MADITRACE

Midterm event report

Deliverable D5.6

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Summary

Keywords

Material Traceability, Digital Product Passport (DPP), Critical Raw Materials (CRMs), Raw Materials Week

Abbreviations and acronyms

Acronym	Description
RMW	Raw Materials Week
WP	Work package
SWOT	Strengths, Weaknesses, Opportunities, and Threats
EU	European Union
ESG	Environmental, Social and Governance
NGO	Non-governmental organization
MFP	Material fingerprint
DPP	Digital product passport

1 Introduction

The **Raw Materials Week** (RMW) is the largest policy event on raw materials, organised by the European Commission since 2016. It attracts over 1,000 participants from industry, administration, civil society, research, and academia.

The **Raw Materials Week 2024**, 9 to 13 December 2024 in Brussels, the dynamic future of raw materials in Europe.

In parallel to events organized by the European Commission during this week many EU funded projects organize and participle into satellite events. In the case of MaDiTraCe project a side event, corresponding to midterm event of the project, was organized on the 13th of December in Le Plaza Hotel from Brussels.

2 Event dissemination and participation

Event Dissemination and Promotion

To maximize visibility and participation, a comprehensive dissemination strategy was implemented across multiple channels, ensuring that key stakeholders were informed and engaged in the lead-up to the event.

Website: Detailed information about the side event, including the date, location, agenda, speakers, and registration, was published on the project's website.

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Figure 1: Event news on the project website

Mailing lists: Invitations and regular updates regarding the event were disseminated through the mailing lists of the project partners. In addition, a specific newsletter about the event and the main topics to be discussed was sent to all subscribers of the MaDiTraCe project.

Join us: MaDiTraCe Project at the Raw Materials Week!

We are pleased to announce that the MaDiTraCe Project will be participating in this year's Raw Materials Week in a satellite event an ideal opportunity to share our early findings and key insights with stakeholders.

Why Attend?

This event offers an exclusive look at the latest developments from MaDiTraCe in the fields of traceability, certification (CERA4in1), and due diligence. It's a chance to learn firsthand how the project is contributing to responsible sourcing and the sustainable future of raw materials.

Event Details:

- Date: December 13, 2024
- Time: 9:00 – 11:00 AM
- Venue: Hotel le Plaza, Paola Room, Brussels

Agenda Highlights:

- Keynote Presentation
- Project Updates: Featuring insights into due diligence, CERA4in1 certification, and traceability innovations
- Open Discussion: Engage in a Q&A with the project teamJoin us for a morning of valuable discussions and networking with industry partners.

This event will also offer you the chance to connect with partners and dive deeper into raw material traceability and responsible sourcing.

Confirm your attendance! See you in Brussels!

Figure 2: *Newsletter about the event*

Social media: The event was actively promoted on LinkedIn through targeted posts and the use of specific hashtags, with the aim of reaching a wider and more diverse audience.

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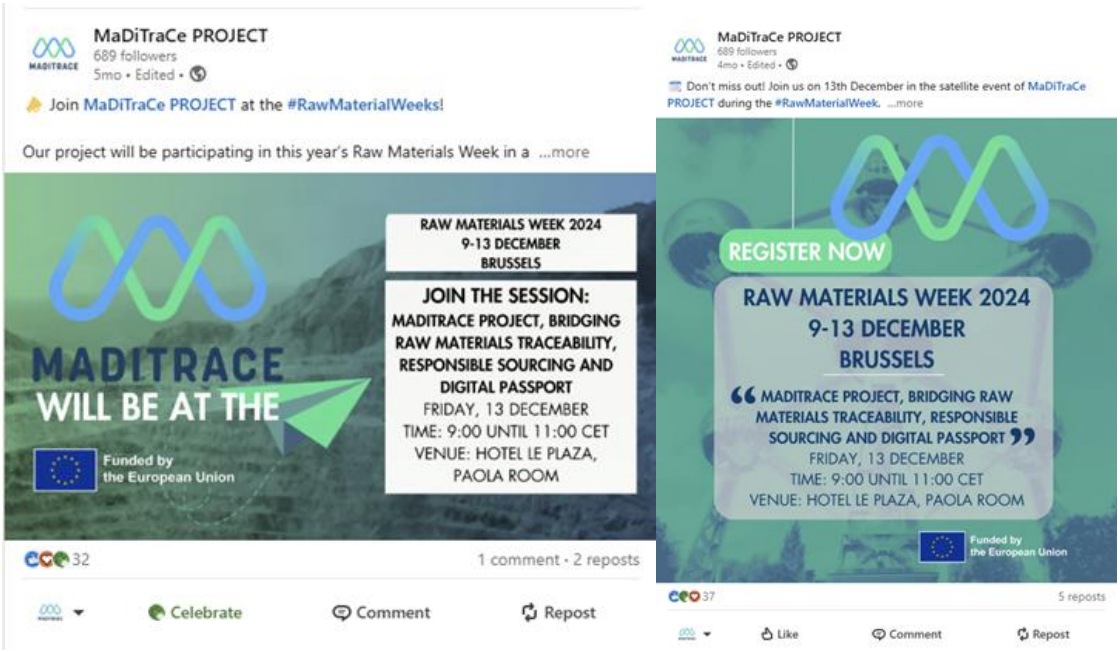

Figure 3: LinkedIn posts

Partners' Networks: The event was also communicated through the networks of MaDiTraCe's partners, ensuring that the invitation reached key individuals in the raw materials sector and beyond.

