

# Stakeholder feedback on the Strategic Research and Innovation Agenda on Raw Materials 2040



ERA-MIN3

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RAW MATERIALS FOR THE SUSTAINABLE DEVELOPMENT  
AND THE CIRCULAR ECONOMY

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**WP 7: Strategic actions/Added value for cooperation**

**Task 7.5: Strategy for cooperation beyond ERA-MIN3**

**Task Leader:** Vinnova

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**ERA-MIN3** comprises a progressive, innovative and flexible pan-European network of 25 funding organisations from 18 EU MS countries/regions (VLAIO – Belgium/Flanders; FWO – Belgium/Flanders; SPW – Belgium/Wallonia; BNSF – Bulgaria; TA CR – Czech Republic; Business Finland – Finland; ETAg – Estonia; ADEME – France; ANR – France; PT JÜLICH – Germany; GSI – Ireland; MUR – Italy; NCBR – Poland; FCT – Portugal; UEFISCDI – Romania; CDTI – Spain; CFNA – Spain/Navarra; AEI – Spain; SAS – Slovakia; MIZS – Slovenia; Vinnova – Sweden), one EU Associated country (TÜBITAK – Turkey), and three non-EU countries (Finep- Brazil; PRIMA-Québec – Canada/Quebec; DSI – South Africa).

Built on the experience of the EU project ERA-MIN (2011-2015) and ERA-MIN 2 (2016-2021), **ERA-MIN3** aims to support the objectives of the European Innovation Partnership on Raw Materials (EIP RM), the EU Raw Materials Initiative and further develop the raw materials (RM) sector in Europe through funding of transnational research and innovation (R&I) activities, fully aligned with initiatives to support the EU's transition to a Circular Economy in many fields, such as the Circular Economy Action plan, the Battery Action Plan, and the European Green Deal, by moreover answering to the United Nations Sustainable Development Goals. This will be achieved through one EU co-funded call for R&I proposals in 2021, one additional call in 2023 and a potential third one, designed and developed specifically for the non-fuel, non-food raw materials sector.

**ERA-MIN3** scope of the joint transnational calls is needs-driven research on non-fuel, non-food raw materials (**metallic, construction and industrial minerals**) that clearly demonstrate potential to promote the sustainable and responsible supply, exploration, extraction, processing technologies, production, consumption and recycling of primary and secondary minerals and metals, as well as substitution of critical raw materials, in a circular economy. There is a focus on resource efficient production and recycling that has low environmental impact and is economically feasible in the short-term. A crucial challenge is to consider societal impact and public perception, health and safety issues related to the different stages of the whole raw materials value chain. New business models and digital technologies will be crucial for transferring research results to the market.



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## 1. BACKGROUND

More than ten years have passed since the publication of the ERA-MIN Research and Innovation Agenda (for consultation here: [ERA-MIN agenda 2013](#)) and the Raw Materials landscape has considerably changed since then. As the world, and in particular the EU, transitions from a fossil-based economy to a near-zero waste and emission economy, the

***Demand** for many raw materials skyrockets. Expert predictions indicate up to 20 times the current demand by 2040.*

***Geopolitical risks** are higher than anticipated a couple of decades ago, thus threatening the sustainable and resilient raw materials supply to European industries and straining the raw materials value chain.*

***Recycling** of raw materials will only meet a fraction of the demand and there is a need to act on both short- and long-term strategies to increase EU resilience.*

In order to support the proposed EU co-funded partnership on *Raw Materials for the Green and Digital Transition* in Horizon Europe Work Programme 2025, ERA-MIN3 accepted to develop a new Strategic Research and Innovation Agenda (SRIA), which will outline the vision, challenges and thematic areas for research and innovation (R&I) in the field of non-fuel, non-food raw materials to guidelines to be implemented within the partnership.

A task force was composed within ERA-MIN3 to create and establish the partnership SRIA. The work has been led by Vinnova (Sweden) with the participation of the research funding organizations FCT (Portugal), PT Jülich (Germany), AEI and FECYT (Spain), GSI (Ireland), MIZS (Slovenia), ANR (France), ADEME (France) and UEFISCDI (Romania).

The aims of the SRIA within the field of raw materials with focus on metals and minerals are:

- Identifying critical technological and structural challenges within the EU, related to the supply of raw materials for the green and digital transition.
- Addressing needs for research and innovation to tackle the challenges, as well as prioritizing among strategically important core targets.

Six thematic areas were proposed for the SRIA, three of which are technical, business-focused themes addressing economic activity (so-called *core themes*) and will tackle the main research and innovation challenges in the field:

- Core Theme 1: Resilient primary and secondary raw materials supply
- Core Theme 2: Efficient use of raw materials in design and production
- Core Theme 3: Sustainable use and reuse of products



The remaining three themes have a focus on policy development, social (and environmental) sustainability and international cooperation (so-called *transversal themes*) and will enable the development of a strong innovation system:

- Transversal Theme 1: Effective policy development and governance
- Transversal Theme 2: Maximizing societal benefits
- Transversal Theme 3: World-class innovation capacity

More information on the SRIA structure, thematic areas and the current progress can be found on a dedicated webpage on the ERA-MIN3 website (<https://www.era-min.eu/sria>).

