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SWEDISH FOUNDATION *for*
STRATEGIC RESEARCH

SSF Call for Proposals

SSF Multidisciplinary Research Center Provision of Strategic Metals and Minerals (MetMin)

The Swedish Foundation for Strategic Research (SSF) announces 60 million SEK in a national call for proposals for a Multidisciplinary Research Centre (MRC) that meets the highest international scientific standards. The call aims to stimulate truly multidisciplinary research collaboration between academia, research institutes, industry, and society.

SSF intends to approve one (1) MRC application in the field of provision of Strategic Metals and Minerals (MRC MetMin).

The MRC will be granted up to 40+20 million SEK in total including overhead costs for a period of six years. Full funding will be contingent upon a successful midterm evaluation.

SSF supports various strategic research centers. Examples are SFC (Strategic Research Centers), IRC (Industrial Research Centers) and ARC (Agenda 2030 Research Centers). Multidisciplinary Research Centers (MRC) is a development of this mode of support. The overall SSF budget for these four center initiatives is approximately 2 billion SEK.

SSF Multidisciplinary Research Centers (MRC)

Multidisciplinary research is defined here as coordinated research efforts in which several scientific competences, presumably not all from the same department or faculty, each outstanding in their field, work together to solve a major societal problem.

A Multidisciplinary Research Center (MRC) should be characterized by the added scientific value that arises from multidisciplinary research. The potential for an MRC to find new solutions through multidisciplinary and synergistic approaches is a key evaluation criterion.

The research by the MRC should be based on a clear scientific question centered on gaps in knowledge related to a significant problem and opportunity. Moreover, the MRC should have explicit plans for the implementation and/or knowledge transfer of research results into industry and society in a long-term perspective.

Another MRC characteristic should be its strong presence in international research initiatives (*e.g.*, *EU Horizon Europe*), leveraging the SSF-funding with international

funding for increased thrust. The potential for an MRC to constitute an internationally leading research center is a key evaluation criterion.

Aims and Scope

This call aims to institute multidisciplinary research, which should contribute to accelerate Sweden into a top international position in the provision of strategic metals and minerals, concerning prospecting and process development. Applications outside of those will be evaluated as out of scope, and thus desk rejected. The supported MRC shall constitute an internationally leading research initiative in this field.

Metals and minerals are used everywhere in modern society. They are necessary for vehicles, energy conversion, buildings, healthcare, food production, manufacturing, to as a disperse salient examples. The technological development in recent years has meant an increased need for metals and minerals that are crucial for modern energy, digitalization, environmental and technological innovations to work, so-called innovation-critical metals and minerals. The need is further strategic for the green transformation of society and is judged by, among others, the European Commission to increase significantly in the future. At the same time, there are challenges to satisfy competing interests in connection with mining, when it comes to various aspects of sustainability and value chains. It can also be noted that the extraction of innovation-critical metals and minerals is today concentrated in only a few countries outside the EU, where China currently dominates.

A provisional definition of strategic metals covers, but is not limited to, EU's 2020 list of 30 Critical Raw Materials, elements that are necessary for the climate transition, and innovation-critical metals and minerals.

Metals and minerals are essential for the world to turn away from fossil fuels and moving towards massive electrification. Sweden can drive innovation in these and more areas towards solutions with positive impact on a number of the United Nation's Agenda 2030 Sustainable Development Goals. Strategic metals also impact on semiconductors, which are crucial for digital sovereignty. The *EU Digital Decade* initiative and the *EU Chips Act* reflect this. Furthermore, energy-efficiency is a cornerstone of the *EU Green Deal* initiative which will also be a driving force. This call is aligned with these EU initiatives and aims to leverage them. The supported MRC shall reflect this position.

Sweden has geological potential for several strategic metals or raw materials and has shown several estimated ore deposits where these raw materials exist. When it comes to metals, despite the possibilities to recycle them infinitely, the extent of recycling for several elements is still limited in part because of lack of processes and in part from lack of scrap material when most metals produced to date are still serving in a construction or component. Sweden has a strong industry in these areas and a thriving research community. Strategic research would ensure the long-term development of those two important sectors in Sweden.

