

LAPLAND
Above Ordinary

ARCTIC
Smartness

EXCELLENT NEWS

SUCCESS STORIES
OF THE LAPLAND'S
SMART SPECIALISATION

ARCTIC
INDUSTRY
AND CIRCULAR
ECONOMY

CLUSTER



ARCTIC
SMART RURAL
COMMUNITY

CLUSTER



ARCTIC
DEVELOPMENT
ENVIRONMENTS

CLUSTER



ARCTIC
DESIGN

CLUSTER



ARCTIC
SAFETY

CLUSTER



Lapland is by its nature the international region

Arcticness is a natural part of everyday life in Lapland. Lappish people have adapted themselves and their activities to their environment and surrounding nature with a goal to become high level experts in Finland and in EU on sustainable development of the northernmost regions.

ARCTIC SMARTNESS EXCELLENT NEWS

Success Stories
of the Lapland's
Smart Specialisation

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Arctic is one of the cleanest and best-preserved places on earth but facing yet many dynamic and complex changes. Worldwide interest towards Arctic natural resources and impact of climate change place Arctic countries and areas to a new position. Balancing with sustainable development sets new challenges for the Arctic.

In addition to challenges, global changes bring great potential. Lapland, as the northernmost region of Finland and European Union, is in the middle of these universal changes and opportunities. Sustainable development is the foundation of growth in Lapland. Looking for the balance in the utilisation of natural resources leads continuous economic and social benefits for current generations and ones to come.

Taking our own place in global operational environment is the foundation for growth in Lapland. It creates an opportunity for internationalisation now and in the future. Lapland must be an internationally recognised region which relies on strong arctic business and competence. Smart and arctic knowledge, sustainable utilisation of natural resources and strong communities are the evolving competitive advantages of Lapland.

Strengthening the international cooperation

"In Lapland, we see international cooperation as a serious business", says Development Director, Päivi Ekdahl from the Regional Council of Lapland. In addition to internationalisation, Lapland is emphasising regional ecosystem approach to deepen the understanding of current overall picture and potential of cross-sectoral cooperation. The foundation for innovation and development of practical solutions towards international market is created by this way.

The objective of international cooperation is to increase produced added value for everyday life in Lapland and support the regional growth. Smart solutions have to be created and means of harnessing the regional competence for sustainable development and growth need to be put in to use in Lapland.

Be active and take your role!

The most important themes for Lapland are the sustainable utilisation of natural resources and conditions and increasing value of resources by refining. The driver industries of natural resources are built on mining and minerals, forestry and rapidly growing nature-based tourism. With the lead of these key industries there is diverse industrial and support service, natural product and food processing business in Lapland, which creates international business and vitality for the whole region.

"By only taking part, carrying out our own responsibilities and leading the development ourselves we can make difference."

– Kristiina Jokelainen, Director of International relations and S3 implementation, Regional Council of Lapland

Lapland doesn't want to be just a mere onlooker when it comes to the arctic development. By being an active player in the international network, the regions can truly have an influence on the crucial matters. One good example of this is the generation of European mining regions network, where Lapland has been the driving force with regional stakeholders. In Lapland, resource efficiency and smart utilisation of raw materials in addition to increasing self-sufficiency are targets that are creating competitive advantage for industries in Finland and European Union. Mining and metallurgy have an

important role when pursuing these targets, which has led to systematic development of industrial circular economy activities in Lapland.

During 2013 Lapland started an active communication with European commission and other international stakeholders. As a result, and most developed example, The Regional Council of Lapland took a leading position on initiative of building a network of mining regions in the EU and invited other interested regions and partners on board. The network was launched together with European commission DG GROW unit of Raw Materials and Resource Efficiency. Process was supported by East & North Finland EU Office, ERRIN (European Regions Research and Innovation Network) and European Committee of the Regions. Most crucial success factor in cooperation was strategic partnership with Spanish region of Castile and León.

That has led to several other inter-regional initiatives and European projects on many fields.

Based on mining regions network, Regional Council of Lapland is coordinating REMIX¹ Interreg Europe project, which includes nine other regions. In addition to REMIX, also the MIREU² project with more than 30 partners was started and it is led by Geological Survey of Finland. These projects are developing together the inter-regional cooperation in the EU. Both projects are marked as strategic by European Commission and they support the new industrial policy framework. On the side

of these two projects, there are several others regional, national and Horizon 2020 projects, which are supporting the mining regions network. Cooperation is actively widening to global scene under coordination of OECD.

"By only taking part, carrying out our own responsibilities and leading the development ourselves we can make difference. The mining regions cooperation stands as a great example about this", says Director of International Relations Kristiina Jokelainen from Regional Council of Lapland.

"As the next initiative among others, we want to strengthen the refining of natural products and food processing in Lapland. Also, growing tourism will be in the core of development of international activities, Jokelainen adds.

1. Smart and Green Mining Regions of EU, Interreg Europe, www.interregeurope.eu/remix/
2. Mining and Metallurgy Regions of EU, H2020, mireu.eu

FACTS OF LAPLAND

- The northernmost region of Finland and the European Union
- Border with Russia, Norway and Sweden
- Capital city, Rovaniemi, the Official Hometown of Santa Claus
- Mining and metallurgy around 5000 M€
- The only chromite mine in the EU
- The biggest gold mine in the EU
- Total area 100 366 km², of which 7 699 km² is water
- 180 200 inhabitants (2016), density 1,8 people/km², a bit more reindeer than people.
- World's cleanest air and Europe's purest water
- World's largest organic harvesting area
- Forestry, manufacturing of wood and paper & paper products 1300 M€, 98% of total land area is forest
- Annual increment of forest growing stock 13,3 Mm³
- Sustainable harvesting limit 7,2 Mm³
- Total annual loss 6,1 Mm³, including harvesting 4,6 Mm³
- Employment: municipal sector 30%, state and state-owned companies 10% and private sector 49% in total 68 610 jobs
- Number of companies 9 094
- Total turnover of companies 12 000 M€
- Total tourism demand in Lapland is more than 1000 M€
- 2,7 million registered overnight stays in Lapland
- Annual growth rate ~20%
- 4th strongest export region in Finland
- Lapland region has the fastest growing economy in Finland
- 3800 M€ Industry export revenues (7% of the national export)
- World's northernmost hub of bio-, mining-, metal industry and services
- Agrofood production 300 M€
- 4 429 Reindeer owners
- Annual revenue ~39 M€, doubled in last 10 years



LET'S SEIZE THE OPPORTUNITY AND GET BUSY!



LAPLAND IS seeking to become more competitive and innovative sparsely populated region. By now, the region has gained visibility and a firm foothold in many international forums.

LAPLAND HAS got off to an excellent start: with joint effort of the regional stakeholders, Lapland has become a wanted and an acknowledged actor in the EU. At the same time, new businesses have been established throughout the region. The goal is to support the competitiveness and growth of business clusters that are genuinely market-based and strive to be international.

ECOSYSTEM BASED approach to cooperation provides new operating models for business life in Lapland and they strengthen, for example, our public and private funding opportunities. Now is the time to seize the opportunity and get busy.

Mika Riipi
County Governor

Foundation of smart specialisation in Lapland

Lapland was one of the first regions in Finland adapting smart specialisation (S3). The systematic approach and strong strategic focus has led to recognition by the European Commission in good practice of governance. The vision of Lapland's smart specialisation is to enjoy a leading position in sustainable utilisation and commercialisation of Arctic natural resources and conditions.

Lapland is the northernmost region of EU where unique nature consists of abundant natural resources which naturally creates strong accumulation of northern expertise. This global hotspot of the Arctic has high standards for infrastructure and outstanding knowledge of sustainable utilisation of resources and circumstances. Lapland is a melting pot of industries and it is one of Finland's fastest growing regions with its backbones in forestry, mining, metallurgy and tourism. Specific characteristics of the businesses are the existence of multinational corporations, few medium size businesses and a huge number of small and micro companies.

From the beginning, S3 has been a very practical concept in Lapland, bringing new insights into regional development.

Despite the remarkable large-scale industrial development, Lapland is actively fostering its clean nature and supporting the small-scale refining industry, which is providing solid income throughout the region. Innovations in fields like tourism safety, locally produced food, decentralised renewable energy or wood construction are great platforms for long term inter-regional cooperation and specialisation.

Successful examples of the public support are the investments in tourism during the past few decades. They have only comprised a few percentages of total investments but targeting them to right spots has had a strong impact.

Seeking after Arctic Smartness
"When we started our work in smart specialisation one core objective was to become an internationally recognised region on innovation. To achieve this goal we had to have our own playing field and regional cooperation in good form first to attract regional actors to get involved", explains Kristiina Jokelainen the Director of International Cooperation at Regional Council of Lapland. The role of the Regional Council is to establish the framework for the operational environment and invite the stakeholder along.

From the beginning, S3 has been a very practical concept in Lapland, bringing new insights into regional development. S3 approach has been used in Lapland not only, as a tool to become an attractive and knowledgeable partner in the EU, but also to implement more efficient regional development having direct impact on growth. By applying S3 in Lapland, partners have found new ways of working together.

It has encouraged them to seek new possibilities from the cross-sectoral collaboration, to develop common approaches towards regional development and to be active in international collaboration. Implementing smart specialisation into practise, Lapland has developed a systematic regional development approach based on Arctic Smartness brand and cooperation.

The vision of Arctic Smartness is that Lapland is being recognised as a most innovative sparsely populated region in the EU by 2022. Arctic Smartness is reaching towards its vision by focusing on regional clusters and ecosystem thinking. These clusters support the co-creation and development of the new regional value chains that generate growth and innovation activities of SMEs. The implementation of the Lapland S3 focuses on bringing in the cross-cutting intervention, which will stimulate the finding of new interfaces where cross-fertilisation appears. This way, the innovations based on Arctic creativity will be born. With the modern clusters of Arctic industry and circular economy, Arctic smart rural communities, Arctic design, Arctic safety and Arctic development environments, Lapland is looking beyond the organisation boundaries and over the national borders.

Pillar Industries of the Regional Economy



The industrial spearheads for smart specialisation

Lapland is looking for the functional spearheads that support the regional development by diversely strengthening and sustaining the existing basic industries and also initiating the new industries. Education, research and development are better integrated in refining new products and services through the smart specialisation approach.