## 2. INTRODUCTION

Following the development of an initial SRIA structure and the suggestion for the thematic areas (see Appendix 1) during the spring of 2023, four workshops were held between June and November 2023 in order to follow a bottom-up approach with deep stakeholder engagement in the SRIA development process. The purpose of these workshops was to gather input and feedback from experts in the field of raw materials as well as from downstream industries, research funding organizations and other stakeholders, as well as to co-create impact goals, outcomes and key performance indicators (KPI's). An overview of the dates, formats, participants and scope of these workshops is provided in Table 1.

*Table 1. Overview of workshops held for feedback and co-creation of SRIA aspects.*

Workshop #	Date	Format	Target participants	Scope
1 <sup>st</sup> workshop	28 <sup>th</sup> June 2023	Online including moderated breakout groups	Research funding organizations, ca. 20 representatives present.	Input and feedback on SRIA structure and thematic areas
2 <sup>nd</sup> workshop	29 <sup>th</sup> August 2023	Physical during the <a href="#">RawMat 2023 conference</a> in Athens, Greece	Academic and industry experts, ca. 40 participants.	Input and feedback on SRIA structure and thematic areas
3 <sup>rd</sup> workshop	20 <sup>th</sup> September 2023	Online including moderated breakout groups	Open to all stakeholders, ca. 50 participants.	Co-creation of impact goals, outcomes and KPI's for the partnership
4 <sup>th</sup> workshop	14 <sup>th</sup> November 2023	Physical during the <a href="#">Raw Materials Week 2023</a> in Brussels, Belgium	Open to all stakeholders, ca. 120 participants (including through online connection).	Input and feedback on impact goals, outcomes and KPI's for the partnership



### 3. REPLY TO AND ACTIONS TAKEN ON FEEDBACK COMMENTS

In order to guide the workshop participants and structure the discussion, especially during the 1st and 2<sup>nd</sup> workshop (see Table 1), the feedback collection revolved around the following key questions:

1. Do the core themes cover the whole raw materials value chain in a good way?
2. Do the transversal themes complement the core themes in a good way?
3. Can you identify gaps on a macro level of the core/transversal themes?
4. Are there elements within the core/transversal themes that are out of scope in your opinion?
5. Which are the first actions that come to mind when you see the core/transversal themes?
6. *Question specific to research funding organizations:* Does your organization support R&I or other actions within the scope of the core/transversal themes?

In the following sections, the written feedback comments are summarized (italic), including replies and potential changes, adjustments, and other actions by the ERA-MIN3 SRIA task force based on the specific comment (blue font colour/underlined). The comments may represent direct written input by a workshop participant, or a summary provided by a workgroup moderator. Redundant comments have been removed. Minor comments on e.g., specific terms or wording used are not reported here.

#### 3.1 Stakeholder feedback on core themes:

##### **General comments:**

- *The core themes are well designed. No change necessary.*
- *The core themes cover the whole raw materials value chain in a good way. No change necessary.*
- *Most research funding organizations are able to fund research and innovation actions within all core themes. No change necessary.*
- *Industry-academia partnerships are crucial for success. We agree with this comment. The majority of projects funded by ERA-MIN are public-private partnerships and we aim to take with us the lessons learnt to establish such partnerships through matchmaking and other tools into the new partnership.*
- *Keep the bottom-up approach. We strive to provide numerous opportunities for stakeholder input and feedback on the SRIA such as workshops or direct contact with the SRIA authors. Indeed, we see a bottom-up approach as crucial to develop a SRIA which is relevant for the future innovation system in raw materials.*





- *Current structure has some overlaps with M-ERA.NET3 on advanced materials, and seeing as there is no continuation of M-ERA.NET perhaps more room for potential synergies or a potential merger of M-ERA.NET aspects could be considered. The interfaces with advanced materials research have been incorporated into the SRIA with good intent of opening up opportunities for close collaboration in R&I areas where we see large potential for synergies. We see this potential primarily in Core Theme 2 (Efficient use of raw materials in design and production) but also in other themes. At this stage, a merger is not foreseen, but we aim to keep the SRIA as a dynamic and flexible document that can be adjusted to changing circumstances and allow for synergetic interfaces with other initiatives.*
- *Ensure that the SRIA will be regularly updated, e.g. taking into account, the regular updates of the list of critical and strategic raw materials. On the other hand, avoid over-emphasizing raw materials, that are of current interest but may be less important in the years to come. We aim to keep the SRIA as a dynamic and flexible document that can be adjusted to changing circumstances and R&I needs.*
- *Revise the explanation and examples for the core themes with regard to circular economy aspects, e.g. the term recycling can be used in different core themes but addresses different parts of the value chain (or cycle). We agree with this comment and will ensure that the terms are correctly used in the final version. Indeed, R&I on recycling technology itself will be part of Core Theme 1 (Resilient primary and secondary raw materials supply), even though aspects of e.g. waste and scrap collection, sorting and pre-processing are located further down on the use and re-use spectrum of the value chain and therefore incorporated into Core Theme 3 (Sustainable use and reuse of products).*
- *Check that the terms used are well understood by different types of readers. We intend to include a glossary in the SRIA which will provide definitions for the terms used.*
- *We need in the SRIA pre-competitive research. If pre-competitive refers to research on the lower end of the TRL scale, we agree with this comment and have taken this into account from the beginning. Indeed, the proposed EU raw materials partnership is envisaged to have a strategic place in the innovation system, complementary to other EU funding schemes (e.g. Horizon Europe, EIT RawMaterials) with regards to including low-TRL research conducted by small to medium-sized consortia, i.e. very accessible funding for lab-scale studies.*
- *We have to consider the Global Metal Value Chain Approach (global demand, diversified supply). For example, lithium recovered from EV batteries could be used (with different degrees of purity) not only for batteries but also for different strategic*





*applications.* The SRIA will have a large priority on metallic raw materials (i.e. chemical elements) which are inherently reusable and repurposable in various strategic applications once recovered from a previous application. There is a strong focus on reuse, recyclability and recycling throughout the core themes of the SRIA.

