

Making Finland a leader in the sustainable extractive industry – action plan

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Tiivistelmä Referat Abstract <p>Products of the extractive industry – metals and minerals, aggregates and building stones – are required to produce products, services and infrastructure essential in modern society. Demand for raw materials has increased along with global population growth, urbanisation and higher living standards. The extractive industry and the related refining, technology industry, and research and development offer significant growth opportunities for Finland.</p> <p>The debate on mining has intensified with the increase in mining activities, and attitudes towards mining have become more critical. While mining activities involve high expectations, there are also fears of irreversible changes and damage to nature and to other lines of business. As the industry grows, sore points have emerged, revealing the need for more extensive discussion on the conditions for the industry's operations and on development needs within the industry.</p> <p>Dialogue between the extractive industry and its stakeholders began in the autumn of 2012 with a round-table discussion, where a common vision was established to raise Finland's profile as a leader in sustainable extractive industry.</p> <p>A decision was taken to prepare an action plan towards this end. The extractive industry was viewed as a source of opportunities for Finland, provided that it is developed in a way that is economically, socially and environmentally sustainable.</p> <p>The action plan is based on round table discussions chaired by Prime Minister Jyrki Katainen, Minister of Economic Affairs Jan Vapaavuori, Minister of Labour Lauri Ihalainen and Minister of the Environment Ville Niinistö, and on concrete proposals for measures, prepared by ten expert working groups.</p> <p>The plan includes measures to be taken by the industry to obtain society's support for its activities. Proposals for improving the operating conditions for the extractive industry are made with regard to administration, training and infrastructure. In addition, the action plan proposes more active, open exchange of information and experiences, along with ongoing dialogue regarding the action plan's implementation and development within the industry.</p> <p>Translated from the original publication in Finnish, Suomi kestävän kaivannaisteollisuuden edelläkävijäksi – toimintaohjelma, published in April 2013 by the Ministry of Employment and the Economy.</p> <p>Contact person within the Ministry of Employment and the Economy: Strategic Programme for Cleantech/Juho Jokinen, tel. +358 50 3960244</p>	
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Preface

Products of the extractive industry – metals and minerals, aggregates and building stones – are required to produce products, services and infrastructure essential to modern society. Demand for raw materials has increased along with global population growth, urbanisation and higher living standards. The extractive industry and the related refining, technology industry, and research and development, offer significant growth opportunities for Finland.

Major new mines have been opened in Finland in recent years. The debate on mining has intensified with the increase in mining activities, and attitudes towards mining have become more critical. While mining activities involve high expectations, such as securing regional vitality, there are also fears of irreversible changes and damage to nature and other lines of business. As the industry grows, sore points have emerged, revealing the need for more extensive discussion of the conditions for the industry's operations and of development needs within the industry.

Dialogue between the extractive industry and its stakeholders began in the autumn of 2012 with a round-table discussion, where a common vision was established to raise Finland's profile as a leader in the sustainable extractive industry. A decision was taken to prepare an action plan towards this end.

Numerous industry experts and stakeholder group representatives participated in the preparation of this action plan, in ten themed groups. Discussion of the industry's problems and ways of solving them was lively and constructive within these working groups. Opportunities, such as the potential for increasing technology exports, were identified during the course of these discussions. Some issues remained controversial and require further discussion. This process evolved into a significant new forum for parties representing diverse interests and views. An important future task is to ensure the continuity of dialogue.

The discussions also produced concrete proposals for action, which are presented in this action plan. The plan includes measures to be taken by the industry, in order to obtain society's support for its activities. Proposals for improving the operating conditions of the extractive industry are made with regard to administration, training and infrastructure. In addition, the action plan proposes a more active, open exchange of information and experiences. Various actors are responsible for the implementation of the proposed measures, but active participation and monitoring of the results is required from diverse interest groups.

The Making Finland a leader in the sustainable extractive industry action plan complements the policies of the Minerals Strategy and advances them with the measures proposed.

I would like to thank everyone who participated in drawing up this action plan, for their active involvement and open discussion in the round-table events and working

groups and on the website. In particular, I would like to thank the chairpersons of the working groups for moderating the discussions and reporting on the results. I hope that the dialogue and search for solutions that this process has initiated between the various interest groups will continue, with concrete results.

Helsinki, 29 April 2012

JAN VAPAAVUORI
Minister of Economic Affairs

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1 The sustainable extractive industry represents a major opportunity for Finland

Demand for metals, minerals and aggregates has increased, alongside global population growth, urbanisation and higher living standards.

Major new mines have been opened in Finland in recent years. The output of currently operating mines is being increased and new mining projects have been launched. Active ore prospecting, the discovery of new deposits and raw materials, and increased recycling of metals are creating preconditions for the industry's development. The extractive industry and the related refining, technology industry, and research and development constitute a significant growth sector for Finland. The industry employs nearly 30,000 people in Finland and has significant export potential.

Rapid growth in mining operations in Finland has given rise to high expectations for new opportunities and success, but also to fears regarding potential growing pains and errors. Finland has first-hand experience of the adverse environmental and social effects mining operations can have.

The current Government Programme states that the Government will promote the sustainable use of natural resources on the basis of the natural resources report. Submitted to Parliament on 2 December 2012, the Government Report to Parliament on Natural Resources is based on the Minerals Strategy and Bioeconomy Strategy. The key objectives of Finland's Minerals Strategy are to promote domestic growth and well-being, offer solutions for global challenges faced by the minerals chain, and mitigate damage to the environment. In addition, the natural resources report addresses the water economy, ecosystem services and the perspectives of material and energy efficiency. The material and energy-efficiency of the exploitation of natural resources, in a closed circle that reduces greenhouse gas emissions and the amount of waste generated, without endangering natural ecosystem services, is one of the key objectives presented in the report. Development of the natural-resources economy requires an operating environment where legislation, the planning of land use, the evaluation of environmental effects, permit procedures and administrative practices support the objectives presented in the report.

In accordance with the present Government Programme and the final report on the discussion related to Making Finland a leader in the sustainable extractive industry, held on 24 October 2012, the state should take measures to promote the development and sustainable growth of mining and the entire minerals cluster. The objective is to make Finland a leading country in the sustainable, economic and innovative exploitation of natural resources and materials. At the same time, we

must safeguard the integrity of the natural values of protected areas and national parks and the upkeep of these areas, and ensure that mining operations respect ecological sustainability and the rights of native people.

The Government of Finland aims to make Finland a global leader in clean technology. The measures proposed for 2012–2013 in the Ministry of Employment and the Economy’s Strategic Programme for Cleantech focus on clean energy, energy efficiency and the promotion of environmental friendliness in the extractive industry.

In November 2012, the Government approved a decision-in-principle to put Finnish enterprises and administration in a position of leadership in CSR. The objective is to increase the number of enterprises strongly committed to CSR, and that those enterprises will be able to set targets for their social impacts and assess their results in dialogue with stakeholders. The extractive industry is one of the pilot industries specified in the Corporate Social Responsibility Programme.

In the autumn of 2012 and spring of 2013, executives and directors from the extractive and tourism industries, research institutes, reindeer herders and environmental organisations discussed the future and vision of Finland’s extractive industry, as well as the measures required to make Finland a model country in the sustainable extractive industry. These discussions were chaired by Prime Minister Jyrki Katainen, Minister of Economic Affairs Jan Vapaavuori, Minister of Labour Lauri Ihalainen and Minister of the Environment Ville Niinistö. High-level round-table discussions have ensured strong political support for a responsible extractive industry operating in accordance with the principles of sustainable development.

Based on the guidelines defined in the round-table discussions, ten working groups have, in the spring of 2013, been engaged in a lively debate over the required, realistic measures to make Finland’s extractive industry economically, socially and environmentally sustainable, and to elevate Finland to a leading position in the global industry. The ‘Making Finland a leader in the sustainable extractive industry’ action plan is based on the visions and proposed measures produced by the working groups. In addition to proposals for measures, the working groups have served as crucial facilitators of information flow between stakeholder groups and have created valuable dialogue on the opportunities and challenges faced by the extractive industry.

The stakeholder groups that participated in preparing the ‘Making Finland a leader in the sustainable extractive industry’ action plan agreed that the extractive industry is welcome in Finland, but not at any cost. The extractive industry must respect the environmental, social and economic demands of sustainable development. Account must be taken of conflicts of interest between different industries in the development of the extractive industry, and the various parties must be capable of handling such conflicts constructively. Points of disagreement also arose during the preparation of the action plan. In particular, the organisations representing tourism, conservation and reindeer herders have proposed additional measures to prevent conflicts of interest.

The implementation of these measures is proposed by 2019. This action plan also presents longer-term objectives to safeguard sustainable development. The implementation and impact of the measures will be monitored using measure-specific indicators and overall indicators of the industry's development.

Sustainable extractive activities are primarily practised by companies. This action plan includes measures by which the industry can minimise environmental impacts, create employment and welfare and improve international competitiveness. By committing to implementing these measures, companies will gain domestic and international social support for their operations. Secondly, an environmentally, socially and economically sustainable extractive industry cannot be created without wide-spread support from civil society. This action plan contains measures for improving the operational prerequisites of the extractive industry, with regard to administration, training and infrastructure. Thirdly, extensive cooperation will expedite the industry's development. Social support cannot be created for the extractive industry without first engaging in an open discussion of the benefits and drawbacks of the industry. This action plan proposes a more active, open exchange of information and experiences, along with ongoing dialogue regarding the implementation of this action plan and development within the industry.

2 The minerals industry in Finland

Finland's extractive industry includes the mining, aggregate and natural stone industries. The mining industry includes metal ore and industrial mineral production. The suppliers of the technology, machinery, equipment and services required by the extractive industry are also part of the minerals industry. Other actors related to the minerals industry include refiners, research institutes, universities and other institutes of higher education, vocational colleges and various organisations.

The development of the extractive industry is regarded as a major opportunity. Finland's bedrock and soil provide a foundation, exceptional in Europe, for the continuity of existing extractive operations and the development of new ones. Ore finds in deeper strata of the bedrock, or in new areas, and demand for new raw materials will create the preconditions for future extractive operations and the development of the related services, technology and refining.

Strategic policy outlines for developing Finland's minerals cluster have been set out in the Minerals Strategy drawn up in 2010. At present, these policy outlines have been implemented by the five-year Green Mining programme launched by Tekes in 2011 and the EUR 30 million additional investment in Finnish Industry Investment for the funding of mining projects approved in 2012.

Extractive operations always alter their environment. The immediate environmental impacts of extractive operations mainly affect the immediate vicinity of the projects and rarely last longer than the operation itself. However, long-term environmental impacts that outlast the end of operations are a possibility. The need to reconcile natural values with the interests of various industries and safeguarding Sámi culture are key challenges related to the environmental friendliness, social responsibility and acceptability of the extractive industry's operations.

Account has been taken of the challenges faced by the extractive industry in the work currently in progress to amend the Environmental Protection Act (EPA) and update the Guidelines for Environmental Impact Assessment (EIA Guidelines). The guidelines for ore prospecting and mining operations in protected areas, the Sámi homeland and in reindeer herding areas are also being updated. The extractive industry is also examined in the Material Efficiency Programme currently under preparation.

International cooperation is being pursued in various fields, with participants from a range of actors in the forums of politics, research, organisations and businesses. Nordic cooperation is being implemented through the NordMin project, among others. Significant groups making raw materials policy at EU level include the European Innovation Partnership on Raw Materials (EIP-RM) and European Technology Platform on Sustainable Minerals (ETP-SMR). The Network on the Industrial Handling of Raw Materials for European Industries (ERA-MIN) and the EIT-KIC (EIT=European

Institute of Innovation & Technology, KIC=Knowledge and Innovation Communities) central network for competence and innovation currently under preparation are also important forums of cooperation. In addition, Finland is involved in the Extractive Industries Transparency Initiative (EITI) established in 2003.

