Swedish Metals and Minerals Impact Innovation Report 2024-2025

How we enable a sustainable and resilient supply of metals and minerals for society's transition

Swedish Metals & Minerals

impact innovation

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Foreword

Since the Industrial Revolution, metals, minerals and technological progress have underpinned societal development. The combination of materials, innovation and access to inexpensive fossil energy has created prosperity, increased life expectancy and a global economy that today permeates every aspect of our lives. At the same time, we know that the model that built our prosperity is not sustainable, given the pressures we see on the climate, biodiversity, water resources and local environments. There are viable paths forward to maintain prosperity in a sustainable way, and this requires fossil-free energy, sustainable transport and much more. What the transition also requires is metals and minerals, and that in turn depends on responsible extraction, use and recycling.

Rapid technological advances in fossil-free energy, electrification, digitalisation and circular solutions point to possible directions of travel. The EU Green Deal and the emerging regulation of sustainable value chains set the framework for how Europe is to become a modern and resource-efficient economy by 2050. But all these ambitions, and the technical and political choices that follow, rest on the same prerequisite: large quantities of metals and minerals need to be extracted, used and recycled in ways that are sustainable.

New technologies in energy, mobility, batteries, digital infrastructure and defence require both higher volumes and entirely new types of materials. At the same time, geopolitics is changing rapidly. Export restrictions and disruptions in global value chains show that access to raw materials can no longer be taken for granted. This is why the EU is now advancing strategies such as the *Critical Raw Materials Act* and other measures to strengthen Europe's supply capacity.

In this landscape, Sweden plays a particular role. Our country has significant mineral resources, world-leading industrial expertise and access to an energy system that is largely fossil-free. We are internationally recognised for sustainable mining, advanced metals production and the development of new fossil-free processes. Together, this creates a unique opportunity to contribute to Europe's and the world's transition. Swedish Metals & Minerals is designed to meet this challenge: enabling a sustainable and resilient supply of metals and minerals for society's transition.

The programme office brings together actors from industry, academia, research institutes, the public sector and civil society in a joint effort. Our mandate is to mobilise, coordinate and direct interventions that strengthen both long-term supply capacity and the sustainability dimensions that must be met for the system to function.

Maria Swartling
Programme Director

Summary

Metals and minerals are a fundamental prerequisite for society's transition, but also a source of competing objectives. Fossil-free energy, electrification, digitalisation, circularity and strengthened defence increase both the volumes and the range of materials required. At the same time, raw material flows are becoming more uncertain in a rapidly changing world, with export restrictions and disruptions in global value chains. The EU's focus on strengthening supply capacity, including through the *Critical Raw Materials Act*, underscores that access can no longer be taken for granted.

In this landscape, Sweden has a particular opportunity. The country has significant mineral resources, world-leading industrial expertise, and a largely fossil-free energy system. This provides strong conditions to contribute to a European transition where the supply of metals and minerals needs to grow while also becoming more sustainable and robust.

The mission of Swedish Metals & Minerals is to enable a sustainable and resilient supply of metals and minerals for society's transition. *Enable* means creating knowledge, methods and enabling conditions across the entire value chain, from exploration to use and recycling, so that supply becomes both a real and a latent capability even when external conditions change. *Sustainable* means that supply can be maintained over the long term without accumulating harmful environmental or societal impacts over time. *Resilient* refers to the system's ability to withstand disruptions, manage risks and maintain function under changing conditions.

The programme office brings together actors from industry, academia, research institutes, the public sector and civil society, and has developed governance, ways of working and tools to translate the mission into practical interventions. A theory of change describes how interventions in the programme's intervention areas are expected to contribute to the desired shifts in the programme's key influencing factors and thereby drive progress towards the mission. A roadmap has been developed to specify how the theory of change is translated into priorities and interventions over time.

The programme's primary tool for achieving change is calls for proposals. In the start-up phase, the ambition was to quickly establish an initial set that provided a broad and stable foundation while also building knowledge about needs, opportunities and knowledge gaps in the system. The programme has carried out 11 calls and built a portfolio where early feasibility studies and subsequent calls have created a pathway from ideas to continued development.

Mission-oriented work is characterised by delayed effects, where a growing project portfolio in itself is not equivalent to mission achievement. Against this background, a need for sustained delivery capacity becomes clear: allowing the theory of change and the roadmap to operate over time.

11

Calls for proposals

285

Projects applied for

135

Projects granted

254

Participating organisations

42 / 58

Percent women/men project managers

316 538 569 SEK

Net granted support

190 133 451 SEK

External funding

1 The Mission

Enable a sustainable and resilient supply
of metals and minerals for the societal transition

Swedish Metals & Minerals operates in a rapidly changing international landscape where access to sustainable and resilient flows of metals and minerals is crucial for Europe's and Sweden's ability to deliver the green and digital transition. The programme's mission therefore sits at the heart of a wider geopolitical, technological and climate-driven transformation.

Sweden is already Europe's leading producer of several important metals and minerals, with an industrial base that is among the most advanced in the world. This starting point entails both responsibility and opportunity. The mission means that Sweden should maintain and strengthen this position, while also creating better conditions for the extraction and use of critical and strategic elements that are not currently produced domestically. Sweden also has a unique combination of industrial experience, research excellence and innovation capacity, which places us in a strong position to develop processes and materials that make the most of available resources and thereby reduce the risk of future supply shortages.

What does our mission mean?

Enable means creating knowledge, methods and enabling conditions across the entire value chain, from exploration to use and recycling, so that a sustainable and resilient supply of metals and minerals can be realised. The aim is for supply to be both a real and a latent capability.

Sustainable means that the supply of metals and minerals can be maintained over the long term without harmful environmental or societal impacts accumulating over time.

Resilient means that the value chain is robust and free from fragile links, and that it can, within reasonable limits, withstand disruptions such as geopolitical instability, supply interruptions, bankruptcies or other changing conditions.

Supply of metals and minerals builds on Sweden's strong position in metals and minerals production and aims both to strengthen existing value chains and to enable the extraction, use and development of critical and strategic materials, as well as more efficient use of available resources.

