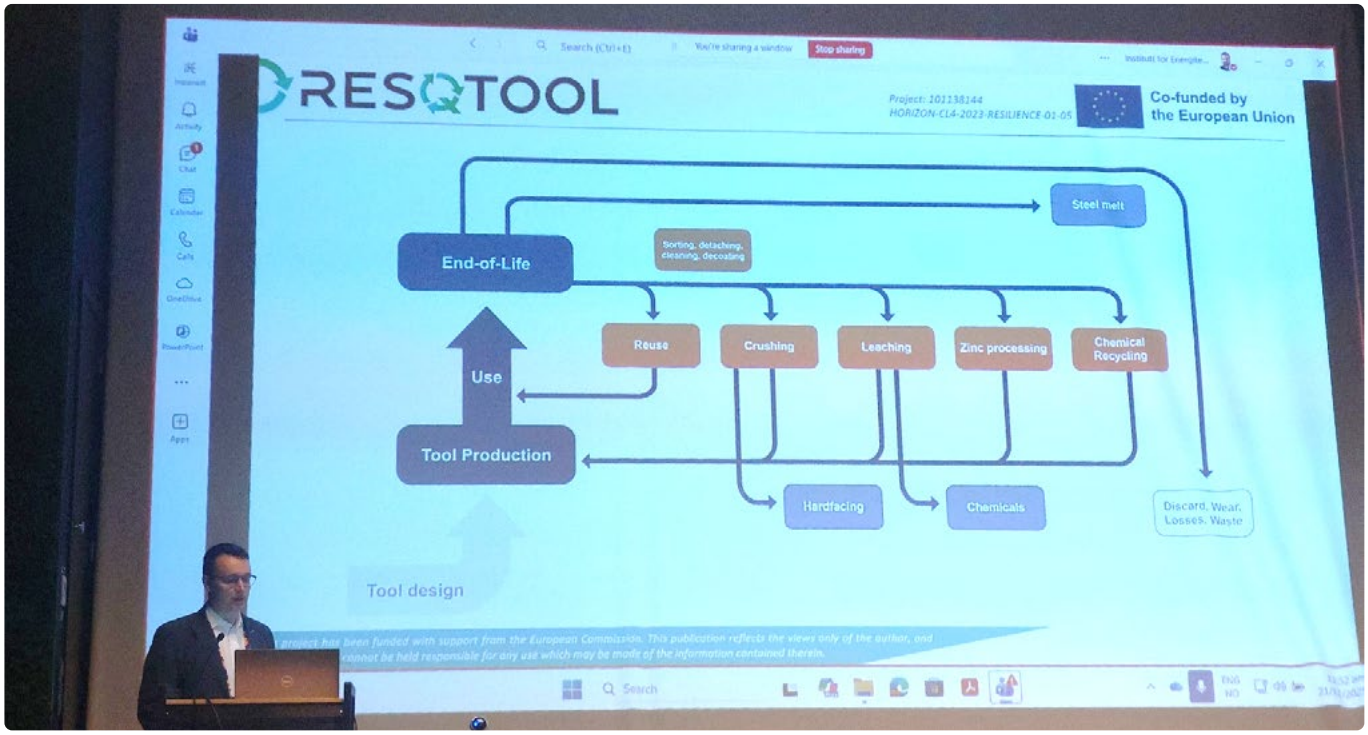

Figure 17 | T. Karhumaa (GTP) presenting RESQTOOL in the RMW2025 Side Event.

Figure 18 | T. Karhumaa (GTP) presenting RESQTOOL in the RMW2025 Side Event.

The side event attracted 115 registrations, including 91 registrations for on-site participation. Final attendance reached 52 participants in person and 25 online, resulting in more than 77 active participants overall, a strong turnout for a Friday side event held after the official Raw Materials Week programme!

Representatives from EPMA, GTP and SANDVIK, all partners in the RESQTOOL consortium, attended the event and actively supported networking, dissemination activities, and stakeholder engagement.