The mining industry

There are 12 metal ore mines operating in Finland at present. Industrial minerals are extracted from around 30 mines. In 2012, the estimated turnover of the mining industry was in the region of EUR 1.5 billion. According to preliminary assessments, the turnover of metal ore mines was in excess of one billion euros in 2012. The mines employ approximately 4,500 people directly, if subcontractors operating in mining areas are included. EUR 87 million was invested in prospecting by 45 companies. Approximately a dozen significant projects are under way, with the aim of launching new mines or expanding mines that are already operating. If all of these were realised, the investments for these projects would be in the region of three to four billion euros. All of these projects are slated for implementation in the current decade. It is estimated that the industry will need some 5,300 new professionals by 2022. These projects are mainly located in Northern and Eastern Finland.

Aggregate industry

Slightly more than 600 new soil extraction permits were issued in 2011 – more than 10% fewer than in 2010. There were more than 6,700 valid soil extraction permits at the end of 2011, authorising the extraction of 1,100 million solid cubic metres of soil. If consumption remains at the level of 2011, the extraction amount authorised by these permits will suffice for the next 20 years. Of the total extraction amount authorised by the permits, 55% consisted of gravel and sand, 43% of rock and 2% of other soil types. There were approximately 2,700 active extraction sites in 2011. Roughly 17 million solid cubic metres of gravel and 14 million solid cubic metres of rock were extracted from these sites. In addition to extraction from authorised extraction sites, a significant amount of crushed rock was extracted in connection with major construction projects. These figures are not included in the authorised extraction amounts. The estimated total use of gravel and crushed rock, including non-authorised extraction, was in the region of 90 million tonnes in 2012. There is significant regional variation in the sufficiency of reserves. In many places, there is already a lack of good-quality natural gravel in the vicinity of major population centres. Aggregate extraction is local in nature, since logistics costs account for a significant portion of the product's price. Aggregate contracting companies refine the aggregates at their own production facilities.

The natural stone industry

The natural stone industry includes the quarrying of stone and refining it into end products. In 2011, the natural stone industry had a turnover of EUR 232.5 million,

of which quarrying accounted for EUR 62.3 million and the manufacture of end products for EUR 170.2 million. There were 330 branch offices active in the industry. In 2011, the natural stone industry employed 1,570 people and quarried more than three million tonnes of natural stone, of which 747,109 tonnes was refined further. The natural stone industry is dominated by small enterprises. Almost 90 per cent of these companies employ less than 10 people. The share of exports in the industry's turnover was approximately 35 per cent. Approximately 60 per cent of quarried granite is exported, mostly as semi-refined, massive blocks. Natural stone quarries also generate significant amounts of waste rock, since only 5–40% of extracted stone is refined into blocks. The increase in international trade has intensified competition in the industry. China and India are by far the largest producer countries, with China USA and India using the most stone products.

Metal processing

A high-level, environmentally responsible metal processing cluster exists in Finland. According to Statistics Finland (TOL 24), the metal processing industry's turnover in 2011 was EUR 7.8 billion and the industry employed 14,670 people. The Finnish metal manufacturing industry is dependent on the import of raw materials. Of Finnish metal ore production, only the production of chromium concentrate is sufficient for the needs of the domestic refining industry. In 2011, the degree of self-sufficiency in nickel, zinc and copper concentrates was around 27%, 15%, and 11%, respectively. The new mines will improve the degree of self-sufficiency. In addition to the concentrates from mines, recycled metal is also used in metal processing. In the refining chain, metal-processing companies are followed by an extensive and versatile group of machinery and equipment manufacturers.

The technology industry and services related to the minerals industry

The Finnish extractive industry's expertise in equipment and technology is of an internationally recognised high standard. It has been estimated that Finland and Sweden together provide approximately 80 per cent of the technology used in underground mines worldwide. A growing number of smaller enterprises offering specialised technologies and services has recently emerged alongside the globally known major companies. In addition to the traditional fields of excavation and concentration technology, high-technology solutions have become available for ore prospecting, process adjustment and monitoring the state of the environment. There is an extensive selection of services available for the extractive industry, from planning, maintenance and material handling to the operational monitoring of entire mining and concentration facilities. The technology and services sector has potential for growth in the export market.

Recycling

According to life cycle thinking, the raw materials contained in products are reused or used to produce energy when the product is no longer used. Although

Finland's recycling infrastructure has been developing throughout the 2000s, significant development requirements still remain. The largest potential store of raw materials is contained in the waste rock heaps of mines and natural stone quarries. Cooperation exists between the waste management sector and the extractive industry. Recycling technology is constantly being updated, and new business has been created in the sector. The recycling of metals has a tradition of efficiency. The most recycled material in the world is steel. In Finland, for example, more than 90% of decommissioned steel products are recycled as raw material for the steel industry. The challenges faced by recycling metals include complex and short-lived products and materials, which contain metals in an impure form. Tightening material-efficiency and waste-processing requirements will increase recycling in the future, and affect the development of the extractive industry. Within the EU, recycling must be increased to a minimum of 50 per cent of the weight of, for example, metal waste by 2020. Recycling and recycling technology are globally growing industries.

3 Competitiveness through sustainability

Long-term investment in safety management and the management of environmental impacts reduces risks related to business operations and plays an important role in ensuring the functioning of efficient processes. Safe production facilities also meet their production targets better. Proactive risk management by companies and finding solutions to problem situations also increases public and official trust in the company's operations.

All industrial activity leaves a mark on the surrounding nature and community, and balancing social, economic and environmental effects is often challenging for the extractive industry. More emphasis must be placed on the prevention of environmental damage and the conservation of natural values over the entire life cycle of mining operations. Companies must develop and implement best environmental practices and integrate them into strategies and management systems. Projects must be planned in a proactive manner from the beginning, in order to ensure that they respect the limits set by environmental and conservation legislation. The demands made by stakeholder groups to minimise the environmental impacts of industrial activities have also grown.

Cooperation based on life cycle analysis and covering the entire value chain offers possibilities to exploit the best practices of several sectors. The target is no longer the minimum requirement set by legislation; rather, companies want to be pioneers and leaders in matters of responsibility. This is the best way to safeguard the continuity of profitable business, both in the short and long terms.

With regard to domestic mines and quarries, it is a question of developing comprehensive operating methods that serve the whole and of committing company executives to voluntary actions that support sustainable development. By investing in the development of environmentally friendly extractive industry in Finland, growth potential can be created for the export of Finnish technology and services. Communications and dialogue play a key role in the development of environmental friendliness. The requirements of other operating environments cannot be applied to Finland without modification. The development of best practices for mining companies and aggregate producers is also a question of highlighting the good practices observed in the quality and management systems of the traditional Finnish process industry. Another important objective is the evaluation and import of operating models developed and tested elsewhere.

The extractive industry's own measures aim at first-class performance on top of what the legal framework requires and what Finnish expertise and technology enable.

3.1 Continuous improvement

Current best environmental and other practices, and the development needs of environmental and safety management, create a foundation for reinforcing the extractive industry's sustainability. The objective must be to continuously improve operations in order to minimise environmental impacts. Current methods used and statutory requirements applied are not the target state, but merely a foundation for new improvements. Positive examples from other sectors and abroad, of ways of reducing the environmental impacts of operations and improving the safety of extractive operations, must be applied more effectively.

Efforts must be made to develop and more effectively utilise technology's potential for reducing the environmental impacts of extractive operations. The general objective is to enhance resource efficiency. Particular investment is required with respect to increasing the total metal intake in production and the management of the water balance, tailings and waste facilities at mines. The goal of water management must be a closed process-water circuit and dispersed water treatment, as well as the systematic evaluation and monitoring of the impacts of operations on water systems. The objective of tailings and waste-facility management is to sort waste according to its properties and to further refine the most environmentally detrimental waste sections into the most harmless form possible. Better account should be taken of recycling and reuse in the planning of production and products. The environmental risks presented by methods, and their effect on the amount of emissions, should be taken into consideration when comparing alternative exploitation and concentration methods.

Measures

- 1. The creation of water-management plans for mines and the development of water technology** Existing mines shall conduct a water review, in which the mine's water balance is determined, including rain water and water use, release, treatment and recycling. More attention shall be paid, at the planning stage, to the water management of new mines. Based on the water balance, a water management plan shall be created, which must include monitoring measurements and the updating of the water balance model. The objective is to keep the various water sections separate and to implement a closed circuit for process waters. Water technology development projects shall be invested in. On the basis of these practices, possibilities for supporting the identification of national and international best practices from public funds shall be investigated and dynamic water balance models for use by companies shall be developed.

Responsible party: Mining companies

Indicators: company's water footprint, water balance models are actively used in the EIA and environmental permitting phases, as well as in the monitoring of operations. Active projects for the development of water technology.

2. **Activities and research related to the sorting of waste and the utilisation of tailings and waste rock shall be increased.** The objective is to characterise solid wastes sufficiently well by using methods such as the existing EU documents on methods, and to utilise usable waste rock in aggregate production and refine waste sections into new products and a harmless state, to the greatest extent possible.
Responsible party: Mining companies, the dimension stone industry
Indicators: Enough is known about the characteristics and long-term behaviour of materials dumped in waste facilities.

3. **The energy-efficiency of the extractive industry shall be developed systematically.** A review procedure suitable for mines and quarries shall be developed, the reviews carried out, solutions to identified problem spots sought and developed and the development of energy efficiency reported on.
Responsible party: Extractive industry companies, Motiva, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries)
Indicators: Energy consumption has been reduced, the energy generated by processes is utilised

4. **The safety of mines and quarries and the related competences shall be developed.** In addition to executing development measures to improve the safety of individual mines and quarries, mining companies shall actively participate in the activities and development of FinnMin's advisory council. Safety training shall be coordinated between companies, educational institutes and universities. Crisis-management guidelines, readiness and risk management shall be improved.
Responsible party: Extractive industry companies, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries), employers' unions
Indicators: The number of accidents is close to zero

3.2 Active dialogue with stakeholder groups

Sustainable business operations that take the requirements of sustainable development into account, and the social acceptance earned thereby, are critical success factors for the entire natural resources industry. Finnish legislation, administrative culture and common procedures require openness and a capacity for active dialogue with stakeholder groups from mining companies. The acceptance of society must be earned. The support of surrounding society can be lost quickly if the communication of plans, impacts or risks related to operations is not sufficiently rapid and clear, or the significance of genuine dialogue is not recognised.

Reassessment of the role of extractive operations and their alignment with other social interests requires the industry to explicitly develop, and present the public with, operating models and development measures for building sustainable profitability. At the same time, the continued success of the entire cluster will be ensured. The export of competence, technology and even administration requires the constant improvement of operations and knowledge of the sector.

Finding, identifying and implementing synergies between local government, entrepreneurs, land owners and other stakeholder groups is an integral part of the operations of functional mining companies and the aggregate industry. Systematic and proactive dialogue with stakeholder groups supports the financial sustainability of the extractive industry, helps minimise environmental impacts and reduces negative social effects. Diverse cooperation with stakeholder groups reinforces trust and improves predictability and general operating possibilities.

Improving the attractiveness of the extractive industry requires active measures from companies in the industry. School visits to companies, offering summer internships for students of all levels, company visits to educational institutes and universities, and offering thesis subjects to students can improve the industry's attractiveness. Diverse interaction will make young people feel that the company is taking an interest in them and offering an intriguing future working environment, and that the extractive and the entire related value chain represent high technology, sustainable development, good working conditions, internationality and leadership.

It is a general objective for the extractive industry to influence the discovery of diverse synergies and the reconciliation of interests, through proactive interaction. Companies in the extractive industry shall determine the objectives of social responsibility and commit their management to them.