Society's transition refers to the shift from a society in which fossil fuels are central to one in which they are no longer.

1.1 The programme's role in the transition

The programme is a convening and driving force for system change. This means mobilising actors, organising joint interventions and directing development towards goals that individual actors may not be able to achieve on their own.

The programme has developed a theory of change that describes the logic linking the programme's interventions to the system change required. It is based on six influencing factors that together provide levers for change: *Demand, Resource availability, Technology, Competence, Economics*, and *Legal requirements and conditions*. Each of these affects the ability to produce, process and use metals and minerals in ways that meet the demands of the

transition. The theory also clarifies three fundamental properties that must be strengthened in parallel for the mission to be realised: sustainability, resilience and sufficient volumes.

The theory of change also shows that many intervention areas play multiple roles within the system. AI is a technological enabler, while also requiring economic investment and forming part of future competence. Recycling influences resource availability, technology and acceptance. CO_2 reduction is both a selling point and a cost item. At the same time, the system is strongly shaped by external factors such as geopolitics, economic cycles and global trade shifts. These circumstances lie outside the programme's direct control, require continuous horizon scanning, and call for the ability to adapt interventions accordingly.

1.2 The programme's shifts

During the establishment phase, a set of long-term objectives linked to the programme's theory of change was formulated as a shared direction for what the system needs to be able to deliver over time. These objectives have since been clarified for practical use: the level of ambition is now expressed as a desired shift for each influencing factor.

The shifts specify, among other things, what role Sweden needs to be able to play in securing a sustainable and resilient supply of materials in Sweden and in our European value chains, what capacity is required for a fossil-free value chain that is robust in relation to regulation, and what conditions need to be in place for demand, skills supply and investment to sustain the transition over time.

As a next step, a roadmap has been developed to translate the theory of change into interventions. The roadmap therefore supports the long-term direction and serves as a practical tool for making the desired shifts achievable.
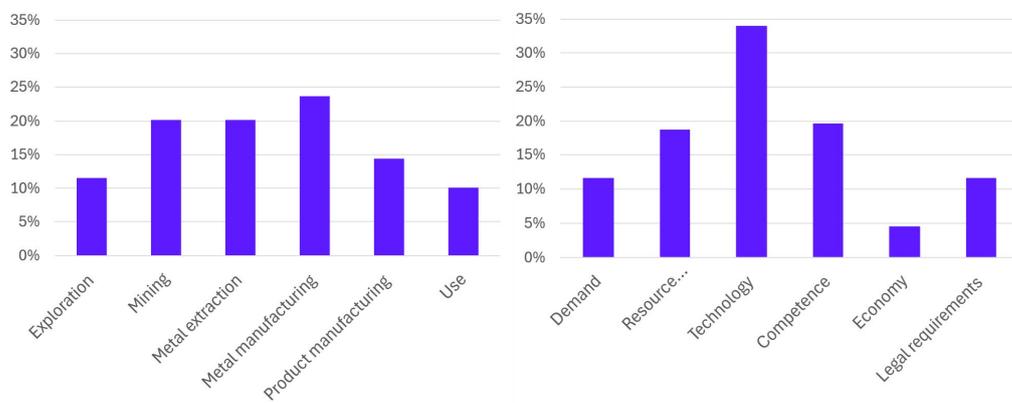

Figure 1: The programme's portfolio across the value chain (left) and influencing factors (right).

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Demand

Technology

Resource
availability

MISSION
Enable a sustainable and
resilient supply of metals
and minerals for the
societal transition

Competence

Legal terms &
conditions

Economy

Influencing factor	Desired shift
Demand is shaped by performance and affordability, but also by external trends, political decisions and competition.	A clear increase in demand for materials that enhance functionality and thereby reduce the need for raw materials for a given application.
Resource availability includes undiscovered mineralisation, primary and secondary sources, and functionality, meaning the ability to deliver the same function with less material.	Sweden should have sources, extraction capacity and processing capability to supply minerals and metals at a scale that makes a significant contribution to the EU's *Critical Raw Materials Act*.
Technology is a decisive enabler across the entire chain, from exploration to the finished metal component.	Technologies that make it possible to locate, extract and process metals and minerals, and to produce advanced metallic materials in a competitive and fossil-free way, should be identified and, where needed, developed.
Competence is a prerequisite for turning available resources and developed technologies into real outcomes.	Qualified skills, education and engaged people should be available so that the transition can be realised.
Economics affects the scope for change through costs for energy, inputs, investments, CO_2 emissions and labour.	Investment and operating business cases for the desired shifts in Demand, Resource availability and Technology should be attractive enough for the shifts to be worthwhile to implement.
Legal requirements and conditions, including environmental permitting, land use, EU directives and emerging regulations such as digital product passports, can both accelerate and hinder the transition. Policy development, standardisation and more predictable processes are of major importance.	Legislation affecting the value chain from exploration to the production of metal products with advanced properties should be free from inherent contradictions. Conflicts over land use should be reduced through greater clarity on how different national interests are balanced.

1.3 The programme office

Ahead of the application to establish a programme office, actors in the ecosystem were identified and mobilised. To justify an application, the programme proposal needed to be based on a clear understanding of which actors are affected by the mission, who needs to contribute to implementation, and what conditions are required for actors to be willing and able to participate. The analysis was based on interviews with member companies within the participating industry associations, complemented by open workshops to mobilise actors that could and wanted to contribute to the programme.

The programme office's mandate is to drive and coordinate implementation of the programme by mobilising relevant actors, perspectives and competences across the entire minerals and metals value chain. The focus is not on representation of individual organisations, but on creating conditions for collaboration, learning and delivery in a complex system where industry, academia, regional development and civil society need to interact.

The programme office[1] consists of actors that together cover the value chain from exploration and mining to processing, semi-finished products and finished metal components, complemented by academic expertise and support for regional development and small and medium-sized enterprises. This composition gives the programme office access to both industrial anchoring and research and innovation capacity. The programme office is jointly run by eight organizations: the industry associations Swedish Foundry Association, Jernkontoret, Svemin and Swedish Aluminium Association; LTU Business, Luleå University of Technology and Örebro University; and the regional innovation environment Sustainable Steel Region.