Play the game, throw the dice – become regionally wise!

RULES

1. Start the game in the middle of the board.
2. Throw the dice and move as shown by the score of the dice.
3. You gain tools for developing your business from each visit to a cluster.
4. If you land in a special circle, follow the instructions it gives.
5. The game ends when the developed player has contacted at least three clusters and returned to the middle with an even number.

Arctic Smartness

Arctic Smartness with its five modern clusters, of Arctic Industry and Circular Economy, Arctic Smart Rural Communities, Arctic Development Environments, Arctic Design and Arctic Safety, are looking beyond conventional operational boundaries, endorse cross-fertilisation, make the best use of the regional expertise and actively network over the borders.

Arctic Safety

Safety through regional and interregional cooperation. The aim of the Arctic safety cluster is to strengthen inter-regional networks and safety business opportunities. The cluster brings together companies, authorities, research and educational organisations, NGOs, regions and towns. The cooperation is carried out in civil and tourism safety.

Arctic Industry and Circular Economy

Arctic Industry and Circular Economy cluster aims to develop its leading position in exploiting and commercialising Arctic natural resources and conditions while maintaining balance of sustainable development. Mix of industrial expertise and commitment to sustainable development are at the core of refining natural resources in the Lapland region. We are reaching the vision by promoting regional clusters and ecosystems of emerging industries that focus on refining natural resources throughout the value chains.

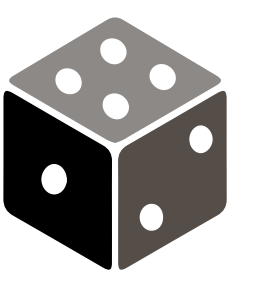
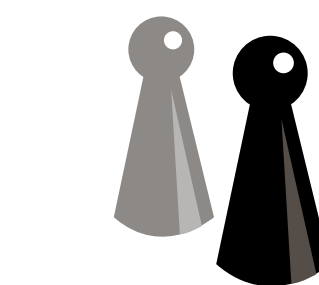


Arctic Smart Rural Communities

Base for our business is nature. The mission of Arctic Smart Rural Community is to avoid capital outflow from rural Lapland and create new innovative enterprises based on circular economy. The cleanest corner of Europe offers a surplus of raw-materials to wide-range smart resource-intensive business. Our goal is to transfer the added value of local natural resources for a benefit of the communities.

Arctic Development Environments

Arctic Development Environments cluster is serving as a supporting network to all clusters with i.e. enabling technologies to all industries and especially SMEs. The tool for measuring the performance and effectiveness of innovations is Technology readiness level (TRL). TRL is used as a meter to indicate the level of cluster's readiness to produce development services to the market.



Learn more about Arctic Smartness online: arctic-smartness.eu

Milestones in Arctic Smartness cooperation



Photo: Lapin materiaalipankki | Antti Pietikäinen

The Arctic Smartness cluster cooperation in Lapland has increased the visibility of the expertise and experts of Lapland and raised new opportunities to bring developed products and services to the market.

The cooperation between businesses, research and educational institutes, the public sector and financiers is at the core of cluster activities. The work has brought euros and visibility to regional development and research. Over the past years, the Arctic Smartness Clusters have developed tremendously. New objectives have been set with a stronger emphasis on the region's emerging lines of business and needs of the business. The steadily progressing locomotive is driven by the new innovative fields, in addition to the growth of the traditional industry and tourism. Success stories have emerged especially in the field of internationalisation of regional development but also among the new businesses that have become active cluster actors.

The Arctic Smartness cooperation is guiding the clusters and implementing the smart specialisation in Lapland. The excellent cluster work has brought added resources and success to each partner. The Natural Resources Institute Finland (Luke), for example, has clearly reinforced its regional status and launched several new research and development projects with the help of both local and international funding. Other research and development organisations, such as the Geological Survey of Finland (GTK), University of Lapland, Regional Council of Lapland and Lapland University of Applied Sciences, have also been successful due to regional cooperation, for example, in the funding application processes of the European Union's spearhead programme, Horizon 2020.

The Arctic Smartness clusters in action

The success of the **Arctic Industry and Circular Economy Cluster** can be measured through the development of business-oriented activities. Cooperation between businesses has become clearer and stronger with the help of pilot experiments, exports promotion and the introduction of the new sustainability

“The Arctic Smartness cooperation is guiding the clusters and implementing the smart specialisation in Lapland. The excellent cluster work has brought added resources and success to each partner.”

assessment tool. Under the lead of Digipolis, both regional and national results have materialised. The Finnish Innovation Fund Sitra is strongly supporting and financing the development of Lapland's circular economy together with the Lapland University of Applied Sciences. The interest of the region's businesses in circular economy and sustainable industrial symbioses has increased because the ideas are starting to show in euros, both in income and savings.

The **Arctic Smart Rural Community Cluster** has been especially successful in the development of business operations of the local food producers and in the activation of the bioenergy producers. The national REKO-model supporting direct sales from producers to consumers has been implemented as a systematic

business development tool in the cluster's food sector. Over 40 producers are already involved in the operations and the producers share a common will to grow as companies and to offer high-quality food products to the region and for export. In addition, the programme for decentralised, renewable energy implemented together with the regional actors and entrepreneurs has been published.

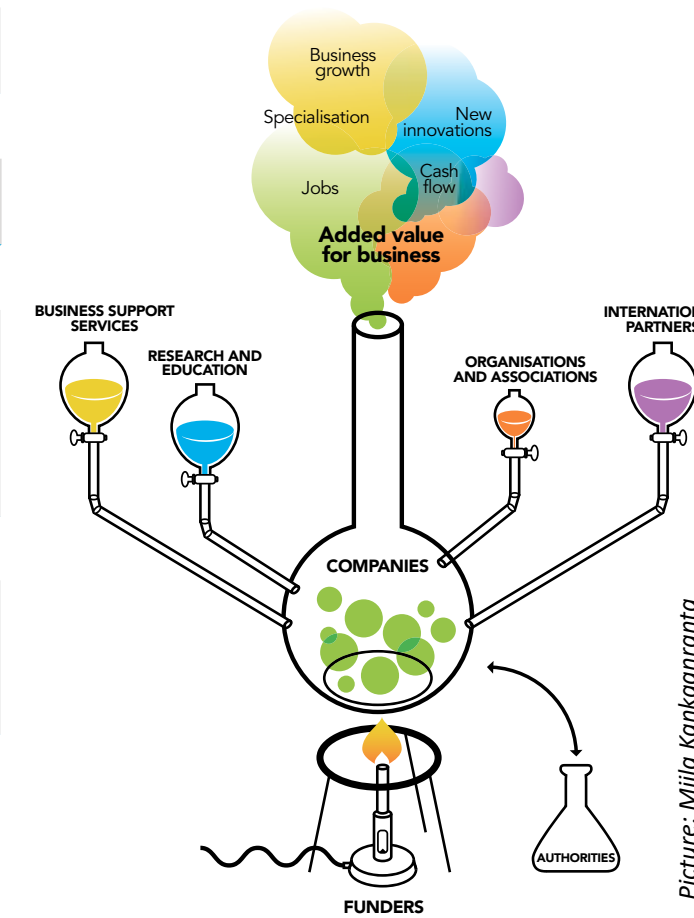
The cluster aims to increase small-scale, local and sustainable energy production in the coming years. Together with the Arctic Bioeconomy project of the Regional Council of Lapland, the cluster has gained wide-ranging visibility within the region, country and European Union.

The **Arctic Development Environments and Arctic Design Clusters** have joint forces in part and together promote product development and innovation services targeted at businesses. In order to safeguard international business financing in the clusters, a product or service to be developed must be correctly set up according to the level of technology readiness (TRL). The clusters for design and development environments are currently developing the required set of indicators in accordance with the European framework for TRL. In addition, Arctic Design has accumulated once again significant business financing for the development of design services under the lead of the University of Lapland.

The **Arctic Safety Cluster** has gained visibility especially as the party putting together a partnership (Smart Specialisation Industrial Modernisation) that promote

How does the cluster work?

1. The cluster assembles businesses of an area that want to grow and develop in cooperation.
2. Public and private financiers support the growth and development of the cluster.
3. Development companies, regional development organisations and other business support services help the cluster businesses, for example, in the field of supervision of interests and business expertise.
4. For the cluster businesses, cooperation with educational and research organisations enables the long-term development of research and innovation activities.
5. Third sector actors support the cluster in communications and its goals.
6. The cluster imports and exports the most recent international information to and from the area.
7. The cluster operates in close cooperation with the authorities transmitting messages from the businesses.



Picture: Miila Kankaanranta

8. The network cooperation generates new innovation. Regional specialisation results in the businesses discovering new market areas and fortifying their business operations.
- Specialisation based on the region's competence strengthens supports business life especially in the long-term. The new jobs generated bring more residents to Lapland. Well-being increases sustainably.

the safety and digitalisation for tourism and as an active leader with the support of the Regional Council of Lapland together with the region of Andalusia. The partnership launched on the World Tourism Day in September 2017 is the cluster's spearhead initiative, which will help Lapland-based businesses to get involved in the international network in order to develop more sustainable and safer tourism.

Lapland is also actively involved in the partnerships between the smart specialisation areas and the lead has been assigned to Lapland in three partnerships: tourism, bioenergy and sports. The bioenergy partnership is led by Lapland and Castile and León in Spain and the sports partnership, with the solid support of the Regional Council of Lapland, by Lapland University of Applied Sciences and Southern Netherlands.

Promoting cluster cooperation in business

Successes of Lapland include new research, development and innovation projects. These projects have been created in cooperation between the regional development actors and the solid trust that has been formatted. The network of Lapland's regional developers has become even tighter and faith in doing things together has been fortified. This has also resulted in the gradual activation of the business sector. The greatest challenge, however, remains: how to make the development work visible in the turnover and result of local SMEs in the long run? Concrete results are the only effective way to get businesses genuinely involved in the cluster activities. Before all, businesses seek visible competitive edge from cluster cooperation. Mutual competition of businesses may

also be a challenge for cooperation. When the joint goals of businesses are genuinely taken into account from the very beginning, the cooperation of the businesses can be supported in the clusters while observing their competitive situations.

