EIT RawMaterials
Call for KAVA projects
Lighthouse Appendix

October 2019

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.

The scope of the LH is to generate impact that goes beyond that created by individual projects and consortia. This is done by:

1. Funnelling synergies and expertise already existing within the partnership into coordinated high-impact activities that will contribute to the solution of important societal challenges and that will enhance the role of EIT RawMaterials as a leading innovation community; and
2. Identifying future challenges and developing the ability to address them in the partnership.

Although individual KIC actions may be very successful in answering specific questions, their collective contribution to solving global challenges may remain unclear if left uncoordinated and not disseminated in a structured way. The added value of the LHs is in their ability to consolidate these individual activities into a single narrative that will position the KIC as a prominent contributor to the global sustainability agenda. In turn, the exposure and recognition gained by the KIC through these large-scale initiatives will boost the partners' role in modern society, thus leading to a more positive attitude towards the sector.

In the KIC activity portfolio, the LHs will serve as beacons for many cross-theme activities and will foster efficient value chain integration and de-siloing. Because the LHs target specific and important societal challenges, they will create synergies with other programmes and organizations dedicated to addressing societal challenges in the raw materials field.

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LHs are implemented through operational actions such as KAVA projects, matchmaking events and business support activities and through strategic actions such as close coordination with external stakeholders, the European Commission, national initiatives and cross-KIC initiatives. Implementation of the LHs is facilitated by allocating to them a portion of EIT RawMaterials' resources, and by supporting Partners to develop their innovation activities accordingly across all instruments provided by EIT RawMaterials.

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 6.1, 6.2 and 6.3 of this document. Additional information on the LHs and on their strategic significance for the KIC can be found in the *Strategic Agenda 2018-22 of EIT RawMaterials*.

2. How to apply for a LH KAVA proposal

LH proposals are submitted using SeedBook in exactly the same way and using the same format of other KAVA proposals, but with two differences:

1. in the proposal registration, the Project Coordinator must tick the relevant box if they want their proposal to be considered as a LH proposal. Although it is acknowledged that there may be overlap between the three LHs considered in this call, a proposal must be assigned to only one LH; and
2. additional eligibility criteria apply, and these are outlined in Section 4.

After registration, EIT RawMaterials will consider the content and scope of all proposals and, after consultation with the Project Coordinator, may re-assign their classification (i.e., a proposal submitted as LH may be re-assigned as non-LH, and vice-versa).

3. Important considerations

LH proposals can be submitted in all segments (Upscaling, Education, RIS and Internationalization). RIS and Internationalization proposals may be considered, however consortia must be aware that the amount of funding to support these segments is limited. To qualify as a LH a proposal, an educational component as outlined in Section 4 must be included.

Overall, the same KCA and co-funding rules apply to LH and non-LH proposals. For example, the 30% minimum co-funding rule applies to Upscaling non-LH proposals and Upscaling LH proposals.

The same Quality and Strategy evaluation and selection criteria and processes apply to LH and non-LH proposals. Proposals that qualify as a LH project, however, will be evaluated positively with respect to their strategic importance for the KIC.

4. Additional eligibility criteria

The same eligibility criteria of non-LH proposals apply to LH proposals. In addition, the following eligibility criteria apply to non-LH proposals:

1. one (or more) of the topics listed in Section 6 (topics 1-6 of Section 6.1 OR topics 1-6 of Section 6.2 OR topics 1-3 of Section 6.3) must be the focus of the LH proposal;
2. at least one Higher Education or LLL or WSL or Coaching program must be included when considering Upscaling activities:
    - A Higher Education component – e.g., a Master course (or summer school) that addresses the specific LH topic of the proposal (addressing KPIs 02-06, 02-07, 02-12, 02-13).
    - LLL program – a training program to develop the skills and competencies needed to drive the innovation process in the specific LH topic of the proposal (addressing KPI 02-08).
    - WSL program – an awareness campaign, dissemination action or learning and teaching activity related to the innovation developed in the LH project (addressing KPI 02-09).
    - Coaching program – industry internship or other professional activities that will expose program participants to the project's innovation (addressing KPIs 02-10 and 02-11).

Where possible, educational activities should be developed jointly with the Industry Partners' relevant departments (human resources, training, corporate responsibility….).

