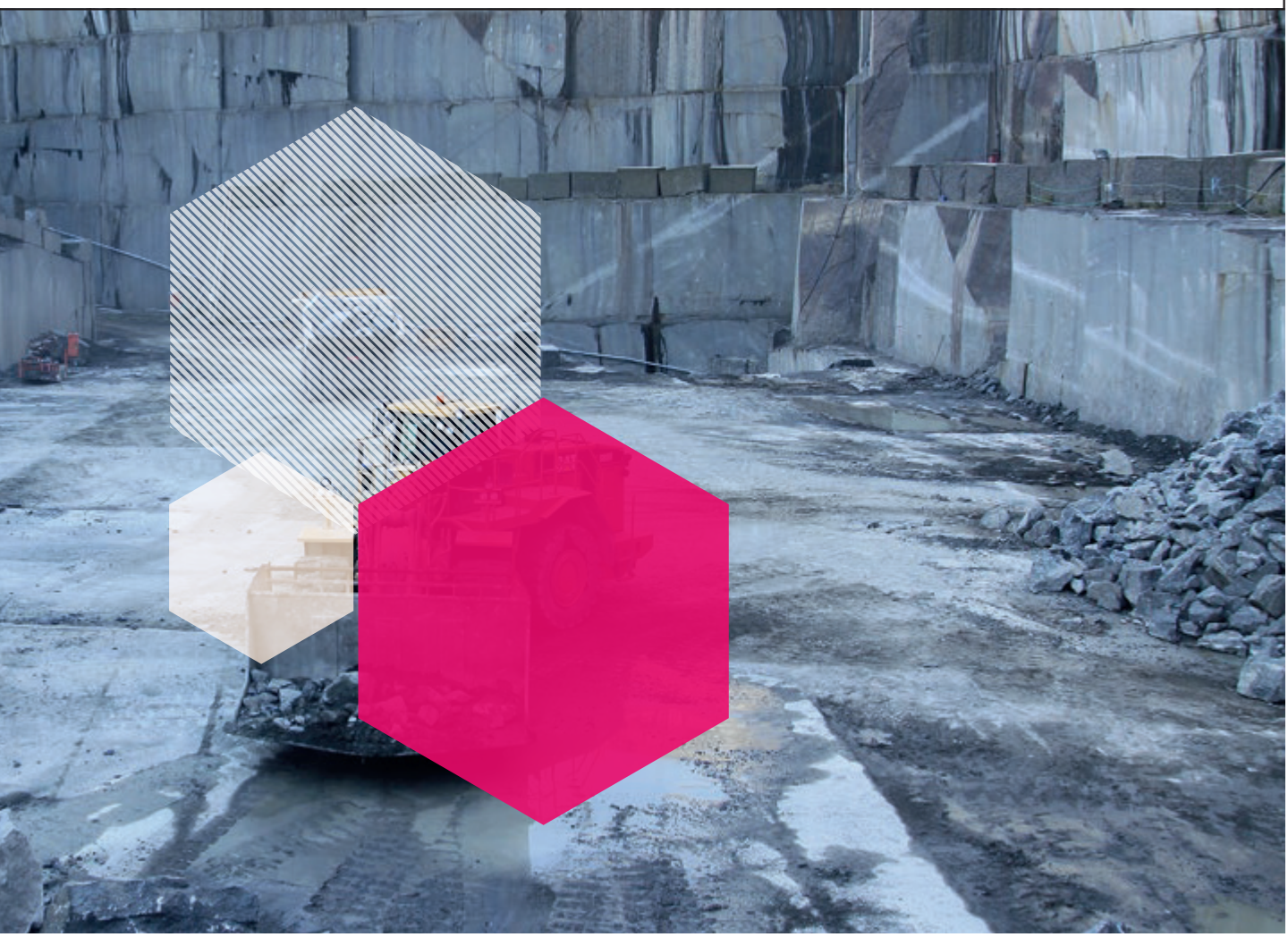
NORWEGIAN MINISTRY
OF TRADE AND INDUSTRY

Strategy

Strategy for the Mineral Industry



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OF TRADE AND INDUSTRY

Strategy

Strategy for the Mineral Industry

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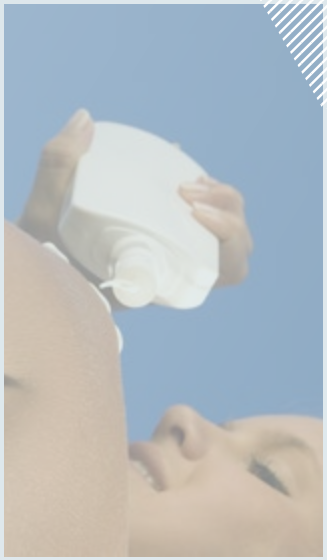

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The Government wants Norway to be an attractive country for mining activities. This is the background for presenting a strategy for the mineral industry.

Introduction

Most of the objects with which we surround ourselves contain minerals. Whether building roads or developing technological products of different kinds, we are dependent on mineral raw materials - to mention some sectors.

Growth and stability in the world economy depend on the ready availability of minerals. Norway's geology is rich in mineral resources. It is therefore critical that we manage our mineral resources well.

Increasing international demand for minerals and metals has resulted in higher prices and increased interest in the mineral resources of Norway. There is increasing optimism in the minerals industry, and many mineral companies are active in exploiting the opportunities that lie in Norway's geology.

In 2010, the Government presented a new Minerals Act which replaced five other Acts. The Act was an important step in simplifying earlier regulations in the minerals sector, and in creating transparent and predictable framework conditions for the minerals industry. The spokesperson for the Minerals Act in the Storting (Parliament), Representative Arne L. Haugen, from the mining town of Løkken, said at the time:

"When it comes to the unimaginable values in our bedrock, we leave far too much to chance. This must stop. These values must also be managed in a sustainable way and for the benefit of the population."

The new Minerals Act was a good start. This strategy is a sound basis for our further work together. With new technology, new market opportunities and new tools, we will build further on the proud history of Norway's mining industry.

The Government wants Norway to be an attractive country for mining activities. The Norwegian mineral industry has good opportunities for growth. Profitable mining enterprises can generate new economic growth and employment, and provide positive local and regional effects. With a targeted, long-term focus on knowledge, skills and expertise, innovation and new technology, the industry can become of great importance, not least in outlying regions.

The Norwegian mineral industry shall be among the world's most environmentally friendly. Mining companies must show social responsibility. I want to contribute to good coexistence between the mineral industry, local communities, other industries and Sámi interests.

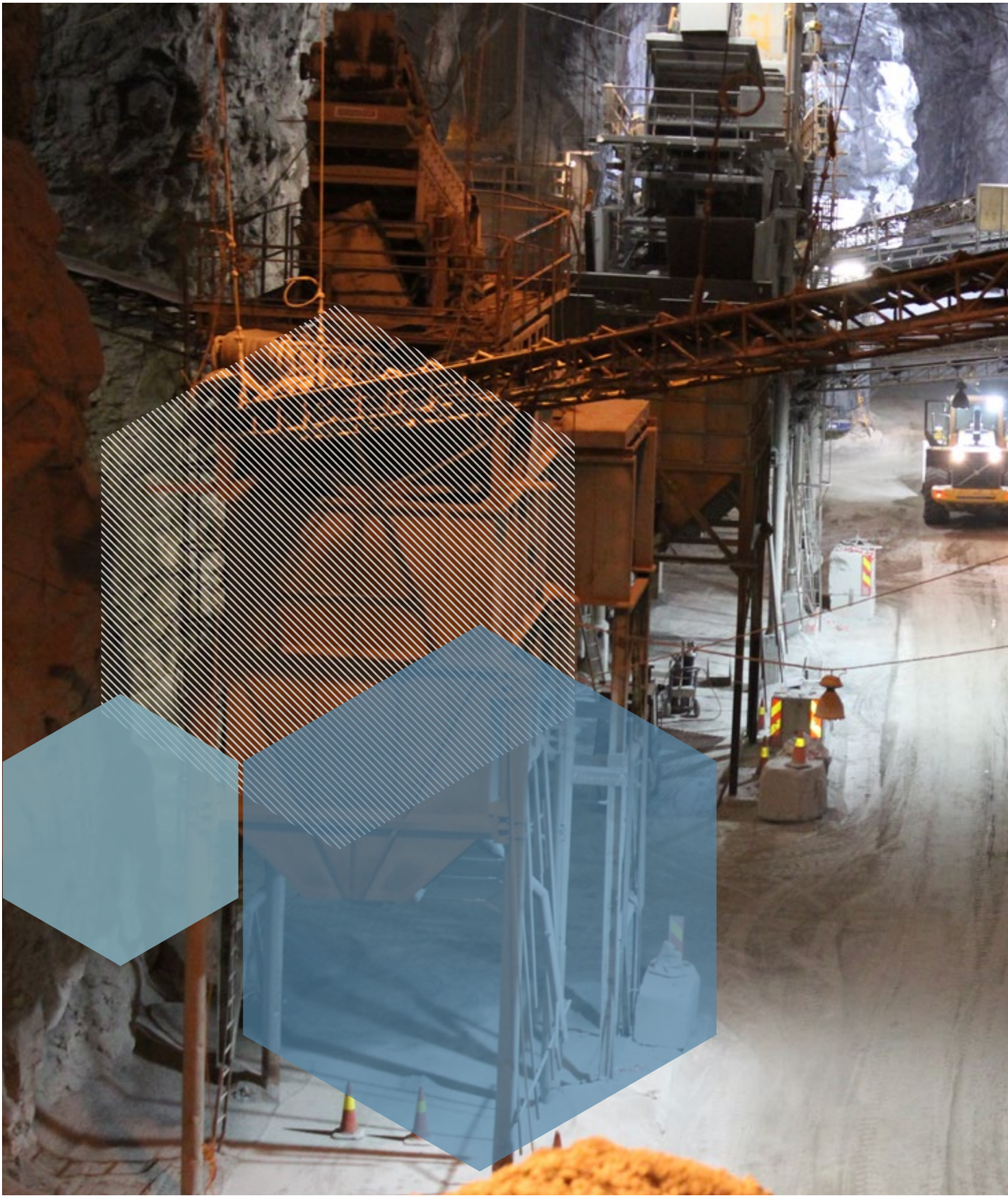
The strategy has been developed in a broad process. We have had a good dialogue with the mining companies, the Norwegian Mining and Quarrying Industries (Norsk Bergindustri), the mineral management institutions, environmental organisations, the seafood industry, the Sámi Parliament of Norway and other relevant authorities and interest groups. Thank you to all who have shown a great interest and provided valuable input.