"Regional Council of Lapland remains grateful for the regional partners and experts involved in cluster development and Arctic Smartness cooperation", says Mika Riipi, County Governor of Lapland. According to him the dedication and hard work for the mutual goals has led to tangible results. Supportive and helpful attitude of dozens of people in Lapland has enabled more powerful development to build on. "We believe, that even greater results will be achieved together in the future", concludes Riipi.

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– Mika Riipi, County Governor of Lapland

CLUSTER MANAGEMENT EXCELLENCE

IN 2016, the five clusters of Lapland received the Bronze Label of the European Secretariat for Cluster Analysis. In 2017, two of the clusters secured the Silver Label. Already now, the cluster is seen as an ideal model in the field of rural development against global challenges.

Further information about the European Secretariat for Cluster Analysis: www.cluster-analysis.org



ARCTIC INDUSTRY AND CIRCULAR ECONOMY CLUSTER

SILVER Cluster Management Excellence DEDICATED TO CLUSTER EXCELLENCE

Arctic Industry and Circular Economy Cluster

Photo: Lapin materiaalipankki | Stora Enso

There has been an active and systematic development process for more sustainable industry and circular economy in Lapland for years. Leading player, the Arctic Industry and Circular Economy Cluster, is the key cluster for the industrial development of Lapland.

Arctic Industry and Circular Economy Cluster connects process- and mining industry companies, SMEs serving industry, universities, research institutions, funding and regional authorities to a same co-operation network. Common goal for Lapland is to be a front-runner in sustainable utilization of natural resources and sustainable industry and circular economy activities. The work in progress for sustainable industrial refining has been notified on national, Nordic and EU levels. Systematic cluster development started in 2014, when Lapland was chosen as one of the model regions of European cluster initiative with six other regions. Lapland has been able to innovatively benefit from natural strengths of the region for cluster development. Selection for showcase, has led to strong, still ongoing, cooperation with European Secretariat of Cluster Analysis (ESCA).



“The example of Lapland’s Arctic Industry and Circular Economy Cluster is a very good one of how smart specialisation strategies are translated through clusters and cluster organisations into concrete business and R&D activities that promote economic development in a region.”

– Thomas Lämmer-Gamp, Director, European Secretariat of Cluster Analysis (ESCA)

With the establishment of this cluster hosted by the regionally operating development agency Digipolis Oy, the Region of Lapland has taken a very important step in contributing to the development and strengthening of the circular economy related activities. “A benchmarking of the cluster and its cluster organisation conducted by ESCA in April 2016 revealed that the cluster is active and partly more active than clusters in similar areas, although the cluster organisation is rather young”, says Thomas Lämmer-Gamp from ESCA.

them throughout Finland. One of the key initiatives of the road map is Kemi-Tornio circular economy innovation platform, where the idea is to create tools for companies through open, cross-sectoral and network based co-operation to improve the utilisation of industrial production and society based side streams. In June 2017 Sitra decided to establish a national Bio and Circular Economy Centre in Kemi. Centre is natural cause for ambitious and determined work in the region. Bio and Circular Economy Centre gathers together the experts, who response to business initiated circular economy challenges based on network model built during past years.

ESCA Silver label audit for cluster conducted together with Lämmer-Gamp in September 2017 confirmed the strong dynamism of the cluster. The strategy of the cluster is yet very much geared towards business development, which is not typical for a comparable cluster in this area. However, in Lapland’s case, the strategy makes sense as there are only a few academic players, but several interesting companies on which such a development can be built on. “Cluster’s strong strategic orientations such as matchmaking, exchange of experience among participants and networking with

external partners contribute to the easing of other regional weaknesses such as a lack of cooperation, in particular among innovative SMEs”, Lämmer-Gamp explained. “After joining the cluster, we have been able to connect better with decision makers and make an influence in the operational environment”, says Mika Alasuutari, Managing Director of the company Palsatech. According to Alasuutari, an entrepreneur’s perspective on the development is usually very practical. Through that perspective, they can bring new views to the cluster work. “We think that this kind of networking activities are very important part of business and development of operational environment”, says Alasuutari.

The strategic decision, to focus on business development to trigger the development of the cluster, makes perfect sense to Arctic Industry and Circular Economy Cluster. “This provides the opportunity of picking the low hanging fruits in order to convince in particular businesses about the potential of the circular economy”, says Lämmer-Gamp.

The cluster organisation supports development by parallel actions under the “Arctic Business Concept”, a three year programme funded by the Regional Council of Lapland and the national government

through the European Regional Development Fund. The Arctic Business Concept is based on a well-developed strategy that aims to encourage business-to-business cooperation and to promote innovation activities in the local industry. Both strategic aims are accompanied by measures to integrate the business and innovation activities on European and international levels. Regular business delegations to other European locations of the circular economy industry and the involvement in different R&D and innovation projects contribute to these objectives.

“The example of Lapland’s Arctic Industry and Circular Economy Cluster is a very good one of how smart specialisation strategies are translated through clusters and cluster organisations into concrete business and R&D activities that promote economic development in a region”, adds Lämmer-Gamp.

Based partly on interview of Thomas Lämmer-Gamp, Director at European Secretariat for Cluster Analysis.

FURTHER INFORMATION
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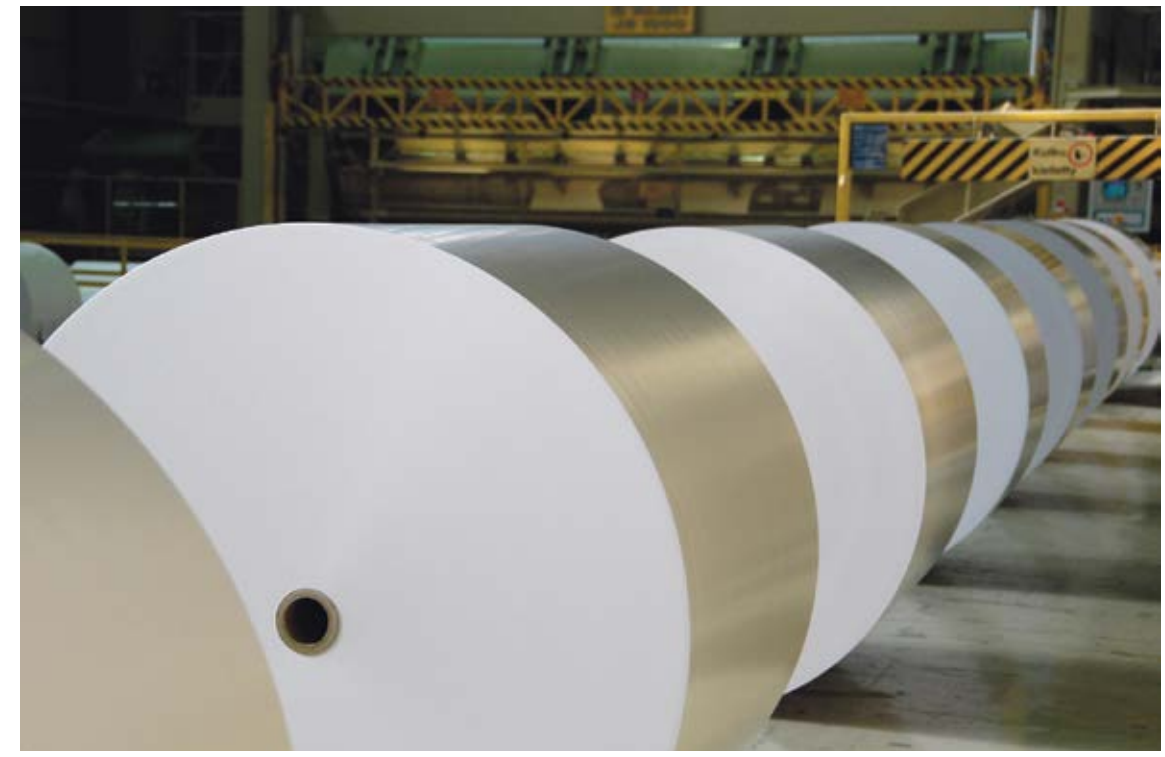


Photo: Lapin materiaalipankki | VisitSeaLapland

Active partnerships in the Horizon 2020 projects

Horizon 2020 is the biggest European Union Research and Innovation programme ever, organised over the years 2014 to 2020. Its goal is to ensure EU produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together. Arctic Industry and Circular Economy Cluster partners, Geological Survey of Finland (GTK) and Natural Resources Institute Finland (Luke) have formed successful partnerships under the Horizon 2020 programme.

“The two-year experience with the Arctic Smartness society has thoroughly changed my work and also my attitude towards the regional cooperation and internationalisation.”

– Dr. Kari Mäkitalo, Senior Scientist, Natural Resources Institute Finland (Luke), Rovaniemi

The Geological Survey of Finland (GTK) is an active partner in the Arctic Industry and Circular Economy Cluster especially in terms of the mining industry sub-cluster. In the Horizon 2020 call for projects in 2017, the cluster cooperation resulted in two new projects that will be implemented in 2017–2020. The “Mining and Metallurgy Regions of EU” (MIREU) project will produce a European network of

regions with economic interest in mineral raw material production. In addition to GTK as the MIREU coordinator, the Regional Council of Lapland and the University of Lapland are included in the consortium as core project partners. GTK also participates in the other Horizon 2020 project “Minland”, which concentrates on land-use issues associated with mining industry.

With the support and contacts provided by the Arctic Smartness clusters, another active arctic industry partner Natural Resources Institute Finland (Luke) achieved partnership in a

Horizon 2020 project ROSEWOOD (European Network of Regions on Sustainable Wood Mobilization) in 2017 – the first one for the institute in Finnish Lapland. “The two-year experience with the Arctic Smartness society has thoroughly changed my work and also my attitude towards regional cooperation and internationalisation”, says Dr. Kari Mäkitalo, Senior Scientist from Natural Resources Institute Finland.

All these European partnership projects will benefit from the strong and ongoing Arctic Smartness cooperation in Lapland.

