

REMX

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Smart and Green Mining Regions of EU



Action Plan Lapland, Finland



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Research &
innovation

Leading the European policies
towards more sustainable mining
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Innovation and research action for mining and metallurgy

Boosting research and innovation based industrial circular economy in Lapland through interregional learning
– SMEs as a driver for sustainable growth

1. General information

Project: REMIX – Smart and Green Mining Regions of EU

Partner organisation: Regional Council of Lapland, Finland

NUTS2 region: East and North Finland

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2. Policy link

The Action Plan aims to impact:

- Investment for Growth and Jobs programme
- European Territorial Cooperation programme
- Other regional development policy instrument

Policy instrument addressed

Sustainable growth and jobs 2014-2020. Finland's structural funds programme, Priority axis 2: Producing and using the latest knowledge and skills (ERDF) Specific objective 4.1: Developing research, competence and innovation clusters that draw from regional strengths.

The policy context and the contribution to improve the policy instrument

The action plan of Lapland will contribute to better implementation of the policy instrument addressed and mentioned above. Better implementation means better use of funding based on actual needs of stakeholders in the regions but more importantly implementation of lessons learnt from other project partners during REMIX Phase 1. This could mean good practices and findings from REMIX peer reviews with other partners. In this case, focus will be in research and innovation activities for circular economy and actions targeting more environmentally friendly mining operations and business support services offered by SMEs in Lapland.

Based on the recent discussions with funding authority, the referred policy instrument is utilised sub-optimally in the region. There is lots of funding left for research and innovation modelling and circular economy could be seen as one of the valuable approaches for new cooperation between universities, sectoral research and intermediaries working actively with SMEs. Regional Council of Lapland is committed to look for new proposals and supports this action plan delivery.

Producing and using new information and knowledge

- Development of the centres of research, expertise and innovation on the basis of regional strengths

The actions taken in accordance with the specific objective will result in new centres of innovation based on regional strengths and smart specialisation. In accordance with smart specialisation of regions, R&D investments will grow and the innovation base will expand. Growth is possible because the research and development environments of applied research will be improved and new ways of producing innovations will be found. Smaller research units will develop into centres of excellence and the ability of higher education institutions and research organisations to conduct top-class research will improve. Strengthening of the science and technology base will also help to create new green and creative business and prerequisites for the renewal of industrial value chains, which is essential for the creation of new jobs in regions.

Funding may be granted for

- research, development and innovation activities in infrastructure improvements that promote regional economies
- the development of centres of research, expertise and innovation, RDI environments and development platforms
- the promotion of international RDI co-operation among universities, higher education institutions, research institutions, vocational institutions, general government actors and enterprises.
- SME product, service and production method development, piloting, commercialisation and adoption of new technologies
- the development of applied research supporting the national economy as well as the development of operating, service and commercialisation processes

At least 25 per cent of the activities will be directed at the development of low-carbon solutions.

reference:

<http://www.rakennerahastot.fi/web/en/producing-and-using-new-information-and-knowledge-erdf->