Together we have prepared a solid basis for development of an environmentally responsible and growth-oriented mineral industry. I will follow up the strategy in close collaboration with the industry, relevant authorities and others who are involved, in order to find good solutions for the challenges to come. Together, we will develop our great visions into reality.

I hope you find the strategy informative and useful.

Trond Giske

Trond Giske
Minister of Trade and Industry



Arna rock crushing plant near Bergen Photo: NCC

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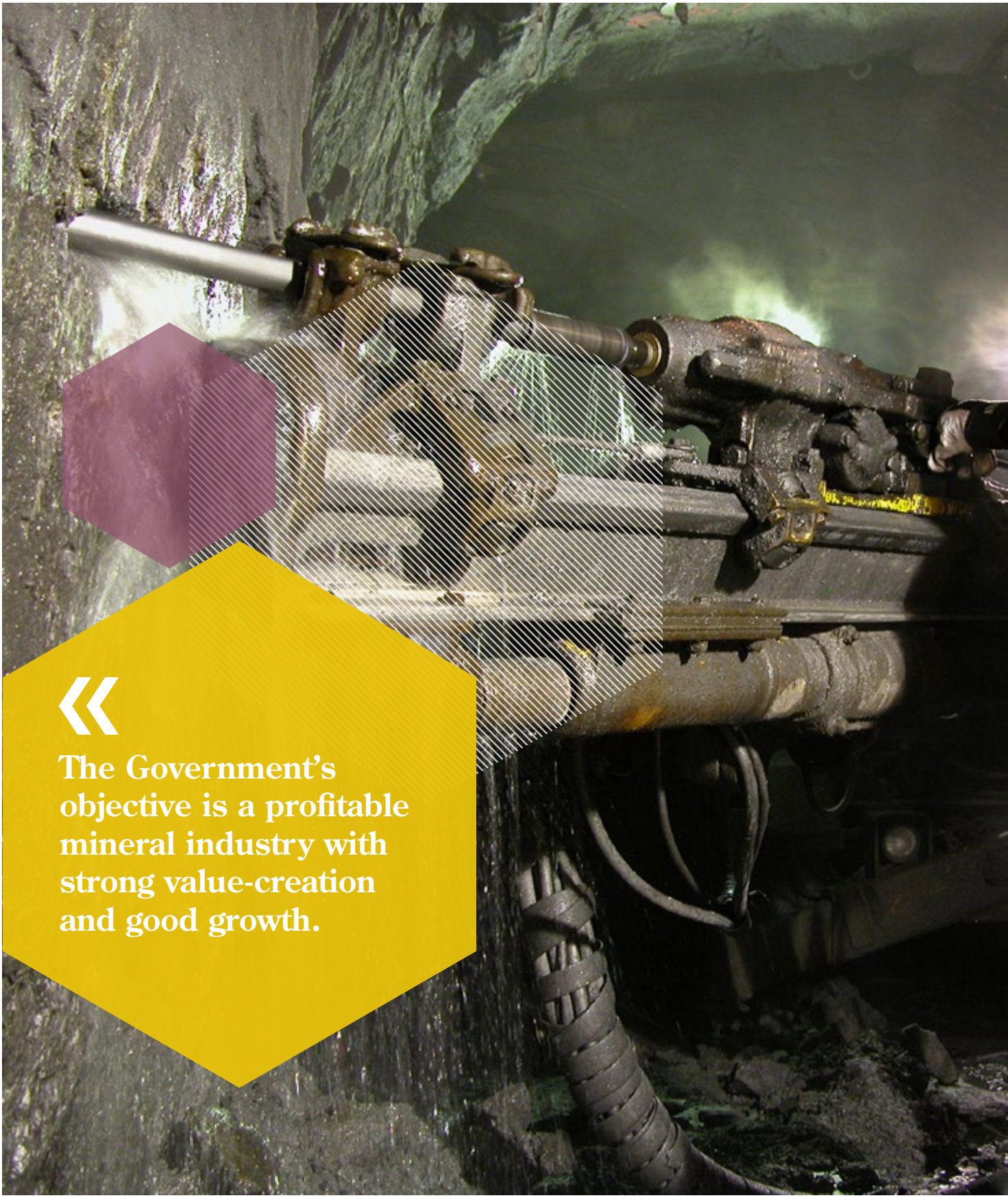


Drilling in Skaland Graphite's graphite mine in Troms County. Graphite is one of the commodities considered as critical in the EU Raw Materials Initiative.
Photo: Reiner Schaufler, Skaland Graphite

1 Summary

The rise in prices for metals and minerals has led to increased mineral production in several parts of the world. New technology and the development and spread of consumer electronics have resulted in an increase in demand for rare metals and minerals. This has led to greater focus from the EU, China, the USA and several other countries on securing access to strategic and economically important minerals and metals.

Chapter 2 presents the background for the Government's strategy for the mineral industry. The mineral industry produces numerous commodities that are necessary for society. The mineral industry provides employment, creates positive local and regional ripple effects and produces tax revenues for the community. Norway is rich in mineral resources and their development will open new opportunities for the mineral industry in Norway. The Government's objective is a profitable mineral industry with strong value-creation and good growth. The Norwegian mineral industry shall be among the world's most environmentally-friendly and must actively seek forward-looking solutions. Predictable and efficient administration and procedure shall be the rule for handling of regulations relevant to the industry.

Chapter 3 describes the Norwegian mineral industry and mineral resources and potential in Norway. The Geological Survey of Norway has estimated the "in situ" value of known and investigated metal resources that are considered to be profitable to exploit to be about NOK 1,400 billion. In addition there is the value of crushed-stone and gravel resources, natural stone, coal and industrial minerals.

The Norwegian mineral industry had a turnover in 2011 of NOK 12.4 billion and employed 6,000 people. The most important parts of the industry, measured in turnover, are construction materials (crushed stone and gravel) with a turnover amounting to NOK 4.7 billion, industrial minerals with a turnover amounting to NOK 2.9 billion, metals (principally iron) with a turnover of NOK 2.5 billion, coal with NOK 1.4 billion and natural stone with NOK 900 million. The industry is typically most important in outlying districts, with Rogaland, Nordland, Finnmark and Møre og Romsdal as the most important counties measured in terms of number of employees and turnover. Coal mining in Svalbard is also considerable.

Chapter 4 describes the Government's strategic priority areas. Social responsibility and the environment, the significance of a predictable administrative framework, mapping of mineral resources and the importance of an

efficient, competent and forward-oriented mineral management are important priority areas. Other important areas are investments and access to capital, education and research and development. Coexistence between mineral industry activities, other industries and Sámi interests will be fostered.

Mineral activities have consequences for the environment. Such activities may also have consequences for other industries. A serious minerals industry must have a proactive approach to social responsibility, must find the best environmental solutions and must be a positive force for growth in the host municipalities. Environmentally responsible disposal of tailings is important in achieving good coexistence with other industries and in ensuring that the natural environment is well safeguarded.

Conflicts over land use may lead to valuable mineral resources being sterilised for the sake of other uses. Considerations related to mineral resources must be safeguarded in municipal and regional area planning in order to secure society's future needs for mineral resources. This requires sound knowledge of the mineral resources.

A thorough environmental impact assessment must be carried out when evaluating new mineral exploitation, in order to provide a sound, professional basis for the decisions to be made. At the same time, efficient, predictable governmental management processes must be ensured. The framework for mineral activities shall be clearer, and must provide better predictability and a basis for time- and cost-efficient decision-making processes.

The Directorate of Mining is the government's central agency for administration and exploitation of mineral resources in Norway including Svalbard. The agency will be strengthened in order to better aid the industry and to carry out its role in the management of Norway's mineral resources.

The increased focus on mapping of mineral resources in Norway shall be continued.

The Geological Survey of Norway started, in 2011, a four-year programme for the geophysical mapping of Northern Norway. When the mapping programme is completed, about 75 per cent of Northern Norway will be covered with geophysical maps. In 2013, a similar mapping programme will commence in southern Norway.