With this call SSF aims to seed fund the above by opening for competing research proposals in the areas of extraction and enrichment of metals, centered on low-TRLⁱ levels 1 through 4, connected to:

1. **Prospecting:** Rock geological and ore genetics research build-up in Sweden regarding innovation-critical metals and (its) minerals and knowledge gaps along the entire value chain. Pathfinder and indicator minerals in exploration. Multidisciplinary collaborations between geologists and materials scientists (from macro to nano). Remote sensing and geophysics or geochemistry. Link to 2) via geo-metallurgical research.

2. **Process development** for e.g., Metal recycling, Hydro- and pyrometallurgical processes, Separation and refining techniques; Less toxic processing risk reduction); and - New metallurgical processes to enable future metal recovery from complex products and material flows (like mine tailings), in which these substances often is present in low concentrations and for which recovery techniques are not yet developed.

This Call aims to engage a comprehensive advanced metals and minerals community in Sweden, with a significant number of senior researchers, PhD students and active industrial/societal partners.

Eligibility

An MRC consists of applicants from one hosting Higher Educational Institution (HEI) and applicants from 1-3 other HEIs or research institutes (RI), supported by at least two industrial and/or societal partners.

Each of these organizations may be represented in maximum two (2) applications in this call.

The main applicant (Center Director) must have international standing as a research leader in her/his field, must be actively employed by the hosting Swedish HEI to at least fifty percent of full time and must be prepared to assume operative responsibility for the MRC during the entire grant period.

The co-applicants are the researchers employed to at least fifty percent of full time by the collaborating HEIs/RIs, including the hosting HEI. The total number of co-applicants should not exceed 7 persons, and gender equality should be considered.

Applications with industrial and/or societal partners registered in Sweden are prioritized.

International research organizations may participate only by their own means, apart from international researchers that becomes employed by the MRC through the participating Swedish HEIs/RIs.

The MRC must have a Governing Board, approved by SSF, consisting of a majority of industrial/societal representatives. The Center Director shall be part of the Board. The Board, with a chair from industry/society, shall have the mandate to recommend SSF to terminate the funding, in whole or in parts, or to change the management of the MRC. A tentative Board should be stated in the application.

The MRC must assign an international Scientific Advisory Committee (SAC), proposed in the application.

A Center Agreement signed by all partners will be required from the consortium behind the application, if and when it is selected for a hearing. The period for this contract is recommended to be at least three years, *i.e.*, until the mid-term evaluation.

While SSF's statutes stipulate that supported research must be in the realms of natural science, engineering sciences, or medicine, it is appreciated that a higher impact of the concerned MRC may come from collaboration with research initiatives relating to society, including humanities, economy, policy making, operation health and safety, and other science branches complementary to what SSF has for statutes. The proposed MRC should describe how it is connected to those complementary research branches as for liaison or formalized direct collaborations. This is an important criterion for SSF:s evaluation of proposals. Likewise, successful parties should be connected internationally, for example to European Commission initiatives.

Applications not conforming to the above eligibility criteria will not be considered by SSF. It is the responsibility of the main applicant to inform all co-applicants and industrial/societal partners, and to check the proposal for compliance before submission.

Grant

SSF-funding is available only to Swedish universities or research institutes, where one HEI is the administrative organization for the grant. The industrial/societal partners and international partners must support the MRC by their own means.

The proposed budget from SSF shall be up to 60 million SEK in total during six years.

The budget allocation from SSF will be a decision of 40 million SEK in conjunction with the MRC's start. Up to 20 million SEK will be decided and distributed by SSF after a mid-term evaluation. Three percent (3%) of the grant will be reserved by SSF for supporting utilization/exploitation efforts of the research results.

The universities/research institutes can use the grant for salaries (senior researchers, postdocs, PhD students, *etc.*), research tools/infrastructure, and running costs according to the needs of the MRC. The application must demonstrate how the SSF grant will be adequately distributed among the HEIs/RIs, *i.e.*, with adequate budget for each organization. It must also clearly display any co-funding (in-kind, cash, lab usage, research infrastructure, *etc.*) from the industrial/societal partners.

