EIT RawMaterials
Call for KAVA projects
Lighthouse Appendix

September 2021

1. Definition and scope of Lighthouses

Lighthouses (hereafter 'LH') are large-scale and long-term coordinated innovation initiatives that address critical and specific raw materials challenges for Europe. They are mission approaches to innovation and education challenges, directly steering KIC activities towards the achievement of its strategic objectives and impact KPIs. LHs will generate tangible solutions for societal challenges that have raw materials at their core. In doing so, they will enable the KIC to raise awareness about the role and importance of raw materials in the sustainable society and create a positive perception about raw materials and their associated industries. From KAVA Call 8 onwards, there will be a strong emphasis on project topics defined within the Lighthouses.

Three LHs are considered for application in this KAVA call: 1) Raw Materials and Circular Societies; 2) Sustainable Materials for Future Mobility; and 3) Sustainable Discovery and Supply. The scopes, strategic and operational actions of these LHs are summarized in Sections 3.1, 3.2 and 3.3 of this document. Additional information on the LHs and on their strategic significance for the KIC can be found in the *Strategic Agenda 2021-27 of EIT RawMaterials*.

2. Critical and Strategic Raw Materials

For a list of Critical Raw Materials, see the current 2020 EU CRM list. In this document, the term 'strategic materials' referes to elements used/found in energy storage and conversion, digital applications, and conflict minerals. These include Ni, Cu, Al, Fe and the 3TG (Sn, W, Ta and Au).

3. Specific topics for proposals

3.1. Raw Materials and Circular Societies LH

Challenge: Raw, processed and advanced materials, from primary and secondary sources, are the backbone of the economy, and a radical shift is required from linear to circular thinking. End-of-life products must be considered as a resource for another cycle, while losses and stocks of unused materials must be minimized and valorized along the value chain. In addition, the interactions between materials must be considered to define the best circular solution from a systemic standpoint. Awareness of the benefits of closing material loops must be raised in society. The successful transition to the circular economy at the global scale, depend on the reliable and sustainable supply and management of raw materials.

Approach: EIT RawMaterials will support activities that optimize the efficient discovery, characterization, processing and flow of materials to move towards 'zero waste', a core target of circular economy. The LH will integrate results, knowledge and data into a digital map of resource locations and their flows within cities and between cities and the surrounding environment ('smart materials grid'). This LH is aligned with the EU Circular Economy Package and the EU Zero Waste strategy to achieve a Circular Society, and provides a focal point for cross-KIC collaboration.

LH topics related to the above-mentioned value chains included in the next KAVA call:

1. **Recycling of end-of-life products containing Strategic Materials and/or CRMs** including dismantling, sorting and recovering technologies. This topic should include, or at least build on, the analysis of framework conditions to support the creation of markets for secondary CRMs in Europe, as in most cases the main challenges are related to market conditions rather than technological limitations.
2. **Supply of Strategic Materials and/or CRMs** through industrial Waste Valorisation/Industrial Symbiosis.
3. **Resource and Energy efficient in metallurgical and Mineralogical processing:** efforts should be dedicated to developing/demonstrating solutions focused on the improvement of metallurgical/mineralogical processing, as for example digital process optimization, smart resources management, water and energy use efficiency and wastewater treatment, new economically viable refining processes, flexible production units, etc. Decreasing the CO2 footprint is also to be considered.

3.2. Sustainable Materials for Future Mobility LH

Challenge: Emerging energy and mobility technologies create a strong demand for raw and advanced materials, and for some critical raw materials this demand will dramatically exceed current production in the next 10-15 years. Limited access to these materials and their respective processing capacities might negatively impact the mobility and energy transitions, thus reducing the competitiveness of European actors downstream.

Approach: EIT RawMaterials will support innovation and critical knowledge to solve challenges in the mobility sector. This LH focuses on the raw materials and advanced materials for two key innovation trends in mobility: electrification and lightweight design. It coordinates materials-related innovation actions across the mobility value chains with respect to exploration, mining, processing, recycling, substitution, and the implementation of the Circular Economy.

LH topics related to the above-mentioned value chains included in the next KAVA call:

1. **Resource efficient design** of materials and products to optimise the use of critical raw materials and to substitute toxic materials; that is, in terms of cost, performance, and sustainability. Advanced Materials are a key enabler for the performance of many products. At the same time they can turn into a significant cost driver and may contribute significantly to the environmental footprint of a product.
2. **Innovative technical and business solutions in process design, plant engineering and construction** for the production of precursor materials, advanced materials, and intermediate products in the above-mentioned strategic value chains.
3. **Development of an improved Life Cycle Inventory database** for raw materials and advanced materials related to e-mobility. There is a lack of data for raw materials and advanced materials in respective LCI databases

3.3. Sustainable Discovery and Supply LH

Challenge: Europe is highly dependent on raw materials that are predominantly sourced overseas: it is using 23% of the world's mine production for metals and minerals but only produces 2-3 % itself. Hence, Europe is vulnerable to scarcity and supply shortage, and there is a need and political will for increased exploration activity and the development of mining operations and processing capabilities. Furthermore, the positive impact of these activities and their key enabling role for the European Green Deal and the New Industrial Strategy has to be clearly communicated, as social opposition to mining remains one of the biggest hurdles to investment and development in the raw materials sector.

Approach: The Lighthouse aims at boosting the sustainable discovery and supply of critical and strategic raw materials in Europe as a driver for domestic raw material value chains. Innovation in technology, service, product development and knowledge creation and transfer will facilitate the identification and targeting of

new European raw material resources as well as ensuring low environmental impact and social acceptance of mining and processing operations. This needs to be enabled by a supportive legislative environment and responsible investments in the European raw materials sector as part of a strategic framework that is tailored to industry requirements and societal demands.

LH topics related to the above-mentioned value chains included in the next KAVA call:

1. **Targeted exploration of Strategic Materials and/or CRMs** with advanced multi-scale data integration—from earth observation to regional multi-sensor surveys and from drill core characterisation to nanoscale geochemistry. Aiming for a quantifiable approach to scoping and pre-feasibility with a clear investor focus should be the overall goal here
2. **Supply of Strategic Materials and/or CRMs** is inherently linked to digitalisation**.** Smart digital solutions such as digital twins, centralized due diligence, life cycle assessment (LCA) and blockchain and artificial intelligence can have significant impacts on the safety, efficiency, traceability, and cost-effectiveness of operations in the mining sector. Digitalisation also acts as a connector with all other segments of existing value chains. The value of data in this context cannot be overstated and innovation in this area still has enormous potential to create impact for responsible sourcing and sustainability
3. **Environmental-Social-Governance (ESG)** . This concept is exceedingly relevant **for exploration, mining, and processing activities**. It incorporates legislative aspects, environmental concerns, and the societal components such as social licence to operate (SLO). A complex area, where stakeholder engagement, technical innovation, corporate responsibility, social science, and policy come together to create value for the EU society as a whole.