Materials Used: To support the event's dissemination, various promotional materials were created, including Flyers and banners highlighting the event's topics and agenda, distributed both digitally and physically during the Raw Materials Week.

Figure 4: flyer and agenda for the Midterm event of Maditrace project.

Attendance and participation

The MaDiTraCe side event at Raw Materials Week 2024 attracted a diverse and engaged audience. Although some 45 participants registered, physical attendance was more limited. Nevertheless, the event managed to gather a very relevant and influential group of stakeholders in the room. Key organisations such as the Global Battery Alliance, the European Lithium Institute, the AVENIA grouping and the Initiative for Responsible Mining Assurance (IRMA) were represented. In addition, representatives of several consulting firms active in the raw materials and sustainability sectors were present.

Although attendance was lower than expected, the quality of participation and the relevance of the discussions remained high. The event provided an excellent opportunity for exchange of knowledge, networking and strategic dialogue on the challenges and opportunities related to traceability, digitisation and sustainability in critical commodity supply chains. This engagement further reinforced the value of the MaDiTraCe project within the broader raw materials policy landscape.

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3 Project presentations

The midterm event consists in four presentations of the four technical WPs of the project.

General presentation of MaDiTraCe project and traceability challenges

Daniel Monfort (BRGM), scientific coordinator of the project, presented the original reasons of MaDiTraCe project (battery regulation, due diligence regulations, critical raw materials Act), the objectives of the project and a brief summary of the first results of the first period of the project.

Figure 5: Daniel Monfort from BRGM during the general introduction to the project.

WP1. Traceability systems and its integration into existing due diligence frameworks and standards

The presentation addresses supply chain traceability as a key tool to ensure the responsible and sustainable sourcing of primary and secondary materials. It highlights that this traceability relies on **frameworks**, which are detailed guidelines and principles that help organizations implement responsible sourcing practices, facilitating effective due diligence processes. Furthermore, **laws and international instruments** are recognized as binding regulations designed by governments and global organizations to protect the environment, uphold human rights, and ensure ethical practices throughout the supply chain. To achieve this, **initiatives** play a key role by promoting methods, technologies, and collaborations among NGOs, companies, communities, and other stakeholders, with the goal of generating positive impacts and achieving long-term competitive advantages. Likewise, the

importance of **ESG standards (Environmental, Social, and Governance)** is emphasized as fundamental frameworks to minimize environmental impact, ensure social responsibility, and strengthen governance processes in the mining industry.

However, gaps and needs remain that must be addressed to improve traceability effectiveness. Regarding **frameworks**, there is a lack of harmonization among them, and companies face dilemmas when selecting the most appropriate framework, influenced by factors such as geographic location, the types of raw materials used, regulatory pressures, and stakeholder expectations. There is also a need for detailed guidelines tailored to specific sectors and considerations for secondary raw materials. Not all frameworks address critical aspects of due diligence, such as financial transparency or third-party audits, which are essential for corporate review processes. Concerning **laws and international instruments**, regional challenges arise from the complexity of adhering to numerous regulations that vary by country. Additionally, these laws fail to specify the responsibilities of actors in the supply chain, which is crucial for ensuring transparency and the sharing of information among all stakeholders. Regarding **initiatives**, it is necessary to evaluate progress through success indicators. Effective integration between academia and industry is vital for strengthening these initiatives, as is expanding international collaboration beyond the borders of EU. Supply chains are global, and since many minerals used in Europe come from other countries, it is essential to include all stakeholders involved in the CRM supply chain. Constant oversight in audits and compliance is critical to ensure transparency and accountability. Furthermore, specific guidelines must be developed to foster effective collaboration among companies while ensuring that technological and chemical solutions are accessible and easy to adopt for all parties involved. Lastly, concerning **standards**, harmonization is a crucial step to prevent confusion when selecting appropriate certifications and practices. Significant deficiencies include a lack of inclusivity and flexibility, as many standards fail to cover the entire supply chain or adapt to companies of different sizes. Another challenge is the low visibility of these standards within the industry and the limited external dissemination of audit results. Additionally, fostering community engagement through effective grievance mechanisms, incorporating innovative technologies, and continuously updating regulations is essential.