A maximum of twenty-five percent of the overall grant may be used for salaries for the Main applicant (Center Director) and/or for the Co-applicants (*i.e.*, these individuals) taken together. However, no more than twenty-five percent of the salary of each applicant (*i.e.*, the same individuals) may be covered by the SSF grant. A maximum overhead cost of twenty-five percent (25%) is allowed.

Proposal and submission

A complete application must contain, among other data specified in SSF's online application portal, a full description of the MRC research plan and details of the relevant and complementary expertise of each of the participants. The multidisciplinary approach to the research problem should be clearly described.

Each proposal must clearly describe the international state of the art within the research area(s) addressed, and present how the MRC would be competitive. In addition, the proposal should clearly state the resources available and to demonstrate that the proposed participating organizations will be effective to reach the MRC goals. The plan and potential for international cooperation and leverage should be clearly described.

The application should contain a clear account of the strategic significance of the research, including an IPR plan and a plan for utilization/exploitation of the results in Sweden during the MRC's lifetime as well as after completion of the MRC.

The MRC participants must themselves propose a concise set of long/short term Key Performance Indicators (KPI) upon which the MRC can be evaluated in the mid-term evaluation. These indicators must cover scientific, managerial, and business qualities and substance as well as strategic relevance impact. Each of the KPIs should be elaborated in the research plan and tightly connected to the MRC goals.

The following KPIs are mandatory for all MRCs:

- the volume of co-authored papers by the collaborating research groups and partners

- mobility in person-years between the collaborating research groups and partners
- international presence, *e.g.*, grants from EU and/or other international initiatives (state also the starting values of these for base line)

The application should be elaborated jointly by all the MRC participating organizations and must be submitted by the Centre Director (main applicant). All participating organizations must attach Letters of Intent (LoI) signed by the highest management level in the organizations (head of research, or equivalent). The vice-chancellor of the hosting HEI must also sign the application.

Each participating organization may be represented in maximum two applications.

The proposal must be written in English and submitted via the SSF online application portal at: <http://apply.strategiska.se>. Note that in order to get a complete view of all data required for submission it is necessary to consult the portal. Please log on to the portal well in advance of the deadline. Please also submit the application in due time before the deadline. When the application is submitted, the system will reject it if some data fields are missing. It is possible to submit and re-submit as needed before deadline.

Applications must be submitted by 11 May 2023, 14:00 hours CET. No additional material will be considered after this deadline, unless explicitly asked for by SSF.

Evaluation

Applications will be assessed by an evaluation committee and a hearing committee consisting of national and international experts from industry, academia, and research institutes as well as by international peer reviews.

The applications will be evaluated using the following criteria:

- Conformity to scope and eligibility as outlined above.
- Constituting an internationally leading research constellation.
- Scientific quality; originality, strengths, weaknesses, and feasibility of research plan.
- Added value of multidisciplinary and synergistic approaches.
- Degree of internationalization.
- Strategic relevance to Swedish industry and/or society as well as explicit long-term impact of the proposed research.
- Qualifications of the applicants and composition of the research team, including previous achievements (science, innovation, and entrepreneurship), international experience and networks, gender balance and leadership/management.
- Level of engagement from all participating organizations, including evidence of anchoring of the application to top management (including Letter of Intent, LoI).

Timetable

Last date for applications: 11 May 2023, 14:00 hours CET

The applications will be evaluated in stages:

- Evaluation of applications (panel and external evaluators) May-August 2023
Hearings. September 2023
- Selection of one application for funding. Contract negotiations. October-November 2023
- Decision by the SSF Board. 14 December 2023
- Center start 1 January 2024.

Please note that the Foundation is subject to the Principle of Public Access to Official Records (*Offentlighetsprincipen*). Thus, applicants should avoid submitting material that they do not wish to be made public, e.g., information that could prevent patenting.

Contact persons at SSF

Gergana Hamberg, Scientific Secretary
tel.: +46-8-505 81 676, e-mail: gergana.hamberg@strategiska.se

Joakim Amorim, Research Programmes Manager
tel.: +46-8-505 81 665, e-mail: joakim.amorim@strategiska.se

ⁱ Technology Readiness Level (TRL) spanning 1) basic principles, 2) technology concept (innovation) formulated, 3) experimental proof of concept, and 4) technology validated in lab