Measures

- 5. CSR programmes shall be adopted by companies and applicable indicators, reporting and monitoring developed.** Indicators for the sustainable extractive industry shall be developed by making use of existing international indicators and applying those most suitable for large and small Finnish businesses. Extractive industry companies shall adopt CSR programmes and reporting, making use of the specified indicators. Shared guidelines for CSR procedures shall also be drawn up, in order to commit subcontractors to the CSR objectives of the extractive industry. An extensive cooperation body for sustainable extractive operations shall be established to support the CSR work carried out in extractive industry companies and to define, develop and monitor indicators and guidelines.

Responsible party: Extractive industry companies, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries), the cooperation body

Indicators: Indicators have been defined, guidelines and reporting are widely implemented by companies

6. Active, diverse and interactive dialogue shall be carried out with various stakeholder groups. International best practices in interaction, indicators and various guidebooks, such as the Reindeer Herders' Association's guidebook for taking reindeer herding into account in the planning of land use projects, shall be used in the planning of mining, the evaluation and mitigation of environmental and social impacts and the reconciliation of different lines of business. Guidelines for recognising and involving stakeholder groups shall be drawn up, with small ore-prospecting companies and aggregate contractors as the target group in particular. Interactive stakeholder group cooperation includes regular meetings with residents and stakeholder groups, taking the form of open-house events, training days or discussions open to the public. On the other hand, companies should also interact actively with wider society. Diverse cooperation with educational and research institutes provides opportunities for developing the industry into an interesting future working environment, which represents long-term thinking, high technology, sustainable development, internationality and leadership throughout the value chain.

Responsible party: Extractive industry companies, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries), the cooperation body for sustainable extractive operations, KaivosAkademia (the Mining Academy)

Indicators: Guidelines applicable in Finland for identifying stakeholder groups, stakeholder events reported on by companies, cooperation between companies and educational institutes

7. **Synergies with local actors shall be sought actively.** The use of local sources of energy and biofuels shall be increased by actively seeking synergies and cooperation with energy producers currently or potentially active in the area (e.g. wind power, biogas). Networking days for potential subcontractors shall be held in mining or quarry towns, with the objective of aligning the needs of the extractive industry with the service offering of local entrepreneurs. The results of the recommendations and surveys of needs for CSR research projects currently under way shall be used in the local distribution of prosperity.

Responsible party: Extractive industry companies

Indicators: Local actors as subcontractors, share of local renewable energy

3.3 Open communications

Even though achieving acceptance for the extractive industry requires systematic investments in responsibility, reputation management and communication and education work have an extremely important role in gaining wider social acceptance for the extractive industry, particularly in the short term. Companies can start

improving their public image by highlighting best environmental practices already implemented by them and by investing in providing training for key stakeholder groups and media representatives in matters related to the extractive industry. The objective is to make the extractive industry a recognised and respected place to work.

In Finland, the development of the communications of mining companies has been neglected somewhat. This is due to the rapid change undergone by mining operations and the requirements set by Finnish legislation, which direct operations in an administration-oriented manner.

It is also worthy of note that mining investments, which require considerable amounts of capital, tend to favour reporting and communications in a form based on stock market regulations, preventing communications from satisfying the information needs of local residents and the general public. The current legislation is divided by sector and requires extensive interaction, but with respect to administration rather than local residents.

Gaining society's trust requires open and up-to-date communications from the extractive industry at the planning stage of projects, after the start of operations and upon their conclusion, in connection with matters such as the monitoring of environmental impacts.

Measures

8. Companies' communications shall be developed in a more rapid and open direction. Companies shall develop new operating methods for collecting and refining information, and adopt communications channels that take account of various stakeholder groups. A key development area is the amount and presentation of information on company websites. Material such as various reports and plans, including EIA reports and the related studies, shall be published on company websites. Making EIA information public will render materials mutually comparable and increase the transparency of the permit process. Companies shall also strive to collect real-time environmental data (online analyses) and to distribute that data through their websites.

Responsible party: Extractive industry companies

Indicators: Company images, materials published on websites (e.g. EIA reports and studies published on the websites of all companies)

4 A stable operating environment supports sustainable development

Finland is an excellent operating environment for the sustainable extractive industry. This represents a significant strength for us when international mining companies, financiers and customers evaluate operating environments and country risks.

Leadership in an economically, socially and environmentally sustainable extractive industry requires long-term planning and a sustained effort from all stakeholder groups. A functional, open and clear administrative culture, competence capital, functioning infrastructure, predictable political climate and well-documented mineral deposits create excellent conditions for attracting mining investments to Finland. Financing costs are a crucial factor in the implementation of mining projects. The fact that Finland wants to safeguard the purity of nature, safety, good administration, transparency, democracy and comprehensive raw materials management creates predictability and stability, which mining operations need in order to develop.

4.1 Promoting good administration

Good administration is particularly important to the citizens of our country and the environment, defenceless in itself, whose interests authorities have been appointed to oversee. The public administration of the extractive industry should form a clear overall picture of the management of natural resources and the resilience of the environment, and use this picture in the planning of land use.

Avoiding strong conflicts of interest is in the interests of society as a whole, as well as being a necessity with regard to the sustainable development of the extractive industry. As a rule, no industry can be set above the rest when interests are being valued and reconciled. It is not acceptable for the development of one industry to cause significant damage to the environment or other industries. Conflicts of interest can endanger the development of a positive investment climate for the extractive and other industries. Seeking positive coexistence, reducing conflicts of interest and reconciliation is in the interests of all parties. Society must nevertheless create operating models for weighing up the interests of various businesses, such as the extractive industry, ecotourism, recreational land use and reindeer herding, and to prevent, reconcile and reduce conflicts of interest.

The objective is to ensure that as many actors as possible intercede in time to reduce and prevent such conflicts. Application of an arbitration procedure, and voluntary action to reduce conflicts, are of paramount importance. However, clear

and equal rules to support the current predictable and reliable investment climate, and safeguard the maintenance of protected areas and national parks, are required at the same time. Conflicts must be reconciled and, if necessary, solved at an early stage through land use planning.

The public administration related to extractive operations functions transparently, efficiently, predictably and well. Administration must facilitate the creation of constructive dialogue within the extractive industry during the entire life cycle of the mine or other operation. Detrimental environmental impacts must be prevented proactively and efficiently, which requires a comprehensive evaluation and understanding of the risks involved in the operation.

These goals can be approached by increasing openness and the understanding between authorities and permit applicants. Everything must be built on the citizens' trust in the administration and authorities. Key objectives and, at the same time, methods of achieving them include improving the quality of permit applications, clarifying the permitting procedure and observing best practices. Other objectives include expediting the permitting process, improving the competence of authorities and actors and increasing mutual understanding, including in challenging and new situations.

Substantive legislation and the roles of the various authorities and their mutual relationships should be clarified. The goal is to achieve smooth, rapid, intelligible and, to the greatest possible extent, mutually supportive administrative processes. This would also decrease the number of appeals made against decisions.

The rapid rise of the extractive industry has significantly increased the requirement for related administration. Correspondingly, administrative resources have diminished sharply due to budget cuts in central government. Measures to ensure the availability of sufficient resources for the evaluation of the extractive industry's environmental impacts, the processing of permits, monitoring and official advisory functions are needed in particular.

Measures

- 9. The authorities' current roles and processes related to permitting and oversight shall be unambiguously described.** The tasks and roles of the various permit and oversight authorities with responsibility for the extractive industry shall be identified. This will create a comprehensive list of official services related to the extractive industry. Based on this list, the functions of the extractive industry shall be described as customer-to-customer processes, in line with guideline JHS 152 published by the central government's Advisory Board on Information Management. A motion shall be prepared for expediting the permitting processes in the extractive and aggregate industries and clarifying legislation and the roles of authorities, including with regard to what is termed an official advisory role.

Responsible party: Ministry of Employment and the Economy, Ministry of the Environment, Ministry of Agriculture and Forestry, Finnish Safety and Chemicals Agency (Tukes), Centres for Economic Development, Transport and the Environment, Regional State Administrative Agencies

Indicator: A comprehensive and high-quality description, shortened permit-processing times

10. **The steering effect of the national land use guidelines (NLG), programmes and national inventory materials on the planning of land use shall be increased.** The national land use guidelines (NLG) shall be revised in order to increase the anticipatory capacity of land use steering, so as to include the most significant potential ore deposits and the deposits most crucial to the aggregate supplies of communities, as premises of land use planning in addition to conservation targets and other reconciliation objectives. At present, different industries and, for example, natural values are considered separately within the NLGs - but the natural resources are not dealt at the same level. Special care shall be taken to observe the NLGs in the steering of land use planning, and their steering effect shall be reinforced. The possibility of reinforcing the state's role in the reconciliation of nationally significant functions during the planning of land use shall be investigated. The know-how of planners shall be increased by drawing up guidelines for ensuring aggregate supply and dimension stone production in regional land use planning.

Responsible party: Ministry of the Environment, regional councils, industrial organisations, Centres for Economic Development, Transport and the Environment, Geological Survey of Finland (GTK), Finnish Environment Institute (SYKE)

Indicators: Updating the NLGs is under way, updated NLGs should be available by 2020

11. **The impacts of planned mining projects on valuable natural environments, such as conservation areas or endangered or rare environments, and the operational preconditions of local industries such as tourism, shall be determined.** This survey will provide background information for reviewing any additional steering mechanisms required to reinforce the protection of the projects' immediate environments, in order to safeguard local businesses and nationally significant natural values. The survey shall be carried out and evaluated by reviewing sample projects.

Responsible party: Strategic Programme for Cleantech, applicable ministries

Indicators: The assessment has been carried out and the need for additional steering mechanisms determined

12. Processes and methods shall be developed, and regional knowledge and understanding of impacts charted in ore-critical areas and regions vital to stone and mineral supply, in order to support reconciliation.

Regulations and obligations that govern land use planning shall be developed in order to enable open and constructive discussion of the uncertainties related to the development of industries, while ensuring that land use planning will lead to decisions quickly. Account shall be taken of the reconciliation of different industries, natural values and transport solutions and the management of conflicts of interest, when amending the Land Use and Building Act. A survey shall be carried out to collect experiences on diverse interaction methods and their functionality, gained from realised and current land use projects, and to chart ways of adding more detailed interaction methods to the land use planning process, in order to enhance the involvement of stakeholder groups and the management of conflicts of interest. Best practices for voluntary and regional reconciliation are included in, for example, the Reindeer Herders' Association's guidebook on taking reindeer herding into account in land use projects. The possibility of implementing an arbitration procedure for situations where local and regional voluntary reconciliation has not been successful shall be investigated. An extensive evaluation of the state of the environment and nature in areas critical to society's stone and mineral supply, as well as the base state of business life, employment and the regional economy in these regions, shall be carried out as a national project. These surveys will provide greater capabilities for recognising and resolving potential conflict situations before land use planning or projects are begun, as well as background information on the appropriateness of any additional steering mechanisms required.

Responsible party: Ministry of Finance, Ministry of the Environment, Ministry of Employment and the Economy, Geological Survey of Finland (GTK), Finnish Environment Institute (SYKE), extractive industry companies, other industries, municipalities, regional councils, stakeholder groups

Indicators: Voluntary practices are actively used to support planning, the land use planning process has developed and the use of sound interaction methods has increased, survey data are available before the start of projects

13. The availability of adequate technological and financial resources shall be ensured for permit and oversight authorities.

Information management shall be developed as part of the overall framework of information management within the extractive industry (measure 35). National technological tools shall be developed for assisting in data collection, oversight and the better steering of functions. Information systems shall support functions such as electronic application procedures for permits, the systematic collection of data on the environment and environmental impacts, and the monitoring of mineral raw material, aggregate and dimension stone resource use. The budget funding of permit and supervising

authorities shall be increased, and the oversight required by the Environmental Protection Act and other legislation, shall be made subject to a fee. Flexible use of human resources must be increased by enabling the use of personnel from other administrative branches in temporarily overburdened areas. The possibility of transferring part of oversight duties to independent auditing organisations authorised and monitored by the authorities shall be investigated.