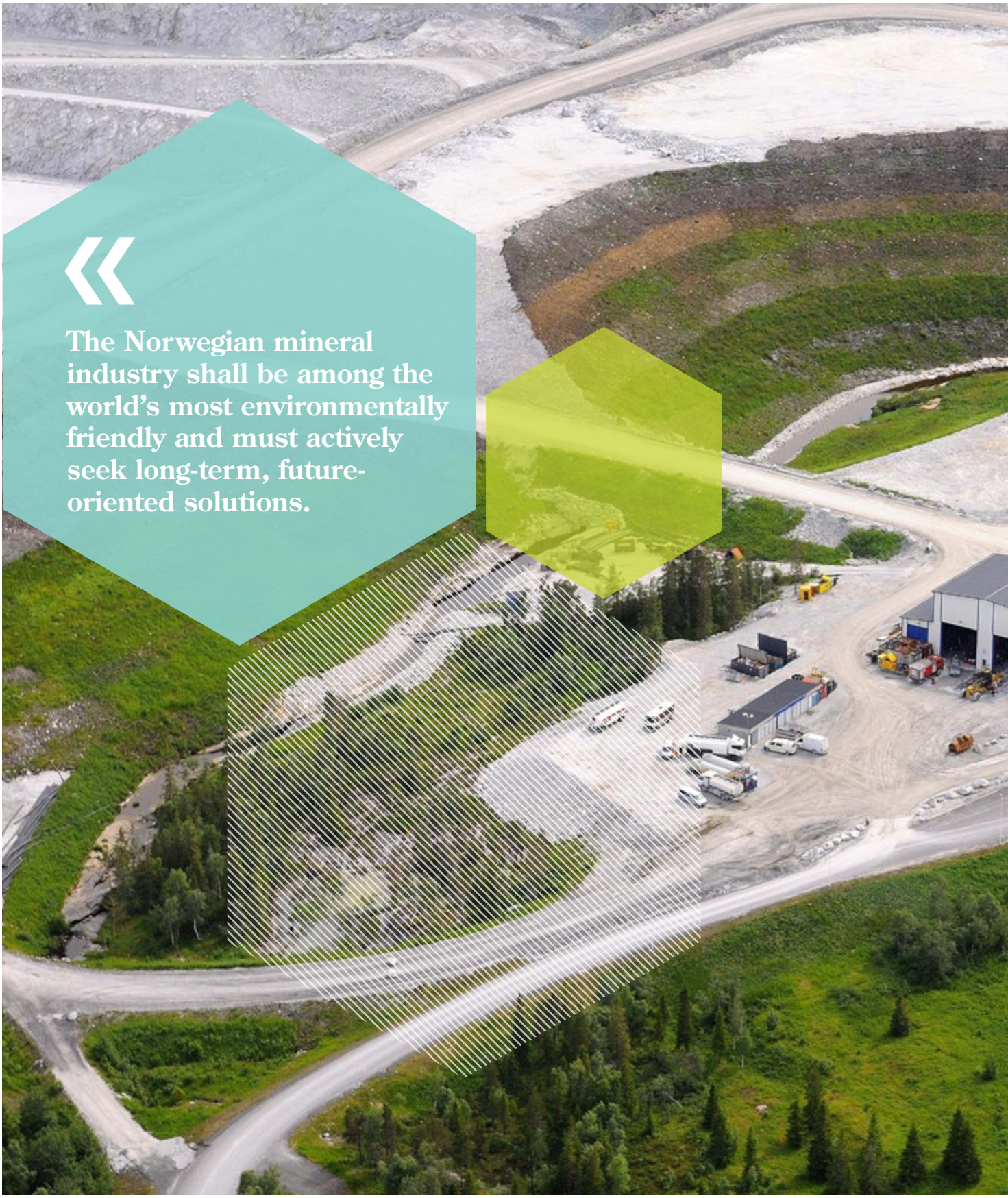
Funding agencies have several loan, guarantee- and support schemes that are relevant for the minerals industry. Existing schemes in the industry-oriented funding agencies will be made available and relevant for participants in the mineral industry, including measures that will contribute to release of funding from other sources.

Access to a competent workforce is critical for the minerals industry. Recruitment of the necessary personnel is challenging. Recent measures include Government support for a professorship in ore geology and mineral resources at the University of Tromsø and a commitment to support the creation of a five-year professorship in minerals engineering at the Norwegian University of Science and Technology in Trondheim. The Government will consider establishing more study places in the sciences and technology and the further development of subjects in basic education that are relevant for the mineral industry.

Development of up-to-date information and acquisition of new knowledge must be based on active research environments, international cooperation and on industry-based research and development. This is important for growth and value creation in the mineral industry, in relation to sustainable environmental solutions and for society in general.

The regulations relating to exploration and exploitation of subsea mineral resources on the Norwegian Continental Shelf are not suited to the current situation. There is a need for a reform of the regulations.

It is of great importance to create a basis for coexistence between the mineral industry, Sámi interests and other affected industries and interests. Emphasis will be placed on finding solutions for coexistence based on good dialogue and a shared understanding of the challenges to be met.



Aerial photograph of Verdal Kalk's facility in Tromsdalen. Photo: Franzefoss Minerals AS. DS.

2 A forward-looking mineral industry

2.1 INCREASING DEMAND FOR MINERALS

Population increase, technological development and economic growth, not least in populous countries in Asia, have led to an increased demand for minerals and metals. Minerals and metals are used in the production of almost all consumer goods, and stable access to minerals is therefore a condition for economic growth. In 2011 in Norway, consumption of mineral raw materials corresponded to 13 tonnes per person.

The rising prices for metals and minerals, unstable markets for several types of mineral resource and uncertainty in relation to the supply situation for certain raw materials are challenges for modern society and for all the industries that utilise minerals and metals. Dependable access to minerals is therefore given great attention by governmental authorities and in industry.

Norway has considerable mineral resources. These must be well-managed in order to secure growth and the creation of profitable companies and employment in the minerals industry. The authorities can, by ensuring that high-quality, basic geological information is available, provide companies with a good starting point for finding and exploiting new commercially viable mineral deposits.

Minerals are non-renewable resources. Ensuring access to minerals is a major challenge for industrial activities. Demand for minerals is increasing while mineral resources, at the same time, are becoming more difficult to find and to exploit. The global mineral industry will, increasingly, have to mine deposits with lower grades of the sought-after commodities. At the same time, technological development and growth in productivity contribute to continually more effective extraction.

The recycling of metals and more efficient use of minerals and metals have become more important for sustainable waste- and resource management and for a relative reduction in the use of raw materials. Some metals, such as copper, lead and aluminium, have characteristics and applications that make them well-suited for recycling, and they are already recycled to a great extent. Electronic circuitry in computers, cell phones and other electronic devices can contain tens of different metals. The increased use of electronic devices and consumer goods has provided a basis for so-called “urban mining”, i.e. recycling of metals from, for example electronic devices and household appliances. Efficient systems for

recycling contribute to reducing the need for new mines and are an important supplement to primary production in meeting society's need for metals.

Focus on renewable energy and the spread of mobile telephones, laptop computers and other electronic devices have led to a strong increase in the demand for special metals. The production of many of these metals is dominated by only a few countries and a few companies. China is, for example, responsible for approximately 95 per cent of global production of rare earth elements. In addition, a ssignificant part of the world's mineral exploitation occurs in areas that are politically unstable. These are factors that entail supply risks for industrial activities in which use of minerals is a factor.

The EU countries have a large industrial production compared with their primary production of mineral raw materials. The EU countries consumes approximately 20 per cent of global metal production but are responsible for only 3 per cent of global production. Uncertain access to metals is therefore a considerable challenge for European industry. This is the background for the EU's 2008 Raw Materials Initiative, in which long-term access to raw materials, sustainable raw material access from European sources and recycling of metals are key elements. The European Commission followed up in 2011, with a strategy for handling the lack of stability in the raw materials markets.

Following presentation of the EU Raw Materials Initiative, several countries have prepared strategies to secure raw material access for their own industries, and to pave the way for increased domestic mineral extraction. France, Germany and the USA have prepared strategies in which emphasis is placed on access to mineral raw materials. Finland prepared a mineral strategy in 2010 and Sweden presented a mineral strategy in February 2013.

FACTS

Mineral raw materials are necessary for the development of infrastructure, in buildings and for the development of new industrial products. Minerals are an important component in most objects that people surround themselves with. The coffee cup you drink from is made from feldspar and clay. Computers, computer screens, cell phones and the tiles in the bathroom are made of minerals. The development of new, environmentally friendly products, more energy-efficient products and a better climate cannot be achieved without access to a multitude of minerals and metals. The electronics industry, and not least, the development of "green" technology, are dependent on minerals. Precious metals such as platinum are used in catalysers for vehicles and rare earth elements such as neodymium are used in super-magnets in windmills and in hybrid vehicles.

The mineral industry in Norway contributes with numerous minerals that are necessary for society. Ground calcium carbonate and limestone are used in paper and cement among other applications. Pure quartz is used in glass, ceramics and in components for optic and electronic instruments and graphite in lithium-ion batteries. Iron ore goes to the steel industry and titanium is used as a pigment in white paint (titanium dioxide), in medical implants and space technology.

FACTS

RHI Normag AS opened a new magnesium plant at Herøya in Porsgrunn in the autumn of 2012. The factory produces different types of magnesium oxide. The raw materials for RHI Normag's production are dolomite from Hammerfall Dolomitt AS in Sørfold and salt water from Frierfjord. The factory at Herøya provides 200 full-time jobs and will be the largest fused magnesia facility outside China. It is considered strategically important for RHI Normag since its degree of self-sufficiency is increasing. In addition to fused magnesia, RHI Normag will supply magnesium oxide to customers in the agriculture, animal fodder, paper and rubber industries, to coal-fired power stations and other chemical industries.

The establishment of RHI Normag demonstrates that Norway's mineral resources and industrial expertise can have strategic importance for European industry.