A key aspect of the presentation was the SWOT analysis of the evaluated standards. Among the strengths, the experience of the leading organizations, effective stakeholder collaboration, high governance and traceability compliance, and third-party verified audits were highlighted. However, weaknesses include the voluntary nature of the standards, limited adoption of advanced technologies, lack of transparency in audit result publications, and a low number of certified companies. Opportunities include growing consumer interest in sustainable practices, the potential for certification incentives, and collaboration with governments and corporations on a global scale. Finally, threats include competition among similar standards, changes in mining regulations, and scandals within certified supply chains.

In conclusion, traceability is essential to ensure the responsible sourcing of critical materials. It is imperative to strengthen existing systems to encompass the entire supply chain, foster greater collaboration among stakeholders, and prioritize transparency in processes. Strategic actions must focus on developing cohesive and scalable traceability systems,

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adopting innovative technologies, and promote responsible practices that enable the industry to meet stakeholder demands for sustainability and traceability.

Figure 6: presentation of Paulina Fernandez from MUL.

WP2. Material fingerprint

The term "material fingerprint" (MFP) refers to the unique characteristics or patterns that can be used to identify a specific material and particularly its origin. This concept is analogous to human fingerprints, which are unique to everyone. In the context of materials/metals, a fingerprint can include various properties such as chemical composition, mineralogy or spectral signatures that distinguish one material/metal from another. These fingerprints are often used in forensic science and materials science, and quality control to ensure the authenticity and consistency of materials.

In the case of Maditrace project Delphine Losno from Ugent presented the development of MFP concept for rare earths, with a main focus on neodymium, and its application to permanent magnets. Different analytical techniques were presented for performing analysis both in-situ and in laboratories. In the case of rare earths and neodymium the main mining activity occurs in China.

WP3. Digital product passport

Doruk Sahinel from Spherity, task leader in WP3, presented several developments in the project in the field of DPP. He presented an architectural framework designed to ensure traceability in critical raw material supply chains. The driving factors and concepts that set the foundation towards the architecture such as conformity credentials, data spaces and self-sovereign identities (SSI) were introduced. Then the relevant initiatives, regulations, standards, ecosystems and specifications are presented and their integration into the architecture is explained together with the architectural principles that stem from these standards.

This proposed architecture recognises the significant advances made in the last few years in creating standards and ecosystems around all the different building blocks of the traceability and Digital Product Passport (DPP) architecture. A modular architecture structured around these building blocks is proposed, and all components are clearly defined with their objective, functions and the interactions with other building blocks. The use case sequence diagrams were presented as case studies to highlight how these architectural components can be exploited to creating secure and verifiable supply chains.

Figure 7: presentation of DPP by Doruk Sahinel (Spherity).

The following aspects are highlighted in the presentation:

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- Background Concepts: As Maditrace aims for compliance with the European Union's traceability and sustainability goals, the key regulations such as EU Battery Regulation, Corporate Sustainability and Due Diligence Directive, and Ecodesign for Sustainable Products Regulation form the backbone of the Maditrace architecture. Furthermore, the integration of SSI principles and decentralized identifiers (DIDs) supports security, privacy-preserving, and interoperable data exchange across the supply chain. Regarding the reference implementations, Catena-X creates a data space for secure data exchange with DPPs, EUDI Wallet stores verifiable DPPs, and the UN Transparency Protocol enhances CRM supply chain resilience and sustainability through standardized digital traceability data models and credentials.
- Architecture Principles: Maditrace architecture is designed around the key principles of accessibility, interoperability, modularity, and verifiability. It ensures that all data shared across the supply chain is traceable, accurate, and easily accessible by all stakeholders, from manufacturers to regulators. The architecture should be made free from proprietary standards, applying open-source standards such as W3C Verifiable Credentials and Decentralized Identifiers to support seamless data exchange and verification.
- Architecture Components: The Maditrace DPP architecture includes several core components such as secure communication protocols, a digital repository for storing credentials, and cryptographic proofs for ensuring data integrity. It also establishes a trust chain that links credentials to trusted authorities, making it possible for stakeholders to trust the data they share and receive. These components work together to ensure a secure, transparent, and verifiable supply chain.
- Generic Use Cases: Material Transformation Event, Mine Audit Process, Data Sharing among supply chain stakeholders, and Data Verification use cases are presented to display how the architecture can be utilized to meet the traceability requirements. The use cases depict how the traceability event data can be made verifiable by linking them to a W3C Verifiable Credential, how organization wallets are used to store credentials such as mining permits. These interconnected use cases demonstrate the MaDiTraCe system's robust approach to ensuring data integrity, traceability, and compliance across the supply chain.