Beyond the side event, RESQTOOL partners participated in the broader Raw Materials Week programme, contributing to:

- Dissemination of project information and results
- Engagement with key stakeholders across industry, research, and policy communities
- Dialogue with institutional, industrial, and regulatory actors
- Exploration of future exploitation pathways and routes to deployment for project outcomes

This coordinated presence further strengthened RESQTOOL's visibility within the European critical raw materials and sustainability landscape, while reinforcing its role in fostering cross-project cooperation and contributing to the development of a more circular and resilient raw materials value chain in Europe.

We can anticipate that also the next edition, planned for January 2027, will see RESQTOOL delegates involved in the Raw Materials Week, and maybe also in some side event, as it may be the last edition within RESQTOOL's duration.

HaDEA SHOWCASE 2026

Beyond our internal milestones and training initiatives, RESQTOOL continues to actively engage with the broader European research and innovation ecosystem. Our project was represented by Kenan Boz and Bruno Vicenzi of EPMA) at the prestigious HaDEA Showcase in Brussels, held at the historic Charlemagne building.

This high-profile event serves as a platform for successful Horizon Europe projects, bringing together stakeholders to present breakthrough achievements and establish contacts for future collaborative developments. RESQTOOL's presence at the showcase provided an opportunity for clustering and networking, allowing RESQTOOL to share its progress on sustainable hardmetal recycling directly with European policymakers, industry leaders, and research peers. By fostering these cross-project synergies and exploring joint opportunities, the consortium continues to strengthen its ties within the European critical raw materials value chain, paving the way for future impact long after the project's completion.

Figure 19 | Official promotional banner for the «HaDEA Showcase 2026» event, January 19, 2026.

Figure 20 | Photo taken during our participation in the «HaDEA Showcase 2026» event.

UNILASALLE

CONFERENCE ON MINERALS AND RARE EARTHS

Beyond major trade fairs and industrial showcases, the RESQTOOL project actively engages with the academic and scientific community to address the pressing challenges of resource scarcity. Our team recently participated in a specialized conference on minerals hosted by UniLaSalle,a premier French Polytechnic Institute that elegantly unites life, earth, environmental, and energy sciences with industrial and digital technologies to drive the green transition.

The event was dedicated to exploring a vital question : «Critical natural resources: what are we talking about? Which materials are critical, and how are they extracted?» Representing the RESQTOOL project, our team delivered a key presentation titled «Recycling of High Quality CRM Resources from Machining Tools for Reuse Applications.» This session provided an invaluable platform to share our cutting-edge research on reclaiming critical raw materials from end-of-life tooling, fostering collaborative dialogue with researchers, students, and academic experts passionate about securing sustainable resources for Europe's industrial future.