The organisation is geographically distributed to enable proximity to central parts of the industry and its ecosystem. Programme office staff are based in five locations in Sweden: Stockholm, Luleå, Örebro, Jönköping and Sandviken. This structure supports ongoing dialogue with industry, regional actors and government agencies, and facilitates coordination across regional, national and international levels.

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[1] Staff at the program office can be found at https://swedishmetalsandminerals.se/sv/kontakta-oss

Through its member organisations, the programme office has established networks within industry and academia, as well as with regional, national and European authorities and decision-makers. The programme office combines experience in leading innovation programmes with access to expertise in technology, system transition, policy and social innovation, creating strong conditions to deliver the programme in line with its mission.

1.4   Structures and influence

The programme's governance is based on a division of roles between the Steering Group, Mission Control and the programme office.

The Steering Group[2] is the programme's highest decision-making body. It consists of representatives of the programme's partners and holds ultimate responsibility for the programme's direction, priorities and the use of intervention funding, in line with the programme's mission and mandate. All decisions concerning the allocation of intervention funding are made by the Steering Group. The programme managers from the responsible agencies attend Steering Group meetings in an adjunct capacity.

Figure 2: Map showing the five offices of the program office in Sweden.

To ensure that the Steering Group's decisions are based on strong evidence and well-prepared input, the programme has established Mission Control[3]. Mission Control brings together actors whose competence, experience and networks span the programme's technical and social intervention areas, as well as the seven system perspectives within Impact Innovation.

Mission Control is responsible for guiding the Steering Group in its decisions. This includes providing input to the programme office during preparatory work and making recommendations to the Steering Group regarding the programme's interventions, to ensure they are aligned with the programme's mission and strategy. To ensure that Mission Control's work is guided by system value rather than individual

[2] Current members of the Steering Group can be found at
https://swedishmetalsandminerals.se/sv/ledning-och-styrning#ordforande-styrgrupp
[3] Current members of Mission Control can be found at
www.swedishmetalsandminerals.se/sv/missioncontrol

organisational interests, the programme has established a code of conduct. The code is intended to foster a culture in which members act in the best interests of the programme and contribute perspectives, rather than representing their home organisations.
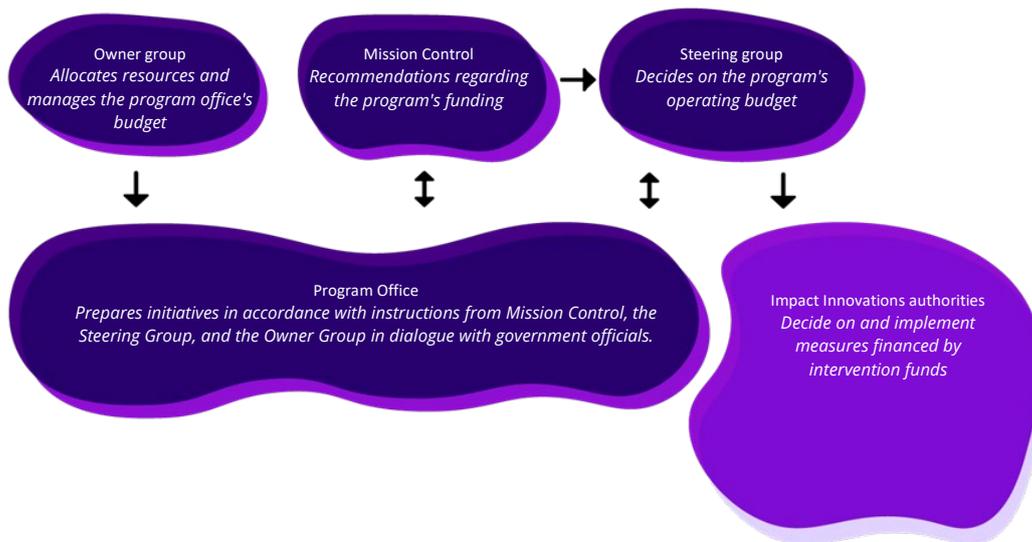

Figure 3: Schematic diagram of the program structure

1.5   Integration of gender equality and equity

The programme office has worked systematically to integrate gender equality and equity aspects into its organisation and ways of working. From the outset, gender-balanced representation was established in the programme's decision-making bodies. The programme office, which carries out the operational work, is also balanced in terms of gender (men/women):

- Steering Group 6/5
- Mission Control 10/13
- Program Office 16/13

Beyond gender balance, the programme office has worked to ensure broader representation through geographical spread, actors from

across the entire value chain, and representation from academia, industry, research institutes, the public sector and civil society. Through mobilisation and communication, the programme has worked to ensure this is reflected in practice by making the programme and its interventions understandable and relevant also to actors without an established connection to the value chain.

The programme office has also worked with inclusive language and high accessibility in all communication. For example, the website and core content have been adapted for accessibility so that more people can access information regardless of visual ability, language support or digital familiarity. English is used as the primary language on the website, in social media and in newsletters to reduce linguistic exclusion, and tone and content are designed to work for both established and new target groups.

1.6　Programme in numbers

Table 1: The ten organizations with the highest net granted support in the programme.

Organisation	Net granted (MSEK)
Swerim AB	69,086
Luleå tekniska universitet	58,423
RISE Research Institutes of Sweden AB	29,297
Kungliga Tekniska Högskolan	14,943
Uppsala universitet	12,125
Linköpings universitet	11,914
Chalmers Tekniska Högskola Aktiebolag	7,990
Umeå universitet	6,933
Boreal Orchards AB	5,004
Stiftelsen Fraunhofer-Chalmers Centrum För Industrimatematik	4,999

Table 2: The ten organizations with the highest external funding (co-funding) in the programme.