- *Forward-looking perspective (prospective aspect) is missing.* We will include a sub-chapter *Vision 2024* for each thematic area in the SRIA which will address such prospective aspects. It is crucial to have a mission and vision for the future in order to formulate R&I outcomes and design actions that will lead to the realization of these.
- *Decarbonization of Raw Materials value chains is a Core theme: Since decarbonization of raw materials value chains is an essential to reduce the environmental impact associated with the production and utilization of crucial resources, should be include as CT. This should involve implementing sustainable practices and innovative technologies throughout the entire lifecycle of raw materials, from extraction and processing to distribution and disposal. Decarbonization will contribute to mitigating climate change and enhance the resilience of supply chains. We agree with this comment and also see decarbonization of the raw materials value chain as a core challenge which will be addressed in the SRIA in all aspects of the value chain, in line with the comment. However, climate action is one (albeit very important) aspect of a broader need for environmental, social and economic sustainability of the raw materials sector. We deem it vital to integrate all these aspects of sustainability in order to develop efficient and game-changing innovation systems.*
- *Circular Economy initiatives are not equally organized at EU level. This brings different priorities between countries.* Yes, there is a need for strong partnerships uniting national initiatives on a common goal towards a circular economy. Our SRIA will be fully aligned with e.g. the European Critical Raw Materials Act, which will provide a strong legislative backbone for this endeavour.
- *Secondary raw materials are not equivalent to recycling or ‘urban minery’ metals or coking coal obtained from waste by chemical procedures and primary ‘mined’, not secondary materials.* We will ensure that all terms are correctly used in the final version.
- *Urban mining and raw materials extraction from waste should be clearly mentioned.* Urban mining and waste collection, sorting and pre-processing is an integral part of Core Theme 3 (Sustainable use and reuse of products) and will be considered in the SRIA.
- *CRM act: expertise to support implementation of CRM Act.* Contributions of the partnership towards the implementation of the CRM act will be addressed in the



impact goals, outcomes and KPI's of the SRIA. We see a clear need and opportunity to strengthen and support national exploration programmes established through the CRM act, for example.

- *Define “material”.* We intend to include a glossary in the SRIA which will provide definitions for the terms used.
- *Involve sciences and stakeholders who were outside of the ERA-MIN community until now.* We agree that strong international R&I partnerships are crucial to reach our objectives, especially in the field of raw materials. The EU co-funded partnership provides unique opportunities for involving EU countries, EU-associated as well as third (non-EU countries) in the innovation system. In addition, a broad range of expertise is necessary to make strong contributions to the challenges outlined, and raw material experts cannot provide the full range of expertise necessary. We agree that efforts will be made to ensure outreach to and involvement of expertise outside of the raw materials field sensu-stricto.
- **Comments on Core Theme 1: Resilient primary and secondary raw materials supply**
- *New and innovative technologies = enable technologies for a greener mineral access. Scope more attractive to industrial partners.* Core Theme 1 has a natural technological innovation focus, which will be outlined in the SRIA.
- *Gaps in the value chain: Does it also covers transports and logistics? And end-users of new and reused products?* This is why we introduced Core Theme 3 to cover the entire value chain including end users. Transport and logistics will be addressed indirectly through focus on resource efficiency, but we do not envisage particular actions aimed at e.g. infrastructure at this point.
- *Distinguish in the value-chain separate and processing the elements; the bottle neck is the processing and extracting of elements itself.* Mineral processing and metallurgy will be important aspects of Core Theme 1. Metallurgy in particular utilizes both primary and secondary (raw) material streams and is therefore a key part of the value chain regarding this theme.
- *The SRIA should reflect both the green and the digital transition (maybe the energy transition as well?).* Supporting the green and digital transition has been incorporated into our Mission and will be a red thread throughout the SRIA. We will not include energy raw materials in order to keep the scope narrow enough for strategic actions.
- *Re-design is also important in the context of recycling.* We agree. This will be included in the core themes.