2.2 THE GOVERNMENT'S VISION FOR THE MINERAL INDUSTRY

The objective of the Government's industrial policy is maximum wealth creation in the Norwegian economy, which also entails full employment. The industrial policy shall contribute to the success and growth potential of companies. The authorities shall contribute with as stable and predictable framework conditions as possible. The companies themselves must make use of the potential for profitable operation. This is a basic perspective in the Government's work in relation to the mineral industry.

It is the collective framework conditions that are critical for triggering the potential for growth and value creation within the mineral industry. The Government's financial policies, energy policies, environmental policies, communication and transport policies, educational, innovation and research policies, a good range of supportive instruments and simplification of routines to reduce the industry's administrative burdens, are areas that are important for stimulating growth in a sustainable manner.

Reputation, social responsibility, the environment and relations to local communities are increasingly important. Local communities expect positive ripple effects from the mineral industry's activities, and that the companies operate in an environmentally responsible manner. The Government expects that the companies that have or wish to have mineral

operations in Norway will adopt a proactive attitude towards social responsibility, the environment, their role in the local community and their relation to other industries.

The mineral industry creates employment and positive ripple effects in local communities in Norway. This is achieved through profitable operation, by the use of modern technology and efficient operating methods and by setting stringent requirements for sustainable and environmentally responsible operation.

The extraction of metals and minerals entails environmental challenges. It is crucial to find environmentally sound solutions. The Government expects the burden on the environment from the industry's activities to be as little as possible. Mineral operations may require large areas and the activities have, in many cases, a need to dispose of large amounts of waste rock and tailings. Long-term solutions are important for handling these masses. Disposal must occur in an environmentally responsible manner. The Government expects that the industry will work actively to minimise the tonnage of waste rock and tailings and that it will contribute to developing solutions for alternative use of these where practically possible.

Another environmental challenge is the use of chemicals in several production processes. Chemicals are used to separate valuable minerals and impurities, and to bind gangue for disposal. Emissions and the use of environmental toxins must be avoided. The Government expects the sector to have a targeted effort and an active attitude against emissions of environmentally hazardous chemicals.

Initiation of new mineral operations usually requires long planning and major investments. Encouragement for companies to invest in Norway necessitates good framework conditions that stimulate value-creation and a profitable mineral industry. The framework must facilitate good, clear, efficient regulatory processes. This will also help to increase predictability for companies in connection with investment decisions. For Norway to be an attractive country for investment in mineral activities there must be proper management of the mineral resources. This includes effective mapping of mineral deposits and sound planning in relation to the resources.

Efficient and environmentally-friendly operation is dependent on the use of new knowledge and technology. Access to qualified labour and the development of new knowledge are decisive in order to achieve the growth potential of the industry. Good educational courses and facilitation of research and innovation are important factors for growth in the mineral industry.

The Government's objectives for the mineral industry are:

1. **A profitable mineral industry with strong value-creation and good growth.**

2. **The Norwegian mineral industry shall be among the world's most environmentally friendly and shall actively seek future-oriented solutions.**

3. **Predictable and efficient administration and procedures shall be the rule for all national, regional and municipal authorities in their handling of regulations relevant to the industry.**

4. **Growth in the industry shall be strengthened by means of a continued commitment to mapping of mineral deposits, access to information about mineral resources in Norway, better resource planning, a continued development of the mineral agencies and access to knowledge and a competent workforce.**

There are separate framework conditions for mineral activity in Svalbard. The policy for economic activity in Svalbard is inter alia laid down in Report No. 22 (2008-2009) to the Storting on Svalbard and the Storting's considerations of this report. This policy sets out very high environmental objectives for Svalbard. The strategy for the mineral industry entails no changes to current Svalbard policies, including those relating to mineral activity there.

MEASURES

National mineral forum

A national mineral forum shall be established to follow up the strategy for the mineral industry. The forum will be led by the Ministry of Trade and Industry and shall contribute to successful implementation, development and foundation of the measures in the strategy.

Aerial photograph of Verdal Kalk's facility in Tromsdalen. Photo: Franzefoss Minerals AS. DS.

3 Mineral resources and the mineral industry in Norway

3.1 THE MINERAL INDUSTRY IN NORWAY

Historically, the industry has been important for Norway's economy and has also formed the basis for other industries. It is typically most important in outlying districts, with companies in all Norway's counties. The industry has a few relatively large companies, primarily dealing in the extraction of iron ore, certain industrial minerals and coal. Most of the companies are relatively small.

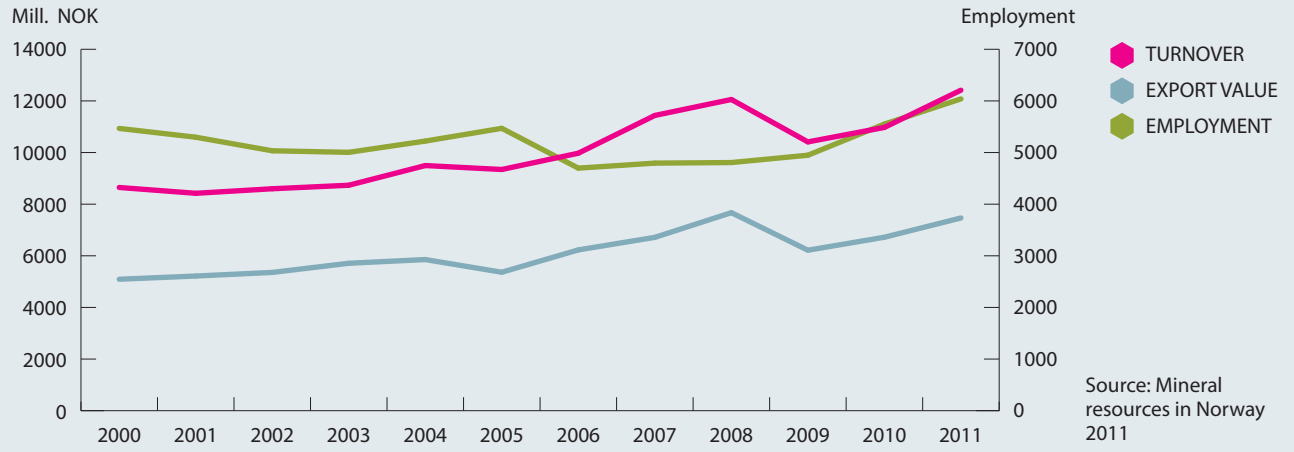
In 2011, the minerals industry had more than 6 000 employees, distributed over 1 104 mines and quarries managed by 833 operators. The industry traded for NOK 12.4 billion, with an export share of 60 per cent. Since 2005-2006, there has been a positive trend in the industry with increased employment, increased turnover and increased export, broken by a temporary decline that resulted from the effects of the financial crisis in 2008. There has been relatively strong growth in turnover and employment in the industry during the period 2010-2011. In 2010, turnover amounted to NOK 10.8 billion and the industry had about approximately 5 500 employees.

The most important mineral county in Norway, in terms of employment, is Rogaland with approximately 800 employees in 2011. Other important mineral counties, in terms of employment, are Finnmark, Nordland and Møre og Romsdal. In 2011, these four counties and Svalbard were responsible for 56 per cent of the total employment in the industry. Vestfold, Sør-Trøndelag, Akershus, Nord-Trøndelag, Sogn og Fjordane and Telemark all have more than 200 employees in the industry. Measured in terms of turnover, Møre og Romsdal is the most important mineral county with a total turnover of NOK 2 billion in 2011.

The mineral companies also contribute to employment for sub-contractors. The companies purchase transport services, maintenance and repair services and provide positive ripple effects in the form of increased activity in the local communities in which they operate. Part of their production is also used as input in industrial production in Norway.

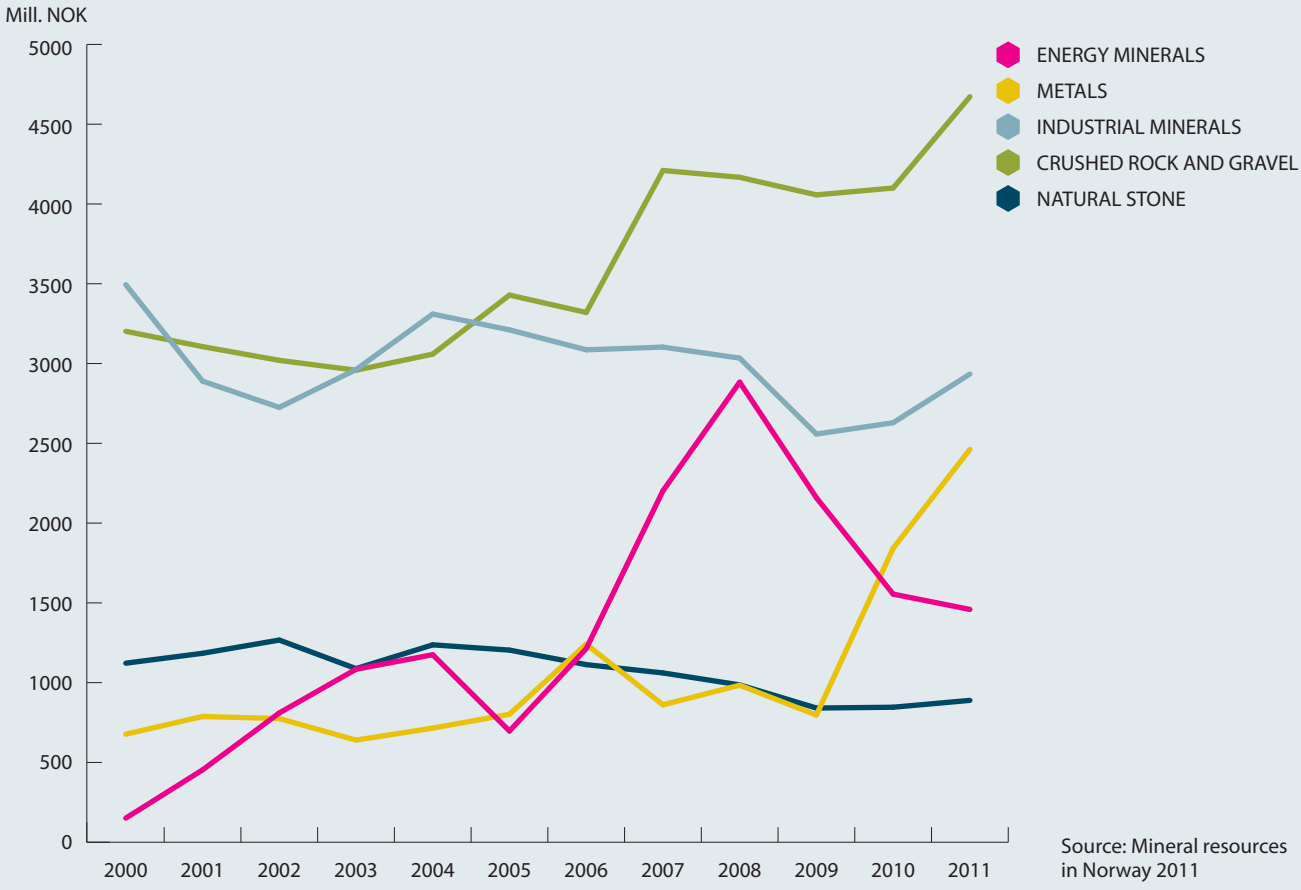
Domestic consumption of minerals is, to a major extent, linked to use of crushed stone and gravel for construction purposes, although much of the natural stone production and