Organisation	External funding (MSEK)
Outokumpu Stainless AB	10,851
Vargön Alloys AB	9,354
Luleå tekniska universitet	8,135
SSAB EMEA AB	8,080
Epiroc Rock Drills AB	6,610
Siemens Energy AB	6,530
Alleima EMEA AB	5,750
Boliden Mineral AB	5,539
Luossavaara-Kiirunavaara Aktiebolag	4,293
Traton AB	3,781

Net granted | External funding

- Private company
- Research institute
- University
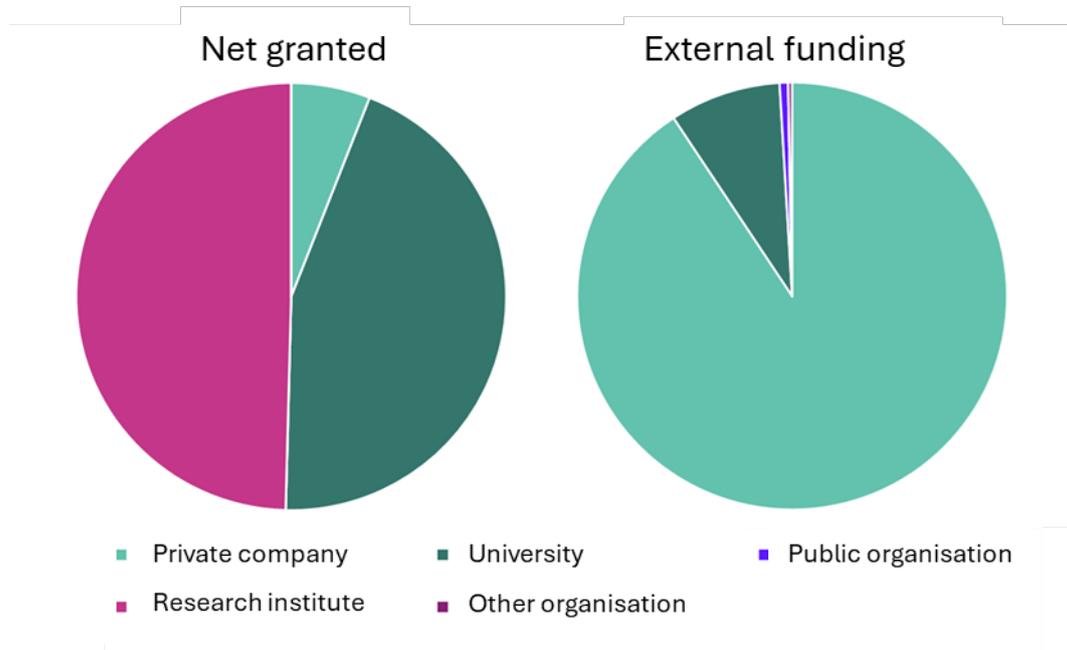- Other organisation
- Public organisation

Figure 4: The figures show how granted funding (left) and external funding (right) are distributed across the programme's actor categories. Awarded funding is dominated by research institutes and higher education institutions/universities, while external funding
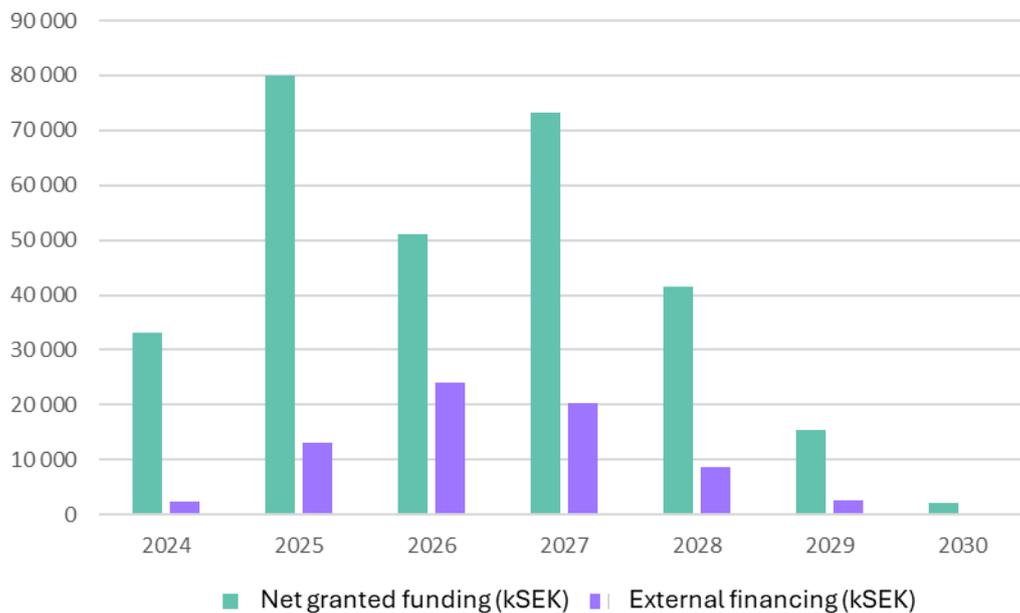

Net granted funding (kSEK) | External financing (kSEK)

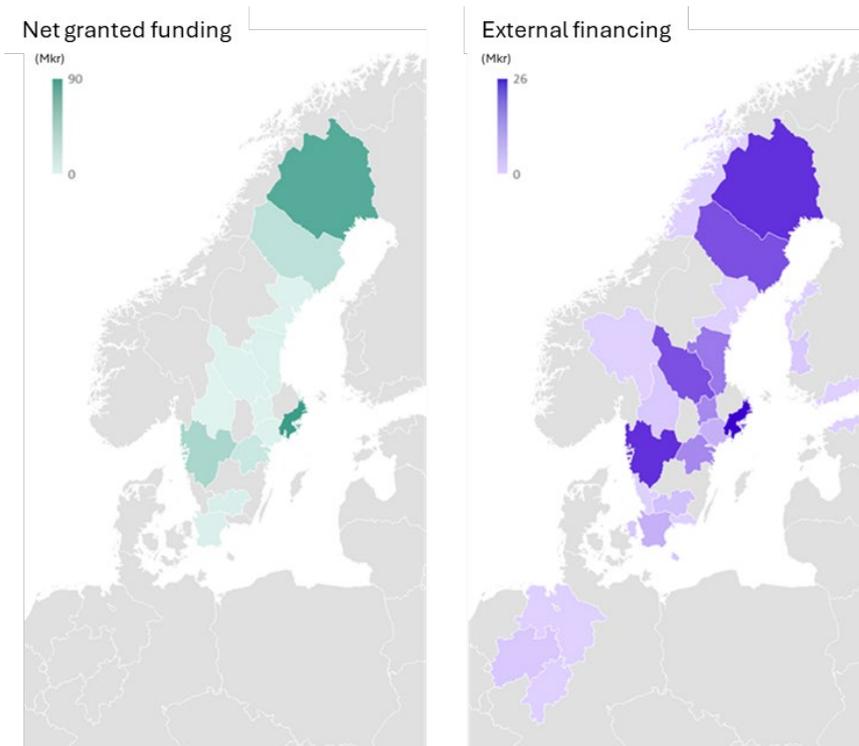*Figure 5: Total net amount granted to approved projects and external funding per year.*