5. Recommendations

The following recommendations are made to assist Partners with the planning and compilation of their proposal. LH projects are expected to have:

1. very high impact in terms of both EIT-core and KIC-specific KPIs, with significant KPIs in each year of the project (i.e., not only in the final year);
2. a minimum duration of 2 years, preferably 3 years.

Although these recommendations are not mandatory, it is expected that most LH proposals will comply with them.

6. Lighthouses considered in this call and specific topics for proposals

6.1. 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 across the value chain included in the next KAVA call:

1. Resource Efficiency in metallurgical processing. The metallurgical sector is one of the main contributors to decoupling growth from resource use: 'to do more with less'
2. Circular products. The development of new types of products considering circularity from the design phase is one of the main priorities of the EIT Rawmaterials. These products will clearly support the Circular Economy strategy (e.g., by extending the product's life cycle, making its dismantling easier or substituting current materials by more circular ones).
3. Tools to support the transition to Circular Cities. This topic will consider different types of tools to support this transition process, e.g., MFAs for specific material flows in cities; tools to support good governance approaches.
4. Recycling of end-of-life products, including dismantling, sorting and recovering technologies (e.g., recovery of rare earth elements from end-of-life products.
5. Circularity Assessment methodologies, bringing together expertise from the resource efficiency, LCA, water and energy fields.
6. Industrial Waste Valorisation/Industrial Symbiosis.

6.2. 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 transition, 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 across the value chain included in the next KAVA call:

1. "Opening of a new (urban) mine" - battery raw materials mining and processing from a primary or secondary European source. The Mobility Transition creates a growing demand for sustainable raw materials by European OEMs. There is an unlocked European potential of primary and secondary sources (Li, Co, Ni, Mn, graphite).
2. Towards Solid State Batteries – advanced materials, processing, battery cell design. Solid state battery materials and technologies are expected to be the next disruptive technological developments in battery technology, particularly regarding safety and energy density.
3. Towards a European source of rare earths – mining, extraction, processing, recycling. Over the last 8 years, the European Commission and the Member States have financed several R&D initiatives in REE extraction and processing from primary and secondary sources. Until today, no project has materialised in a European industrial production of rare earth oxides and metals.
4. Sustainability – towards an improved Life Cycle Inventory database for raw materials and advanced materials related to e-mobility; ethical sourcing; traceability. Raw materials and advanced materials of batteries have a significant impact on the overall footprint of electric vehicles. However, there is a lack of data for raw materials and advanced materials in respective LCI databases.
5. Sustainable Steel and aluminium – energy and material efficiency processing; ethical sourcing; new alloys. Steel and aluminium are the dominant structural material in cars. Today, aluminium alloys and composites can hardly compete in terms of cost/performance ratio, recyclability, and environmental footprint. The amount of high strength steels and metallic alloys used in the automotive sector is rising to reduce weight. To achieve high performance, they typically contain critical metals.
6. Education business. Development of clever business model to develop a raw materials recruitment company. A collaboration between all three partner groups of the knowledge triangle would be anticipated.

6.3. 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 that exploration, mining and processing have on our economy and their critical role in a sustainable

circular society have 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: 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.

LH topics across the value chain included in the next KAVA call:

1. Resource Efficiency and Process Optimisation: Smart solutions that significantly reduce water and energy consumption are of critical importance to achieve more sustainable mineral processing operations that will have a positive impact along the entire value chain. Decreasing ore grades combined with larger volumes at smaller grain sizes are further challenging aspects that require new innovative ideas and cost-effective solutions for optimized performance.
2. Artificial Intelligence and Data Integration: The raw materials sector is still at a hunter-and-gatherer stage when it comes to data—in its 2018 Flagship Report, the Joint Research Centre (JRC) states that '…the digital transformation of society has just begun…'. New innovative solutions are required to fully integrate existing data from all sources and scales of observation and to apply the latest developments in AI and machine learning to create reliable exploration models, ensure ethical sourcing (certification) of raw materials and to lead the way to Industry 4.0 and beyond.
3. Safe and Sustainable Mining under a Social License to Operate: How do we create and operate the mine of the future—from remote and deep-seated deposits to mining in populated areas and the valorisation of tailings—in a safe and sustainable fashion? This topic is at the interface between technology, society, legislation and industry and therefore requires smart multifaceted approaches (from mine development to operation and maintenance to remediation) to yield tangible results within the framework of a social licence to operate.

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