Responsible party: Ministry of Employment and the Economy, Ministry of Forestry and Agriculture, Finnish Safety and Chemicals Agency (Tukes), Centres for Economic Development, Transport and the Environment, Regional State Administrative Agencies, Ministry of Finance

Indicator: Technological tools, the resources available to authorities, services subject to a fee, shortened permit-processing periods

14. **Guidebooks shall be produced for stakeholder groups, describing their possibilities for influencing and participation in decision-making, and for industry actors on the application of legislation.** Instructions on participating in the various stages of a mine or quarry's life cycle – prospecting, establishment, operation and decommissioning – shall be drawn up for stakeholder groups. Land use planning, for example, has a significant influence on the development of society, and it is vital that stakeholder groups are able to participate to a sufficient extent. In order to increase the timely participation of stakeholder groups in land use planning, their awareness of land use planning and its significance, the land use planning authorities and process, as well as of participation in that process, shall be increased. A guidebook shall be produced for municipalities, in whose area ore prospecting is to take place or mines are to be opened. The guidebook shall include a comprehensive description of the planning process for industrial-scale mines, guide the municipality in municipal land use planning for extractive operations and provide practical advice on arranging key services such as schools, day care, housing and health care. Methods for the systematic evaluation, modelling and monitoring of the environmental and social impacts of the extractive industry shall be defined and, if necessary, developed, in order to provide companies with uniform guidelines or standards on how such impacts should be assessed. Instructions and a model for creating a good permit application shall be produced – "Best Practice Permit Application for the Extractive Industry". The guidebooks shall be updated and training organised as required.

Responsible party: Ministry of Employment and the Economy, Ministry of the Environment, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuuslitto ry (Association of Finnish National Stone Industries), KaivosAkademia (the Mining Academy), environmental organisations

Indicators: The guidebooks and models are in distribution, in electronic and printed formats

4.2 Leadership through competence

The sustainable development and leading role of Finland's extractive industry requires strong investment in the long-term, as well as diverse training and research. The extractive industry has need of top experts, in order to prosper internationally and develop into a pillar of prosperity for Finland. Several recent studies have indicated that one of the greatest challenges to the growth of the extractive industry is the sufficient availability of skilled labour. The sustainable growth of the extractive industry also requires new research data, with which the ever stricter requirements of the market and society (e.g. environmental protection and occupational safety) can be met. The industry needs strong basic and applied research, carried out at both institutes of higher education and research institutes.

Developing training and research related to the extractive industry does not concern mines only, but the entire extractive cluster and its value chains. Matters such as recycling, material and energy efficiency, low-carbon energy, environmentally friendly solutions, management of environmental risks and the export of technology shall be taken into account in the various stages of an extractive operation's life cycle - from ore to metal and from rock to aggregate and stone products. Training and research shall anticipate future requirements from the perspectives of the life cycle and circulation of material, with the extractive industry forming part of the circulation of materials.

Diverse expertise in basic sciences, such as thermodynamics, electrochemistry and the material and geological sciences, is crucial to successful innovation in new raw material processes. The diverse expertise requirements of the extractive industry shall be taken into account at all levels of education. The objective is for education and research to correspond to the industry's development needs. Companies must be capable of communicating their future needs directly to educational establishments and institutes of higher education, at an earlier stage and in a more concrete fashion than now. In order to ensure the sufficient availability of competent labour, training for the extractive industry must be increased in vocational colleges and universities of applied sciences. Increasing training requires extractive industry companies to take the initiative and directly communicate with the schools, so that technical education can be focused to correspond to the regional labour needs of the extractive industry. Apprenticeship training should be developed further in order to make it a viable professional path for gaining employment in companies in the extractive industry. Training events for the extractive industry are required for various stakeholder groups, such as authorities, administration experts and media, in order to provide an understanding of the industry's special characteristics and to update information.

The success of the extractive industry requires strong research throughout the cluster. International cooperation with leading mining countries must be emphasised in research activities. Cross-disciplinary research - such as research that combines expertise in the technical, natural and social sciences - will create

many new possibilities for the development of the industry's environmental and energy solutions and the study of social impacts. With increased internationality and cross-disciplinary research, the latest results in the field will become available to the Finnish extractive industry.

The extractive industry and its entire value chain shall be elevated into a focus area for research organisations that fund studies related to the industry. This will also promote the study of practices to reduce environmental impacts. The Finnish Funding Agency for Technology and Innovation Tekes has focused research funding on the extractive sector through the Green Mining programme. More financing and following up on these programmes is required, as is similar focusing of funding from the Academy of Finland. The share of EU funding in extractive research can be increased significantly, following the launch of research, expertise and innovation projects focusing on raw materials. Examples of EU initiatives include the EIP-RM, ERA-MIN and EIT-KIC programmes. Companies should also commit more fully to research. A particular challenge lies in getting foreign companies operating in Finland involved in research activities. The effectiveness of public measures in promoting sustainable mining operations should also be studied.

Measures

15. A training plan shall be created and maintained for the extractive industry.

The objective is to increase the amount of available know-how and labour to correspond to the requirements of the sustainable extractive industry. Labour requirement studies must be taken into account when determining the number of study places: more than 4,000 employees with a vocational education, approximately 700 engineers and 600 people with university degrees in various fields will be required in the mining industry by 2022, for example. More varied account must be taken of the extractive industry in the curricula of vocational colleges, universities of applied sciences and universities. The syllabuses of primary and secondary education, the amount and content of adult and complementary education, and tools for providing training fulfilling specific requirements must be developed and account must be taken of the various substance areas required. Ways of increasing international cooperation and mobility shall be ensured in the strategy, particularly through existing scholarship systems, by enhancing international teaching cooperation between Masters' schools, through "travelling schools" for students and by means of diverse recruitment.

Responsible party: Ministry of Education and Culture, all levels of education, companies and organisations, stakeholder groups

Indicator: The completion and topicality of the strategy

16. A research strategy shall be prepared for the extractive industry, comprising key fields of research and the development of research

infrastructure. The use of various financing instruments and their development in support of the sustainable extractive industry shall be outlined in the strategy. Matters such as research programmes of Tekes and the Academy of Finland that constitute international top research, Strategic Centres of Excellence, the establishment of a national doctoral studies programme for the extractive industry, venture capital for top research in the sustainable extractive industry and long-term support for research, shall be examined at national level. Nordic cooperation shall be increased within the framework of the NordMin project. In addition to European sources of funding (e.g. the ERDF/ESE, Framework Programme and EIT-KIC, EIP-RM, ERA-MIN, Life follow-up), account shall be taken of the potential for cooperation with leading countries outside Europe, such as Canada and Australia. Key research subjects, on which domestic research infrastructure will be focused through instruments such as R&D&I programmes, shall be specified in the strategy. Strong expertise in different fields of basic research shall be combined within these programmes. Examples of key research subjects include resource efficiency (e.g. the creation of new value chains from existing side and waste streams generated by mining, concentration and refining, or from low-quality materials or new metals), the reduction of environmental impacts (e.g. methods and technologies for deeper excavation), models for collecting financial and other indicators of regional impact data during the life cycle of industries, and methods of commensurate mutual evaluation.

Responsible party: Research institutes, universities, universities of applied sciences, extractive industry companies, organisations, stakeholder groups, Finnish Funding Agency for Technology and Innovation Tekes, Academy of Finland

Indicators: Up-to-date strategy, realised research projects, improved knowledge base, new technology that is cleaner and more competitive

17. Cooperation between various actors shall be enhanced and a division of labour and specialisation agreed on.

Cooperation between companies, educational institutes and research institutes in fields related to the extractive industry shall be consolidated. With regard to the consolidation of cooperation, the key issue involves reviewing strengths and the infrastructure and agreeing on the division of labour on that basis. The objective is to eliminate redundancies, cooperate in the field of education by allocating material resources according to specialisation, focus research cooperation in areas where we need to reach the top, and to exploit the shared research infrastructure of universities and sectoral research institutes in the extractive industry. A process for determining the possibilities created by cooperation and specialisation shall be agreed on. Universities of technology will pilot the concrete division of labour.

Responsible party: Universities, universities of applied sciences, other educational institutes, research institutes

Indicator: The study has been completed and cooperation and fields of specialisation agreed upon.

4.3 Towards sustainable use of raw materials

Finland has diverse mineral resources, but their location, magnitude and quality is not known in detail. Future deposits will probably be harder to find and exploit, poorer in concentration or be located deeper. The critical resources, changing needs and raw material prices of the future can be difficult to predict. Developing a deposit into a mine takes a minimum of five years, but the mine can operate for decades. Safeguarding the availability of minerals requires more precise geological data and solid overall management of deposits. In addition to domestic production, the availability of imported raw materials and metal and mineral products, as well as their reuse and recycling, must be ensured.

Without effective ore prospecting, there will be no mining in the future. Prospecting is a long-term, capital-intensive activity, which requires venture financing. Most prospecting projects do not lead to mining. The environmental impacts of prospecting are negligible if the environmental and natural values of the prospecting area are known and taken into account. Maintaining a high level of investment in ore prospecting requires new prospecting innovations produced by research, a competitive operating environment and active promotion.

Aggregate has been specified as a locally critical material at EU level. The profitable logistics distance for aggregate is no more than a few dozen kilometres. Aggregate business is thus nearly always local in nature, serving the needs of local construction. Aggregate operations compete with the community's other forms of land use. The key critical factor in aggregate production is the availability of the right materials close to the consumer. There is strong international demand for the products of the dimension stone industry. Finland is well known as a producer and exporter of granite and a world market leader in soapstone products. With regard to safeguarding the availability of aggregate and dimension stones, it is vital to develop land use planning, the permit procedure, material and energy efficiency and logistics. Additional challenges faced by dimension stone production include increasing the profit ratio and promoting exports.

The products of extractive operations can usually be recycled, but a significant amount of side products and waste is created by primary production. The efficient use of material streams requires knowledge and consideration of the life cycle (material circulation) of materials in primary production, recycling and product planning. The goal must be a continuous circulation of material (raw material - product - recycling - product), producing the minimum amount of unusable waste and creating new applications for side and waste materials.

In order to limit the growth of the amount of side materials and waste created by extractive operations, concentration and refining and to replace the use of primary raw materials, the exploitation of existing side material and waste stockpiles must be promoted and the generation of new, unusable stockpiles prevented. Increasing overall resource efficiency requires the elimination of obstacles to recycling and reuse, development of procurement procedures and innovative research and development work. The rate of utilisation is monitored, and evaluated with regard to the promotion of sustainable extractive operations, through data collected on the amount, quality and location of material stockpiles.

Measures

- 18. Long-term charting and modelling of stockpiles shall be carried out and the availability of sufficient resources ensured.** With regard to metals and minerals, for example, three-dimensional materials and ore potential forecasts shall be prepared for major prospecting areas. The roles of various actors in charting and modelling shall be clarified and the sufficiency of public resources ensured on that basis. Investments in research and charting will primarily be focused in areas in which the prerequisites for actual mining operations exist without causing damage to areas that are particularly crucial to biodiversity.
Responsible party: Ministry of Employment and the Economy, Geological Survey of Finland (GTK), (ore prospecting) companies
Indicators: Extent of prospected area, new deposits
- 19. Obstacles to recycling shall be identified and eliminated and instruments, steering methods and incentives created for the recycling and reuse of side rock, tailings, construction masses and mineral products.** New definitions in accordance with the Waste Act shall be adopted with regard to aggregate, and the need for amendments to current legislation shall be determined. The key issue is the dismantling of obstacles related to waste legislation and the cost-effective arrangement of logistics, in order to ensure that materials can be processed and transported to where they can be put to use. Recycling and reuse can be increased through financial steering, which can take the form of subsidies or waste charges. Utilisation of side rock generated by dimension stone quarries, for example, could be promoted by making the side rock and products manufactured from it eligible for transport subsidies. By encouraging industrial symbioses and creating a material data bank, it is possible to illustrate and facilitate life cycle thinking in the planning of production and product design. The long-term availability of good-quality aggregate can be safeguarded by allocating first-class aggregate only to the projects that require it. The required measures shall be specified further on the basis of the survey.