The next steps for MaDiTraCe include developing a prototype for the proof-of-concept architecture to demonstrate its application in various use cases. Additionally, CERA 4in1 certificate integration, fingerprinting data, and validating the architecture's usability for varied materials will be key milestones. These efforts will drive further adoption and ensure compliance with evolving regulations and standards.

WP4. CERA4in1 development

The presentation introduces the maturity of the CERA 4in1 certification system including its background, overview, the different standard characteristics, systematic and certification process as well as its four unique innovation aspects.

- Digital Traceability, link to WP3: CERA 4in1 defines the requirements for data exchange of organizations operating on digital platforms (e.g., materials origin, GHG emissions) among different stakeholder across the supply chain, promoting the transparency of mineral raw material value chains.
- Digital Product Passport, link to WP3: Digital Product Passport attributes are considered in the development of CERA 4in1. By implementing the relevant CERA 4in1 criteria, the organization effectively generate verified DPP data.
- Chemical Traceability, link to WP2: CERA 4in1 adopts chemical traceability measures where feasible and necessary to determine the origin in case of material identity preservation and if the material originates from conflict-affected and high-risk areas (CAHRA).
- Life Cycle Assessment, link to WP4 - ULEI: CERA 4in1 includes a tailored Life Cycle Assessment (LCA) methodology for the battery industry. This methodology helps organizations across the battery supply chain meet specific standard and regulatory requirements, improving their capability to conduct an environmental impact evaluation and enhancing standardization efforts and industry compliance.

These four interfaces present the technical guidance on how to ensure digital and chemical traceability as required by CERA 4in1. No comparable certification system in the market has adopted this technical guidance so far.

Figure 8: presentation of DMY by Lukas Foerster.

4 Main discussions and questions

During the discussion time in the mid-term event several aspects were raised by the different stakeholders present in the room, representatives from sectors such as the DPP industry, responsible mining standards and raw materials cluster associations.

- **Interaction with other initiatives in the field of standardization and traceability**.
- **Feasibility of the implementation of material fingerprint at a larger scale**. The research work did in MaDiTraCe in WP2 is identifying the potential developments in

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the field of MFP for four commodities. Tasks in WP2 also covers the degree of feasibility and criteria such as cost.

- **LCA data in DPP and standards**. DPP and more particularly battery DPP regulation in the EU are aligned with an LCA methodology. Responsible mining standards such as Cera4in1 considers as a main criteria the capacities of companies to compile data for LCA calculation. In the framework of MaDiTraCe project it is the object of one of deliverables (D4.6).
- **LCA approach for recycling and its integration into DPP/traceability system.** The consideration of recycling in traceability system represents a challenge for some traceability systems. In terms of MFP, recycling can suppose the complete mixture of fingerprints from different origins of materials. The LCA task for recycling flows is a part of the tasks led by Leiden university to assess in WP4.
- **Interoperability between different standards in a chain of custody standard.** Different initiatives will exist, and it is not possible to imagine a single and unique standard. However, discussions such as ISO working groups would be a good basis for a common understanding.
- **Multi-Stakeholder Governance Approach in CERA 4in1.**
- **Feasibility of certification for small- and medium sized enterprises**. Question on how can smaller mines be better assisted in achieving certification? One significant challenge lies in the lack of upfront visibility into the criteria expected by various certification standards, making it difficult for these enterprises to identify and address gaps in advance. Some standards, such as IRMA, address this issue by offering their criteria and guidelines free of charge and providing support throughout the auditing process. This proactive approach can serve as a model to make certification more accessible for smaller mines.
- In the SWOT analysis, **the voluntary nature of standards systems** was identified as a weakness, as this lack of enforceability can limit their adoption and effectiveness at a global level. However, some standards see this voluntariness as a positive aspect and a source of pride, highlighting that it arises in a context where there is no formal regulatory framework.

5 Conclusions

The MaDiTraCe interim event, held in the framework of Raw Materials Week 2024, successfully brought together key stakeholders from industry, research, and certification bodies to present and discuss the progress of the project after almost two years of implementation. Despite lower-than-expected physical attendance, the event facilitated valuable exchanges with stakeholders and highlighted the relevance of the project in the wider context of EU sustainability and traceability policies.

Presentations on each work package showed significant progress in technical development, from material fingerprinting methodologies to the architecture of a Digital Product Passport and its integration with leading certification standards such as CERA 4in1. Constructive discussions highlighted critical challenges ahead, such as ensuring interoperability between

standards, addressing traceability in recycling streams and helping smaller players to achieve certification.

For this final stage of the project, MADITRACE will focus on consolidating its technical solutions through the development of prototypes, cross-cutting integration between work packages and increased collaboration with external initiatives. Future events could benefit from a stronger dissemination strategy and hybrid participation options to maximise their impact and reach.

Figure 9: Maditrace project team in mid-term event.

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