Education in Arctic Industry and Circular Economy Cluster

BACHELOR AND MASTER DEGREE LEVEL OF EDUCATION IN TWO COURSES. The aim for these courses is to work in an authentic customer client project-environment concerning the case of industrial side streams. Student gets acquainted with production technology RDI case study given by a customer company. Research problems of clients were solved by the project groups of students using the development environments of Lapland University of Applied Sciences. A major part of learning process is to operate with the standard specifications of RDI unit in the area of project management and communication with the customer company. Study module were and will be carried out in real life case.

OTHER EUROPEAN ACTIVITIES IN THE CLUSTER

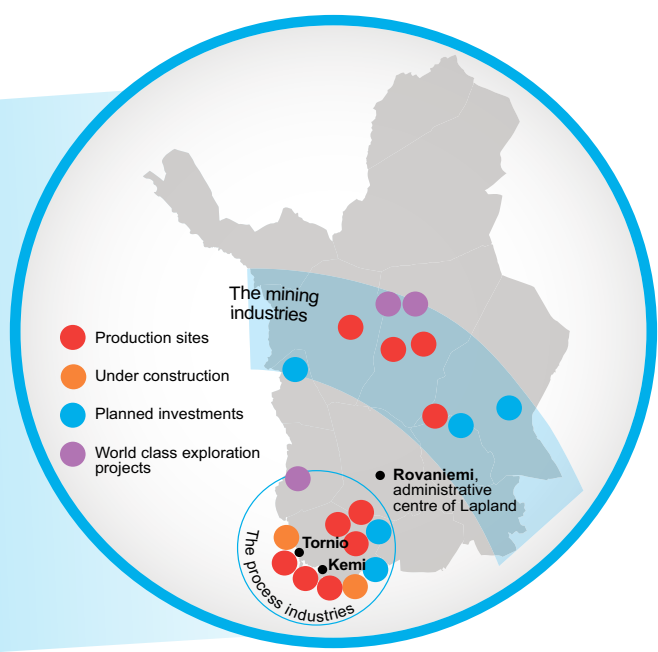
MSP- REFRAM (4 workshops 2015-2016) MSP-REFRAM (Multi-Stakeholder Platform for a Secure Supply of Refractory Metals in Europe) is now available. The project’s main aim has been to address these challenges by creating a common multi-stakeholder platform that will draw the current value chain of refractory metals value chains and identify its innovation potential to support the implementation of the EIP on Raw Materials.

SCREEN (1 workshop 2017, to be continued) SCREEN (Solutions for Critical Raw Materials – a European Expert Network) project aims to create a long-lasting Expert Network on Critical Raw Materials issues. The activities of the project are focused on the three pillars of critical raw materials: primary resources, secondary resources (recycling and recovery issues) and best alternatives for substitution of materials/processes.

CLUSTER IN A NUTSHELL

ECOSYSTEM OF THE ARCTIC INDUSTRY

- Ecosystem of the Arctic Industry is an operational environment and unique innovation platform.
- The process industry, which is largely concentrated in the Kemi-Tornio region, actively searches for new, eco-innovative ways to modernise its processes.
- Management of by-product processes of industries and process optimisation in the Kemi-Tornio region is a prioritised issue.
- The annual volume of by-products and residues of Kemi-Tornio large scale industries amounts to 1,7 million tonnes.
- Rovaniemi is the administrative centre of Lapland and an important regional centre of public governance for mining in Finland.
- Mining industry is active throughout Lapland.
- With the long traditions in Lapland the coexistence between industries using natural resources has been amicable.



ARCTIC SMART RURAL COMMUNITY CLUSTER

SILVER Cluster Management Excellence
DEDICATED TO CLUSTER EXCELLENCE

Big visions of rural Lapland – still down to Earth

The current state of rural areas might seem depressing when viewed from Lapland, but in Europe Lapland is considered a treasure trove. The preconditions of rural life are dependent on the developing business activities. We live in the midst of nature's own treasure trove.

Photo: Lapin materiaalipankki | Antti Pietikäinen

If we combine the expertise of those operating in different sectors in Lapland, we will have the knowledge and skills to develop the products and services that are already high in quality into world-class success stories. We just need to dismiss our notions of a dying countryside and trace a new smartly specialised, living rural Lapland of opportunities.

Arctic Smart Rural Community Cluster, i.e. Rural Cluster, aims to demonstrate to people by its actions the business potential of the rural area and to prevent the outflow of rural capital. One concrete example of the impacts of fleeing capital on the regional economy can be seen in Figure 1. Even if rural Lapland has enormous natural resources, we are not utilising them efficiently and sustainably enough at the moment. Rural Lapland is by no means a remote corner of the world, but is situated amidst incredible sources of raw material, which guarantee almost

infinite uses by utilising the principles of circular economy. At the moment, however, villages in Lapland purchase energy and food from outside Lapland with millions of euros annually. According to our studies, nearly 50% of the villages' purchasing power is spent on energy and food. All these euros are fleeing the area, Lapland and even Finland, even though a major portion of energy and food could be produced locally in a sustainable and profitable manner. Luckily, we can have an impact on this by adjusting our way of thinking and operating. This way, we can keep the euros in the area to bring benefit to all residents of the area in the form of picking up of regional economy.

The objective of the Rural Cluster is to cut off the outflow of capital of rural Lapland by creating completely new business operations in the fields of food products and decentralised energy production alongside the traditional entrepreneur

ship activities. The operations of the Rural Cluster aim to improve the local growth of the value added of the rural raw materials in order to maintain an increasing amount of capital with the owners of raw materials.

“When we manage to put an end to the fleeing of capital and turning the trend to the opposite direction, the benefits will multiply within the area.”

All operations of the cluster are focused on the development of the selected business sectors. An operating method has been created for the cluster wherein the aim is to find solutions for the existing problems of entrepreneurs and to introduce new entrepreneurs to the sector. The tool for this is the knowledge development, which covers training, research and the counselling needed by entrepreneurs. We constantly need new research data and new able hands in order to make entrepreneurship profitable in Lapland. The regional development tools serve as resources for the development of business operations and knowledge. With the help of different projects, for example, we can tackle the challenges faced by the development of entrepreneurs and knowledge, distribute information efficiently and influence our decision-makers. The operations of the different sub-areas of the Rural Cluster result in a business-driven cluster that is able to identify the bottlenecks in the business life development and resolve them with the help of an extensive cooperation network and, finally, stop the outflow of capital plaguing the rural areas as a joint effort.

When we manage to put an end to the fleeing of capital and turning the trend to the opposite direction, the benefits will multiply within the area. The new entrepreneurship generated in the region will help in generating economic growth and capital will remain in the area. As capital remains in the region, new jobs are created, which in turn generates well-being for the people. Due to the employment opportunities and rich nature, rural Lapland is seen as an attractive place to live in, which, for one, attracts especially young returning migrants and new residents to Lapland. We need young, innovative entrepreneurs to vitalise the local business life, among other things, in the form of new kinds of businesses. This will generate a positive cycle with a huge impact on the future of all of rural Lapland.

Join us in generating a positive cycle by doing things together! The Arctic Smart Rural Community Cluster, i.e. Rural Cluster, is constantly working with might and main for the vitality of rural Lapland. We all carry responsibility for the future Lapland, so all hands are needed on deck in the activities of the Rural Cluster – let's do it together.

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Procurement impacts on regional economy

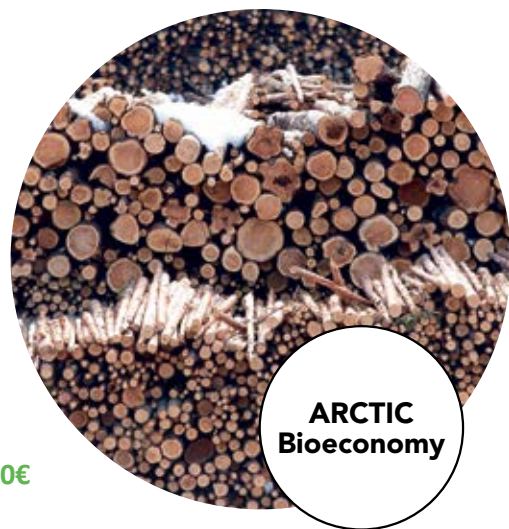
Example: procurement impact on regional economy in one region

In a tender for energy wood a Russian vendor was chosen

"Savings" were estimated 9 000€ per year

Losses: 6-9 jobs, 312 000€ in taxes and 210 000€ in harvest subsidies.

= Overall losses to the regional economy approximately 648 000€ per year



ARCTIC Bioeconomy

Figure 1. Regional economic impacts of procurement.