Responsible party: The Government, Ministry of Finance, Ministry of the Environment, Ministry of Employment and the Economy, Geological Survey of Finland (GTK), Finnish Environment Institute (SYKE), Motiva Oy, municipalities, Finnish Transport Agency, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries)

Indicators: Survey of obstacles and required measures, implementation of measures

4.4 Competitiveness through development of the operating environment

A growing and sustainable extractive cluster requires solid competence and long-term policies to promote sustainable development and create a positive investment climate, incentives through economic policy and sufficient preconditions for competitiveness. Operating in the international market requires functioning logistics and energy, among other things.

The deliveries of mining products are currently mostly destined for Europe and domestic production facilities, using the existing transport network and the ports on the Bay of Bothnia. Increased transport creates problems such as the deterioration of routes and issues with traffic safety. At present, bottlenecks for deliveries exist in a few sections of the transport network, and the route capacity of these sections needs to be increased as the volume of transport grows. New tracks and the renovation of sections of track closed to traffic are justifiable investments for mines with large transport requirements. Of the mines that will open in the coming years, such mines include those of Sokli and Kolari and, in the longer term, the new mines in Central Lapland.

Creating the logistics infrastructure required for the development of the extractive cluster requires systematic and multilateral decision-making, requiring an assessment of the effects of individual decisions on the entire logistics chain, transport fleet, terminals and routes (roads, railways, ports and sea lanes). Since the infrastructure solutions of our neighbours have a considerable impact on Finland's logistics chain and the development of the extractive cluster, close cooperation is required with Sweden, Norway and Russia.

Ensuring the operational preconditions of Finland's industry requires the availability of energy at a competitive price. Mitigation of CO₂ emissions is another energy-related objective, in addition to reasonable pricing. A harmonised and consistent climate and energy policy will set ambitious targets for energy conservation, without preventing investment in metal and mineral refining processes. At the same time, investments should be made in low-emission production capacity, renewable sources of energy and the energy-efficiency of old and new production facilities.

A high-level, environmentally responsible metal processing cluster exists in Finland. As demand for metals increases, the growth potential of metal refining will present economic opportunities for Finland too. The goal is to refine metals and minerals in Finland that have been excavated here. At the same time, new value chains related to the implementation of new processes and the utilisation and refining of new minerals, and to the side streams generated by the extractive industry, provide opportunities for the creation of new types of clusters and market success.

Threats to the development of metal refining include the possible deterioration of the Finnish investment climate and the international competitiveness of refining operations, as well as the export of concentrates produced in Finland for refining abroad. Since the refining of several metals in Finland is principally based on imported concentrates, refining capacity exists for new, domestic concentrates as well. Finnish raw material production assists in keeping metal refining in Finland. Major new mining projects create a positive opportunity for increasing metal refining capacity.

Measures

20. Transport in the extractive industry and its management shall be developed to be more efficient and ecological, in cooperation with neighbouring countries. The transport connections of existing mines shall be improved by measures to increase traffic safety and improve the condition of routes. Bottlenecks shall be eliminated from sections with heavy traffic. The availability of railway transport shall be ensured for mines and metal refining facilities with large transport requirements. The development of transport needs related to mining operations shall be monitored and the building of new connections prepared for in land use plans. The planning and implementation of transport chains, equipment and routes (rail, road, sea, ports) shall be actively coordinated with neighbouring states. The objective is efficient and environmentally friendly transport.

Responsible party: Ministry of Transport and Communications, Finnish Transport Agency, Ministry of Employment and the Economy, Ministry of Finance

Indicators: Bottlenecks that impede transport related to mining (weight limits, lack of capacity), corporate customer feedback on the transport system (implemented every other year), volume development of different forms of transport.

21. The availability of reasonably priced energy for the extractive industry shall be ensured. A picture of the amount, production methods and distribution forms of energy required by Finland's level of consumption shall be created within the framework of the national climate and energy strategy, Roadmap

2050, drawn up by the European Commission, and based on national targets for reducing emissions. The national electricity transmission grid's sufficient condition and capacity to meet the needs of mining and metal refining industry facilities shall be ensured, as shall the implementation of a predictable and consistent emission rights system. In accordance with Finland's national climate and energy strategy, the adoption of low-carbon energy solutions and the improvement of energy efficiency shall be supported. The Energy-Efficiency Directive shall be implemented proactively. Best practices for various processes shall be determined in cooperation with industry actors.

Responsible party: Ministry of Employment and the Economy, Fingrid

Indicators: International energy-efficiency benchmarking, development of energy prices in international comparison.

- 22. The anticipation, decision-making and funding models of the new transport routes required by mining operations shall be developed.** The development of the transport needs of mining operations shall be monitored and the required new transport routes planned. In transport solutions, the early participation and commitment of the state and agreeing on funding models at an early stage are crucial prerequisites for corporate investment decisions. The principles of participating in funding shall be examined in the future, taking the regional and economic impact of mines into account, in addition to transport-related issues (such as investments and route tolls).

Responsible party: Ministry of Transport and Communications, Ministry of Finance, Finnish Transport Agency

Indicators: Readiness to plan transport solutions, development of route tolls, funding decisions

5 Cooperation will expedite the path to leadership

In addition to promoting domestic growth and prosperity, Finland seeks to offer solutions for the mitigation of environmental damage and to global challenges faced by the minerals chain. Leadership in the sustainable extractive industry and cleantech cannot be achieved without access to the best expertise and resources, as well as the ability to influence international standards and anticipate changes in them. A Finnish sustainable extractive industry would require a solid foundation of expertise, networking and a profile that would create new business opportunities in Finland and in the international market. Achieving a leading role will also require incentives and subsidy methods that take account of the ambitious targets for cleantech and the sustainable extractive industry.

5.1 Strong growth through internationality

The operational preconditions of Finland's sustainable extractive industry can be influenced through international cooperation. Finland should actively implement environmental best practices in the mining industry. Globally competitive, high-quality machinery production, process expertise, service companies and expertise in good government that respects human rights exist in Finland, and these could serve the global development of the sustainable extractive industry in a significant way, including in developing countries. The relative competitiveness of Finnish expertise will improve as material and energy-efficiency requirements, as well as those regarding the environment and safety, tighten globally.

International cooperation and advocacy is aimed at having EU legislation and actions facilitate the development of sustainable extractive operations, particularly in the fields of research and innovation. On the other hand, European and international expertise in the extractive industry should be attracted to Finland, in order to facilitate the development of the industry. Reinforcing the cooperation of Nordic extractive industry companies and those operating in Finland with regard to the supervision of interests and joint export projects is regarded as a major opportunity.

The Nordic Council of Ministers supports the development of a network of excellence for minerals research (NordMin). Parties represented in the network include companies, governments, institutes of higher education and research institutes. The network's objective is to improve the industry's competitiveness and achieve sustainable growth. The Council of Ministers has made provisions for funding the network for a period of three years, starting from 2013.

Achieving the overall objective - making Finland a leader in the sustainable extractive industry - requires Finland to profile itself as a country with an open

administrative culture, sustainable mining operations and clean technology. A good reputation will attract mining, refining and research investments to Finland. Finland should therefore aim to become a significant international cooperation partner that, as a country with a responsible mining cluster, develops good extractive industry administration, best practices and technological applications through economic and design cooperation, including in rising economies and developing countries.

In order to achieve these objectives, we shall organise ourselves, exchange information, acquire partners in Finland, engage in ambitious advocacy at EU level, use the potential of closer cooperation between Finland and Sweden, be active in extractive cooperation in the Arctic and promote the development of the sustainable extractive industry in emerging economies and developing countries. Our national interest demands active advocacy in international forums.

Measures

23. Nordic cooperation within the extractive industry shall be consolidated.

Regular meetings and discussions shall be held between ministers, regarding common interests in the development of the extractive industry and minerals policy. Cooperation in the development of expertise, promotion of exports and EU advocacy shall be increased, as shall Nordic cooperation between organisations within the industry. Nordic research cooperation shall be facilitated and shared instruments for funding research developed, making use of the NordMin network, for example. Regular match-making events shall be organised in order to develop cooperation between small and medium-sized technology and service companies in the Finnish and Swedish mining clusters, with the long-term objective of creating a shared Nordic mining cluster.

Responsible party: Ministry of Employment and the Economy, the Government, Ministry of the Environment, VTT Technical Research Centre of Finland, Finnish Funding Agency for Technology and Innovation Tekes, Finnish Association of Extractive Resources Industry FinnMin, extractive industry companies

Indicators: Meetings, joint activities and projects

24. Finland shall participate actively in the preparation of new initiatives and programmes for the sustainable extractive industry in the EU.

Through active participation, we shall influence decisions such as steering programme contents to support the development of the sustainable extractive industry. Supervision of the extractive industry's interests in the EU shall be reinforced by maintaining an active dialogue with the Commission's unit and department responsible for matters related to raw materials. Finnish actors shall be actively encouraged to apply for ERA-MIN and Public-Private-partnerships within the scope of the HORIZON programme. We shall advocate the establishment of ERANET PLUS for the extractive industry. We shall support EIP cooperation within the raw materials industry, by gathering Finnish EIP actors together

and creating an EIP cooperation network within the raw materials industry. The Extractive Industries Working Group shall be tasked with coordinating the monitoring of EU advocacy.

Responsible party: Ministry of Employment and the Economy, Ministry of Education and Culture, VTT Technical Research Centre of Finland, Geological Survey of Finland (GTK), Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries)

Indicators: A person participating in the preparation of each major initiative

25. **The development of the sustainable extractive industry shall be promoted through advocacy and prominence in international forums.** Taking the development of EU regulations into account, action shall be taken to meet the standards of the Extractive Industries Transparency Initiative (EITI) in domestic extractive operations. The objective is to achieve approved compatibility with EITI standards for Finland's national operations, and to report on those operations in accordance with the standards. The development of the sustainable extractive industry and the related expertise shall be promoted in the Arctic Council. Political, administrative, scientific and corporate cooperation with Canada (chair of the Arctic Council in 2013) in developing mining operations in the Arctic shall be agreed on. The role of the sustainable extractive industry in Finland's Arctic Strategy, in which the ecosystem approach is applied to planning of the use of Northern areas and their national resources, shall be safeguarded. Cooperation in the Arctic is regarded as an opportunity to promote expertise in environmentally friendly mining, which might conserve the unique environment of the Arctic. A sustainable mineral economy shall be promoted as part of Finland's development policy.

Responsible party: Ministry of Employment and the Economy, Ministry for Foreign Affairs, Ministry of the Environment, the national EITI group (MSG)

Indicators: Finland's operations are EITI-compliant, the development of the Arctic mining industry is part of Finland's Arctic Strategy

26. **Finnish scientists and industrialists shall network actively with their Russian colleagues and promote the operational preconditions for the sustainable extractive industry in Russia.** Corporate and scientific cooperation networks between the Finnish and Russian minerals clusters shall be prepared during the implementation of the action plan for economic cooperation projects within the framework of the modernisation partnership between Finland and Russia in 2013-2014, and the operations of select networks will be launched in 2014.

Responsible party: Companies, research institutes

Indicators: Fenno-Russian cooperation projects and forums

5.2 The sustainable extractive industry creates export potential

By investing in the development of environmentally friendly extractive industry in Finland, growth potential can be created for the export of Finnish technology and services. Cleantech solutions help to reduce the dust and odour emissions, discharges into water systems and energy consumption of mining, as well as helping mines to utilise renewable sources of energy and improve material efficiency. Environmental information systems, the monitoring of environmental impacts and other services also offer new, global business opportunities.