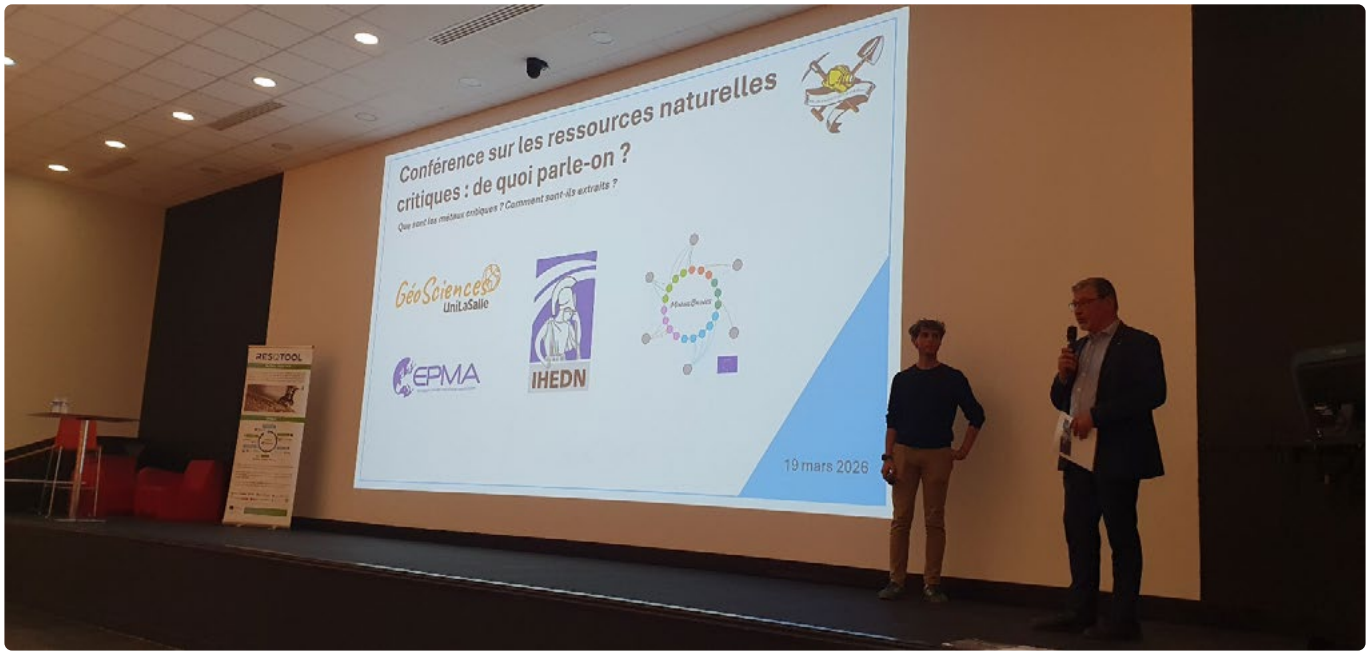

Figure 21 | UniLaSalle Conference on minerals and raw materials.

Figure 22 | Presentation delivered by L. Aboussouan (EPMA) at the UniLaSalle Conference.

HANNOVER MESSE 2026

This past spring, the RESQTOOL project participated in Hannover Messe 2026, the world's leading trade fair for industrial technology. Perfectly aligned with the event's core focus on industrial digitalization and climate-neutral production, our team presented RESQTOOL's key breakthroughs in the project booth.

We highlighted our newly developed automated code-reading algorithms, robotic handling systems, and green bio-chemical processes designed to reclaim Critical Raw Materials like Tungsten and Cobalt. The event fostered high-level dialogue with international stakeholders eager to reduce heavy industry's carbon footprint.

Figure 23 | RESQTOOL Exhibition Stand at Hannover Messe 2026.

WORLD PM 2026 | RESQTOOL showcased on the global stage

The RESQTOOL Consortium successfully promoted its latest project advancements at the WorldPM 2026 congress in Montreal, specifically inside the programme of the Tungsten2026 conference. Representing the consortium, Johannes Pötschke of Fraunhofer IKTS delivered a presentation titled «RESQTOOL - Enabling High Quality Secondary Powders: Sorting, Recovery, and CO_2 Savings in WC–Co Recycling» during the European Projects Leadership Issues Discussion session on Monday 29th June.

The presentation highlighted the project's success in establishing a high-quality closed-loop recycling system for industrial tools that achieves a target of at least 70% recycled content without sacrificing performance. Key milestones shared with the international powder metallurgy community included the implementation of automated, AI-driven sorting using shallow laser-marked digital codes, as well as low-energy recycling processes such as optimized zinc-vapor reclamation and bio-based chemical recycling.

Figure 24 | Official banner for the WorldPM2026 congress in Montreal

Figure 25 | Johannes Pötschke presenting the key results of the RESQTOOL project on sustainable hardmetal recycling at the WorldPM2026 congress.

The presentation highlighted the project's success in establishing a high-quality closed-loop recycling system for industrial tools that achieves a target of at least 70% recycled content without sacrificing performance. Key milestones shared with the international powder metallurgy community included the implementation of automated, AI-driven sorting using shallow laser-marked digital codes, as well as low-energy recycling processes such as optimized zinc-vapor reclamation and bio-based chemical recycling.

Furthermore, the consortium presented validated data from real-world prototypes, including Hilti drillheads and Sandvik rockdrill inserts, demonstrating that tools manufactured with RESQTOOL secondary powders match the exact hardness and microstructural quality of those made from virgin materials. Environmental impact assessments shared at the event confirmed that achieving the 70% recycling target slashes the carbon footprint of these components by nearly two-thirds, marking a significant step forward in sustainable industrial manufacturing.