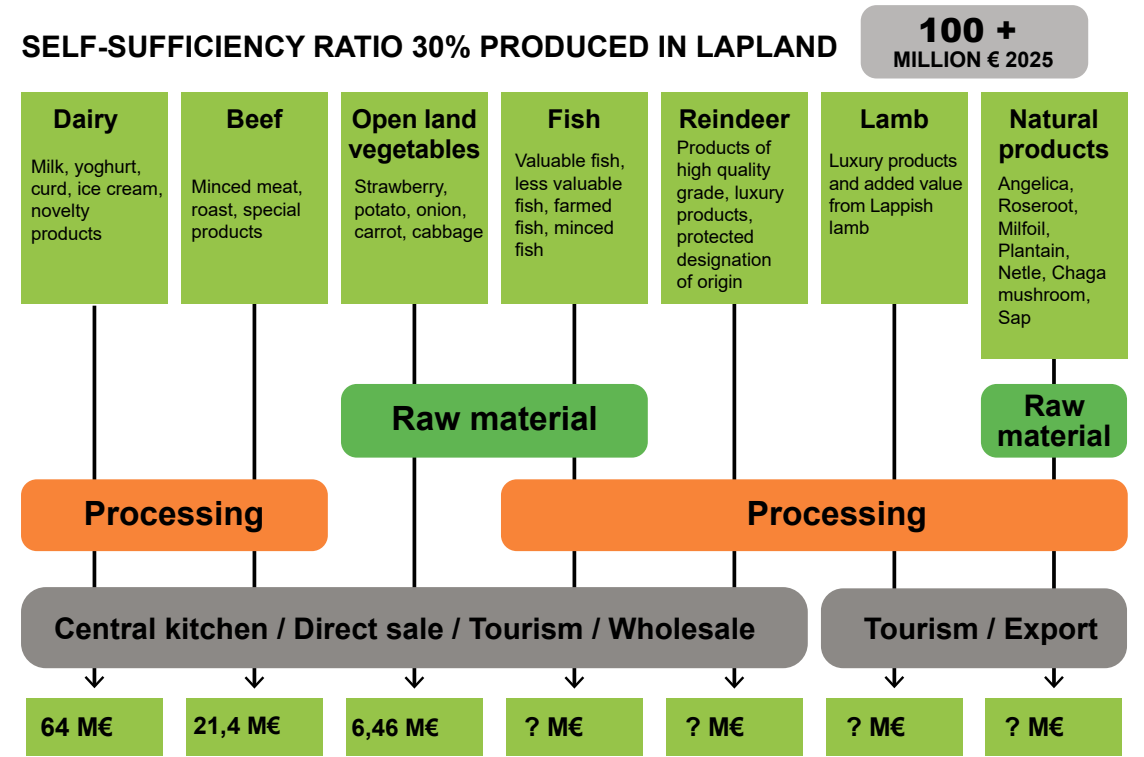
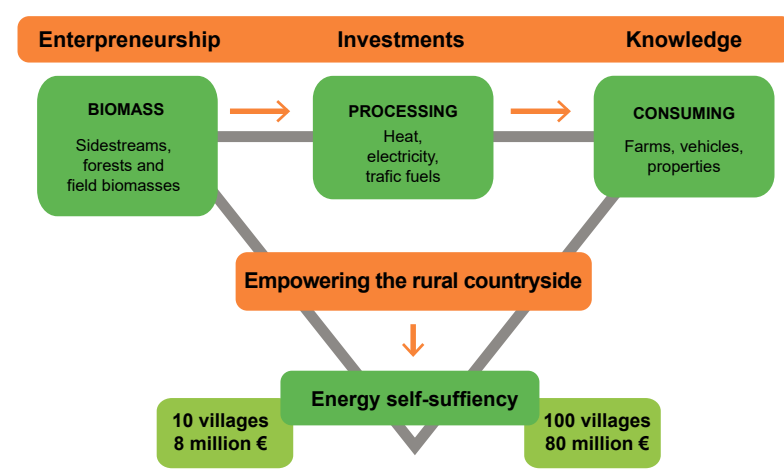
Food and energy

One focus area in the activities of the Rural Cluster has been to close the ranks of the developers around the themes of the cluster. For this reason, three programmes have been prepared in extensive cooperation in the cluster: Bioeconomy development programme, Lapland's food programme and Lapland's decentralised renewable energy programme. The programme contents have been assembled from hundreds of different workshops, meetings and events in Lapland. The work has involved

hundreds of people from dozens of different organisations, businesses and educational institutes, so expertise has been guaranteed and viewpoints in the preparation of the programme contents wide. The programmes have been published in electronic format enabling their updating.

The programmes describe briefly the current status of the different themes of bioeconomy (food and natural products, decentralised renewable energy, blue bioeconomy and wood construction) in Lapland, vision for 2025 as well as the

VISION 2025 – 10 energy self-sufficient villages



measures needed to obtain the vision. The vision of Lapland's food programme is to reach a 30% degree of self-sufficiency in terms of provisions manufactured from raw materials growing in Lapland by 2025. The measures emphasised by the programme include processing, marketing, communications and knowledge development. In addition, the programme presents Food House -concept, which assembles entrepreneurs under one roof to utilise joint

machinery and to jointly offer their products to central kitchens, tourism and other customers. In the Energy programme, the vision is to establish 10 energy self-sufficient villages in Lapland by 2025 via decentralised energy production in the villages utilising local raw materials. The programme presents among other things different new financing models as well as packaging the demanding permit processes into services.

The programmes will not be left to gather dust on a shelf, but will be put into active use in future development work. The programmes can also be utilised by entrepreneurs by picking development possibilities suited for their own operations and representatives of educational institutes that see, for example, topical education possibilities in the programmes when cultivating future actors.

Lapland's food programme and Silver Label in the cluster analysis

Shelves have been rolled up action taken in Rovaniemi in the implementation of Lapland's food programme. In May, the REKO local food circle of Rovaniemi was launched with the aim of providing a new direct sales channel for the producers of local food and natural products where the products exchange owners based on electronic advance orders without any middlemen. At the moment, the REKO circle operates as a Facebook group that had approximately 2,800 consumer members and approximately 40 producers in October 2017. Orders are placed

in the event of the distribution day held on Fridays roughly every two weeks or via the rekorder order platform after log in, so it is not necessary to join the Facebook group to be a part of the operations. There is a total of five REKO circles in Lapland: Rovaniemi, Ranua, Enontekiö, Sea Lapland and Kittilä as the most recent one.

The operations of the Rural Cluster have received much international attention over the last year. On 11 October 2017, the cluster received the Silver Label in the cluster analysis as a recognition of successful development of

cluster operations. The cluster has taken the required steps towards genuine entrepreneur-orientation and put in motion important measures for the development of rural Lapland. These have not gone unnoticed in Finland or abroad. Key persons of the Rural Cluster are regularly asked to speak in different seminars and events about the operations. The Rural Cluster shone on the stage, for example, in a public discussion event of a seminar organised in Estonia where it was suggested to turn the operations of the Rural Cluster into an exports asset to be spread globally.

REKO FOOD CIRCLES in Lapland



Learn more about REKO food circles online:



- 7 REKO circles
- Executes the Lapland food program
- Approximately 6000 consumers and 100 producers
- REKO is a simplified electronic sales channel directly from the producer to the end user
- A good way to test new products and receive feedback from the customers

CLUSTER IN A NUTSHELL

ARCTIC SMART RURAL COMMUNITY CLUSTER, I.E. RURAL CLUSTER

- The objective is to prevent capital from fleeing rural areas and to demonstrate to other people that rural areas offer good possibilities for profitable business operations.
- The focus is on further processing of food and the development of decentralised renewable energy.
- Consists of mutually supportive sub-entities: the entrepreneurship, knowledge and regional development entities.
- A network of 100 entrepreneurs and 200 developers: municipalities, financiers, politicians, projects, research and educational institutes and business advisors.
- Centralised and industry specific knowledge on food processing and multipolar energy production.
- Coordinates international development and project activities.



ARCTIC DEVELOPMENT ENVIRONMENTS

CLUSTER



Laboratory professional is inspecting a ceramic electronics substrate with inverted research microscope.

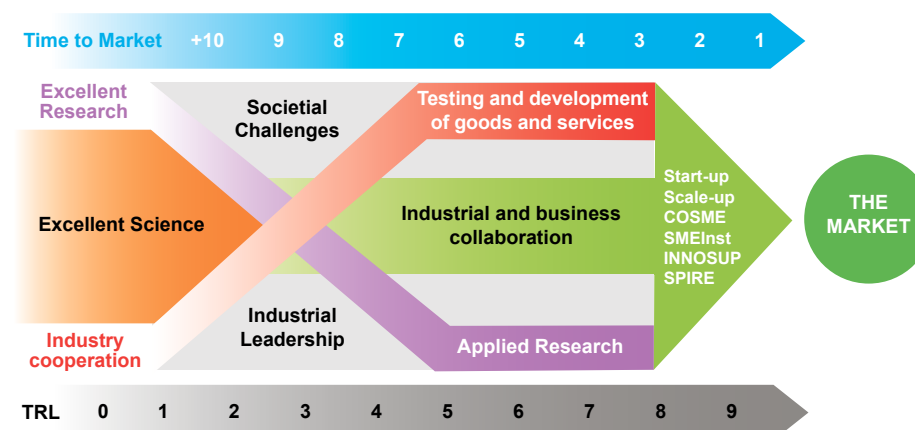
Cluster Management Excellence
STRIVING FOR CLUSTER EXCELLENCE

Arctic development environments produce services for the region's businesses

The significance of development environments and experts working there to the area's RDI activities has been traditionally valued in Lapland, which is why much investment have been made in them. The development environments are physical and virtual environments meant for use in learning and innovation, such as laboratories, studios, workshops or simulation environments where products, services and expertise can be further developed.

Approximately ten RDI organisations operate in Lapland and they manage approximately fifty different development environments. Now, the Lapland-based RDI organisations operate as separate actors according to their own organisations' objectives and strategic goals. The Arctic Development Environments Cluster started its operations in autumn 2015 by mapping the RDI field of Lapland and the development environments situated there. The objective of the Arctic Development Environments Cluster is to bring together the RDI environments and expert services operating separately in Lapland to form a uniform body to serve the region's business life and to enable the development of business life and business investments in product development and internationalisation.

Freshly starting and small businesses, for example, often do not have contacts to the research world and they often have business-related development needs but lack the required resources. The task of the cluster is to bring together the RDI services of Lapland by establishing Lapland's regional research, development and innovation activity expertise entity where research activities are allocated across organisational limits with a business life need orientation. A joint research



The new operating model will be used to develop an innovation ecosystem based on the research activities of Lapland with a focus on RDI-based innovation cycle management and the identification of technology readiness levels (TRL).

strategy will be formed for the expertise centre to strengthen the region's Arctic research and research strategy and to enable the mandates and roles of separate research institutes to join forces. The new operating model will be used to develop an innovation ecosystem based on the research activities of Lapland with a focus on RDI-based innovation cycle management and the identification of technology readiness levels (TRL).

The ideas and concepts created with the help of a shared service model based on the identification of the technology readiness levels (TRL) will be tested with

the help of pilots, and concrete results will be served to businesses and for utilisation in the business operations and production processes of the interest groups. Further resources for the region's development can be acquired through international cooperation. Networking with the other European expertise centres enables cooperation and planning of new project initiatives and consortia, in particular, in the spearhead areas of research. The final goal is to support in this manner the business life of Lapland to develop new products and to launch them with the help of high-quality research.

Objectives of the Arctic Development Environments Cluster

- Producing added value to the business life of Lapland, improving the businesses' competitiveness and creating new businesses
- Generating added value to the other organisations operating in the network
- Strengthening the RDI activities of Lapland
- Identifying core competence and managing focus areas of competence
- Developing shared service models
- Strengthening the cooperation between the Arctic Clusters
- Increasing international funding and competence

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pLAB – game graphics to help with learning and product development

Lapland University of Applied Sciences' software technology laboratory pLAB develops learning and virtual environments with the help of game technology.