Figure 6: Approximate geographic distribution of the programme's awarded funding for funded projects.

2 Programme activites

The programme office's main mandate is mobilisation towards the mission. The programme office includes four industry associations representing the entire value chain, which means that from the outset it has access to established networks and channels to companies, academia, research institutes, government agencies and regional actors. Ahead of the application to establish a programme office, actors in the ecosystem were mapped and mobilised through an analysis that clarified who is affected by the mission, who needs to contribute to implementation, and what conditions are required for actors to be willing and able to participate.

Since the programme's main tool for implementing interventions beyond the programme office's own work is calls for proposals, much of the mobilisation has been directed towards the relevant call areas. At the same time, strategically important actors need to be reached through complementary contact points. For the programme's social intervention areas, this has meant a deliberate focus on reaching actors in the public sector and civil society, as these are necessary to deliver on areas such as attractiveness and, over time, skills supply.

During the programme's establishment phase, mobilisation has been carried out through existing networks as well as targeted efforts to reach actors outside the traditional value chain. The work has been driven both thematically through the programme's working groups and intervention areas, and geographically through the programme office's presence in several locations across Sweden. Mobilisation has been clearly anchored in the programme office's member organisations and their owner dialogues.

A core premise in the programme office's work is that trust is the most important asset for delivering a mission in a complex system. Bringing together industry, academia, government agencies, municipalities and other actors requires trust that makes it possible to move beyond traditional roles and test new approaches. The programme office has been able to build on trust and structures established through previous programme offices and long-term joint work within the Strategic Innovation Programmes Swedish Mining Innovation and Metallic Materials.

> We use inclusive communication to lower barriers and mobilise the actors who can contribute to the programme's mission.

2.1   Collaboration activities

Interventions are shaped through collaboration and stakeholder dialogue in order to capture signals from the system. These dialogues provide input and shared understanding, and help the programme office identify needs, barriers and possible approaches. Not all dialogues have yet been translated into concrete interventions, but they have generated input that is being carried forward into the programme's ongoing design.

Early on, the programme office aimed to develop a formal collaboration format through Transition Labs, meeting places where actors meet other actors to jointly explore barriers, goal conflicts and possible solutions. This intervention format proved not to be feasible, and collaboration has instead been integrated into other formats such as thematic workshops, seminars, targeted dialogues and collaboration linked to calls for proposals, though with less continuity than a recurring lab structure could have provided.

EU Info Day[4]

EU Info Days were organised in collaboration with the Impact Innovation programme Net Zero Industry to bring Swedish actors together around EU funding opportunities and partnerships. The dialogue highlighted a need for improved overview, peer exchange and lower barriers to participation in EU projects.

Policy and regulations[5]

A workshop was held with all projects within the call Regulations and policy instruments, a call delivered in collaboration with the Impact Innovation programme Net Zero Industry. The discussions highlighted how ongoing R&I projects encounter policy-related barriers and opportunities, as well as the need for stronger alignment between project results and policy development at national and European levels.

Aluminiumdagarna[6]

The annual Aluminiumdagarna (Aluminum Days) bring the Swedish aluminum industry together in a joint forum to discuss current and future issues for the sector. Swedish Metals & Minerals attended this year's meeting, where discussions focused on global challenges, technological development, skills supply and competitiveness, with collaboration highlighted as a key prerequisite in an increasingly uncertain world.

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[4] https://swedishmetalsandminerals.se/sv/nyheter/fullsatt-eu-info-day-2025-med-fokus-pa-framtidens-europeiska-forskningssamarbeten/
[5] https://swedishmetalsandminerals.se/sv/nyheter/gemensam-workshop-gav-viktiga-inspel-till-framtida-policyarbete/

Industry water management

Two separate seminars on the industry's needs in water management, organised by Svemin and Jernkontoret respectively, have highlighted the issue from different industrial perspectives. The participation of the Impact Innovation programmes Swedish Metals & Minerals and Water Wise Societies in these contexts has made it clear that water-related challenges need to be addressed cross-sectorally and from multiple perspectives: technical, policy-related and societal.

2.2   Our Calls

Impact Innovation: Feasibility studies in technical intervention areas within the Metals & Minerals programme (Vinnova 2024-01480)

In May 2024, the programme opened a call welcoming feasibility studies within the programme's technical intervention areas. The call resulted in 53 projects.

Impact Innovation: Feasibility studies and R&I projects in social intervention areas within the Metals & Minerals programme (Vinnova 2024-01486)

In May 2024, the programme opened a call welcoming projects within the programme's social intervention areas. The call resulted in 11 projects.

Impact Innovation: Regulations and policy instruments for a sustainable industry (Vinnova 2024-01242)

In June 2024, the programme opened a joint call together with Net Zero Industry, welcoming policy-oriented projects. The call resulted in 9 projects that became part of the Swedish Metals & Minerals portfolio.

Impact Innovation: Human–technology interaction – Swedish Metals & Minerals (Vinnova 2024-04199)

In January 2025, the programme opened a call aimed at exploring the interaction between people and technology, and how new technologies and processes can be introduced in an inclusive and well-considered way to

strengthen employee engagement, efficiency, well-being and safety. The call resulted in 3 projects.