Finland aims to achieve a "top of mind" position of leadership in mining cleantech. The Nordic countries are pioneers in innovations and technological development in the extractive industry. This competitive advantage should be leveraged better in the export market. The export of cleantech for the extractive industry currently rests on the shoulders of a few major corporations. Public support for the export of cleantech and the field of export actors are also scattered at present. SMEs must be activated and more extensive export concepts, such as the export of training, identified. There is also a clear need for extensive domestic areas of reference to support the development of exports. Cooperation projects in developing countries can also support the export efforts of Finnish companies.

Natural resources are being exploited in increasingly challenging conditions in the Arctic. A considerable amount of expertise in operating in challenging Arctic conditions exists in Finland, in fields such as ship building. This expertise should be developed and exported for the needs of the extractive industry in Arctic projects.

Although there are significant amounts of high technology and service expertise in Finland, breaking into the international market will require considerable marketing and sales efforts. Measures to promote exports must be focused on supporting the R&D efforts, growth and domestic market references of SMEs aiming at the export market, and the effectiveness of public subsidies must be improved. On the other hand, the dispersed field of actors must be made to unite in supporting the export efforts of companies and groups. The objective is to double the value of exports from the current level of EUR 3.5–5 billion, by 2018.

To achieve these objectives, the measures proposed in this action plan focus on identifying the offering of Finnish companies in the industry, building export concepts, drawing up an export promotion plan for the target group, and developing the export cooperation between Finland and Sweden.

Measures

27. The offering of Finnish companies shall be identified and an export promotion plan drawn up for the sustainable extractive industry. The offering and attitudes of Finnish companies shall be determined in cooperation with the Green Mining programme of Tekes. The survey will focus on SMEs.

Export concepts shall be created on the basis of the offering, and will include the export of services and training. Based on the results of the survey, target countries shall be selected from a matrix of developing and developed countries. Brazil, Chile, Peru, Zambia, Tanzania, Ethiopia, Russia, Kazakhstan, Kyrgyzstan, the Republic of South Africa, Namibia and Myanmar have been preliminarily identified as interesting countries. The Middle-East is an intriguing, but difficult market area. Responsible extractive operations shall be more effectively connected with development cooperation. Development proposals to this end shall be produced for the Government Programme.

Responsible party: Ministry of Employment and the Economy, Ministry for Foreign Affairs, the Green Mining programme, Finpro

Indicators: Total relevant turnover, number of companies operating in international markets, total number of personnel in Finland, Team Finland indicators

- 28. The access of companies to export markets shall be supported.** Measures for promoting the growth of companies shall be focused on companies and groups aiming at international markets, and on the development of reference areas. The instruments for promoting growth shall be updated to render them suitable for this purpose. A new model based on the needs of target markets shall be drawn up to support the growth of cleantech exports and those of SMEs in the extractive industry. The Export Partner Groups service of FinPro shall be developed into a cluster-based direction. Active participation of companies in the charting of new markets shall be supported by measures such as the sending of export promotion delegations. Joint marketing efforts, such as shared exhibition stands, shall be organised for companies. The competitiveness of the aggregate industry shall be analysed and a strategy drawn up on the basis of the results, with a particular focus on increasing the production and export of aggregate industry SMEs.

Responsible party: Ministry of Employment and the Economy, Finnish Funding Agency for Technology and Innovation Tekes, Finpro, Finnvera, Centres for Economic Development, Transport and the Environment, Strategic Centres of Expertise, extractive industry companies

Indicators: Survey on the impact of the new operating model, volume of subsidies and export activities, number of growth companies, total increase in growth companies' turnover, investments in growth companies, companies' own investments.

- 29. Cooperation between Finland and Sweden shall be developed in support of exports.** Potential and operating models for joint export-promotion efforts shall be examined and potential partners identified. A seminar shall be held with Sweden and a common presentation prepared for the PDAC2014 congress,

with the objective of promoting cooperation between Finnish and Swedish extractive industry SMEs in the field of exports.

Responsible party: Ministry of Employment and the Economy, Finnish Funding Agency for Technology and Innovation Tekes, Finpro

Indicators: Finland and Sweden present a united front in the global market.

- 30. The internationalisation of Finnish consulting, measurement and monitoring companies in the extractive and water industries and the expansion of their customer bases shall be supported.** The objective is to increase the service offering in Finland and thereby build expertise and export services.

Responsible party: Finnish Water Forum, Finnvera, Finpro, Finnish Funding Agency for Technology and Innovation Tekes

Indicators: The number of internationally high-level consulting companies specialised in the extractive industry has increased.

5.3 Encouragement and remuneration

Achieving a leading role requires hard work, with an emphasis on meticulous and systematic work to minimise environmental impacts, earning the acceptance of society and achieving economic success. While we cannot afford to make mistakes, incentives for recognising, developing and implementing best practices will be included in the action plan. The goal is to encourage stakeholder groups to continue the constructive social debate regarding the extractive industry, actively disseminate success factors and successes, and to continuously improve their operations.

Measures

- 31. Ways, within companies, of supporting the implementation of new methods of mitigating environmental impacts and surpassing legislative requirements shall be examined.** Development subsidies for companies, such as investment subsidies, tax concessions or the steering of structural funds could be effective in supporting the setting of development-oriented goals that surpass current legislative requirements. The criteria for granting subsidies are tied to investment and technological risk level surveys.

Responsible party: The Government, Ministry of Employment and the Economy, Ministry of the Environment

Indicators: Support mechanisms have been implemented

- 32. Funding for reconciliation work and the implementation of discovered solutions shall be secured.** The costs of reconciliation cannot be heaped on extractive industry companies alone, since this is a question of ensuring the competitiveness of the entire region. Public funding is required for reconciliation

work, such as dialogue with stakeholder groups and the implementation of social initiatives and discovered solutions.

Responsible party: The Government, Ministry of Employment and the Economy

Indicators: Support mechanisms exist

- 33. Financial instruments shall be developed for the investments required by value chain development.** Investment in industrial symbioses and development of the services of SMEs shall be promoted through new financial instruments.

Responsible party: Ministry of Employment and the Economy, Ministry of Finance

Indicators: Functional financial instruments

- 34.** A quality award shall be presented for the development of sustainable extractive operations. The award criteria shall be determined by reference to award systems existing elsewhere.

Responsible party: The cooperation body for sustainable extractive operations

Indicators: Criteria have been specified and the first awards presented

5.4 Information management and communications

The fragmented nature of information on the subject makes it difficult to form a comprehensive picture of the extractive industry's development. Responsibility for permits, oversight and monitoring related to the extractive industry is divided between several authorities. Comparison, synthesis and further processing of information contained in the systems of different authorities are difficult if not impossible. Companies can also report the same information into different systems.

Room for improvement has also been identified in the flow of information between the various authorities, as well as between authorities and companies. For example, companies have not been informed of the current EU initiatives related to the extractive industry. The participation of Finnish companies in EU programmes or projects implemented within the framework of development cooperation could be increased by improving communications. Active and well organised communications can increase the participation of the SME sector in particular and facilitate the internationalisation of SMEs.

In addition to official and corporate actions, public discussion is required on the significance of the extractive industry. There is a need to discuss the positive and negative impacts the industry has on the environment, people, other industries and the entire Finnish economy. Comprehensive, easily available information on the industry is required to form the basis of such discussion.

Better overall information management will serve both companies, authorities and other stakeholder groups. The objective is to make the collection of information more effective, process the information to serve the needs of target groups, and to efficiently communicate and disseminate such information to the target groups and others requiring it. The development of information management and communications requires cooperation between various actors in areas such as the definition of needs and development of technological systems.

- 35. An information management plan shall be drawn up for the extractive industry, in order to improve the collection, processing and dissemination of information.** The information management plan will cover all extractive industry-related information requirements of authorities, companies and stakeholder groups and the management of those requirements. Procedures and technological systems for the collection, monitoring and dissemination of information shall be designed and created, taking account of the needs of the various user groups. The Internet (e.g. an extractive industry portal), e-mail and social media can be used for communications and the dissemination of information. Use of such information can be controlled flexibly through the implementation of different profiles (authorities, companies stakeholder groups), for example. Involving the various parties in cooperation will ensure that comprehensive information on the extractive industry, responsibility and the significance of the industry is available to companies, citizens, authorities and other stakeholder groups, and that information on best practices and operating principles is distributed. The availability of information produced by various actors for use in compiling joint reports and summaries shall be ensured.

Responsible party: Ministry of Employment and the Economy, Ministry of the Environment, Finnish Safety and Chemicals Agency (Tukes), Centres for Economic Development, Transport and the Environment, Regional State Administrative Agencies, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries), Suomen Vuoriklusteri (Finnish Mining Cluster), Geological Survey of Finland (GTK), environmental organisations

Indicator: The information management plan is completed and technological systems are ready

6 Monitoring of the action plan

6.1 Longer-term objectives

The operating environment of the extractive industry is changing rapidly. This action plan focuses on short-term measures and the monitoring of their implementation. At the same time, longer-term objectives have been established to support this action plan and determine a favourable development path for the sustainable extractive industry, and to foster predictability and perseverance. It is easier to set targets for the long term than to identify means of achieving them.

We have identified the following issues to be ensured in the long term (2020/2030):

- Safeguarding the favourable development of the metal refining industry's operational preconditions, without compromising Finland's climate, energy or environmental policy outlines.
- A transport policy that supports the development of a smooth and functional logistics and transport infrastructure. The objective is to eliminate transport bottlenecks and increase the unit size of railway transport, in order to keep pace with international development. A functioning cooperation with the Nordic countries and Russia. Presence in international cooperation forums and promotion of the realisation of global environmental regulation. Development of traffic in the North-East Passage and the resulting opportunities.
- The availability of top expertise in the extractive and refining industries. The availability of venture financing for top research, and that of financing for multidisciplinary research within the extractive industry and international research teams. Attracting the best talent to the industry with high-quality research teams and inspirational top professors. Cooperation between companies, institutes of higher education and research institutes. Investment in the development of technologies (modelling, online measurement, hydrotechnology, promotion of material and energy efficiency), new value chains, research into ecological footprints and indicators and the development of new methods. Top expertise and the development of new technologies will ensure export growth.
- Taking account of the sustainable use of mineral resources in land use planning. Reconciliation of the steering of existing and future land use with data on the state of the environment, on the sustainable use of resources found in the area and on other needs. The utilisation of geographic data in land use planning.
- Development of the permit process. Development towards a permit system that functions according to the one-stop-shop principle. The permit authority to be appointed by law shall have the authority, upon the applicant's request, to

simultaneously process permit matters falling under the competence of other authorities but directly related to the operation for which the permit is being applied.

- Raw material reserves and their management. Safeguarding the reserves of the future, subject to changing requirements, through long-term research into Finland's mineral potential and reserves. The development of information systems for the management of minerals, aggregates and dimension stones reserves and consumption data. The creation of a material data bank comprising the materials most commonly used by society.
- Promotion of cleantech exports in the extractive industry. Focusing measures for promoting the growth of companies on groups aiming at international markets, and on the development of reference areas. Consolidation of cooperation with Sweden and the execution of joint export-promotion measures in prioritised target markets. Cooperation with Swedish, Norwegian and Russian companies in Arctic mining projects. Solid cooperation with the Ministry for Foreign Affairs in developing markets.
- Active participation in forums of international cooperation. The visibility of Finland in European and international forums for the extractive industry and profiling Finland as an expert on cleantech and the sustainable extractive industry.
- Exchange of experiences and development of communications. The development of electronic information management and communications. Support in sharing best practices between different actors. The production of analysed information and summaries on environmental monitoring data, for example.
- Encouraging companies to aspire to a leading role, by developing financial incentives.