STRATEGIC CHOICES OF LAPLAND FOR OPERATIONAL PROGRAMME

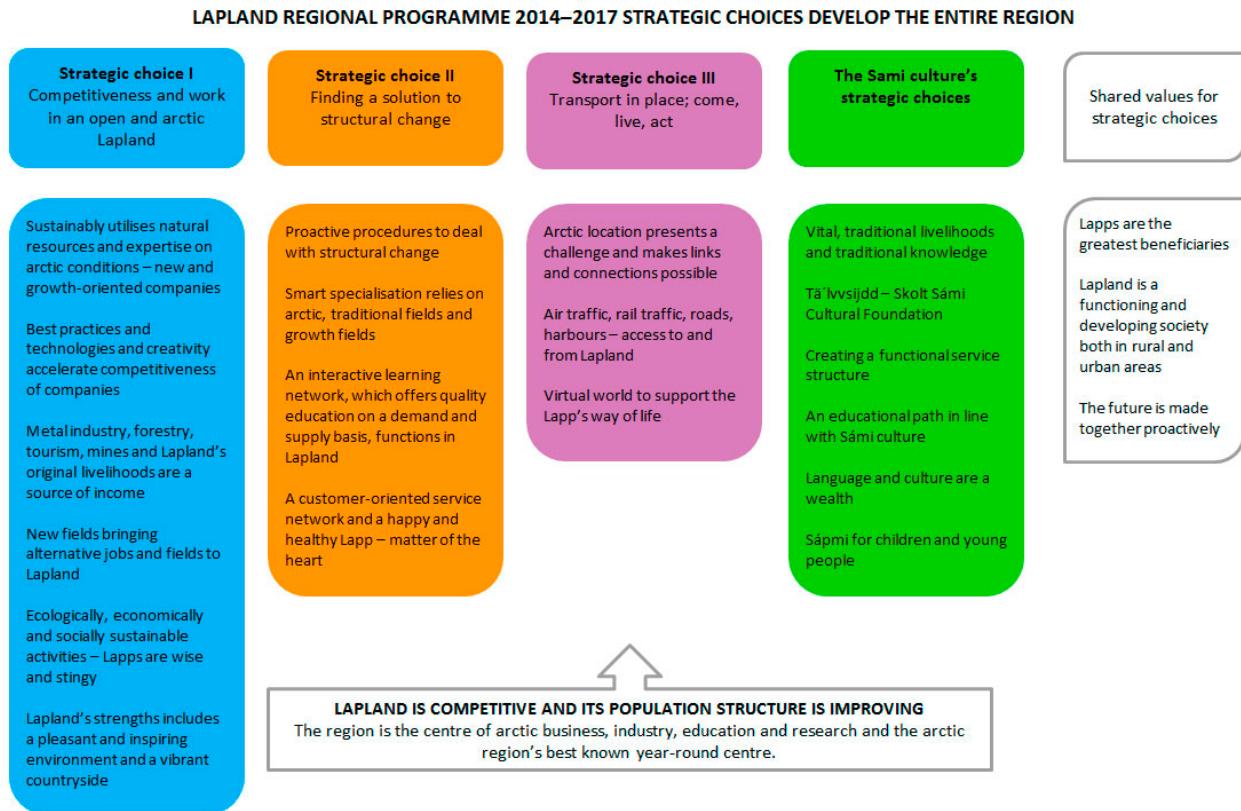


Figure 1: In Lapland, Strategic choice I supports this action plan implementation and links the operational programme to the regional development and specialisation.
Reference: <http://www.rakennerahastot.fi/web/en/lapland>

3. Action

Arctic Circular Economy Innovation Concept
– Research and innovation based circular economy products, services and business models for SMEs in Lapland.

3.1. The background

Creating an “Arctic Circular Economy Innovation Concept” implementation in Lapland from ERDF as mentioned previously.

a. Research and innovation-based products, tools and services for circular economy are key in future mining and metallurgy operations development. Need for raw materials is increasing tremendously in coming years. Especially, the political targets of low carbon economy including more sustainable transportation has increased the pressure for need of raw materials for batteries, wind turbines other technological solutions. Significant share of innovations is developed in mining and metallurgy value chains were SMEs have active role delivering industrial services for driver companies. Research and applied science in universities is turned to innovation through active cooperation between business, business development services and research institutions. Clusters play often a crucial role for offering a framework for this kind of development. In Lapland, one of the challenges for innovation is the skills shortage for SMEs in mining and metallurgy value chains. Lapland has extensive development work going on which is funded from the addressed policy instrument. Especially intermediary REMIX stakeholders Kemin Digipolis Ltd (host for cluster of Arctic industry and circular economy), Lapland University of Applied Sciences and Geological Survey of Finland have been active in circular economy development projects which are funded from the addressed policy instrument (ERDF).