Impact Innovation: Society–industry interaction – Swedish Metals & Minerals (Vinnova 2024-04215)

In January 2025, the programme opened a call aimed at developing and testing methods and processes that support the development of attractive, healthy and inclusive communities, which is crucial for long-term skills supply, strengthened competitiveness and innovation capacity. The call resulted in 8 projects.

Impact Innovation: Urgent challenges within Swedish Metals & Minerals (Swedish Energy Agency, P2025-201797)

In April 2025, the programme opened a call to address urgent challenges within four identified areas: access to critical raw materials, use of secondary raw materials, water management, and reduced environmental impact from waste streams. The call resulted in 11 projects.

Impact Innovation: Research and development projects in social intervention areas within the Swedish Metals & Minerals programme (Vinnova 2025-00876)

In April 2025, the programme opened a follow-on call to the initial call in the social intervention areas, offering feasibility studies a pathway forward. The call also welcomed applications that had not participated in the previous call. The call resulted in 10 projects.

Impact Innovation: Research and development projects in technical intervention areas within the Swedish Metals & Minerals programme (Vinnova 2025-00959)

In April 2025, the programme opened a follow-on call to the initial call in the technical intervention areas, offering feasibility studies a pathway forward. The call also welcomed applications that had not participated in the previous call. The call resulted in 25 projects.

Impact Innovation: Digital Product Passports – Swedish Metals & Minerals (Vinnova 2025-01768)

In September 2025, the programme opened a call aimed at preparing industry for EU requirements related to digital product passports. This was the programme's first so-called mission-strategic intervention and resulted in 1 project.

Impact Innovation: Digitalisation, circularity and climate neutrality in the metals and minerals industry (Swedish Energy Agency, P2025-208650)

In October 2025, the programme opened a call limited to resource-efficient and circular production processes, fossil-free and climate-neutral processes, and advanced digitalisation. The call closed in February, but the outcome is not yet known.

Resilient metal and mineral supply for enhanced preparedness (Vinnova 2026-00349)

The program has opened a call for proposals that closes in April 2026 and funds projects involving industrial research or experimental development to strengthen the metal and mineral industry's ability and conditions to contribute to total defense.

2.3 Design and selection of interventions

The programme's primary tool for achieving change is calls for proposals. In the start-up phase, the ambition was to quickly establish an initial set of calls that provided a broad and stable foundation for the continued work. Early on, the programme application was translated into what later became known as the *Scope* document, which framed the programme's intervention areas.

In parallel, the government agencies required a theory of change to be developed. Work on the theory of change was carried out at the same time as the programme office and governance functions were being established and the first calls were launched. The theory of change describes how interventions within defined intervention areas contribute to desired shifts in the programme's influencing factors, thereby driving development towards the mission.

The early calls were designed to open up the programme to many types of actors, create a shared overview of needs, opportunities and knowledge gaps, and lay the foundation for a balanced long-term project portfolio. The programme therefore offered feasibility studies in both technical and social intervention areas to mobilise the system early and to gather input for future investments. At the same time, a call was carried out together with Net Zero Industry with a focus on policy and legislation.

A follow-on call for research and development projects deepened the work within the programme's technical and social intervention areas. The technical projects strengthen, among other things, resource efficiency, processes and material flows, and develop solutions with the potential to reduce climate

and environmental impacts across industrial value chains. In parallel, the social research projects have focused on organisational and societal conditions such as attractiveness, skills supply, social sustainability, forms of collaboration and legitimacy, i.e. factors that in practice determine whether technical solutions can be implemented and at what scale.

The programme has also carried out a number of more thematically focused initiatives exploring the interaction between people and technology, between society and industry, and the role of policy instruments and regulation. These interventions broaden the portfolio by addressing how relationships, behaviours, institutions and frameworks shape the transition, including changes in working life and the development of local communities, thereby strengthening the conditions for uptake and lasting system impact.

In parallel, the programme has launched targeted initiatives where the window of opportunity is short or where larger calls are not appropriate. The *Urgent Challenges* initiative addresses areas where the programme assesses that interventions can have significant effect and contribute rapidly to the mission, such as critical raw materials, secondary flows, water management and waste. The mission-strategic *Digital Product Passports* initiative has in turn been designed to strengthen industry preparedness for upcoming EU requirements and to drive transformation across the value chain, from digitalisation and process development to traceability, reporting, material choices and business models.

Overall, these interventions mean that after the establishment phase the programme has a first broad portfolio that makes visible which parts of the system actors are moving towards and what types of solutions are being developed. The combination of broad mobilisation and targeted deepening has helped to ensure that:

- more actors have been able to enter the programme at an early stage, creating a shared baseline and greater legitimacy for subsequent prioritisation,
- the programme has gained a clearer picture of knowledge gaps and implementation needs along the value chain,
- the portfolio includes the societal and organisational conditions required for implementation and scaling.

The programme has classified the entire project portfolio, mapping projects from the initial calls to the Scope document areas, and later projects to the areas of the theory of change. This has been done partly to understand the portfolio's composition, but also to specifically examine whether gaps are emerging that the programme should address. The programme office has

also examined other aspects such as TRL levels, system dimensions and value chain perspectives across projects. However, the system is complex, with many interdependencies, and the number of data points is still limited to date.