FIGURE 1 –DEVELOPMENT OF TURNOVER (SALESVALUE), EXPORT AND EMPLOYMENT - 2000–2011



Source: Mineral resources in Norway 2011

FIGURE 2 – PRODUCTION VALUE OF MINERAL RESOURCES 2000-2011 (2011-PRICE LEVEL)



Source: Mineral resources in Norway 2011

part of the industrial minerals production are sold in Norway. Within other parts of the industry, such as metallic ore, industrial minerals and coal, the exported shares of the production are high.

The exports are distributed among several mineral products. The four major export products in 2011 were iron ore concentrate, coal, ground calcium carbonate and crushed rock. Other important export minerals are stone blocks (primarily larvikite), ilmenite (titanium ore), olivine, nepheline syenite and quartz/quartzite.

Some decades ago, there was a considerable degree of public ownership in the minerals industry. Today, the State has ownership only in Store Norske Spitsbergen Kullkompani AS (SNSK). SNSK has two fully owned subsidiaries: Store Norske Spitsbergen Grubekompani and Store Norske Gull. Extraction of coal takes place in Svalbard under the management of Store Norske Spitsbergen Grubekompani, while Store Norske Gull operates exploration projects in Svalbard and in Northern Norway.

3.2 MINERAL SECTORS IN NORWAY

The mineral industry is usually divided according to the production of the various types of commodity. It is usual to distinguish between the following five principal groups (selected examples and typical products are given in parentheses):

- Construction raw materials (crushed rock, sand and gravel)
- Industrial minerals (marble, dolomite, olivine, quartz, graphite, etc.)
- Metal ores (iron, nickel and ilmenite - titanium dioxide, etc.)
- Natural stone (larvikite, granite, slate, etc.)
- Energy minerals (coal and peat)

FIGURE 3 – EMPLOYMENT IN THE MINERAL INDUSTRY, INCLUDING SVALBARD - 2011

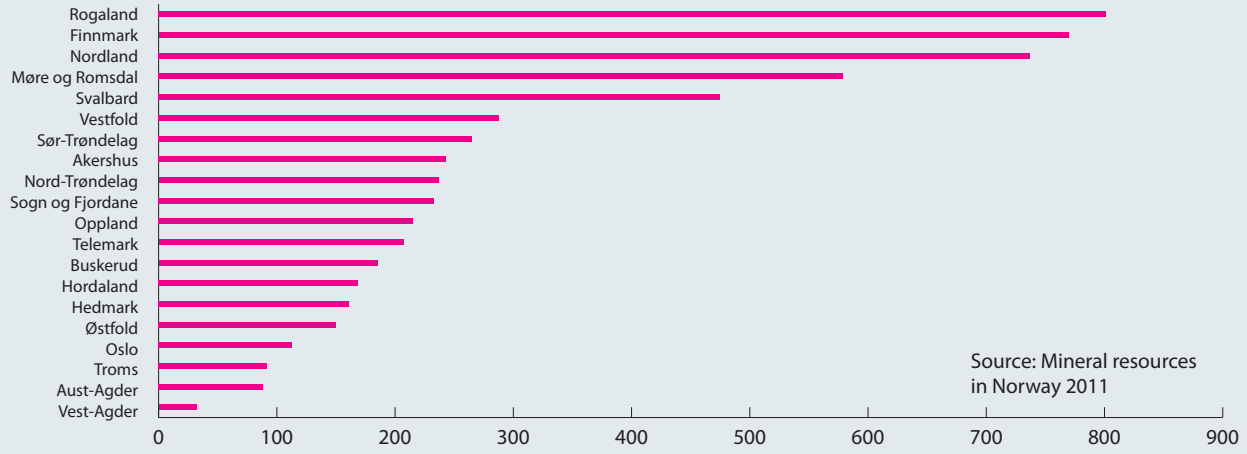
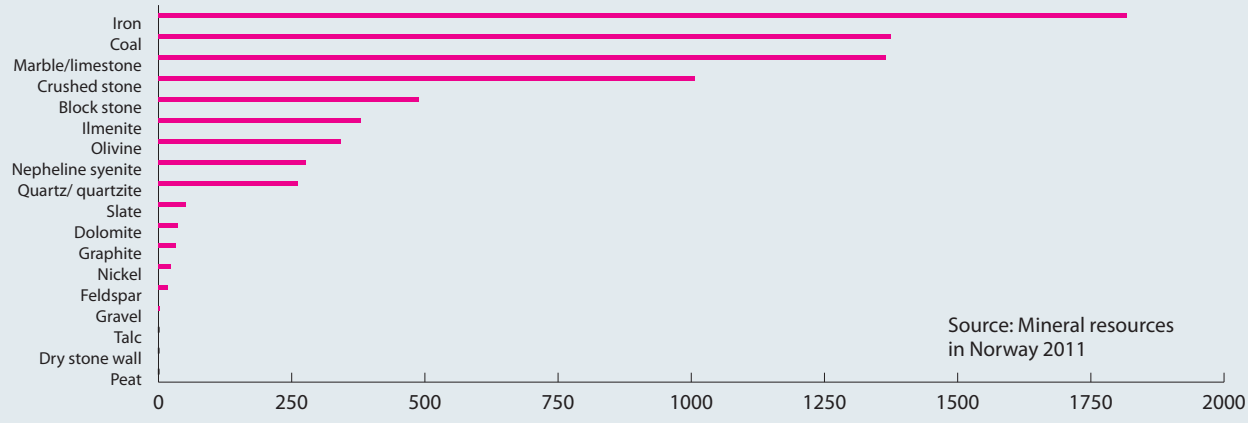


FIGURE 4 – EXPORT VALUE IN REALTION TO COMMODITY TYPE - 2011



Crushed stone is used for road construction, infrastructure and house building. Crushed stone is inexpensive to produce but costly to transport. Crusted stone is ideally used close to its source. Photo: Getty Images

In 2011, Bremanger Quarry in Sogn og Fjordane exported 3.3 million tonnes of crushed stone to, i.a. the Netherlands and Belgium. The company has a CO2-friendly crushing method that involves releasing the stone from 200 m height in the mountains. The photo shows the plant at Dyrstad near Svelgen. Photo: Bremanger Quarry

Photo: NCC

CONSTRUCTION MATERIALS

The companies producing construction raw materials sell most of their products, crushed rock, gravel and sand, for building and construction purposes. The products are used for many important purposes in society, such as buildings, roads and other construction projects. Production is largely affected by the level of activities in these sectors.

Sales of construction materials in 2011 were NOK 4.7 billion and amounted to about 38 per cent of sales in the mineral industry. Approximately 2,750 people were employed in the construction materials sector, and production was distributed among 950 small and large extraction plants. The number of quarries must be viewed in relation to of the fact that long transport distances on land are not compatible with a cost-efficient supply of crushed rock and gravel. Calculations carried out by the crushed rock and gravel industry indicate that with transport of more than 30 kilometres from the extraction plants, the transport cost exceed the cost of the production itself. Many crushed rock and gravel extraction plants are owned by companies in the building and construction sector.

In 2011, the sector generated export income totalling NOK 1 billion, which corresponds to 20 per cent of the turnover. Exports were sold to neighbouring countries (Germany, the Netherlands, Denmark, Poland, the UK and other parts of northern Europe). Production locations near harbour facilities make the export of crushed rock from Norway profitable.