During the technical sessions there were also two other presentations by consortium partners, on Saturday 27th June 10:30-11:45, during the session "Carbides II - Recycle Feedstock", chaired by professor Natasha Sacks of Stellenbosch University:

- "Comparison of Cemented Carbide Properties Made from Reclaimed WC-Co Powders Obtained by Different Recycling Methods", Anne Vornberger, Fraunhofer IKTS
- "The Influence of Different Amounts of Recycled Zinc Reclaimed Powder on Properties, Microstructure and Performance of a WC-6Co Cemented Carbide for Rock and Concrete Drilling", Susanne Norgren, Sandvik Coromant

The project also had a booth in the exhibition, with project material available for pick up by delegates.
The interest shown confirmed that the topic of HM recycling is felt as very important also outside of Europe.

Figure 26 | From right to left: Johannes Pötschke (Fraunhofer IKTS), Anne Vornberger (Fraunhofer IKTS), Lionel Aboussouan (EPMA), and Steven Moseley (Hilti AG) attending the WorldPM2026 congress.

SUMMEREV, 2026 VIENNA

From May 4th to 5th, 2026, the hardmetal and cemented carbide community gathered in Vienna, Austria, for the latest edition of **SummerEv**. Organized by the European Hard Materials Group (EuroHM) of the EPMA, this recurring technical workshop serves as a premier European platform for discussing the newest advancements in material science, processing technologies, and cutting-tool industrial applications.

Figure 27 | Promotional banner for the «SummerEv 2026: From Materials Design To Application» event, 4–5 May 2026

Figure 28 | Johannes Pötschke presenting the latest RESQTOOL project status and results at SummerEv 2026 in Vienna.

Representing the consortium, Dr.-Ing. Johannes Pötschke from Fraunhofer IKTS delivered a key presentation titled: «RESQTOOL – Sustainable hardmetal recycling for a sustainable and greener future: Project status and key results». The presentation gave the EuroHM community a comprehensive update on our latest technical breakthroughs. It sparked highly engaging discussions around how RESQTOOL's advanced recycling and sorting innovations are directly addressing the future of powder metallurgy, wear parts, and green manufacturing in Europe.

A big thank you to EPMA and all the attendees for making this edition a fantastic hub for technical exchange!

UPCOMING EVENTS

Look out for RESQTOOL at several upcoming events. We look forward to the opportunity to connect with you!

EPMA SUMMER SCHOOL 2026

The 2026 of the EPMA Summer School[10] is running in Porto from 20th to 24th July. Thus, as it is happening while we prepare this newsletter, we will report on it next time!

EURO PM2026

The annual edition of the EPMA European Congress and Exhibition[11] on powder metallurgy is taking place this time in Budapest, Hungary, on 11-14 October 2026. As usual, hardmetals and hard materials in general will be well represented in the programme of the event. Six of the technical sessions will be of interest for hardmetal experts, plus a Special Interest Seminar.

RESQTOOL presence will be both in the Exhibition, with a booth as usual, where you are all welcome to pop up to meet us and ask any questions, and in the technical programme.

In Session 14 "Hardmetals - Recycling Methods & Powder Manufacturing", that will run on Tuesday 13th October from 8:30 to 10:00, RESQTOLL partners will present two papers:

- "Particle Size, Grain Size, And Powder Morphology During Oxidation And Reduction Of Recycled Hard Metals And Other W-containing End Of Life Products" (A. Bjerke, S. Tedeschi, F. Pirone, G.P De Gaudenzi) – Powder Production
- "Advances In A Hydrometallurgical Process With Organic Acids For A Wide And Eco-friendly WC-Co Scraps Recyclability" (M. Cera, G.P. De Gaudenzi, A. Bjerke, A. Muntoni, G. De Gioannis, A. Serpe) – Sustainability & Circularity

In the early afternoon of the same day, from 13:45 to 15:15, the session 30 "Hardmetals - Processing of Recycled Powders" will host two more RESQTOOL presentations:

- Properties Of Hardmetals From Reclaimed WC-Co Powders Produced By Different Recycling Methods (A. Vornberger, J. Pötschke) – Hardmetals & Cermets
- Comparison Of The Sintering Behavior Of Different WC-10 Wt.%Co Recycled Powders: Zinc Reclaim (ZR) Vs. Oxidation-reduction-carburization (ORC) Processes (L. Muñoz Ortuño, T. Soria Biurrun, J.M. Sanchez Moreno, A. Vornberger, J. Pötschke, T. Karhumaa, J. Ronkainen, C. Poltorak, G.P. De Gaudenzi) – Hardmetals & Cermets

We are sure that these presentations will be very interesting for participants, so we hope to see you there. Remember that the proceedings of EuroPM are available for purchase (either included in the participation fee or standalone afterwards) and that they will become Open Access after 6 months.

(10) https://summerschool.epma.com/
(11) https://www.powdermetallurgycongress.com/

PUBLICATION OF THE STRATEGIC POLICY BRIEF ON EUROPEAN CRITICAL RAW MATERIALS ACT BOTTLENECKS

In a significant contribution to evidence-based policymaking, RESQTOOL, in collaboration with 10 other leading Horizon Europe projects, has co-authored and published a new Strategic Policy Brief[12] addressing the industrial bottlenecks that threaten the successful implementation of the Critical Raw Materials Act (CRMA).

This collaborative policy brief synthesizes extensive empirical evidence gathered from cross-sectoral stakeholders during the Raw Materials Week 2025 side event "Crossroads of Innovation: Shared Challenges and Joint Solutions in Raw Materials", held on 21st [NV2.1]November 2025 (see in the previous pages a description of the event). The document identifies critical structural delays in scaling critical raw material (CRM) projects, highlighting regulatory fragmentation, permitting obstacles, investment gaps in transitioning from pilot to industrial scale, and the urgent need to strengthen secondary raw material recycling.

To accelerate industrial scale-up, the brief outlines key strategic recommendations. These include establishing streamlined, predictable permitting processes, harmonizing cross-border recycling and waste legislation, deploying blended financing to de-risk industrial investments, and fostering enhanced circularity and traceability across CRM value chains. The complete policy paper and its comprehensive recommendations can be accessed on the official RESQTOOL platform.