Each funded project is assigned a programme contact from the programme office. Programme contacts are appointed by the programme office's participating organisations. Their role is both to support the project in navigating the programme's routines and to serve as a communication channel between the projects and the programme office. The purpose is to enable the programme office to follow the project portfolio, and the individual projects within it, at close range.
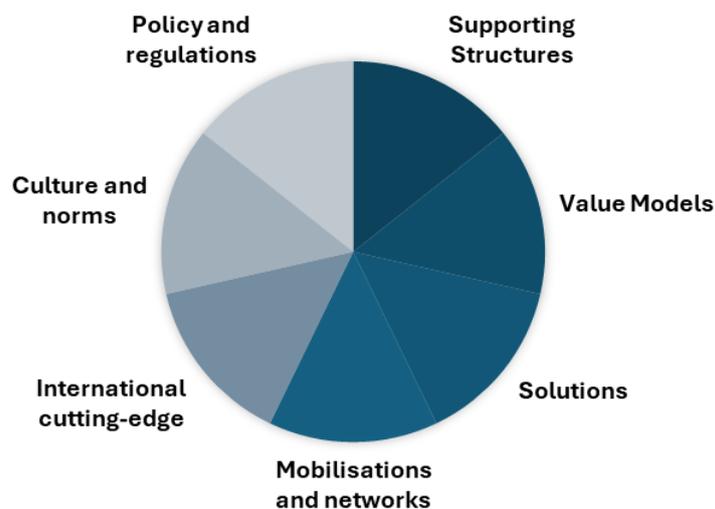

Figure 7: The seven system dimensions

2.4   The seven system dimensions for system change

At the start of the programme, it was expected to address seven system dimensions for system change. By nature, these dimensions overlap, and in designing interventions the programme has not sought to limit itself to any single dimension. A call that primarily sits within the technological solutions dimension will attract proposals that also need to include value models and support structures. Likewise, a proposal aimed at influencing culture and norms will require mobilisation of networks.

The calls in the first years have had a clear centre of gravity in the solutions dimension through the technical intervention areas, where the focus has been on, for example, technology, environmental performance and resource issues. These issues are fundamental to achieving the mission and often constitute bottlenecks for both competitiveness and real climate and environmental benefits across value chains.
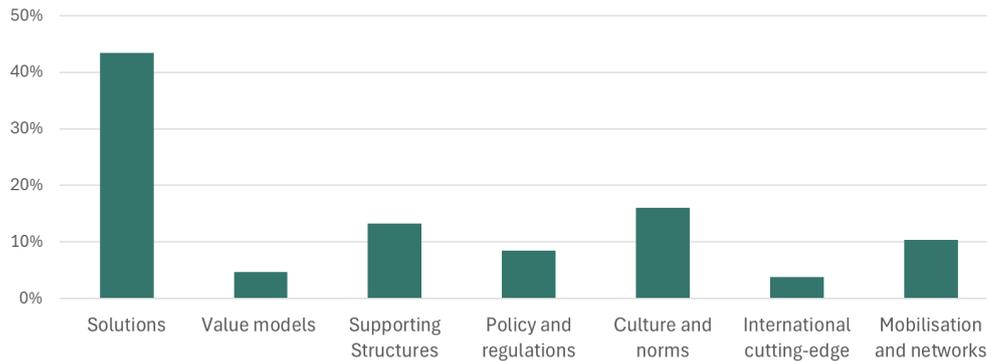

Figure 8: The programme's project portfolio distributed across the seven system dimensions.

The programme has also built a portfolio within the system dimensions of support structures, culture and norms, and not least mobilisation and networks. At the same time, social and policy-related dimensions have been integrated from the outset, through social R&D projects and thematic initiatives on policy instruments, regulation and society–industry relations, to build acceptance, attractiveness, skills and organisational capacity. The overall portfolio has therefore been designed to both develop solutions and strengthen the system conditions that determine whether solutions can be realised and have impact.

The programme's strategic priorities

Creating research and other projects that foster collaboration and trust across real or perceived boundaries along the value chain, in order to streamline the chain, maximise resource efficiency and minimise waste.

Building critical mass and strengthening capacities in areas that are essential to the mission but where Sweden is not yet sufficiently strong today.

Developing business models, policy proposals and social innovations that pave the way for the solutions required to achieve the mission.

2.5 The programme in its external context

Swedish Metals & Minerals operates in a rapidly changing external environment. New and tighter regulations, shifting market conditions and an evolving risk landscape continuously affect the conditions for metals and minerals supply. The programme has therefore designed its interventions to be able to respond to change.

Reaching young people[6]

The programme has adapted its interventions to an environment where competition for people, skills and future education choices has intensified, and where "attractiveness" and "understanding" have become as critical as technological development.

In the programme's theory of change, competence is described as a prerequisite for turning available resources and developed technologies into real outcomes. The desired shift is that qualified skills, education opportunities and engaged people are available so that the transition can be realised.

Against this background, the programme has designed an intervention that addresses the challenge that young people are harder to reach through traditional industry messaging, while their perceptions of industry influence both education choices and willingness to engage. The intervention is a practically useful guide for reaching young people, developed by the anthropologist Katarina Graffman. The guide supports actors in the ecosystem in updating language and approaches so that communication resonates with young people's realities and motivations. This strengthens the conditions for more people to see the metals and minerals industry as relevant, understandable and attractive.

Swedish positioning in the EU's environmental regulatory development[7]

Changes in the EU's policy and regulatory development have directly influenced the design of the programme's interventions. A clear example is the establishment of INCITE in 2024, a new EU initiative intended to develop evidence and identify innovative technologies as a basis for future environmental legislation.

When INCITE was established, it became clear that the Swedish minerals and metals industry was covered by the initiative's early focus. This highlighted

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[6] https://swedishmetalsandminerals.se/sv/nyheter/att-na-unga-antropologens-guide-till-kommunikation-som-fungerar/
[7] https://swedishmetalsandminerals.se/sv/nyheter/starkt-engagemang-nar-incite-eus-innovationsnav-for-industriell-omstallning-fyllde-ett-ar/

the need to contribute to updates of key EU regulatory frameworks where Swedish sectors are directly affected. It also meant that opportunities to influence future requirements largely shifted to early-stage analytical and knowledge-building processes at EU level.

Against this background, the programme carried out targeted mobilisation activities to bring industry, research, authorities and other relevant actors together around a shared understanding of INCITE and how Swedish industry can be positioned. Representatives from the EU and INCITE were invited, combining dialogue meetings with visits to Swedish first-of-a-kind facilities. These efforts helped present Swedish technologies and innovations in a coherent way to EU counterparts.

The work also led to the formation of a consortium that was later awarded support through the programme's call on policy and instruments. The example illustrates how rapid changes in EU regulatory development have prompted the programme to adapt its activities in order to strengthen Swedish influence, visibility and room for maneuver in a changing European regulatory system.