BREMANGER QUARRY AS

Early in the 1990s, the properties of the sandstone at Bremanger in Sogn og Fjordane were investigated. It was established that the sandstone's properties were favourable for use in road construction and other applications. Today, Bremanger Quarry AS is one of the major exporters of crushed rock in Norway. This particularly hard sandstone is used in asphalt production in the Netherlands and Belgium, but also for concrete in the building of railways and various offshore projects. In 2011, Bremanger Quarry exported 3.3 million tonnes of crushed rock and had a turnover of approximately NOK 235 million. The company also generates electricity in the production process. This contributes to a more cost-efficient sustainable production.

Aerial photo of Sibelco Nordic's facility for shipping olivine at Åheim in Møre og Romsdal. Photo: Harald M. Valderhaug

Quartz is used in, among other applications,, solar cells and glass - here in a halogen lamp. Photo: Istockphoto

The industrial mineral graphite is an important component in lithium-ion batteries - here in a car battery from a Mercedes Benz. Photo: Getty Images

Titanium white (titanium dioxide) is used as a pigment in, i. a. plastic products, toothpaste, food and cosmetics. Photo: Istockphoto

Many different metals are needed for building windmills, among others iron, copper and rare earth elements. Photo: Getty Images

Nepheline syenite is used as filler in, among other applications, ceramics, glass and paint. Photo: Shutterstock

INDUSTRIAL MINERALS

Industrial minerals often have characteristics and qualities suitable for a broad range of applications in other industries. For certain types of industrial minerals, the applications are very specific and there are few producers globally. It is not unusual that the producer of the industrial minerals and the companies using the minerals cooperate closely on adaptation of the quality and characteristics of the industrial mineral to the requirements of the final products. Stable access to industrial minerals is critical for global industry, technological development and for the development of new products. Employment in the industrial minerals sector is barely 960 people. In 2011, the companies' turnover amounted to NOK 2.9 billion, which represents about 23 per cent of the total turnover in the mineral industry. The total export of industrial minerals amounted to NOK 2.3 billion, which means that nearly 80 per cent of industrial mineral production in Norway, in terms of value, is exported.

A significant amount of industrial minerals production is linked to the production of dolomite and marble. The number of companies involved is approximately twenty. Hustadmarmor in Møre and Romsdal is the world's largest supplier of ground marble filler to the paper industry. Norway is also the world's largest producer of olivine, which among others is used in the production of steel. Other industrial minerals in Norway are quartz and quartzite which, for example applications, are used to produce glass, semi-conductors and solar cells and in the metallurgical industry. On Senja, Skaland Graphite AS extracts flake graphite and is one of only two producers in Europe of this mineral.

OLIVINE IN VANYLVEN

Olivine is a magnesium-iron silicate with a high melting point, high specific gravity and high thermal capacity. The mineral is used in the steel industry to precipitate impurities and in the aluminium industry. Other applications include foundry sand, raw material for fireproof products and rock wool production. A new area of use for olivine, recently discovered, it that it is very suitable for absorbing many heavy metals. At Åheim in Vanylven, Sibelco Nordic AS extracts olivine from one of the world's largest and purest olivine deposits. Estimated reserves at Åheim are more than 500 million tonnes. Sales in 2011 were 2.2 million tonnes, which represents about 40 per cent of global production of olivine. The most important export market is Europe, but olivine from Åheim is currently being exported globally.

At the Klåstad quarry near Larvik in Vestfold, about 20,000 m^3 of granite blocks are quarried every year and exported all over the world. Lundhs Emerald, or dark larvikite, is a type of granite that is used among other products for counter tops, façade plates, floor tiles and sculptures. Photo: Jørn Holtan

Lundhs Antique is quarried at Sirevåg, Rogaland. Here it is used as floor tiles in the fashion department of the Dubai Mall. Photo: Morten Rakke

NATURAL STONE

Natural stone is a collective term for all stone that is used, for example, in buildings, monuments and outdoor recreational areas. Natural stone is also used for other purposes, such as exclusive interior products. It is usual to divide natural stone into the categories dimension-stone, slate, roofing stone, flagstone and walling stone. Extraction of blocks of larvikite is the most important part of the industry. Raw blocks of larvikite are produced in Vestfold county and exported to Europe, China and India.

There is production of dimension-stone products in other counties, including Sogn og Fjordane, Hedmark, Nordland, Buskerud and Sør-Trøndelag. In the Fauske area, there is some production of marble. Roofing stone, flagstone and walling stone are produced in several parts of the country, the most important production areas being Alta, Oppdal and Otta.

In 2011, the natural stone sector had 655 employees and a turnover of NOK 534 million for block stone, NOK 256 million for slate and NOK 131 million for walling stone. This corresponds to 7 per cent of the turnover in the mineral industry. Approximately 56 per cent of the natural stone production is exported.

Use of more efficient and modern production equipment to extract natural stone, special expertise and access to sea transport are important factors for development of the industry.

The façade of Devon Tower in Calgary is clad with Lundhs Royal Blue, which is a type of larvikite. Photo: Sean Phillips

LUNDHS AS – PRODUCTION OF OF EXCLUSIVE LARVIKITE

Larvikite is one of the most exclusive natural stone types in the world and has been chosen as Norway's national rock. The company Lundhs AS is the largest producer of natural stone in Norway, with approximately 150 employees. The company had a total turnover of NOK 386 million in 2011. Almost the entire production is exported. The largest markets are China, India, Italy, Spain and France. In all, there are seven different types of larvikite, with Lundhs Blue and Lundhs Emerald as the most well-known. Larvikite is used, among others for facade plates, counter tops in kitchens and bathrooms and as floor tiles. Larvikite decorates a number of well-known buildings. Among them are the world's first seven-star hotel, Burj-Al-Arab in Dubai, the Jame Asr Hassanil Bolkiah mosque in Brunei and the world's largest shopping centre, the Dubai Mall. A number of shop facades in Manhattan in New York, are decorated with larvikite.

Overview image of the open cast mine at Tellenes, Titania A/S. Photo: Titania AS/ Linda Løvås

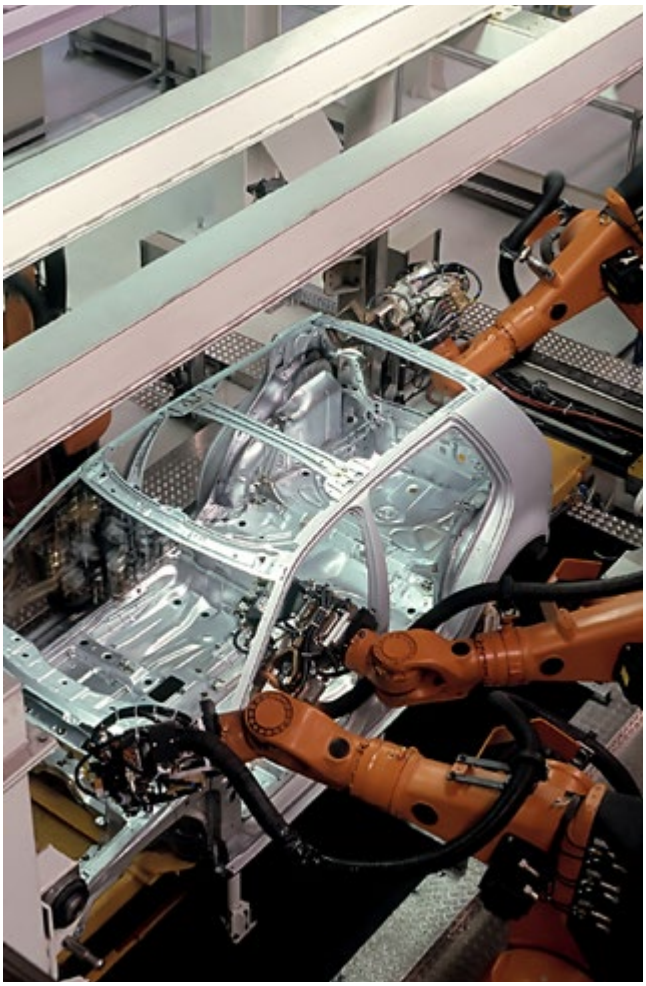
METALLIC ORES

There is a long tradition and history of production of metallic ores in Norway. Several local communities are built on the economic activities linked to the extraction of ores. The silver mines in Kongsberg, mining of chalcopyrite (copper-iron sulphide) in the Trøndelag area and extraction of iron ore at many locations in the country are examples of mining that has been of great importance.

In 2011, there were three producers of metallic ores in Norway. All are among the largest mining companies in the country. In Nordland, Rana Gruber produces iron ore concentrate ("iron powder") and processed special products based on iron ore. In Sokndal in Rogaland, Titania AS produces ilmenite and a small tonnage of nickel concentrate. In Finnmark, Sydvaranger Gruve AS produces iron ore.

The prospect of increasing demand for metals has led to renewed interest in metal mining in Norway. The reopening of the iron ore mines in Sør-Varanger in the autumn of 2009 is an example. Start-up of other projects is also being considered. In Kvalsund in Finnmark, Nussir ASA is assessing the feasibility of mining copper ore, and in Sogn og Fjordane Nordic Mining ASA is working on plans for mining rutile from Engebøfjellet in Naustdal municipality.

In 2011, approximately 1,060 people worked in the metallic mining sector. There is growth in the sector and the turnover increased from NOK 1.8 billion in 2010 to NOK 2.5 billion in 2011. The sector exports nearly all of its production. In 2011, the export value amounted to NOK 2.2 billion, which corresponds to an export share of almost 90 per cent.