- *Recycling is between CT1 and CT3, it could be more specified (Put recycling in CT1). R&I on recycling technology itself will be part of Core Theme 1 (Resilient primary and secondary raw materials supply), even though aspects of e.g. waste and scrap collection, sorting and pre-processing are located further down on the use and re-use spectrum of the value chain and therefore incorporated into Core Theme 3 (Sustainable use and reuse of products). Having the recycling technology itself focused in one core theme is logical and will promote strong R&I in e.g. metallurgy, focusing on both primary and secondary raw materials streams. We have decided to incorporate all pre-recycling aspects of the value chain in core theme 3 since these are located more towards the consumer side of the value chain spectrum.*
- *Overlapping between CT1 and CT3 (collection, sorting and pre-processing) – It doesn't make sense. See comment above. The circular value chain is by definition a continuum and you naturally need to draw lines between different parts of this chain at certain key points, e.g. at a stage where a smelting plant takes over metal scrap from a scrap collector.*
- *Recovery of by products. This will be addressed in Core Theme 1 (Resilient primary and secondary raw materials supply).*
- *Extraction of raw materials. This will be addressed in Core Theme 1 (Resilient primary and secondary raw materials supply).*
- *Consumer education. This will be addressed primarily in Transversal Theme 2, even though communication and education activities for the wider public will be an integral part of any activities and projects funded through this partnership. This will be specified in the SRIA and the following implementation plan for the partnership.*
- *Energy efficiency in the extraction: To minimize the carbon footprint during extraction advanced technologies such as renewable energy sources, and innovative techniques should be employed that can reduce the energy-intensive nature of these activities. With the objective not only to lower their costs but also decrease greenhouse gas emissions, i.e, fight against climate change. Resource efficiency in the extractive industry will be a key aspect of the impact goals, outcomes and KPI's of Core Theme 1 (Resilient primary and secondary raw materials supply).*
- *Need to tackle water use efficiency across the value chain. Will be a bottleneck in the near future. Resource incl. water use efficiency in the extractive industry will be a key aspect of the impact goals, outcomes and KPI's of Core Theme 1 (Resilient primary and secondary raw materials supply).*



- **Comments on Core Theme 2: Efficient use of raw materials in design and production**
- *Substitution of CRM in products is a very strong aspect of CT2, and not covered by other instruments. We agree with this comment.*
- *It's necessary to take into account the eco-design of process for raw materials and not only eco-design of product. This is a valuable comment and will be considered in the SRIA chapter on Core Theme 2 (Efficient use of raw materials in design and production).*
- *Product design. This is a key aspect of Core Theme 2 (Efficient use of raw materials in design and production).*
- *Descriptive text: « Raw materials such as copper, rare earth elements and cobalt are finite resources. » All raw materials are finite resources. There are raw materials such as wood which are renewable, but these are outside of the scope of this SRIA. The purpose of naming examples in this case was to remind the reader of the SRIA focus on metals and minerals.*
- *Efficiency is needed whatever the difficulty of the supply. We agree with this comment. Increased efficiency in production will also decrease the criticality of a raw material. There are strong synergies between the SRIA themes.*
- *Rename CT2: «Efficient design use and production of raw materials and raw materials products». We believe that this suggestion can be misleading to involve production of raw materials itself, which is part of Core Theme 1 (Resilient primary and secondary raw materials supply). It would also require a glossary entry for “raw materials products” which is not easily defineable. We prefer to keep the current wording, but will discuss the title issue with independent experts in future review rounds.*
- *Product design to increase durability of products. For instance, there is a law regarding quality of products (if some device is broken before 2 years, it should be replaced/repared by guaranty), then products are designed to last no much more than two years. This is a very important issue. While the technical aspects of durability increase will be addressed within Core Theme 2, the policy and legal aspect development regarding this subject will be addressed through activities within Transversal Theme 2 (Effective policy development and governance).*
- *Automation and mechanization in the production. We envisage activities and projects with an automation focus that contribute directly to the more efficient use of raw materials in production to be eligible.*



- *Design in what sense and how?* We intend to include a glossary in the SRIA which will provide definitions for the terms used. We define design in a broad sense regarding any industrial product, component etc. that includes non-fuel, non-food raw materials.
- *Recyclability of products addressed in CT2 has important implications for recycling efficiency in CT1 and also end-user behaviour in CT3. Need to reduce material complexity of products and processes in order to increase recyclability.* We agree that there are strong synergies between all core themes. We envisage partnership activities and projects on e.g. recycling contributing to the vision in all core themes. Material complexity will be considered in the SRIA chapter on Core Theme 2 (Efficient use of raw materials in design and production).
- **Comments on Core Theme 3: Sustainable use and reuse of products**
- *Include circular economy in Core Theme 3.* Circular economy is the essential part of Core Theme 3. Indeed, we see Core Theme 3 as an important part of establishing a circular economy and not considered in sufficient detail in e.g. the ERA-MIN research agenda 2013.
- *Pre-processing could fit better in CT1 rather than in CT3.* Pre-processing refers to the handling of waste and scrap, which in our opinion is more connected to Core Theme 3.
- *Limit CT3 (business-model, ...) or remove completely CT3.* We see Core Theme 3 as an important part of establishing a circular economy and not considered in sufficient detail in e.g. the ERA-MIN research agenda 2013. The vast majority of consulted experts are in favour of this Core Theme and also suggest that it should not be limited only to business model aspects.
- *CT3 needs to be redefine (because overlapping with CT1 and CT2).* We do not believe that sustainable use and reuse of products is covered by Core Themes 1 and 2.
- *The reverse logistic: Referring to the process of managing the return, recycling, and disposal of raw materials and products after they have been used or reached the end of their life cycle.* This aspect is an integral part of Core Theme 3 and will be considered in the corresponding SRIA chapter.
- *Use The concept of “recycling” to explain/connect “sustainability” to the public. Because recycling is a mature and known concept but sustainability is a new one.* This is important input and will be considered, also for e.g. Transversal Theme 2 (Maximizing societal benefit).