In education, game technology can be used to create believable situations that enable efficient and safe learning. Virtual reality has been utilised for years, for example in the training of nurses, and KaiVi to be released in late 2017 will enable also mining education in virtual environment. KaiVi is a game-like learning environment where the players carry out real-life work tasks at a fictional mine. The task of the foreman, for example, is to get the mine operating as efficiently as possible and to solve arising problem situations. At the end of each shift, the player scores according to his/her performance. At the moment, the game is meant for students of the field but, in the future, it could also be used for the training of mine employees and subcontractors.

pLAB also offers product development services to businesses. "In product development, game technology enables realtime participatory design", says coordinator Pertti Rauhala. VirtualForest developed by Lapland UAS is a program combining game technology and geographical information to support forest planning. With the help of the program, the forest planner can immediately visualise the impact of logging on the landscape at different intervals. With the help of VirtualForest, logging can also be planned together with local communities by visualising different alternatives. According to Pertti, in the future, game graphics can also



In VR Logging game the player can try the principles of logging in virtual reality. The game was created in project called Äkräs, which aims to raise the young people's awareness about the forest sector. Äkräs is EU-funded project carried out together with Lapland UAS and Finnish 4H organization.

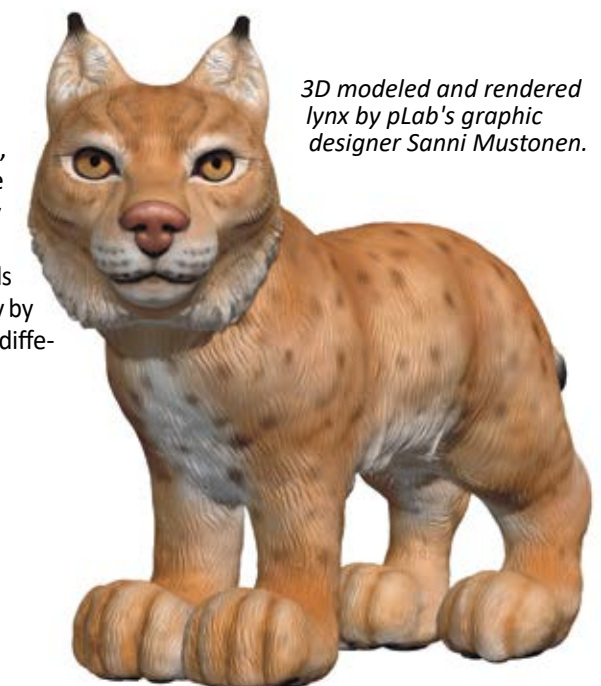
be utilised in the integration of lines of business by visualising, for example, the impact of a mine on the environment of a tourism centre.

pLAB has created in cooperation with research centre CERN, located in Switzerland, a virtual reality platform of the planned research buildings. It can be used, for example, to contemplate the impact of the buildings on the landscape with the area's residents and train the employees of the institute already in advance.

Anyone can download an application called HiLumi3D from the app store of his/her smart phone.

The development of the laboratory started as early as 2001 with funding from the European Regional Development Fund and, today, pLAB is an international actor that creates high quality game environments for use by different industrial sectors. The laboratory runs with project funding (90%) and employs approximately 20 people ranging from IT and game field experts to graphic designers.

In addition, students have the opportunity to develop their professional skills in the laboratory by participating in different projects.



3D modeled and rendered lynx by pLab's graphic designer Sanni Mustonen.

Learn more about pLab's virtual learning environments online:



KaiVi trailer



VirtualForest trailer



pLab presentation



Forest games (Only in Finnish)

CLUSTER IN A NUTSHELL

- Arctic research, development and innovation services in Lapland
- 50 modern development environments
- More than 750 experts and specialists
- Multidisciplinary research communities from University of Lapland, Lapland University of Applied Sciences, Natural Resources Institute Finland, Geological Survey of Finland, Vocational College Lappia and Lapland Vocational College
- Arctic Power – Cold climate testing
- Arctic Steel and Mining – Ultra strong steel and bulk steel research and testing
- ENVI – Welfare business virtual centre
- Natural Resource Institute Finland – laboratory, environment, food and primary research
- SINCO – Service design facilities
- SKY – social and healthcare simulation environment
- Audiovisual production research and testing studio



ARCTIC DESIGN

CLUSTER

Cluster Management Excellence
STRIVING FOR CLUSTER EXCELLENCE



Service Design
Wintertime safari with husky teams. Local tourism companies offer different concepts of high quality service design such as activities and safaris with memorable and magical experiences year-round. Photo: Lapland Safaris



Product design
Future snowmobile design competition organised by BRP Finland in cooperation with Industrial Design Department of the University of Lapland. Snowmobile concept by Tuomas Lappalainen.

Smart regional specialisation makes the world class design



Interaction design
The interactive Breaking of the Dawn jacket includes sensors, thermochromic materials and reindeer leather, promoting the sustainable traditions of Lapland. Designed by Paula Roinesalo and Tuomas Lappalainen from University of Lapland's Faculty of Art & Design. Photo: Teppo Vertomaa



Applied visual Arts
The snow installation Hyyde was on display in front of Arktikum – Museum and Science Centre in Rovaniemi during the Arctic Design Week 2017. The project was organised by lecturer of industrial design Antti-Jussi Yliharju together with the students of University of Lapland's Faculty of Art & Design.

Photo: Lapin materiaalipankki | Simo Vilhunen

The main purpose of the Arctic Design Cluster is to make local businesses, products and services nationally and internationally competitive by utilising the knowledge from research, art and design specialisation. The cluster brings together expertise on arctic conditions, culture and knowledge on materials and aspires to resolve the challenges of sparsely populated area. At the heart of the cluster is Arctic Design Centre where the businesses, science and art meet.

The Arctic Design Centre of Expertise, created by the faculty of art at the University of Lapland, promotes cooperation between the local businesses, educational institutions, the city of Rovaniemi and regional development organisations. At the centre of expertise small design enterprises can create and test their prototypes with the new technologies developed by the university and get access to the exhibition spaces. The Arctic Design Centre can boost the innovation of new products and re-design of mature ones. The Arctic Design Cluster has a vision to become a world leader in arctic design research by 2020. The goal of this research is a deep understanding of the arctic environment, everyday life, minority cultures and heritage. Furthermore, the research aims at making the arctic environment more visible in the choices of materials and type of the design. At the end, research problems are becoming more complex and more holistic view of different research disciplines is needed. The multi-disciplinary research

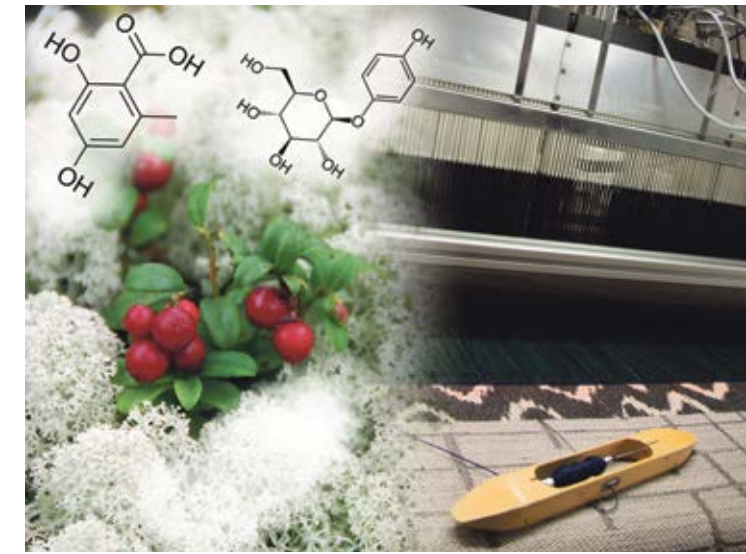
team can utilise the design research in an all-rounded manner. The Arctic Design Cluster aims at being part of at least 15 potential synergy and collaboration projects by the year 2020. Leaders of the next cluster projects shall be global enterprises surrounded by consortiums with high level researchers and businesses. Attractiveness for business involvement rises from the bright ideas, high quality research and other companies with investment capabilities. The backbone of the cluster is formed by the research of arctic designing including: service design, product design, interaction design and applied visual arts. SERVICE DESIGN develops new service concepts, expands expertise and supply quality of services in close cooperation with local, national and international businesses and the public sector. Service design produces award-winning and internationally esteemed research, as well as creative activities and service concepts of a high quality.

PRODUCT DESIGN innovates international cutting-edge products that are individualised and ready for production. Product design utilises 3D models and physical prototypes of high quality conveying the design vision and expertise. Product design prototypes enable the testing and development of new product ideas, evaluation of the products by consumers and communicating the innovations to larger audiences. INTERACTION DESIGN creates practical and innovative interfaces for physical and digital products, product concepts and services. It combines international cutting edge research, participatory methods and design expertise from different fields. APPLIED VISUAL ARTS combines participatory environmental art to service design in ways that are culturally sensitive, attractive for tourists and take into account expertise in Arctic conditions.

- Goals of the Arctic Design Cluster**
- To become a permanent part of the S3 thematic platforms and networks of the European regions
 - Increase the international collaboration of local businesses and create value chains to strengthen the economy and SME operations
 - Design in Smart Mobility Business Services
 - Investigate ecosystems
 - To study Human-Computer Interaction
 - Build research groups around the Arctic Design Cluster pilots
 - Increase the international funding opportunities for Arctic Design Cluster partners

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Organic smart textiles from Lapland



This project could result in, for example, a non-toxic mosquito repellent garment made of natural raw materials for the use of tourism in Lapland with additional characteristics and technology that are useful in wildlife hiking"

– Susan Kunnas, Natural Resources Institute Finland (Luke)

Future Bio-Arctic Design (F.BAD), or organic smart textiles, is a new interdisciplinary innovation from Lapland, resulting from the Arctic Design Cluster collaboration. The aim of the work is to create new innovations for smart textiles. Through organic smart textiles, the natural science research of the Natural Resources Institute Finland (Luke), natural resources and technology competence of the Lapland University of Applied Sciences and textile and clothing design research by the University of Lapland's Faculty of Art and Design are raised to a globally interesting sector. The textile industry uses thousands of chemicals in the manufacturing of fabrics and most of them are hazardous both to humans and to the environment. Not all effects of chemical

exposure, especially long-term exposure, are known well enough. Research has mainly focused on immediate effects, such as skin irritation and allergies. The pure, healthy and safe nature of Lapland has all the potential needed to create a less toxic future for the textile industry. The goal of the Future Bio-Arctic Design (F.BAD) research is to create from the natural raw materials of Lapland toxin-free and organic smart textiles that include bioactive plant compounds. Various techniques for manufacturing such textile are being tested, as are different material alternatives. The potential of arctic plant extracts and fibres for example as organic anti-mould agents, UV-shield or insect repellent become central in the applications.