This action targets transferring good practices from REMIX partner, Faculty of Sciences and Technology, NOVA University of Lisbon. In particular the adaptable content is rising from [REMIN&eTHROUGH project results and findings](#) at Faculty of Sciences and Technology, NOVA University of Lisbon.

These two projects have been finding new circular economy products through research. Adaptability, technical and chemical aspects of the products like “high energy-efficient alkali-activated-based structural panel”, “pavements infrastructure and as pouring pavement materials” and other alkali-activation based materials (using e.g. slag or fly ash) like novel binders, geopolymers and ceramic materials for thermal insulation need to be further mapped. Also, the business potential must be evaluated through proper feasibility study in Portugal and Lapland.

The concrete circular economy activities that the project will aim to develop for the end beneficiaries are the following:

- New circular economy-based innovations such as new construction products utilising the different side streams from mining industry.
- Creating and developing new circular economy business models based on clusters
- Hindering the cost of logistics for current circular economy models
- Determining the reusable materials and creation of potential new products through refining of the side streams.
- Developing of the educational programmes in mining through researcher and teacher exchange between Portugal, Finland and possible other REMIX regions.

This interregional learning process was established during 8th PRV in Fundão December 2018 in the review part of meeting. Also, the site visit to the mining sites where the side streams used as source for these innovations strengthened the idea and link for adaptability. Hosting partners shared pre-material, presented projects in the meeting and this input served as basis for group discussions where LP realised the potential for further cooperation and the chance for implementation oriented action. Two mentioned projects are seen as good practices of research-based innovation of circular economy within the REMIX consortium. Due to inspiring discussions in the groups and bi-laterally in PRV and after, Regional Council of Lapland decided suggest an action for stakeholder group in Lapland, mainly the Arctic industry and circular economy cluster with a target to create similar kind of action(s) in Lapland by adapting some of the technical measures of these Portuguese projects in current operational environment of Lapland. Policy instrument of LP is suitable for funding of this kind of activities in case the proposal is fulfilling the general terms of Finnish national ERDF Programme project proposal.

b. There is a strong policy support in Portugal by Fundação para a Ciência e a Tecnologia (FCT) as the Portuguese public agency that supports science, technology and innovation, in all scientific domains, under responsibility of the Ministry for Science, Technology and Higher Education. FCT states following thematic agenda for research and innovation of circular economy:

"A commitment for sustainable management of resources through: i) the sustainable exploitation of critical and / or strategic raw materials for our country (e.g. lithium) for greater self-sufficiency and resilience in face of external constraints; (ii) the recovery of waste and waste water; iii) bio economics promoting the circular, integrated and sustainable use of biological resources; and iv) eco-innovation for the development, demonstration and optimization of more efficient processes and innovative products and technologies."

(Reference: [Presented in REMIX Peer Review, Fundao, December 2018 by President of Board of Administration, Luís Manuel Plácido Martins, Portugal Mineral Resources Cluster](#), "AGENDA TEMÁTICA DE INVESTIGAÇÃO E INOVAÇÃO ECONOMIA CIRCULAR", final version published April 2019, <https://www.fct.pt/agendastematicas/ecocirc.phtml.en>)

C. Based on active dialogue with stakeholder group of Lapland (Arctic Industry and Circular Economy Cluster and KATEPAL network, mining and industry service developers' network) has led to a conclusion that deeper interregional cooperation must target to better services for SMEs operating in circular economy, better utilisation of current projects in the region and skills for circular economy need to be developed in the region. This indicates about need for wider communication for different levels of education including active cooperation with municipalities as they are responsible for business development funding in Lapland. Chamber of Commerce has shown interest to help with communication and up-to-date data collection. Also, stakeholders wish that reconciliation with other industries must be taken into account when discussing about mining and metallurgy. Especially, forestry and other bio-economy and tourism must be taken into account.

3.2. Circular economy activities deriving from REMIX

Relevance for REMIX project is clear because of the link to Research and Innovation Thematic Objective as well as activating the policy instrument of Regional Council of Lapland as mentioned above. Also, stakeholder group has been actively following the project and taking part to Peer Review Visits (PRV) of REMIX as progress reporting states.