6.2 Indicators

The realisation of this action plan and the sustainable development of the operating environment and extractive cluster are monitored using the following indicators:

- Finland's ranking in international assessments on competitiveness
- Investments
- Cleantech exports (SMEs/major corporations)
- Turnover (by sub-sectors)
- Number of employees (by sub-sector)
- Number of appeals and whether they were granted (permits and land use planning)
- Emissions into the environment (in violation of the terms of permits) and accidents
- Top research teams

- Number of young people entering the extractive industry (applicants for jobs and study programmes)
- Rankings of extractive industry companies on “most popular employer” lists
- Acceptance of the extractive industry (suitable method of measurement)
- Finland’s visibility on international forums

6.3 Monitoring of the action plan

The Extractive Industry Working Group under the Ministry of Employment and the Economy, consisting of representatives from several ministries and other parties, monitors the implementation of the measures proposed in this action plan and is responsible for updating the plan. The representatives of other ministries and stakeholder groups are consulted before appointing members to the working group, which ensures comprehensive representation with regard to monitoring the action plan.

It is the working group’s task to ensure the continuation of dialogue between industry actors and stakeholder groups, collect monitoring data on the implementation of the action plan, report to ministries on the action plan’s results and to communicate those results and any updating requirements to the general public.

A round table forum will be held at least once per year, to monitor the implementation of this action plan and make any required revisions.

7 Summary of measures

Measure	Responsible party
1. The creation of water-management plans for mines and the development of water technology	Mining companies
2. Activities and research related to the sorting of waste and the utilisation of tailings and waste rock shall be increased.	Mining companies, the dimension stone industry
3. The energy-efficiency of the extractive industry shall be developed systematically.	Extractive industry companies, Motiva, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries)
4. The safety of mines and quarries and the related competences shall be developed.	Extractive industry companies, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries), employers' unions
5. CSR programmes shall be adopted by companies and applicable indicators, reporting and monitoring will be developed.	Extractive industry companies, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries), the cooperation body
6. Active, diverse and interactive dialogue shall be conducted with various stakeholder groups.	Extractive industry companies, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries), the cooperation body for sustainable extractive operations, KaivosAkademia (the Mining Academy)
7. Synergies with local actors shall be sought actively.	Extractive industry companies
8. The companies' communications shall be developed in a more rapid and open direction.	Extractive industry companies
9. The authorities' current roles and processes related to permitting and oversight shall be unambiguously described.	Ministry of Employment and the Economy, Ministry of the Environment, Ministry of Agriculture and Forestry, Finnish Safety and Chemicals Agency (Tukes), Centres for Economic Development, Transport and the Environment, Regional State Administrative Agencies
10. The steering effect of the national land use guidelines (NLG), programmes and national inventory materials on the planning of land use, shall be increased.	Ministry of the Environment, regional councils, industrial organisations, Centres for Economic Development, Transport and the Environment, Geological Survey of Finland (GTK), Finnish Environment Institute (SYKE)
11. The impacts of planned mining projects on valuable natural environments, such as conservation areas or endangered or rare environments, and the operational preconditions of local industries such as tourism, shall be determined.	Strategic Programme for Cleantech

Measure	Responsible party
12. Processes and methods shall be developed, as will regional knowledge and understanding of impacts charted in ore-critical areas and regions vital to stone and mineral supply, in order to support reconciliation.	Ministry of Finance, Ministry of the Environment, Ministry of Employment and the Economy, Geological Survey of Finland (GTK), Finnish Environment Institute (SYKE), extractive industry companies, other industries, municipalities, regional councils, stakeholder groups
13. The availability of adequate technological and financial resources shall be ensured for permit and oversight authorities.	Ministry of Employment and the Economy, Ministry of Forestry and Agriculture, Finnish Safety and Chemicals Agency (Tukes), Centres for Economic Development, Transport and the Environment, Regional State Administrative Agencies, Ministry of Finance
14. Guidebooks shall be produced for stakeholder groups, describing their possibilities for influencing and participation in decision-making, and for industry actors on the application of legislation.	Ministry of Employment and the Economy, Ministry of the Environment, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuuslitto ry (Association of Finnish National Stone Industries), KaivosAkademia (the Mining Academy), environmental organisations
15. A training plan shall be created and maintained for the extractive industry.	Ministry of Education and Culture, all levels of education, companies and organisations, stakeholder groups
16. A research strategy shall be prepared for the extractive industry, comprising key fields of research and the development of research infrastructure.	Research institutes, universities, universities of applied sciences, extractive industry companies, organisations, stakeholder groups, Finnish Funding Agency for Technology and Innovation Tekes, Academy of Finland
17. Cooperation between various actors shall be enhanced and a division of labour and specialisation agreed on.	Universities, universities of applied sciences, other educational institutes, research institutes
18. Long-term charting and modelling of stockpiles shall be conducted and the availability of sufficient resources ensured.	Ministry of Employment and the Economy, Geological Survey of Finland (GTK), (ore prospecting) companies
19. Obstacles to recycling shall be identified and eliminated and instruments, steering methods and incentives created for the recycling and reuse of side rock, tailings, construction masses and mineral products.	The Government, Ministry of Finance, Ministry of the Environment, Ministry of Employment and the Economy, Geological Survey of Finland (GTK), Finnish Environment Institute (SYKE), Motiva Oy, municipalities, Finnish Transport Agency, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuuslitto ry (Association of Finnish National Stone Industries)
20. Transport in the extractive industry and its management shall be rendered more efficient and ecological, in cooperation with neighbouring countries.	Ministry of Transport and Communications, Finnish Transport Agency, Ministry of Employment and the Economy, Ministry of Finance
21. The availability of reasonably priced energy for the extractive industry shall be ensured.	Ministry of Employment and the Economy, Fingrid
22. The anticipation, decision-making and funding models of the new transport routes required by mining operations shall be developed.	Ministry of Transport and Communications, Ministry of Finance, Finnish Transport Agency
23. Nordic cooperation within the extractive industry shall be consolidated.	Ministry of Employment and the Economy, the Government, Ministry of the Environment, VTT Technical Research Centre of Finland, Finnish Funding Agency for Technology and Innovation Tekes, Finnish Association of Extractive Resources Industry FinnMin, extractive industry companies

Measure	Responsible party
24. Finland shall participate actively in the preparation of new initiatives and programmes for the sustainable extractive industry in the EU.	Ministry of Employment and the Economy, Ministry of Education and Culture, VTT Technical Research Centre of Finland, Geological Survey of Finland (GTK), Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries)
25. The development of the sustainable extractive industry shall be promoted through advocacy, and via prominence in international forums.	Ministry of Employment and the Economy, Ministry for Foreign Affairs, Ministry of the Environment, the national EITI group (MSG)
26. Finnish scientists and industrialists shall network actively with their Russian colleagues and promote the operational preconditions for the sustainable extractive industry in Russia.	Companies, research institutes
27. The offering of Finnish companies shall be identified and an export promotion plan drawn up for the sustainable extractive industry.	Ministry of Employment and the Economy, Ministry for Foreign Affairs, the Green Mining programme, Finpro
28. The access of companies to export markets shall be supported.	Ministry of Employment and the Economy, Finnish Funding Agency for Technology and Innovation Tekes, Finpro, Finnvera, Centres for Economic Development, Transport and the Environment, Strategic Centres of Expertise, extractive industry companies
29. Cooperation between Finland and Sweden shall be developed to support exports.	Ministry of Employment and the Economy, Finnish Funding Agency for Technology and Innovation Tekes, Finpro
30. The internationalisation of Finnish consulting, measurement and monitoring companies in the extractive and water industries, and the expansion of their customer bases, shall be supported.	Finnish Water Forum, Finnvera, Finpro, Finnish Funding Agency for Technology and Innovation Tekes
31. Ways, within companies, of supporting the implementation of new methods of mitigating environmental impacts and surpassing legislative requirements shall be examined.	The Government, Ministry of Employment and the Economy, Ministry of the Environment
32. Funding for reconciliation work and the implementation of discovered solutions shall be secured.	The Government, Ministry of Employment and the Economy
33. Financial instruments shall be developed for the investments required by value chain development.	Ministry of Employment and the Economy, Ministry of Finance
34. A quality award shall be presented for the development of sustainable extractive operations.	The cooperation body for sustainable extractive operations
35. An information management plan shall be drawn up for the extractive industry, in order to improve the collection, processing and dissemination of information.	Ministry of Employment and the Economy, Ministry of the Environment, Finnish Safety and Chemicals Agency (Tukes), Centres for Economic Development, Transport and the Environment, Regional State Administrative Agencies, Finnish Association of Extractive Resources Industry FinnMin, Infra, Kiviteollisuusliitto ry (Association of Finnish National Stone Industries), Suomen Vuoriklusteri (Finnish Mining Cluster), Geological Survey of Finland (GTK), environmental organisations

8 Evaluation of the action plan's environmental effects (Environmental assessment of plans and programmes)

The action plan for Making Finland a leader in the sustainable extractive industry presents measures for promoting the sustainable development of the extractive industry. The premise for drawing up the action plan was for the proposed measures to result in improvements to operations and current practices, with regard to both social and environmental impacts, to facilitate the growth of the extractive industry, and to improve its international competitiveness on a financially sound basis.

This action plan proposes measures for implementation by the industry and public sector. The objective of the measures proposed for the industry is to achieve an excellent standard of operations, surpassing the minimum requirements specified for sustainable activity in legislation. Measures are proposed for promoting a culture of continuous improvement, preventing conflicts and increasing dialogue and active communications, among other things.

The measures proposed for the public sector aim at facilitating sustainable economic growth and the application of the principles of sustainable development in extractive industry companies. Measures are proposed for developing the operating environment, administration and competences, and for promoting the sustainable use of raw materials.

Promoting the implementation of best practices, both in industry and administration, is a strong element of this action plan. International cooperation can reinforce Finnish expertise and the industry's knowledge base. Active participation in various international forums promotes the global development of the extractive industry.

Environmental effects of the action plan's implementation, in comparison to the current situation

This action plan will promote the sustainable development of the extractive industry by helping to focus development measures that concern the industry and operating environment on making operations compliant with the principles of sustainable development. The principles of sustainable development will be increasingly applied by companies. Expertise in the mineral industry will increase. Coordination will improve and permit and land use planning processes will become more efficient. The international competitiveness of companies in the minerals cluster will improve, the industry will grow and develop, operations will diversify and new actors will enter the industry. The industry's growth will create new prosperity in Finland.

Best practices will be widely applied by companies, which will reduce detrimental social and environmental impacts and ensure that better account is taken of various interests during the planning stages of projects.

- a)** Effects on population, human health, living conditions and the attractiveness of the living environment.

The measures presented in this action plan will lead to the development of methods that will improve the opportunity of people to participate in developing their own living environment. Open communications and greater awareness of the operations of extractive industry companies and the development of the area will build trust among citizens. People will be more content and happy with their living environment. Increased expertise and resources will improve job satisfaction.

- b)** Effects on biodiversity, populations and vegetation

The improvement of operating models and new research data will create tools for taking biodiversity into account. Increased cooperation between stakeholder groups and its systematic development will take account of the preservation of biodiversity and the minimisation of detrimental impacts.

- c)** Effects on soil, air quality and climate factors

Increased competence, improved operating models and systematic development will help decrease emissions and thereby minimise detrimental impacts.

- d)** Effects on regional and community structures

Competitive industry, functioning administration and the reconciliation of different interests will create stability and preconditions for long-term community planning and construction, and for overall regional development. Companies will create employment and increase the vitality of the locality in which they are established. Mining areas and aggregate and natural stone extraction sites will limit the other use of such areas.

- e)** Effects on the built environment, landscape and cityscapes, material property and cultural heritage

Extractive operations, mines and industrial buildings change the landscape and are conspicuous in their immediate environment. The effects need to be individually evaluated for each project. Developed within the scope of this action plan, functional mechanisms for reconciling various interests will ensure the preservation of valuable areas. Improved cooperation with various stakeholder groups will create preconditions for the minimisation of detrimental impacts.

- f)** Effects on the utilisation of natural resources

The measures presented in this action plan aim at the sustainable use of natural resources. Measures such as those intended to promote the appropriate use of raw materials, recycling and more efficient utilisation of side streams and waste material, will reduce the need for primary raw materials.