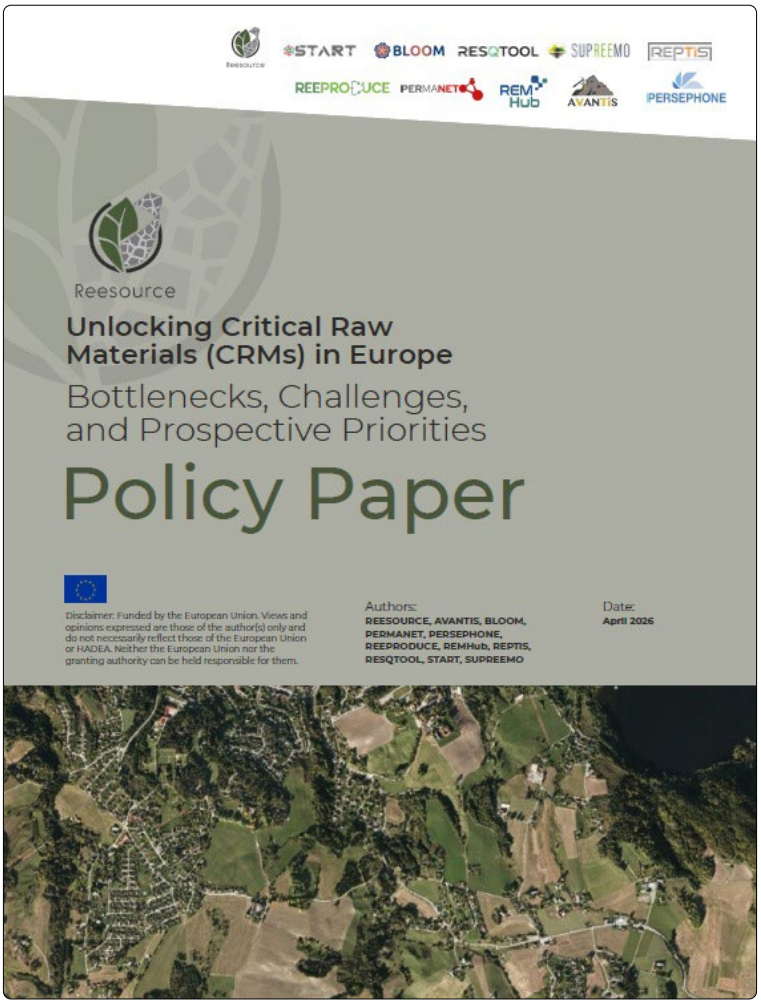

Figure 29 | REESOURCE Project& Yılmaz, D. (2026). Policy Paper: Unlocking Critical Raw Materials (CRMs) in Europe: Bottlenecks, Challenges, and Prospective Priorities.

(12) REESOURCE Project& Yılmaz, D. (2026). Policy Paper: Unlocking Critical Raw Materials (CRMs) in Europe: Bottlenecks, Challenges, and Prospective Priorities. Zenodo. https://doi.org/10.5281/zenodo.19818962

RESQTOOL TEAM TOUR

Two more partners of the consortium are brought to you in this issue: Fraunhofer IKTS and Stadler Metalle GmbH & Co. For more details, you are welcome to check their websites!

FRAUNHOFER IKTS

The Fraunhofer Institute for Ceramic Technologies and Systems IKTS is one of the world's leading research centers for technical ceramics, superhard materials, cermets, and hardmetals. Across the entire value chain, from fundamental research to industrial application, IKTS develops materials, processes, and components for traditional and new fields of application, such as mechanical engineering and automotive technology, energy and environmental engineering, electronics, as well as bio- and medical technology.

The infrastructure ranges from state-of-the-art particle and suspension characterization to microstructure preparation (both conventional and FIB/ion beam methods), quantitative phase and microstructure analysis, a broad spectrum of thermoanalytical techniques, and tribological and mechanical characterization. This is complemented by extensive furnace technology from laboratory to pilot scale, as well as thermodynamic and kinetic modeling. The combination of advanced analytics and deep process and material knowledge enables comprehensive evaluation of materials, components, and entire process chains.

Figure 30 | Image courtesy of Fraunhofer IKTS

Figure 31 | Image courtesy of Fraunhofer IKTS

In the area of hardmetals and cermets, powder metallurgical high-performance materials based on WC-Co and alternative hard and binder phases are developed. One focus is on the substitution of critical raw materials and increasing raw material efficiency.

This includes:

- Iron- and nickel-based binders as low-Co or Co-free alternatives.
- High-entropy alloys (HEA) as novel binder phases for hardmetals and cermets with high strength and toughness.
- Alternative hard phases such as NbC/NbCN or high entropy carbide (HEC) as potentially less critical substitutes for tungsten carbide.
- WC-based composites with diamond for applications under extreme wear loads.