The connection of circular economy research and innovation activities was established since 8th PRV in Fundão, Portugal December 2018. In practise this means that hosting partner (PP6) presented previously mentioned research based circular economy projects at the 8th PRV in Fundão December 2018. Apart from comprehensive presentations in the meeting, there was facilitated discussion in groups where the topic was discovered from point of view of Lapland and its potential to learn from it with stakeholders. LP recognised the potential for learning both ways. Lapland has a cluster (Arctic industry and circular economy) which is the national leader in development of industrial circular economy in mining and metallurgy environment. Cluster has successfully utilised ERDF funding (policy instrument) for the framework development and intermediary actions with industry.

On the other hand, extensive experience of PP6 inspired LP to discover the link further and learn more about the innovation activities thriving in the mining environment in Central Portugal. The chemical processes, metallurgy and mineralogy must be left in this case to experts and this requires further exploration during the described action, but this kind of cooperation with industry, intermediary and research organisation is crucial for creating innovation and models for innovation platforms. Lapland targets to utilise the knowledge learnt from Portugal, but also activate the regional stakeholders for development of more tangible cooperation between industry, intermediaries and research in the region. This action serves as test case for further development. Also, experience of framework management, circular economy business models and successful pilots in Lapland can be considered as strong advantage for the action.

After 8th PRV, the communication between LP and PP6 was active during the first months of 2019. Inspiration was strengthened with similar policy approach by FCT in Portugal and strong support by Portugal Mineral Resources Cluster based on the discussion with them in Fundao 2018 and in Ponferrada, Castile and León in April 2019.

3.3. Needs for action, goals and target group

What is the problem action will solve? How is this action prepared? How this action is taking into account learning from REMIX and previous actions in the region of Lapland?

World urgently needs pioneering solutions where growth of the economy and well-being are no longer based on the wasteful use of natural resources. By developing the best solutions for the carbon-neutral circular economy, Finland and Lapland can be among the first to create sustainable well-being and success in a new way during the coming years.

In the circular economy, the use of materials is carefully planned throughout their life cycle and material loss and waste generation are minimised. In the industrial circular economy, the volume of materials is enormous. More than 95 % of the waste generated in Finland is produced in industry, so it is important to promote the utilisation of these streams in particular. The industrial circular economy is accompanied not only by the promotion of environmental issues but also by huge business opportunities. The promotion of the industrial circular economy improves industrial competitiveness and offers business opportunities for new operators. The key is the principle of someone's waste or side stream being someone else's unprocessed raw material for production. Industrial circular-economy products are utilised, among other things, in geotechnical construction, as nutrients, in concrete products, in chemicals production and as energy.

New methods of utilisation are constantly being developed among industry and industrial service companies. In the cluster, the development work is done by SMEs, mid-cap and large enterprises. Pilots, which companies, municipalities, educational establishments and research institutes conduct as part of their operations, are an integral part of industrial side stream utilisation.

This action targets better support mechanisms for industrial circular economy innovation in Lapland. Circular economy implementation needs new innovation and we need to learn from each other in the EU. REMIX has offered a great opportunity for Lapland to learn from other partners, in particular from Portugal to adapt new methods and material solutions to mining and metallurgy value chain.

In return the REMIX partner from Portugal can learn and gain from the expertise of the business development company, such as Digipolis, Kemi and the overall working of the Arctic Industry and Circular Economy Cluster in Lapland. In addition, cooperation with Lapland University of Applied Science as service provider and active developer in SME and industry interface will provide knowledge how to work with companies directly when commercialising new products based on research. Commercialisation of research based innovations is one the EU level challenges in global competition and intermediaries and active business developers between public and private sector have great responsibility and even greater opportunities to boost the growth and investments in the EU. Particularly, in Portugal there is no culture for active intermediary bodies acting in between the academia and industry who would bring together the R&D&I institutions with the companies to develop a mutually beneficial relationships.