Digital Product Passports[8]

The Digital Product Passports initiative is a direct response to changing external conditions, where the EU Green Deal and the Circular Economy Action Plan have tightened requirements for transparency, traceability and reliable product information. Through the Ecodesign for Sustainable Products Regulation (ESPR), digital product passports are introduced as a binding requirement, with iron and steel as well as aluminium among the first product groups to be covered. Detailed rules are expected to be decided in 2025–2026, with implementation from around 2028.

Digital product passports affect the entire value chain and require coordination on data, standards, digital infrastructure and regulatory compliance. The programme's mission-strategic initiative has therefore brought together a broad base of actors to build shared competence and carry out pilot studies, particularly to prepare small and medium-sized enterprises for upcoming requirements. The initiative has resulted in a project bringing together 26 actors across the programme's value chains, with the aim of testing ways of working and collaboration models that make the requirements manageable in practice.

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[8] https://www.vinnova.se/e/impact-innovation-swedish-metals--2025-01767/impact-innovation-digitala-produktpass-2025-01768/

Resilient minerals and metals supply to strengthen preparedness[9]

Resilience, supply preparedness and total defence have been integrated perspectives in the programme from the outset, but developments in the external environment have made them more urgent and more operational. Against the backdrop of a deteriorating security situation and a clearer national and European focus on supply security, these perspectives are brought together in the call *Resilient minerals and metals supply to strengthen preparedness*, in line with Sweden's total defence approach and Article 3 of the NATO Treaty on resilience.

The call aims to strengthen the ability of the metals and minerals value chain to maintain, adapt and, when needed, rapidly scale up production and deliveries in peacetime, heightened readiness and, ultimately, war, as well as in other security-policy challenging situations. Projects are expected to develop knowledge, analyses and practically usable tools that enable planning and concrete measures for a robust supply of metals and minerals.

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[9] https://www.vinnova.se/e/impact-innovation-metals--minerals-2024-01339/impact-innovation-resilient-metall-2026-00349/

3 Looking ahead

3.1 Programme strenghts

A strong actor base and high mobilisation capacity

From the outset, the programme has a strong and well-anchored actor base that spans the entire value chain, from exploration and mining to metals production, recycling, materials and product development, and onward to use. The partnership and the programme's established structures for influence give the programme access to a shared knowledge base with insights close to both industrial practice and the research frontier. This creates a mobilisation capacity to bring together relevant actors through established channels and joint processes, build a shared understanding of what matters, and translate that into coordinated interventions. The first calls have already demonstrated this capacity through high application pressure and new constellations of actors.

Programme contacts and ongoing stakeholder dialogue

An important part of the programme's delivery model is the use of programme contacts. Each funded project is assigned a designated programme contact from the programme office, tasked with following the project's progress and supporting the project leader when needed. Programme contacts are allocated based on competence and the character of the projects, providing both stronger support to projects and better insight for the programme into what is actually happening across the portfolio. This approach gives the programme continuous feedback on results and effects, strengthening its ability to refine interventions and draw lessons, not least ahead of follow-up and evaluations.

***Roadmap* for strategic steering of the programme**

The design of the programme's roadmap has been a strategic process to translate the mission and the theory of change into a shared and prioritised direction for implementation. The work began immediately after the theory of change was finalised and was structured as a broad mobilisation effort, inviting programme owners and key actors around the programme to contribute input and priorities. Input was collected, processed, compiled and circulated through several consultation rounds for comments and improvements. In this way, the roadmap has been shaped as a tool for strategic steering: it builds shared understanding of what matters most, provides a basis for prioritising interventions, and strengthens the programme's ability to steer the portfolio towards areas where system impact can be achieved.

3.2 The programme going forward

During its first years, Swedish Metals & Minerals has established a theory of change, a roadmap and analytical processes. The OECD review[10], an early assessment of how the agencies and the programmes have been set up and of their delivery capacity, notes that this development took place in a context where the programmes needed to be established quickly and start delivering in parallel with governance structures and steering logic being built. The OECD describes the context as follows:

"The programmes have had a little over a year to set up their structures... they did not have a learning phase to work through innovation agendas, develop their theories of change or test them before jumping into implementation. This meant that often decisions on calls had to be made before the work on concrete programme theories of change started."

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[10] OECD. (2025). Governance of ecosystem-driven missions: The case of the Impact Innovation Programme in Sweden. OECD Publishing. https://doi.org/10.1787/72521628-en

Against this background, a need for sustained delivery capacity becomes clear: allowing the theory of change and the roadmap to operate over time. Mission-oriented work is characterised by delayed effects, where a growing project portfolio in itself is not equivalent to achieving the mission. The programme's primary tool for translating direction into practice is open calls for proposals, where actors are invited to contribute projects and solutions that together drive the desired shifts. The lessons from the establishment phase therefore point primarily to the need to sharpen governance and to direct interventions more clearly towards the mission.

An important part of delivery is follow-up through programme contacts, which provide a structured interface between projects and the programme office. The purpose is to identify barriers and problems early, support linkages between projects, and ensure that learning is captured in portfolio steering, enabling gradual sharpening based on actual implementation and observed results.

In parallel, access to the agencies' open data[11] creates better conditions for horizon scanning and analysis of the research landscape. The ambition is for this to enable a more systematic identification of complementary initiatives, overlaps and clear gaps, thereby strengthening the evidence base for the programme's priorities.

The programme's continued challenge requires a holistic approach in which technology, competence, environmental performance, business models and societal trust are developed in parallel and in interaction. The value chain is only as strong as its weakest link: efficient exploration fails if permitting processes do not work, advanced materials make no difference if manufacturing cannot handle them, and fossil-free production does not deliver full impact if waste systems and societal relationships are not sustainable.

Over the coming years, the programme therefore needs to focus on building the long-term capacity that makes the transition possible as a whole, not through isolated projects, but by gradually strengthening all functions that together carry the system forward. The ambition of system change must at the same time be combined with a clear delivery focus and prioritisation based on what the programme can actually influence.

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[11] https://gdphub.se/