Environmental effects if the action plan will not be implemented, in comparison to the current situation

Companies would probably implement sustainable development measures even without this action plan, but as uncoordinated individual efforts, possibly at a slower pace. The differences between companies would be greater with regard to the implementation of sustainable development measures. There would be no general improvement in the standard of operations. Without this action plan, development measures would lack a shared discussion forum in which issues could be easily raised and development projects launched.

9 Participants in the action plan's preparation

This action plan has been drawn up under the Ministry of Employment and the Economy's Strategic Programme for the Cleantech Business, with Mari Pantsar-Kallio and Maija Uusisuo responsible for its preparation. Pasi Rinne, Piia Pessala, Tiina Pursula and Niina Hokkanen of Gaia Consulting Oy assisted in drawing up the action plan, and facilitated the working groups.

Steering Group

Last name	First name	Organisation
Aaltonen	Riikka	Ministry of Employment and the Economy (MEE)
Alapassi	Markus	Ministry of the Environment (ME)
Järvinen	Tapani	Board member in several mining companies
Loukola-Ruskeenniemi	Kirsti	Ministry of Employment and the Economy (MEE)
Nurmi	Pekka	Geological Survey of Finland (GTK)
Pantsar-Kallio	Mari	Ministry of Employment and the Economy (MEE)
Suomela	Pekka	Finnish Association of Extractive Resources Industry FinnMin
Uusisuo	Maija	Ministry of Employment and the Economy (MEE)
Wähä	Susanna	Ministry of the Environment (ME)
Yrjö-Koskinen	Eero	Finnish Association for Nature Conservation (SLL)

Working groups and chairpersons

Theme	Chairperson
1. Training and research	Kari Knuutila, Outotec Oyj
2. Duties and resources of good administration	Ari Niiranen, Centre for Economic Development, Transport and the Environment for North Karelia
3. Potential of refining	Maija Uusisuo, Ministry of Employment and the Economy (MEE)
4. Cleantech exports	Mari Pantsar-Kallio, Ministry of Employment and the Economy (MEE)
5. Energy, logistics and transport infrastructure	Pasi Holm, Pellervo Economic Research PTT
6. Voluntary action by the industry	Pekka Suomela, Finnish Association of Extractive Resources Industry FinnMin
7. Development and implementation of best environmental practices	Kirsi Sormunen, Nokia Oyj
8. Search for synergies between industries and constructive handling of conflicts of interest	Anna Mäkelä, City of Kittilä
9. International cooperation and advocacy	Jouni Lind, Confederation of Finnish Industries (EK)
10. Mineral resources and the sustainable extractive industry	Pekka Nurmi, Geological Survey of Finland (GTK)

Working group discussion participants

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Heikkinen	Hannu	Kainuun Liitto joint municipal authority
Heikkinen	Ritva	The Finnish Funding Agency for Technology and Innovation Tekes
Heinonen	Pertti	The Finnish Funding Agency for Technology and Innovation Tekes
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Hievanen	Sauli	Central Organisation of Finnish Trade Unions (SAK)
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Last name	First name	Organisation
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Kauppila	Tommi	Geological Survey of Finland (GTK)
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Keskinen	Kari	The Finnish Funding Agency for Technology and Innovation Tekes
Knuutila	Kari	Outotec Oyj
Kohonen	Jukka	Centre for Economic Development, Transport and the Environment for Kainuu
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Kuopanportti	Hannu	University of Oulu
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Lahti-Nuutila	Teija	The Finnish Funding Agency for Technology and Innovation Tekes
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Lehtonen	Jaakko	The Finnish Tourist Board (MEK)
Leskinen	Pekka	The Finnish Environment Institute (SYKE)
Liikamaa	Terho	Finnish Safety and Chemicals Agency (Tukes)
Lind	Jouni	Confederation of Finnish Industries EK
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Pellinen	Terhi	Aalto University
Penttilä	Vesa-Jussi	

Last name	First name	Organisation
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Tekijät Författare Authors Työ- ja elinkeinoministeriö Cleantechin strateginen ohjelma	Julkaisu aika Publiceringstid Date Heinäkuu 2013 Toimeksiantaja(t) Uppdragsgivare Commissioned by Työ- ja elinkeinoministeriö Arbets- och näringsministeriet Ministry of Employment and the Economy Toimielimen asettamispäivä Organets tillsättningsdatum Date of appointment
Julkaisun nimi Titel Title Suomi kestävän kaivannaisteollisuuden edelläkävijäksi - toimintaohjelma	
Tiivistelmä Referat Abstract Kaivannaisalan tuotteita, metalleja ja mineraaleja, kiviainesta ja rakennuskiviä, tarvitaan nyky-yhteiskunnassa välttämättömien tuotteiden, palvelujen ja infrastruktuurin tuottamiseen. Globaali väestön kasvu, kaupungistuminen ja elintason nousu ovat lisänneet raaka-aineiden kysyntää. Kaivannaisala ja siihen liittyvä jatkojalostus, teknologiateollisuus, tutkimus ja kehitys ovatkin Suomelle merkittävä kasvun mahdollisuus. Kaivostoiminnan lisääntyessä myös kaivostoimintaan liittyvä keskustelu on vilkastunut ja kaivoskriittisyys on lisääntynyt. Kaivostoimintaan on liittynyt suuria odotuksia, mutta myös pelkoja peruuttamattomista muutoksista ja haitoista luonnolle ja muille elinkeinoille. Toimialan kasvaessa esille on tullut kipupisteitä, joiden myötä on nähty tarve myös laajemmalle keskustelulle alan toimintaehdoista ja kehittämistarpeista. Kaivannaisalan ja sen sidosryhmien välinen vuorovaikutus käynnistyi syksyllä 2012 pyöreän pöydän keskustelulla, jossa todettiin yhteinen tahtotila Suomen nostamiseksi kestävän kaivannaisteollisuuden edelläkävijäksi ja päätettiin käynnistää toimenpideohjelman laatiminen tähän tavoitteeseen pääsemiseksi. Kaivannaisteollisuus nähtiin mahdollisuutena Suomelle edellyttäen, että sitä kehitetään taloudellisesti, sosiaalisesti ja ympäristön kannalta kestävällä tavalla. Toimintaohjelma on syntynyt pääministeri Jyrki Kataisen, elinkeinoministeri Jan Vapaavuoren, työministeri Lauri Ihalaisen ja ympäristöministeri Ville Niinistön johdolla käytyjen pyöreän pöydän keskustelujen ja kymmenessä asiantuntijatyöryhmässä työstytyjen konkreettisten toimenpide-ehdotusten tuloksena. Toimintaohjelma sisältää teollisuuden toimenpiteitä yhteiskunnallisen tuen saavuttamiseksi toiminnalleen. Parannuksia kaivannaisteollisuuden toimintaedellytyksiin esitetään hallintoon, koulutukseen ja infrastruktuuriin liittyen. Lisäksi toimenpideohjelma ehdottaa aktiivisempaa ja avoimempaa tiedon ja kokemusten vaihtoa sekä jatkuvaa keskustelua toimenpideohjelman toteutumisesta ja alan kehitymisestä. Käännetty työ- ja elinkeinoministeriön huhtikuussa 2013 julkaisemasta alkuperäisestä suomenkielisestä julkaisusta, Suomi kestävän kaivannaisteollisuuden edelläkävijäksi – toimintaohjelma. Työ- ja elinkeinoministeriön yhteyshenkilö: Cleantechin strateginen ohjelma/Juho Jokinen, puh. 050 3960244	
Asiasanat Nyckelord Key words Kaivannaisteollisuus, kaivostoiminta, kaivannaistoiminta, kestävä kehitys, vastuullisuus, toimintaohjelma	
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Julkaisun nimi Titel Title Finland som pionjär inom hållbar utvinningsindustri – ett handlingsprogram	
Tiivistelmä Referat Abstract <p>Utvinningsindustrins produkter, metaller och mineraler, stenmaterial och byggnadssten, behövs i det moderna samhället för produktion av nödvändiga produkter, tjänster och infrastruktur. Den globala befolkningsökningen, urbaniseringen och den stigande levnadsstandarden har ökat efterfrågan på råvaror. Utvinningsindustrin och därmed förknippad vidareförädling, teknologiindustri, forskning och utveckling ger Finland en avsevärd tillväxtpotential.</p> <p>I och med att gruvdriften har ökat, har också debatten om den blivit livligare och kritiken mot gruvor har ökat. Förväntningarna på gruvdriften har varit stora, men det har också funnits rädsla för oåterkalleliga förändringar och olägenheter för naturen och andra näringar. I och med att branschen har vuxit har smärtpunkter upptäckts, och därmed har man sett att det också finns behov av en bredare diskussion om verksamhetsförutsättningarna och utvecklingsbehoven i branschen.</p> <p>Växelverkan mellan utvinningsindustrin och dess intressenter startade hösten 2012 med en rundabordsdiskussion, där man fastslog gemensamma strategiska avsikter för att lyfta Finland till en pionjär inom hållbar utvinningsindustri och beslutade att inleda utarbetandet av ett handlingsprogram för att uppnå detta mål. Utvinningsindustrin sågs som en möjlighet för Finland, förutsatt att den utvecklas på ett ekonomiskt, socialt och miljömässigt hållbart sätt.</p> <p>Handlingsprogrammet har uppkommit som resultat av rundabordsdiskussioner under ledning av statsminister Jyrki Katainen, näringsminister Jan Vapaavuori, arbetsminister Lauri Ihalainen och miljöminister Ville Niinistö och konkreta åtgärdsförslag som har bearbetats i tio expertarbetsgrupper.</p> <p>I handlingsprogrammet ingår industrins åtgärder för att få samhällets stöd för sin verksamhet. Förbättringar i utvinningsindustrins verksamhetsförutsättningar föreslås i fråga om förvaltning, utbildning och infrastruktur. Dessutom föreslår handlingsprogrammet ett aktivare och öppnare informations- och erfarenhetsutbyte samt en kontinuerlig diskussion om genomförandet av programmet och om branschens utveckling.</p> <p>Översättning av original publikation på finska, Suomi kestävään kaivannaisteollisuuden edelläkävijäksi - toimintaohjelma, vilket publicerades i april 2013 av arbets- och näringsministeriet.</p> <p>Kontaktperson vid arbets- och näringsministeriet: Strategiska programmet för cleantech/Juho Jokinen, tfn 050 3960244</p>	
Asiasanat Nyckelord Key words Utvinningsindustri, gruvdrift, utvinningsverksamhet, hållbar utveckling, ansvarstagande, handlingsprogram	
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Making Finland a leader in the sustainable extractive industry – action plan

Products of the extractive industry are required to produce products, services and infrastructure essential to modern society. In addition to mining, Finland's extractive industry includes the aggregate and natural stone industries. The suppliers of the technology, machinery, equipment and services required by the extractive industry are also part of the minerals industry. Other actors related to the minerals industry include refiners, research institutes, universities and other institutes of higher education, vocational colleges and various organisations.

The debate on mining in particular has intensified with the increase in mining activities, and attitudes towards mining have become more critical. While mining activities involve high expectations, such as securing regional vitality, there are also fears of irreversible changes and damage to nature and other lines of business. As the industry grows, sore points have emerged, revealing the need for more extensive discussion of the conditions for the industry's operations and of development needs within the industry.

Dialogue between the extractive industry and its stakeholders began in the autumn of 2012 with a round-table discussion, where a common vision was established to raise Finland's profile as a leader in the sustainable extractive industry. A decision was taken to prepare an action plan towards this end.

This action plan proposes measures in all sectors of the minerals industry and measures to be taken by the industry to obtain the support of society for its activities. Proposals for improving the operating environment of the extractive industry are made with regard to administration, training and infrastructure. In addition, the action plan proposes the more active, open exchange of information and experiences, along with ongoing dialogue regarding the implementation of the proposed measures and development within the industry.

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