What are the goals of the action?

- To create better conditions for new innovation on industrial circular economy (CE) (mining and metallurgy value chain) by learning from REMIX partner NOVA University of Lisbon, Portugal.
- Increase interregional collaboration between Lapland and Central Portugal region
- Help REMIX stakeholders of Lapland to get better access to new ideas for CE innovation mechanisms, pilot actions, and profitable business models
- Offer SMEs in Lapland better access for research and innovation services through intermediaries such as development companies, universities and research institutions.

What is the added value this action is creating for region of Lapland through learning in REMIX project? What will change due to this particular action?

This action offers further development opportunities for circular economy developers in Lapland. Both regions, Lapland and Central region of Portugal (through REMIX partner NOVA University of Lisbon) are active in mining and metallurgy value chain linked industrial circular economy development. Stakeholders have interest to share their knowledge and experiences on technical level. Regional Council of Lapland has committed to help create and sustain the supportive policy framework for circular economy in Lapland. The added value will be better implementation of chosen policy instrument (POLICY LINK) in Lapland and strengthening the link to Lapland Smart Specialisation strategy - Lapland an Arctic and international highflier (S3, updated 2018). In S3 "Arctic circular economy" is described as growth sector in Lapland. Also, the regional development support mechanisms are targeting to increase the local added value in mining and metallurgy industry related circular economy processes.

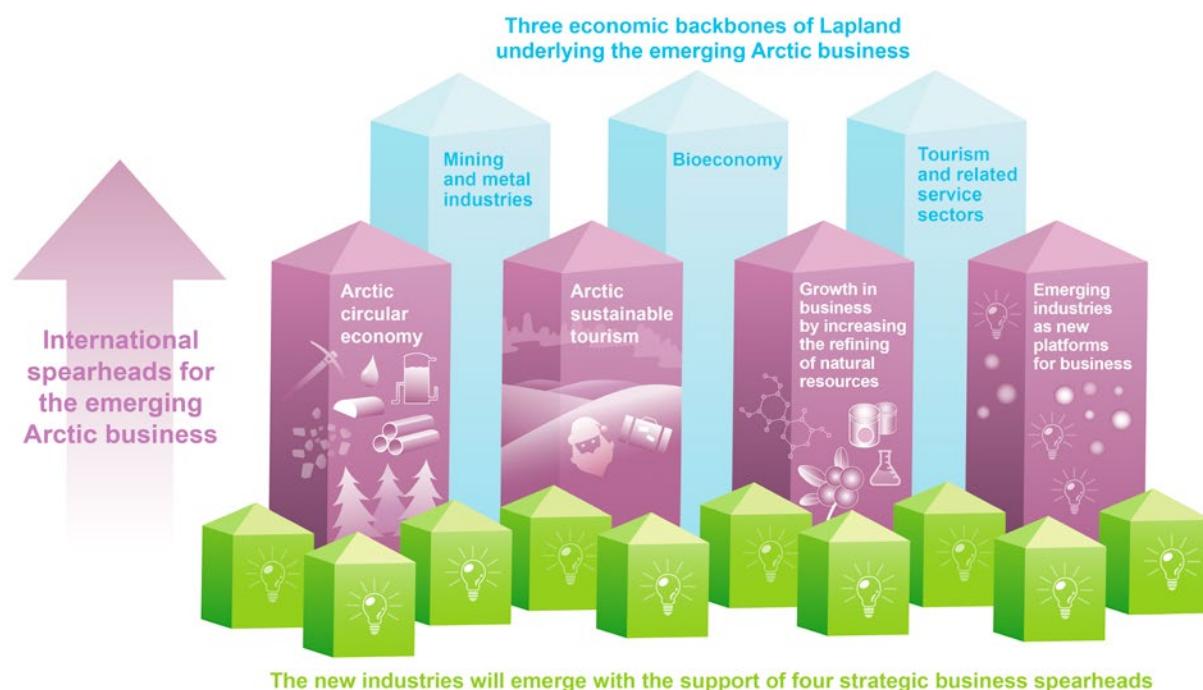


Figure 2: The new emerging industries in Lapland. Source: Lapland, an Arctic and international highflier. The strategic priorities for international and smart specialisation 2018 – 2022.