Iron ore is produced at Rana Gruber and at the Sydvanger mine. The iron produced in these mines has a number of different uses. Primary products go to make steel for the car and building industries, but special products are also produced that are used in the chemical industry, for water purification purposes, the paint industry and the concrete industry. Photo: Istockphoto

FACTS

Titania AS in Sokndal municipality in Rogaland is one of Europe's largest suppliers of raw materials for the pigment industry. Titania extracts black ilmenite concentrate which is processed to pure, white titanium dioxide pigment which is used in products such as paint, varnish, paper and plastic, cosmetics and food-stuffs. The company, founded in 1902, is currently part of the US company Kronos World Wide Inc. The deposit in Sokndal is one of the world's largest and Titania is responsible for approximately 6-8 per cent of the world's annual production of titanium minerals. Kronos Titan AS in Fredrikstad is an associated company of Titania. The company in Fredrikstad processes the concentrate to produce white pigment.

Increased prices for iron ore have resulted in increased iron ore production in Norway. The growth in turnover for the industry in 2010 and 2011 is partly due to this. Rana Gruber AS is one of Norway's largest mineral companies. Production has doubled during the past four years. According to the Geological Survey of Norway, the iron ore deposits in Dunderlandsdalen are estimated to be Norway's most valuable deposits. The end product, haematite, is sold mainly to the metallurgical and chemical industries. The subsidiary, RG Mineral AS, produces various special products for paint manufacturers and the construction and motor vehicle industries.

Sør-Varanger has long traditions in mining iron ore. For many years, the state-owned company A/S Sydvaranger, was the cornerstone company in the local community, but operations were shut down in 1996 as a result of weak profitability. In 2009, iron ore production was again started up under the auspices of Sydvaranger Gruve AS. The company has approximately 400 employees and is well on its way to achieving a production capacity of 2.8 million tonnes of iron ore concentrate annually. A further increase in production capacity is being evaluated.

View from the Lunckefjell plateau towards the south across Martha Glacier where we see the exit from the Svea Nord mine at the base of Skollfjell and the road that has been begun across the glacier towards the opening on the Lunckefjell side of the glacier. Photo: SNSK, Malte Jochmann

ENERGY MINERALS

Energy minerals are compounds that release energy on combustion. Today there are two companies that produce coal in Svalbard. Store Norske Spitsbergen Grubekompani AS operates Mine 7 in Adventdalen outside Longyearbyen and Svea Nord about 60 km south of Longyearbyen; the Russian company Trust Arktikugol in Barentsburg started production again in 2011. Store Norske Spitsbergen Grubekompani is the world's northernmost mining company and remains a key employer in Svalbard.

There is also a relatively modest production of peat in Norway with extraction in several counties. Sale of coal and peat products amounted to NOK 1.46 billion in 2011 and the industry had approximately 520 employees. The peat produced is primarily used for soil improvement and composting, but can also be used for energy. There is little export of peat, whereas the export share for coal is almost 100 per cent.

3.3 MINERAL RESOURCES IN NORWAY

Increased exploration and deposit investigation activities require good knowledge of Norway's bedrock and its resource potential. The primary task of the Geological Survey of Norway is the collection, processing and organising of basic geophysical, geochemical and geological data.

Increasing prices for minerals and metals and the development of new exploration and production technologies for mineral resources means that historic mining areas are once again attractive and that new types of resource can be investigated. Good management of mineral resources requires a long-term perspective in which both traditional raw materials and potentially new, future types of raw material are included. Technological breakthroughs, price changes and new environmental standards may lead to new requirements and significant changes in demand and price for different types of raw material.

The EU Raw Materials Initiative points out weaknesses and challenges in the global market for mineral resources, and outlines strategies to meet these challenges. Norway and Norwegian industry are also best served by a well-functioning global market for minerals and metals. Norway, for example, imports large amounts of mineral raw materials for the production of aluminium, nickel and ferro-alloys. Increased production of minerals and metals in Norway will be a contribution to global demand for stable access to resources.

Norway has significant mineral resources that can contribute to Europe's access to resources. Norway is already an important producer of several commodities that are exported to European and other markets. Examples are titanium minerals, iron ore, coal, limestone, quartz, nepheline syenite, olivine, crushed rock and natural stone. In addition, Norway is Europe's largest producer of aluminium, ferro-alloys, mineral fertilizer, manganese alloys, nickel metal and silicon metal. These are products primarily based on imports of mineral raw materials for further processing in metallurgical plants.

The Geological Survey of Norway has calculated that known and investigated metal resources in Norway, at current prices, have an "in situ" value of about NOK 1,400 billion. Known resources of industrial minerals, crushed stone, gravel, coal and natural stone are estimated to have an "in situ" value of an additional NOK 1,100 billion. Further additions will come for all the mineral deposits that have yet to be investigated. Geological and operational conditions, labour and other costs linked to extraction will govern how large a portion of the "in situ" value can be attained. Increased mapping and new discoveries will add to the value estimates. Prices that can be achieved in the market and production costs associated with extraction will be critical for whether new discoveries can provide a basis for profitable mineral operations.

Markets for mineral resources have changed significantly in recent years. Prices for many minerals and metals have increased. Given continued growth in the world economy, there is reason to assume that the prices of many minerals and metals will, in the future, be at a higher level than today. However, there will be challenges related to short-term fluctuations in prices in the years to come. Furthermore, technological and industrial developments have given increasing importance to "new" metals and minerals. In a European context, this development has led to an acknowledgement that access to certain minerals and metals can no longer be taken for granted. The European Commission has prepared an overview of metals and minerals for which production is dominated by a few individual countries. Some of these countries are also politically unstable. The European Commission's goal is that industries in EU countries should have good access to minerals from reliable sources.

Norway has probable deposits of several metals and industrial minerals for which production is dominated by only a few countries. There is already production in Norway of some of the metals and industrial minerals. The extent to which there is a basis for future commercial exploitation of deposits of other metals and industrial minerals, currently not being extracted in Norway, must be considered more closely.

FACTS

The Geological Survey of Norway has made an estimate of the "in situ" value of investigated mineral deposits. The value is calculated based on given raw materials prices and estimates for the amount of resources that are expected to be profitable to extract.

Iron ore is extracted from large deposits in Sør-Varanger in Finnmark and in Rana in Nordland. These have an estimated total "in situ" value of approximately NOK 400 billion and thereby provide the basis for many years of extraction. In Naustdal municipality in Sogn og Fjordane, large deposits have been found of the titanium mineral rutile, with an estimated "in situ" value of some NOK 180 billion. In the Bjerkreim - Sokndal area in Rogaland, there is a large deposit of ilmenite, apatite and magnetite in which the "in situ" value is estimated to be NOK 230 billion. In the Oslo region, significant deposits of molybdenum have been found that are estimated to be among the largest in Europe, with an "in situ" value estimated to be about NOK 50 billion.

Source: Mineral and metal resources in Norway: in situ value of metal deposits of national significance (Geological Survey of Norway, 2012)

FIGURE 5: LEADING PRODUCER COUNTRIES FOR SELECTED INDUSTRIAL MINERALS IN 2010

	First	%	Second	%	Third	%	Σ%	Norway
Barite	China	46	India	24	USA	8	78	-
Diamond	Russia	26	Botswana	20	DR Congo	15	61	-
Feldspar	EU	33	Turkey	23	China	11	77	0.3
Fluorite	China	56	Mexico	18	Mongolia	7	81	-
Graphite	China	86	India	5	Brazil	4	95	0.3
Gypsum	China	26	EU	15	Iran	10	51	-
Kaolin	EU	30	USA	22	China	11	63	-
Magnesite	China	64	Russia	12	EU	12	88	-
Nepheline syenite	Russia	84	Canada	10	Norway	6	100	6
Olivine (estimate)	Norway	43	Japan	25	EU	10	78	43
Phosphate	China	37	Morocco	15	USA	14	66	-
Potassium salts	Canada	29	Russia	18	Belarus	15	62	-
Salt	China	23	USA	17	EU	9	49	-
Talc	China	27	EU	17	India	14	58	0.1