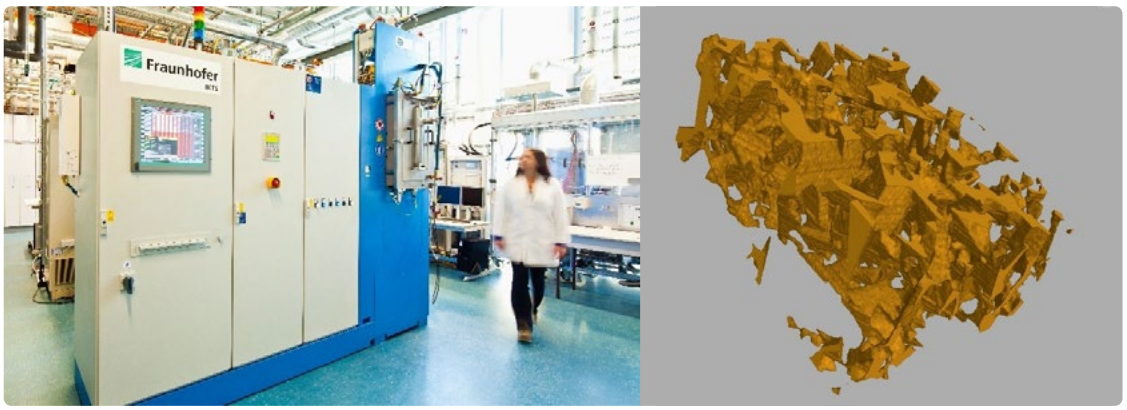

Figure 32 | Image courtesy of Fraunhofer IKTS

Within the framework of RESQTOOL, IKTS[13] plays a key role in Work Packages 4 and 5 (Characterisation & Validation): Hardmetal powders provided from recycling lines (e.g., zinc reclaim process at GTP Finland) are comprehensively characterized at IKTS—from powder morphology and phase analysis to sintering behavior, porosity, microstructure development, and mechanical properties such as hardness, fracture toughness, and wear resistance. This ensures that powders derived from secondary raw materials meet industry requirements and can compete with conventional primary powders.

By linking material development, process expertise, and high-resolution characterization, IKTS, together with the partner CEIT, functions as a «Materials Competence Hub» within the RESQTOOL consortium: It provides the data basis to demonstrate, optimize, and release the performance of recycled hardmetal materials for industrial demonstrators—an important step towards a resilient, circular hardmetal industry in Europe.

STADLER METALLE GMBH & CO. KG (STADLER RAW MATERIALS)

Stadler Raw Materials is a German specialist in the trading, processing, and recycling of critical and high-value metals. Since 1985, the company has been dedicated to keeping valuable raw materials in circulation by transforming production residues and metal-containing waste into strategic secondary raw materials. Its activities support both resource conservation and the secure supply of critical materials for industry.

The company's expertise covers the entire value chain, from the global sourcing and collection of metal-bearing materials to their analysis, sorting, processing, and reintegration into industrial supply chains. Stadler Raw Materials focuses particularly on tungsten-containing hardmetal scrap, nickel alloys, cobalt alloys, high-speed steel (HSS), titanium alloys, and other specialty metals. Through its recycling and recovery activities, the company contributes to a more circular and sustainable economy while reducing dependence on primary raw material extraction.

Figure 33 | Image courtesy of Stadler Metalle GmbH & Co. KG

(13) https://www.ikts.fraunhofer.de/en.html

With a strong commitment to supply security, sustainability, and resource efficiency, Stadler Raw Materials[14] serves as a reliable partner for industry, helping customers implement responsible material management and circular economy solutions. By recovering valuable metals and returning them to productive use, the company actively supports Europe's goals for sustainable raw material management and increased resilience of critical material supply chains.

Stadler Raw Materials contributes its extensive expertise in hardmetal secondary raw material collection, sorting, and recycling. As an industrial partner and leader of key activities within Work Package 2 – Sorting & Classification, Stadler supports the development of innovative solutions to improve the recovery and recycling of critical raw materials from hardmetal scrap. In close collaboration with project partners, Stadler provides industrial know-how on current sorting practices and supplies real-world scrap materials for the development and validation of automated sorting technologies based on artificial vision, robotics, and artificial intelligence. The company also contributes to the evaluation of the pilot sorting system by providing industrial secondary raw material streams and operational feedback to ensure that the developed technology meets the requirements of large-scale industrial recycling.

Figure 34 | Image courtesy of Stadler Metalle GmbH & Co. KG

(14) https://www.stadler-rawmaterials.com/en/

KEEP IN TOUCH WITH RESQTOOL

If you read this newsletter and found it interesting, why not enter the RESQTOOL community?

If you have not done so yet, go to our website www.resqtool.com and click "SUBSCRIBE".
You will be inserted in our mailing list (you can opt out any time!) and receive info about our activities.

You can also follow us on three social media:

LinkedIn: https://www.linkedin.com/company/resqtool-he-project/

X: https://x.com/RESQTOOL

YouTube: https://www.youtube.com/channel/UCrONO4fl0r4ZExrOL6FbXLA

All our Open Access documents will be stored on Zenodo. We have a RESQTOOL community there (https://zenodo.org/communities/resqtool), visit it if you prefer downloading or reading there rather than from our website (but the website is cool!).

If you prefer a direct E-Mail, contact our coordinator Kenan Boz, kboz@epma.com

RESQTOOL

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