An example of circular economy-based thinking by utilising industrial side-streams

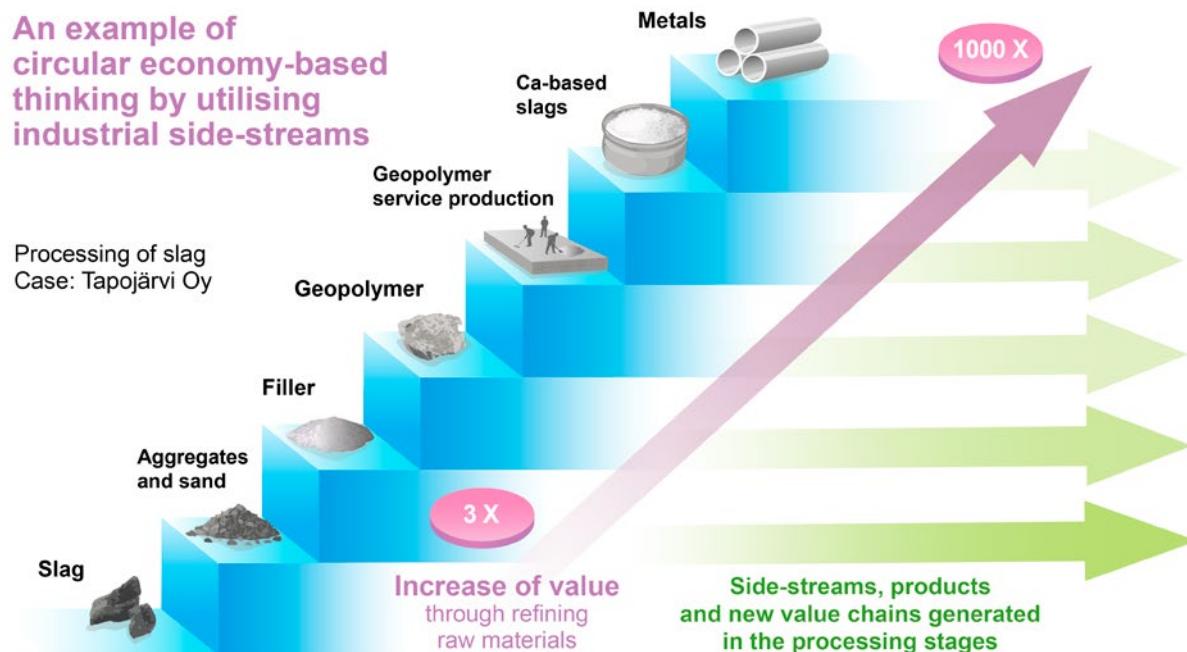


Figure 3: Example for value creation through industrial circular economy innovation in local economy.
Source: Lapland, an Arctic and international highflier. The strategic priorities for international and smart specialisation 2018 – 2022.

What is the target group of this action?

Target group of this action is intermediaries working with circular economy SMEs and innovation development. In Lapland, intermediaries in this regard are Lapland University of Applied Sciences, public development company Kemin Digipolis Ltd. and Geological Survey of Finland. players have been activated and committed during REMIX to this action delivery together with REMIX project partner Regional Council of Lapland. During the action, other intermediaries active in research and innovation activities in the region might be considered as part of target group. SMEs are indirect beneficiary due to national ERDF funding rules. This action may also involve third parties such as external experts in the field of circular economy if the final project proposal for the action will suggest so and if Regional Council of Lapland as funding authority will approve so.

What are the concrete measures taken to reach the set goals?