Through research and development co-operation, new uses are being created for local raw materials. Thanks to the improved added value, the economic benefits remaining in the area will also be greater than it now is. "This project could result in, for example, a non-toxic mosquito repellent garment made of natural raw materials for the use of tourism in Lapland with additional characteristics and technology that are useful in wildlife hiking", says researcher Susan Kunnas from Natural Resources Institute Finland. Several companies operating in the textile and clothing industry, tourism and natural resources have expressed their interest in the idea and willingness to join the co-operation.

Interactive surfaces



Photo: Teppo Vertomaa

Häkkinen from the Faculty of Art and Design. The project involves 15 partners, both businesses and research institutes, from 10 different countries. According to Ashley Colley, a researcher at the University of Lapland, we are presently suffering from an overdose of gadgets that include illuminated displays. "Non-light emitting displays embedded in surfaces reduces stimuli and light pollution and represents so-called calm computing," says Colley. The project will develop smart surfaces for use in clothing and sports equipment, furniture and architecture. In the future, technology may enable, for example, embedding dynamic information signs in the surfaces of public places, or shoes that indicate the number of steps taken. The project is interdisciplinary, linking chemistry and design. As well as managing the project, the University of Lapland, Faculty of Art and Design brings expertise in design and usability testing to the project.

The EU has granted EUR 6.7 million in Horizon 2020 funding to the DecoChrom project that will begin in 2018. The purpose of the world-leading project is to develop technology that will enable printed display elements to be embedded into different surfaces using low-energy electrochromic technology. The project is led by the University of Lapland and conducted by professor Jonna

Sinco Laboratory as a tool of the Design Cluster

Sinco (Service Innovation Corner), the first ever service design laboratory, started its operations at the University of Lapland's Faculty of Art and Design in 2009, with the support of the EU's structural funds. The idea of Sinco started from a so-called mock-up model used in industrial design. Mock-up model is the first prototype of the product to be manufactured and used for product development. Sinco is reminiscent of a small theatre brought to life with new technologies. The service to be developed is photographed and videoed and brought into the laboratory where it is turned into an experience prototype to be developed together with the service producers and customers. At Sinco, entrepreneurs get to try their service from the customer's perspective, which is genuine customer-orientation. "Sinco can be used both for developing existing services or



Photo: Marko Junttila

innovating totally new ones," says PhD Candidate and Researcher Essi Kuure. Sinco offers businesses product development services and there is demand for such service more than the laboratory can offer, because Sinco operates most of the time in teaching use. Similar service design laboratories have been built globally, most recently to Volkswagen in Germany. There is also a mobile

version of the laboratory, which has enabled the export of service design from Lapland to e.g. Japan and Namibia.

Check out the Sinco: Elektribox case online:



CLUSTER IN A NUTSHELL

ARCTIC DESIGN CLUSTER STRATEGY 2017 – 2020

- Linking the Arctic design cluster internationally
- European cluster co-elaboration
- Finding the answers to societal needs in the Arctic Area
- Accelerating design driven entrepreneurs in the region
- Support innovative start-ups
- Create fast prototypes in development environments
- Contribute to the Academic arena by publishing research papers based on Arctic Design.

CLUSTER MARKET SEGMENTS AND POTENTIAL

- Now 150 members, 50 SMEs, 9 large companies, 64 research organisations and 27 ecosystem actors.
- Strengthen the key areas and find new fields of R&D in Arctic Design
- Move away barriers to SME's
- Testing in cold climate
- Access to finance, investors for new innovations
- IPR-support to innovative firms



ARCTIC SAFETY

CLUSTER



Arctic Safety Cluster – safety through co-operation

Photo: Lapin materiaalipankki | Juha Kauppinen

The goal of the Arctic Safety Cluster is to anticipate and ensure the smooth operating of business activities. Lapland's location, sparse population, natural conditions and large numbers of travellers require risk management expertise, Arctic expertise, and network competence.

Lapland's sparsely populated areas and low resources require all actors to join forces. Together, the businesses, authorities, research and educational organisations, municipalities and organisations form a safety network that ensures the safety of the residents and the smooth operation of businesses.

Arctic safety means responsibility at the individual, business, organisation and regional level. The Arctic Safety Cluster is composed of the safety of tourism and everyday life. The cluster's beneficiaries include local businesses, residents, travellers, industries and the environment. The cluster's activities and actors can be found on the cluster's website www.arcticsafety.fi.

The cluster's objective is to produce a visible and recognised network that brings added value to the competitiveness, internationalisation and vitality of the businesses, network actors and region. The cluster's activities in international networks are significant and international funding is channelled to the region and its actors.

Tourism safety

The competitiveness and appeal of tourism in Lapland are based on its natural conditions and their sustainable use. The tourism safety network, which has been built together with businesses in the region

and tourism areas over several years, is an operating model based on trust and cooperation.

Safety is a central part of the quality and competitiveness of tourism businesses. Cooperation, information exchange and joint development interests solidify the network operations and bring added value to all parties. The tourism safety cluster consists of tourism businesses and other businesses that serve the field. In addition, key actors in the cluster include support

Arctic safety means responsibility at the individual, business, organisation and regional level.

and development organisations, which support and serve business activities, as well as institutes of higher education and research institutions. The tourism safety cluster is already strong both in Lapland as well as nationally, but it has also become widely networked on an international level. Lapland has joined the Network of European Regions for Competitive and Sustainable Tourism (NECSTouR). In the UArctic network, Lapland coordinates the sub-theme called Tourism Safety, under the thematic network for Safety and Security. In addition, the Digitalisation and Safety for Tourism theme network, which is also coordinated by Lapland, has been accepted into the European Smart Specialisation Platform.

Civil safety

Civil safety is about ensuring the well-being and safety of residents, businesses and other actors in peripheral, sparsely populated areas. It is a multi-sectoral and multiple entity that promotes involvement, services and businesses. Civil safety facilitates the provision of high levels of standards of living, well-being and employment in Lapland – now and in the future. The local and regional resources can be efficiently allocated to the needs of municipal residents through cooperation between the residents, organisations and businesses. The management of resources and moving the focus from corrective to preventive work are at the core.

Civil safety has also been under development on a national level for several years. The civil safety operating model, which is based on network cooperation and joint management of resources, was developed in Lapland in 2004–2007. The core of the operations is extensive cooperation between the political and official management of municipalities, organisations, village associations, educational institutes, the parish and entrepreneurs. Civil safety has also been seen as a good operating method in the EU. The European Institute of Public Administration (EIPA) has granted the European Public Sector Award (EPSA) on regional innovation to Lapland's civil safety operating model.

FURTHER INFORMATION

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Tourism Safety Cluster on international arenas

An essential part of the Arctic Smartness programme is to strengthen business opportunities through networking, international operations and internationalisation of the region, clusters, businesses and other actors.



Photo: Lapin materiaalipankki | Lapland Safaris

Another objective is to use research, development and innovation activities to channel more international funding to the region and its actors with the help of different projects. In the international networks, the activities of the Safety Cluster have gotten off to a running start. The maximisation of benefits gained from own activities requires own activity and taking initiative in the international arenas. One coordination task of the clusters

is to shape and strengthen the region's and its actors' role and status in the international networks, i.e. to serve as a kind of pioneer to other actors.

The "Digitalisation and Safety for Tourism" theme network has been approved for the European Smart Specialisation Platform for Industrial Modernisation thematic network, which is led by Lapland/Multidimensional Tourism Institute together with Andalusia. The other regions of the initiative

are Lazio and Tuscany in Italy, Catalonia, Valencia and Castile and León in Spain and Slovenia. The objective of the network is to support tourism businesses especially in matters relating to digitalisation and safety. This also strengthens innovation activities based on open innovation, cluster-like operations and new technology. Via the thematic networks, the regions can impact the funding programmes of the EU being prepared and, thereby, improve their chances of receiving

direct EU funding. In addition, the development of the theme is supported by NECSTouR, which is the Network of European Regions for Competitive and Sustainable Tourism.

The Lapland Safety Network has prepared two new courses to improve the Arctic expertise and cooperation of actors. Arctic Guide is an online course in English that instructs new guides to operate safely in the Arctic operating environment. Arctic Rescue Guide is a continuation course for experienced guides and it instructs them on how to assist the authorities in search and rescue assignments.

In the UArctic network, a theme for Safety and Security has been established and it includes a sub-theme called Tourism Safety, which is coordinated by Lapland. Safety is a precondition for the growth and well-being of the Arctic communities and the region's viable and durable commercial operations. UArctic's thematic network Arctic Safety and Security targets the risks and operating methods of the Arctic area that can be used to prevent accidents, which can threaten the life and health of people, the environment, values and well-being in the Arctic area. The theme emphasises cooperation across borders and the optimal use of preparedness resources of the Arctic countries.

Lapland/Multidimensional Tourism Institute is involved in

the SOCENT SPAs project which promotes cooperation between the regions with the help of six public and private non-profit units in Finland, Germany, Slovakia and Spain. The project is funded by the Interreg Europe programme. The purpose of the SocentSpas project is to influence local policies and programmes. The objective is to improve the efficiency of local policies by actively supporting the visibility, incubation and speeding up of social enterprises. The activities target sparsely populated areas (SPAs) as the driver of their competitiveness and participatory growth.