- *Prioritization for manual dismantling.* We agree. This will be considered in the SRIA chapter on Core Theme 3.
- *Technical support for collectors.* We agree. This will be considered in the SRIA chapter on Core Theme 3.

### 3.2 Stakeholder feedback on transversal themes:

#### **General comments:**

- *The transversal themes complement the core themes in a good way.* No change necessary.
- *The transversal themes are of course aspects to consider and key for good projects.* No change necessary.
- *Some research funders can only support technical innovation projects.* It is a common occurrence and not necessarily an issue that certain organizations cannot participate in all activities of a partnership. We will attempt to accommodate the specific national priorities and legal restrictions when implementing the activities to ensure a broad participation of partnership member countries and regions.
- *Complicated to understand the difference and the relation between the two set of themes.* Transversal themes are to be seen as non-technical themes which enable the more technology-focused core themes which will tackle the main innovation challenges. This relationship will be clarified further in the SRIA document.
- *Look into case-studies and experience from other countries.* We agree with this comment and see the partnership as a unique opportunity not only to study other countries' experiences, but also to collaborate directly with them through membership or calls and other activities.
- *Mention "environmental" in theme titles.* We identify environmental sustainability as a primarily technical challenge and prefer to focus on it in the core themes.
- *Mobility should be mentioned.* We will consider this comment in the SRIA. We see mobility as an important societal function which relies on sustainable raw materials supply. As such, it will also be included in the core themes.
- *Differentiation between two types of aspects considered in the transversal themes: 1) more related to how projects should be designed (LCA), and 2) more related to how the*





*network can help realize the objectives of the core themes. Indeed, an important distinction. The enabling character of the transversal themes for tackling the challenges specified in the core themes needs to be emphasized. The impact goals, outcomes and KPI's as well as the implementation plan will distinguish clearly between activities organized by the partnership itself and those to be conducted within the R&I project.*

- *Could we consider a different naming, to make clearer the difference between CT and TT? These names can be reconsidered but we would need more concrete suggestions on what is unclear.*
- *It is important to give more incentives for third countries. We agree that third country involvement as key in all transversal themes. The partnership will provide unique opportunities to collaborate with strategic innovation partners among the non-EU countries.*
- *The transversal themes were recognised as complementary to the core themes. However, while core themes were seen as potential call topics, the role of transversal themes was not clear and therefore, needs further revision. The role of transversal themes on the activities of the partnership should therefore be made clearer. The SRIA should give a general structure and guideline for the thematic priorities of the partnership. There will be a complementary document, the implementation plan, detailing the specific activities of the partnership aligned with each theme. Such activities will include but not be limited to R&I projects. These may also be, for example, policy labs, conferences, networks etc.*
- *Topics, which are missing (or perhaps not well described) are: open science data bases, networking with projects, data sharing, human rights/rights of indigenous people, transfer of know-how to industry. We are grateful for and agree with the input and will integrate these aspects in the corresponding SRIA chapters (open science, data sharing = Transversal Theme 1; human rights = Transversal Theme 2; networking and knowledge transfer = Transversal Theme 3.*
- *The names and descriptions of the themes should be reflected, so that they can be better understood. Examples for each "sub-topic" could be helpful. Avoid abstract phrases and terms, examples are given above. The presentation material gives only a summary of the focus areas in each thematic area and is not a complete description. More detailed descriptions including examples will be given in the SRIA document. We also envisage to include a glossary with definitions of important terms in the SRIA.*
- *The benchmark needs to be carried out with similar actions (EIT, ...). Synergies and collaboration with related initiatives will be detailed in a dedicated chapter in the SRIA.*





We see constant dialogue with such initiatives as essential for developing efficient innovation systems across value chains.

- *Involve sciences and experts (e.g. policy makers) who were outside of the ERA-MIN community until now. We have also identified this as an important aspect to develop in the partnership compared to the ERA-MIN network. A broad range of expertise is necessary to make strong contributions to the challenges outlined, and raw material experts cannot provide the full range of expertise necessary.*
- *More physical events and exchange of research infrastructure and knowledge. Partnership activities will not only be limited to traditional joint transnational calls for R&I projects but also include such events and activities to a larger degree than in the ERA-MIN network.*
- **Comments on Transversal Theme 1: Effective policy development and governance**
- *In the case of Norway, policy development and incentives introduced were very important = looking into related industries, case-studies, and similar experiences. In line also with a comment above, we will seek to involve expert policy makers and expertise from other industries and value chains.*
- Research for policy is not usually funded by the funding organisations, funding of research projects that have outputs that can feed into policy and decision making. Address the gap between researchers and policy makers. Outputs that can feed into policy can also be e.g. datasets and scientific insights that have a strong impact on policy making. These aspects will be addressed in the impact goals, outcomes and KPI's of the partnership.
- *We should learn from other countries' experience in research for policy. As mentioned previously, involvement of strategic partner countries with relevant experiences is a core aim of the partnership. This includes expertise in policy for raw-materials-related issues.*
- *Include contribution to EU policies. This will, of course, be emphasized even more.*
- *Geopolitical and legal aspects are missing. The presentation material gives only a summary of the focus areas in each thematic area and is not a complete description. More detailed descriptions including examples will be given in the SRIA document.*
- *Description line 4: It's lobbying, out of scope. We do not see maximizing societal benefits for the benefit of future generations as lobbying.*