Concrete measures will include couple of work packages. Draft for work package 1 will include the framework from REMIX interregional learning, mainly focusing on Portuguese cases. There will be further interaction to confirm the current status and update of knowledge since REMIX PRV in December 2018 in Fundão. Also, there will be modelling activities with regional circular economy players for business models and potential pilot cases targeting further investments for circular economy activities

What are the deliverables of this action?

- 1.** Draft for work package 1, the deliverable is research and innovation model for circular economy business models
- 2.** Draft for work package 2, the deliverable is communication toolkit for branding and external communication of circular economy business potential, investment potential and further European interregional cooperation.
- 3.** Draft for work package 3, the deliverable is to manage and coordinate the circular economy activities in the region of Lapland.
- 4.** Draft for work package 4, internal management and communication of the action with stakeholders and partners in the project, in case apply.

In addition to previous content, the action implemented in Lapland will include mapping of needed skills for digitalisation and automation of SMEs in mining and metallurgy value chain in Lapland. These are the skills of future in circular economy. This also includes activities for promoting interest and attracting skilled workforce to Lapland.

3.4. Stakeholders

Regional Council of Lapland, regional managing authority for ERDF and potential funder of action, in case the application is evaluated positive. At the moment there is strong commitment to fund the actions.

Arctic Industry and Circular Economy cluster and Kemin Digipolis. Regional cluster for circular economy. Kemin Digipolis is the hosting organisation for the cluster. It serves industrial and SME clients as Kemi area's public development company. Potential applicant for action implementation. Cluster also offers set of tools and network for further development of circular economy services and business models. Kemin Digipolis has experts working on the field on mining and metallurgy value chains.

Lapland University of Applied Sciences is a key partner for the action. They have active and ongoing circular economy research with industry and SMEs, and they can offer the infrastructure and services for further product development.

Chamber of Commerce in Lapland holds many tools for successful implementation of the action. Can help in communication in the region.

Sodankylä municipality is active in mining and metallurgy development in Lapland and they have experience in cooperation with following actors. There is one active mine and one big mining project in the municipality.

3.5. Timeframe

Timeframe of implementing the planned actions are:

- A.** October 2019 (next call for policy instrument)- Submission of the project proposal (Industrial Circular Economy in Lapland 2.0) by Digipolis, Kemi
- B.** February – March 2020 - Receiving the funding decision from the Regional Council of Lapland
- C.** 1.6.2020-31.5.2023 Implementation of the project if the funding is granted
- D.** During the project implementation reporting is done every 4-6 months.
In the project reports the delivery of the promised qualitative outputs are being monitored as well as indicators such as:
 - a.** How many new business contacts have been made and more specifically how exactly have they been involved in the project
 - b.** How many new innovations has the project been able to advance forward on the TRL scale.

The outcome of the project aims to pave the way for new investments and business models in the field of industrial circular economy. The project strengthens the R&D, knowledge and innovation infrastructure, cooperation and networking. The activities are characterized by energy and material efficiency, utilization of the latest relevant knowledge, and new business development.

3.6. Cost estimate

Indicative costs are depending about the final number of partners of the implementing project. With one partner the budget should be around 400 000 - 500 000 €, two partners 700 000 € and for 3-4 partners from 700 000 € to 1 million €. Funding rate for ERDF is varying between 70-80 %.

Funding is planned through the policy instrument of Regional Council of Lapland: Sustainable growth and jobs 2014-2020. Finland's structural funds programme, Priority axis 2: Producing and using the latest knowledge and skills (ERDF) Specific objective 4.1: Developing research, competence and innovation clusters that draw from regional strengths.

This action depends entirely of final funding decision of Regional Council of Lapland as funding authority and potential action plan proposal should fulfil the eligibility criteria of funding of the ERDF Programme as any other project proposal for the policy instrument.



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Regional Council of Lapland as the Lead Partner REMIX Interreg Europe Project is committed to delivering and monitoring this action plan.

Date: 28 / 6. 2019

Signature:

Päivi Ekdahl, Development Director
Regional Council of Lapland