Lapland University of Applied Sciences has joined the NECSTouR network, which is the Network of European Regions for Competitive and Sustainable Tourism, <http://www.necstour.eu/>. The network includes 35 European tourism regions and also tourism higher education institutes. The task of the NECSTouR network is to support the development of sustainable and competitive tourism, strengthen the cooperation between the regions and actors, develop and plan projects, build networks and distribute information within the network. NECSTouR distributes information about the development processes upcoming and ongoing in the EU and regions, which improves the regions' influence possibilities in them.

Safety of route markings – REILA

The objective of the 'REILA reittimerkintöjen turvallisuus, pilotointialueena Lappi' project (Safety of the REILA route markings, Lapland as a pilot region) is to improve the reliability of route markings in the terrain. The project is run by Lapland University of Applied Sciences, Metsähallitus Lapland National Parks Finland and Rescue Services of Lapland. The project also involves 14 municipalities in Lapland: Enontekiö, Inari, Kemi, Kemijärvi, Kittilä, Kolari, Muonio, Pello, Posio, Rovaniemi, Salla, Sodankylä,

Tornio and Ylitornio. The project is funded by Lapland ELY Centre from the European Regional Development Fund (ERDF).

The results of the REILA project manifest multidisciplinary network cooperation and the results can be utilised on a national level. The results are available at www.reittimerkinnat.fi and will be updated by Lapland University of Applied Sciences after the project ends. The databank is targeted at planners and maintenance staff of terrain routes.

REILA project results

- Network description of regional and national actors and their roles
- New rescue and positioning mark
- Route marking instructions to deliver safe and customer-oriented route markings
- ReilaRiski, an online risk management tool, to help with the documentation of the terrain routes and mapping the related risks
- Safety document of the routes that will help the maintenance party to verify that the safety of the routes has been ensured
- Report, Multi-use of outdoor routes in the terrain: current status, obstacles and possibilities.
- Report, Responsibility of the maintenance party of outdoor routes in the terrain, responsibility of the entrepreneur and responsibility of the individual taking the route
- Report on safety as regards the mobile guidance of the routes

CLUSTER IN A NUTSHELL

THE ARCTIC SAFETY CLUSTER ACTIVITIES

- support the operations of businesses and network actors
- strengthen the anticipation and management of and preparation for risks
- promote the internationalisation of local actors
- involve participation in national and international development and design processes

- strengthen expertise and RDI activities and convey them for use by the businesses and region
- build and strengthen the networks

Reila Project online: www.reittimerkinnat.fi
Digitalisation and Safety for Tourism network:
<http://s3platform.jrc.ec.europa.eu/thematic-areas>



The future looks Smart and Excellent

Lapland is a unique arctic region that strives to be the most innovative and business-driven sparsely populated area in the EU and Circumpolar Arctic by 2022. Future aims are high, but the actions taken to reach this goal are concrete and remain close to the actors.

Necessary boost to regional development in Lapland has been discovered through international cooperation and by bringing regional actors together. During the past few years, Lapland has achieved an internationally significant status and acknowledgement for its innovativeness and efficient cluster activities. A concrete concept based on smart specialisation (S3) has facilitated connecting different regional development actors from universities to research institutes and development companies. Smart specialisation has generated new ways of collaboration across organisational boundaries and national borders, and the potential of this collaboration seems to have no limits.

Smart specialisation has been put into practice on grass-roots level in Lapland under the Arctic Smartness brand. Arctic Smartness is an approach to regional development established by actors in Lapland, and it functions as an 'umbrella' for all projects implementing smart specialisation in Lapland. "Lapland's Arctic Smartness concept gives a shining example

of how regions may successfully enhance their development activities and utilisation of EU resources. Dedication, cooperation across different sectors and strong common vision are the key ingredients", says Kari Aalto, the director of East and North Finland EU Office.

The vision of Arctic Smartness approach in Lapland is to become an acknowledged and valuable partner in EU in smart specialisation spearhead industries, such as mining and metal industry, bioeconomy, as well as tourism and its sub-industries. This vision is pursued by means of effective cluster activities.

Several subcluster function under Lapland's five Arctic Smartness clusters. The clusters represent a new way of cooperating across organisational boundaries and developing new regional value chains. The core of cluster activities is to create growth and innovation opportunities for SMEs in Lapland. The clusters functioning in Lapland have established a firm

foothold in regional development work and discovered their own networks in international arenas as well. The clusters are being continuously developed further in order to meet the needs of SMEs and cluster organisations. All clusters in Lapland have already been awarded the Bronze Label in cluster evaluation, and furthermore, the Rural cluster and the Industry and Circular economy cluster have already achieved Silver Label.

The clusters are strongly leaning towards the future. Arctic Industry and Circular Economy Cluster will continue its work in creating industrial symbioses and putting circular and bioeconomy in practice in Lapland together with industrial and service businesses. Arctic Smart Rural Community Cluster will concentrate on developing micro-enterprises'

business and gathering new entrepreneurs into the cluster. Both clusters aim towards the Golden Cluster Label. Arctic Development Environments Cluster will mainly focus on creating a centre of excellence, which offers businesses in Lapland help and support in refining preliminary business ideas into market-ready products and services. Arctic Design Cluster's vision is to become a global leader in arctic design research by 2020 and to use this expertise to support the international competitiveness of local businesses, products and services. Arctic Safety Cluster will make continuous efforts in order to strengthen business interface operations and

internationalisation including stronger tourism approach in the future. Active international networking aims to ensure channeling international funding into the region. The primary aim of all activities is to establish permanent action that will outlive the projects.

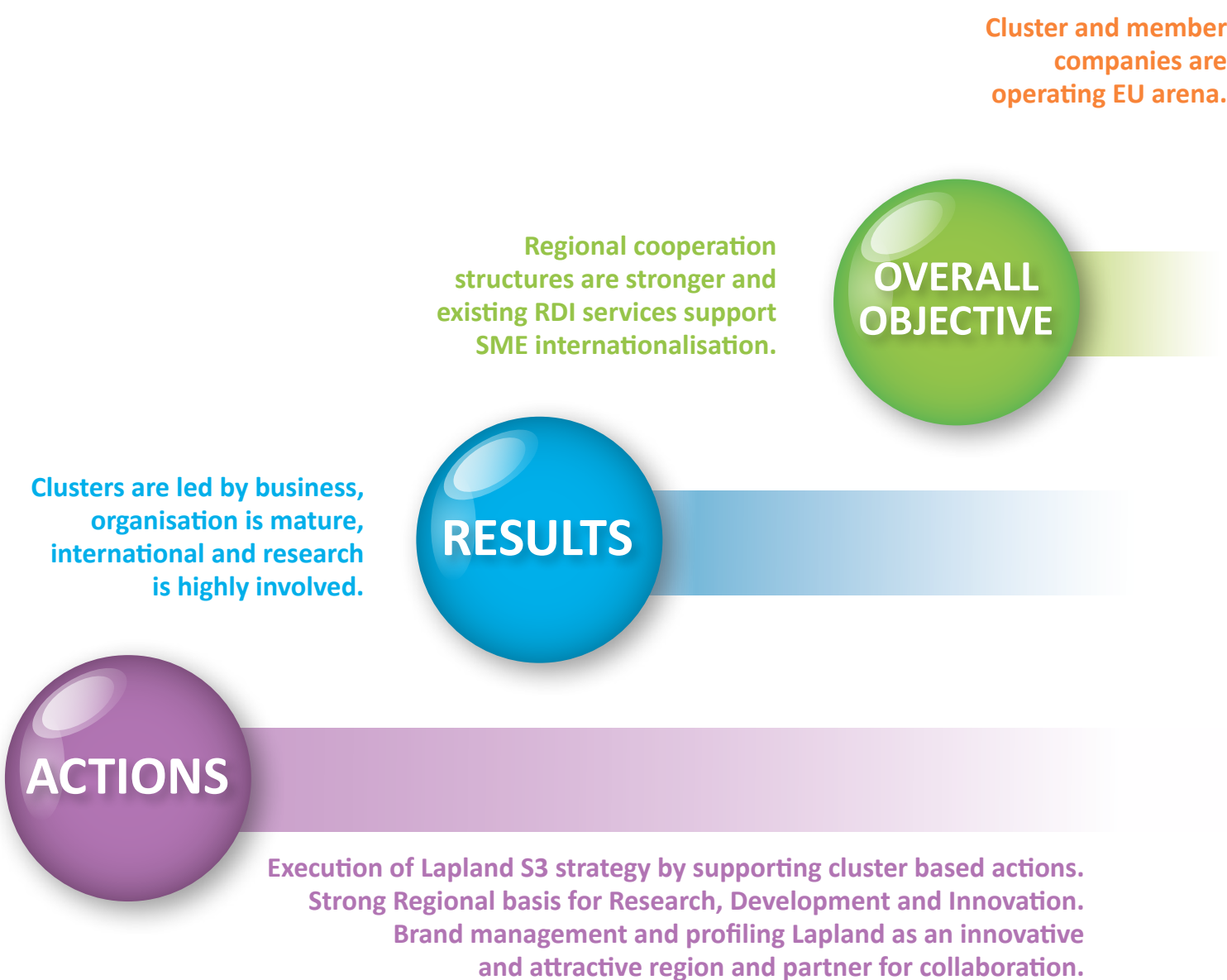
Arctic Smartness activities provide stakeholders in Lapland continuous opportunities to participate different networks, both nationally and internationally. This will open up possibilities for new innovation, skills and funding, and furthermore, increase local know-how in regional development. At the same time, the actors must ensure that smart specialisation

is put into practice to raise awareness about Lapland's economy by producing feasible material and information about the statistics in the region.

The future of Lapland looks smartly excellent. "Via Arctic Smartness activities, we offer SMEs in Lapland a healthy and stable breeding ground for growth and development. With tightened cooperation between regional actors and entrepreneurs, we will become even more powerful in international networks and markets as well", says Kristiina Jokelainen, Director of international relations in the Regional Council of Lapland.

"Lapland's Arctic Smartness concept gives a shining example of how regions may successfully enhance their development activities and utilisation of EU resources. Dedication, cooperation across different sectors and strong common vision are the key ingredients."

– Kari Aalto, Director, East and North Finland EU Office



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