- *Descriptive text «Data collection to support sustainable development» - difficult to understand. The phrasing will be reconsidered. It refers to data collection for efficient policy making, which we see as a requirement for sustainable development.*
- *LCA out of scope, it can be moved in CT2. LCA provides important data, which can be the base for efficient policy making. It can also identify important sustainability bottlenecks throughout the entire raw materials value chain. The collection of LCA data will not be limited to activities associated with Transversal Theme 1 only.*
- *It's difficult to propose/ to imagine projects in this theme. The SRIA should give a general structure and guideline for the thematic priorities of the partnership. There will be a complementary document, the implementation plan, detailing the specific activities of the partnership aligned with each theme. Such activities will include but not be limited to R&I projects. These may also be, for example, policy labs, conferences, networks etc.*
- *Extend the list of conflict minerals: include 'promoting sustainable value chains as bullet point in theme 1. We agree and will consider rephrasing accordingly.*
- *Miss a way to obtain "society opinion" or "society demand: For example, if now society is demanding sustainability, do not allow to producers to have only 2 years by lar of guaranty in electronic devices. Because, in order to sell more products, the quality of the devices that they are going to produce is only going to be for 2 years (programmed obsolescence). We agree that the civil society is an important stakeholder for policy development. The involvement of civil society stakeholders will be emphasized in the SRIA.*
- *First target should be to cooperate with non-EU countries to ensure sustainable practices and human right respect. Contributing to improving human rights policy and practice in third countries is at the heart of our Mission of sustainable supply of raw materials.*
- *LCA and LCI data need to be brought to the next level, currently poor. As mentioned above, LCA and relevant datasets are important aspects of this Transversal Theme. This will be emphasized even more, also in the impact goals, outcomes and KPI's.*

### **Comments on Transversal Theme 2: Maximizing societal benefits**

- *No mention to sustainable and responsible mining, minimizing the impacts of mining, recycle as resource efficiency. The actual environmental footprint minimization and resource efficiency solutions are addressed by Core Theme 1 (Resilient primary and secondary raw materials supply).*



- *Elaborate more on public acceptance in order to avoid the not-in-my-backyard syndrome. We will elaborate more on this in the SRIA document.*
- *In some countries it might be a challenge to introduce in this theme the Native people rights. Yes, we need to develop solutions to increase social sustainability and to include all stakeholders. We need social innovation and we need to involve all parts of society. This is a big challenge the innovation system faces and therefore important to establish a R&I partnership.*
- *Communication and transparency action are missing in social acceptance. The KPI's are being developed separately and will involve outcomes regarding communication and social acceptance. The implementation plan for the partnership will include specific actions in the workplan.*
- *title is OK but content should be improved. Without further details, it is unclear how the content should be improved.*
- *Involve young people to bring new ideas and not expertise. Valuable input, this will be elaborated on in the SRIA document.*
- *We have not addressed enough and need to focus more on societal education. Yes, we agree. Societal education will be part of the impact goals, outcomes and KPI's.*
- *Give information about mining to society. See comment above.*
- *Taking some precautions against to oppositions to mining. We agree but would formulate it positively: this core theme aims to improve social sustainability and this includes social acceptance of mining operations.*
- *Dedicated education events for the general public without hiding trade-offs with raw materials operations. Public outreach activities are part of the impact goals, outcomes and KPI's of the partnership SRIA.*

### **Comments on Transversal Theme 3: World-class innovation capacity**

- *Focus on EU-13 (widening countries) in Transversal Theme 3. We agree and see the EU-13 as potential key partners in the partnership, along with current members of ERA-MIN3, EU-associated countries and strong innovation partners among third countries. The partnership will include dedicated activities targeted towards young talent and innovation capacity including e.g. Eastern Europe.*



- *Is “SRIA” listening to young people/future? I.e., the SRIA is going to be used for the next partnership on RM, therefore the future/young people should participate in this workshops. We welcome input and feedback on the SRIA from any interested stakeholder. The focus on capacity building and attraction of young people is evident through the introduction of Transversal Themes 2 (Maximizing societal benefits) and 3 (World-class innovation capacity).*
- *How much room there is for “world-class” collaboration/capacity. We believe that ensuring skills and competence on raw materials within the EU is a bottleneck for a strong innovation system and needs to be strengthened in order to support a strong innovation system.*

#### 4. NEXT STEPS

The collected feedback from stakeholders will be vital in the improvement and further development of the SRIA. The task force envisages to finalize and publish the SRIA by the end of April 2024, until which the work will focus on formulating a change theory including impact goals (long-term, up to 10 years after the end of the partnership), outcomes (mid-term, within five years after the end of the partnership), and KPI’s (short-term, to be reached during the course of the partnership) for the different thematic areas (see Background). This theory of change will form the basis of the thematic chapters of the SRIA.

Following feedback collection during the 1<sup>st</sup> and 2<sup>nd</sup> workshops (see Table 1), a list of potential KPI’s for the partnership was co-created by stakeholders and ERA-MIN/partnership representatives (3<sup>rd</sup> workshop, see Table 1). During the 4<sup>th</sup> workshop, this list of potential KPI’s (several hundred suggestions) was scrutinized for relevance and possible improvements, leading to a series of internal discussion meetings of the ERA-MIN SRIA task force to make a selection of most relevant KPI’s for the six respective themes, to align the different long-, mid- and short-term aspects of the change theory and to set ambitious target values for the KPI’s, based on the format of the partnership and the lessons learnt during ERA-MIN since its launch. The co-creation process towards the establishment of impact goals, outcomes and KPI’s will be presented in a separate ERA-MIN3 report to be published in February 2024.

Further stakeholder engagement actions and in-depth review by an independent expert advisory group will ensure the relevance and feasibility of the SRIA and the change theory, as well as the alignment with the objectives and benchmarks of the European Critical Raw Materials Act and other relevant policy documents. The task force has initiated close dialogues with other partnerships (e.g., *EIT RawMaterials*, *Batt4EU*), partnership candidates (such as the *Innovative Materials for EU* partnership candidate), and other networks (e.g. *ETP SMR*) to map and find interfaces and synergies, in order to avoid R&I fragmentation and to identify areas of possible collaboration and bi-/multi-lateral actions in the future.



APPENDIX 1: SRIA SUMMARY PRESENTATION

# A strategy on raw materials research and innovation beyond 2030

SCOPE, METHODOLOGY & THEMATIC OUTLINE

## A mission towards sustainable raw materials use and supply

The aims for the new Strategic Research and Innovation Agenda (SRIA) within the field of non-energy, non-food raw materials, are two-fold:

**Identifying** critical technological and structural challenges within the EU relating to raw material supply for the green and digital transition

**Addressing needs** for research and innovation to tackle the challenges, as well as **prioritizing** among strategically important core targets



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# Complementarity with Horizon Europe and EIT RawMaterials

## New partnership on raw materials

- Small consortia (4 to 11 partners)
- Usually 3 to 5 countries
- €0.5 to €1.5 Mio requested funding
- Focus on needs-driven (basic and applied) research at TRL 1-6
- 24-36 months project duration
- Involvement of EU regions
- Involvement of strategic third countries

## Horizon Europe

- Large consortia (12 partners and above)
- Usually 6 countries or more
- €6M and above of requested funding
- TRL 3-7 (RIAs and IAs)
- 36-60 months project duration

## EIT RawMaterials

- Varying consortium size, all must pay membership fee to EIT RM
- Minimum start TRL5, minimum target TRL 7
- Minimum co-funding 30%
- Focus on commercialization and financial backflow to EIT RM

## TOP-DOWN INFLUENCERS

The European Innovation Partnership (EIP) on raw materials  
Strategic Implementation Plan (SIP)  
Horizon Europe

EIT RawMaterials  
Critical Raw Materials Act  
ETP-SMR  
Other co-funded partnerships

## EUROPEAN PARTNERSHIP ON RAW MATERIALS

Strategic Research & Innovation Agenda

Implementation Plan

Actions

Projects  
Results  
Effects  
Impacts

Research community,  
industry, stakeholders

Partners within  
the programme

Actors within  
the system



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# EUROPEAN PARTNERSHIP ON RAW MATERIALS

Strategic Research & Innovation Agenda

Implementation Plan

Core and transversal  
**R&I themes**

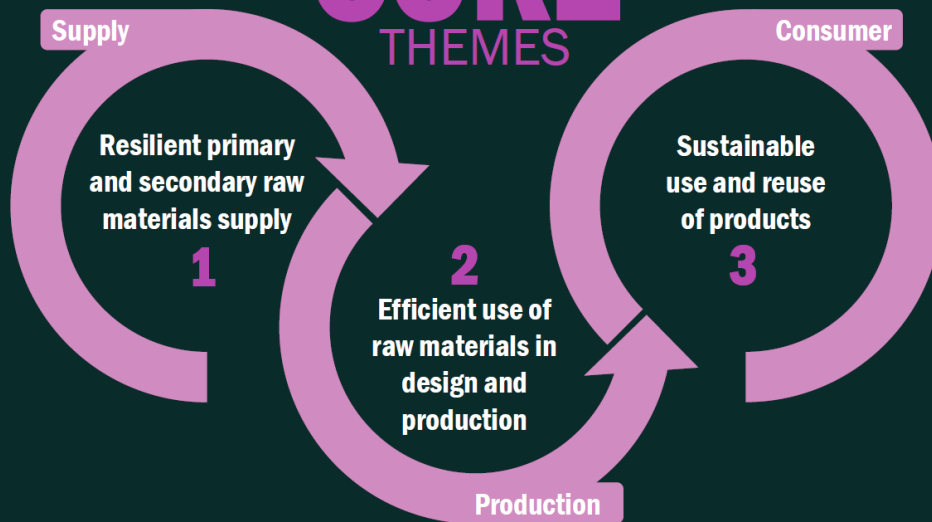
Call for projects  
(call topics)

Workshops & events

Strategic actions

Roadmaps & dialogues

## CORE THEMES





# TRANSVERSAL THEMES



**1. Effective policy  
development and  
governance**



**2. Maximizing  
societal benefits**



**3. World-class  
innovation capacity**



## CORE THEMES

### Core targets

Technical innovation

Close to business

Focus within  
economic activity



## TRANSVERSAL THEMES

### Enabling targets

Social innovation

Human centric

Focus on social and  
ecological sustainability



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## CORE THEME 1: Resilient primary and secondary raw materials supply

Raw materials are needed to produce virtually everything we use in society. As economies and populations grow, and with an increasing need for a twin transition to new green and digital technology, our demand for raw materials sky-rockets. Building resilient value chains begins with developing supply for raw materials from both primary (mining) and secondary (recycling) sources. CT1 includes, but is not limited to:

- Technological advances in exploration, mining, processing, metallurgy, re-mining, urban mining and recycling, in order to secure a resilient raw materials supply
- Securing environmentally sustainable raw material operations
- System innovation within scientifically identified planetary boundaries

### Singular example of actions or projects within the theme:

Call for projects on automation and AI technology within blasting and loading in the mining industry



## CORE THEME 2: Efficient use of raw materials in design and production

Raw materials such as copper, rare earth elements and cobalt are finite resources. As demand grows, it will become increasingly more difficult to supply certain raw materials to the market, thereby increasing their criticality. For this reason, it is crucial to conduct research and innovation on minimizing the use of raw materials in the production industry, especially related to raw material intensive industries, for example in batteries, automotive and energy industries. CT2 includes, but is not limited to:

- Production processes with minimized raw material usage and minimized losses
- Product design to minimize raw material need, especially regarding critical raw materials
- Product design to enable reuse, repair and recycling
- Substitution of critical raw materials in products

### Singular example of actions or projects within the theme:

Evaluation criteria or KPI on successful substitution of critical raw materials in a production line




## CORE THEME 3: Sustainable use and reuse of products

The most effective way to reduce the increasing need for raw materials, and the impact on the climate and our environment, is to keep products as high up in the circular economy as possible. But changing the way we use, reuse and repair our products requires innovation, for example within new business models and consumption patterns. CT3 includes, but is not limited to:

- Technologies for more long-term use by reuse, repair, refurbishing, repurposing and remanufacturing
- Method development within collection, sorting and pre-processing
- New business models that enable the circular economy
- Research and action on behavioral changes in society connected to consumption patterns

**Singular example of actions or projects within the theme:**

Demonstration project on metal recycling, with work packages on exploring new business models



## TRANSVERSAL THEME 1: Effective policy development and governance

To truly support more sustainable use and supply of raw materials within the EU, effective policy and governance must be developed. Many pieces of the puzzle have been provided or proposed, for example the Critical Raw Materials Act, but complementary actions that aim to support the increasing needs are vital. Data collection to support sustainable development will be especially important. TT1 includes, but is not limited to:

- Development of interdisciplinary scenarios, life cycle analysis and other necessary data to support policy development
- Policy labs to work with issues in an experimental way
- Innovation in guidance and structure within governance for the public and private sectors
- Policy and governance to promote investments within raw materials industries

**Singular example of actions or projects within the theme:**

Policy lab workshops during a programme conference on effective permitting processes




## TRANSVERSAL THEME 2: Maximizing societal benefits

While we rush to meet all the challenges that the climate crisis and value chain disruptions present, we must take care not to create new challenges to our sustainable development. While industries might need to be expanded or developed in new areas, it is important not to forget the local communities. By focusing research and innovation on maximizing societal benefits, we can ensure that we leave the world a better place for coming generations. TT2 includes, but is not limited to:

- Strengthening societies through social innovation
- Minimizing adverse environmental effects
- Innovation in workplace safety, health and gender issues
- Advancing practical implementation of human rights
- Building trust and acceptance of new industries, policies and norms

**Singular example of actions or projects within the theme:**

Promotion of public sector and NGOs in specific calls for projects to encourage system approach

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## TRANSVERSAL THEME 3: World-class innovation capacity

To build a foundation of world-class research and innovation, the EU needs a large supply of skilled personnel. To extract critical raw materials lacking in the EU, future industries will need skills that are not available within the EU today. There is also a need to focus efforts and align strategies among the EU partners, in close collaboration with third countries, to maximize the joint innovation capacity. TT3 includes, but is not limited to:

- Building expert networks, win-win partnerships and arenas for innovation and research
- Actions to attract and sustain future skills, for example by implementing university programmes and PhD-networks, and engaging young people to influence future career paths
- Effective collaboration with third countries
- Identifying, developing and maintaining optimal utilization of the EU research infrastructure

**Singular example of actions or projects within the theme:**

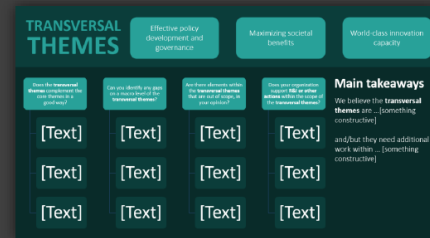
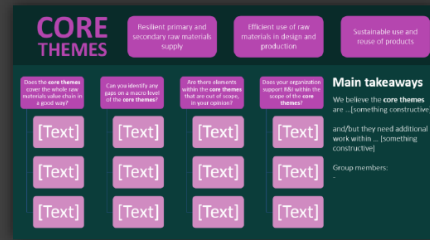
Active collaboration on exchanges with international partners to encourage skills transfer

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# Workshop

- Breakout session – core themes
  - Moderator will guide the discussion
  - Main takeaways from each discussion in plenary
- Breakout session – transversal themes
  - Moderator will guide the discussion
  - Main takeaways from each discussion in plenary
- Wrap-up



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# Building the agenda – prel. timeline



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