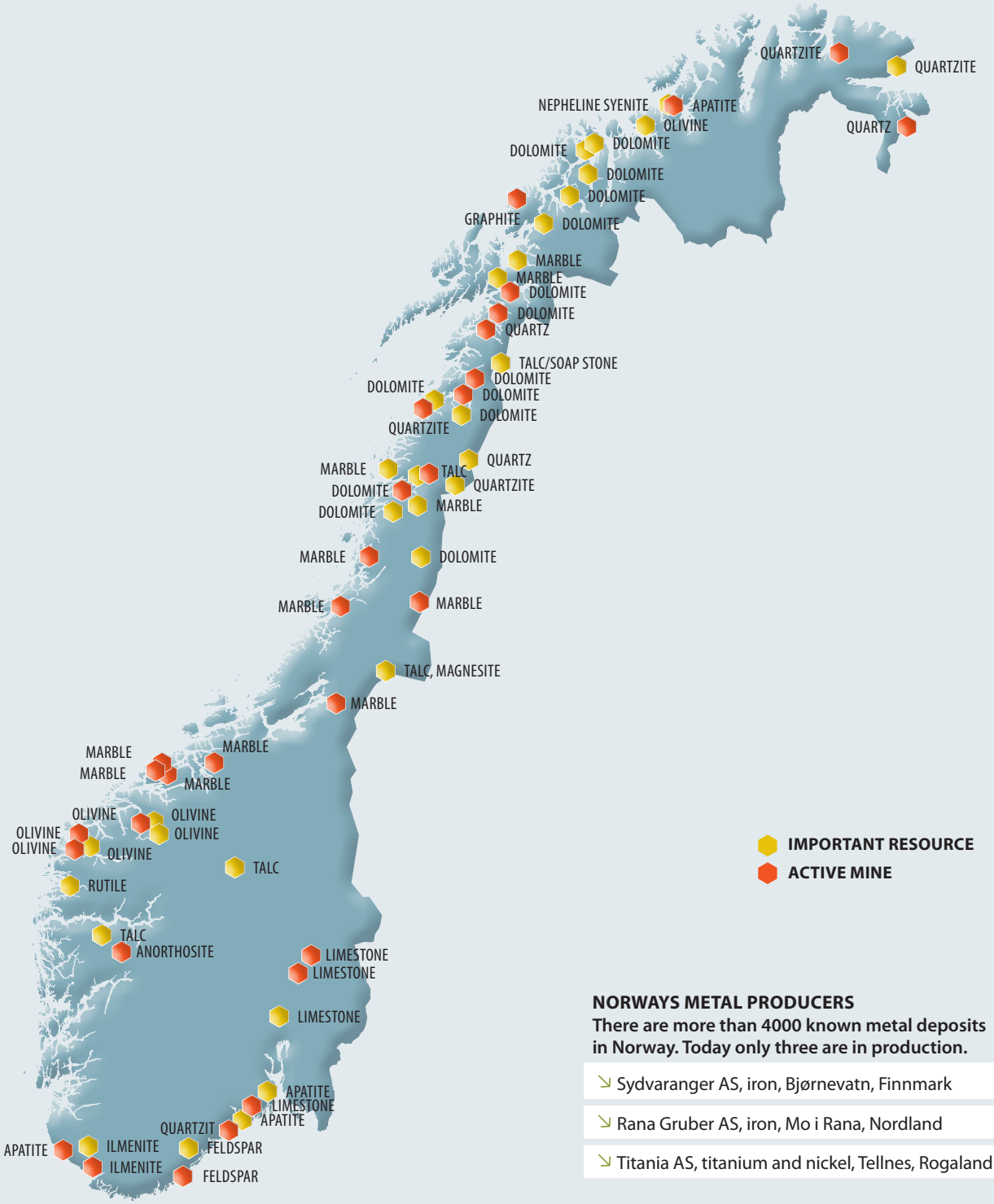
FIGURE 6: LEADING PRODUCER COUNTRIES FOR SELECTED METAL ORES IN 2010

	First	%	Second	%	Third	%	Σ%	EU%	Norway
Antimony	China	88	Bolivia	3	Tajikistan	2	93	-	-
Bauxite	Australia	31	Brazil	15	China	14	60	1.4	-
Beryllium	USA	85	China	14	Mozambique	1	100	-	-
Chromium	South Africa	36	Kazakhstan	29	India	14	79	0.3	-
Cobalt	Congo	67	Canada	6	Australia	5	78	-	-
Copper	Chile	33	Peru	8	China	7	48	4.8	-
Gold	China	13	Australia	10	USA	9	32	0.7	-
Iron	China	41	Australia	17	Brazil	14	72	1.2	0.115
Lead	China	43	Australia	17	USA	9	69	5.6	-
Manganese	China	33	South Africa	17	Australia	15	65	0.4	-
Molybdenum	China	40	USA	22	Chile	15	77	-	>0.01
Nickel	Russia	17	Indonesia	14	Australia	11	42	4	-
Niobium/Tantalum	Brazil	92	Canada	7			99	-	-
Platinum	South Africa	60	Russia	30	Zimbabwe	4	94	-	-
Rare earths	China	98	Russia	2			100	-	-
Titanium minerals	Australia	23	Canada	22	South Africa	14	59	-	7.2
Tungsten	China	84	Russia	5	Bolivia	2	91	3.2	-
Vanadium	South Africa	34	China	33	Russia	31	98	-	-
Zinc	China	30	Australia	12	Peru	12	54	6.6	-

The column to the right specifies Norway's share of world production for the selected minerals. A dash means that the commodity is not produced in Norway. Red markings mean that resources have been proven or that the resource may very likely be found in Norway.

Source: World Mineral Production 2006–2010 (British Geological Survey, 2012)

FIGURE 7– METAL DEPOSITS OF NATIONAL IMPORTANCE



NORWAYS METAL PRODUCERS

There are more than 4000 known metal deposits in Norway. Today only three are in production.

- Sydvaranger AS, iron, Bjørnevatn, Finnmark
- Rana Gruber AS, iron, Mo i Rana, Nordland
- Titania AS, titanium and nickel, Tellnes, Rogaland

Source: NGU

FIGUR 8 – INDUSTRIAL MINERAL DEPOSITS OF NATIONAL IMPORTANCE

NORWAY IS EUROPE'S (EU34) MOST IMPORTANT PRODUCER OF :

- ↘ Calcite filler
- ↘ Olivine
- ↘ Nepheline
- ↘ Titanmineraler

Source: NGU

Most of Store Norske's coal production comes from the mine at Svea Nord. Longwall benching is the production method. Photo: Kim Bierbauer

3.4 SPECIAL FEATURES OF MINING ON SVALBARD

Report no. 22 to the Storting (2008-2009) Svalbard (The Svalbard Report) and the Storting's considerations on this report lay down the main elements in the Government's policy for the archipelago. All activities shall take place within the framework of the environmental objectives that are set for the archipelago. These conditions also apply to mineral activities.

The Mining Codefor Spitsbergen (Svalbard) provides rules and regulations for mineral activities on the archipelago and includes, i.a., provisions relating to exploration and discoveries, allocation of mining rights and the entitlements and duties of the holder of the mining rights. The Mining Ordinance is administered by the Directorate of Mining with the Commissioner of Mines at Svalbard.

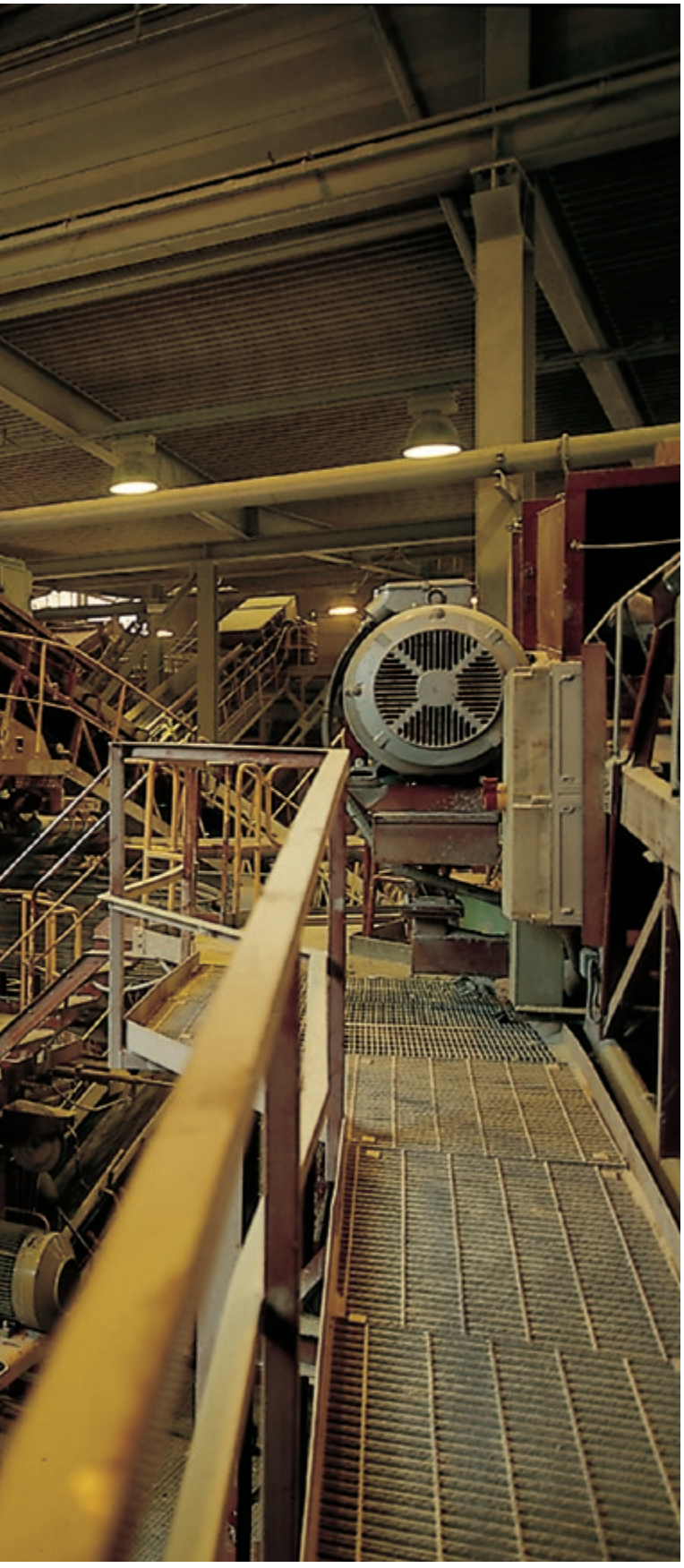
Exploration for, and extraction of minerals in Svalbard are also regulated in other legislation that applies to the archipelago. These include the Svalbard Environmental Protection Act. This act lays down among others prohibition of physical encroachements in protected areas, requirements for permits for all types of infrastructure development outside protected areas and requirements for impact assessments of all activities that can be assumed to have more than an insignificant effect on the natural environment.

The Norwegian Polar Institute is responsible for the official geological mapping programme in Svalbard. The objective for the Institute's geological activities is to provide the administration and other user groups with knowledge about the geological structure, ground conditions and geological resources in Norwegian Polar areas. Mapping under the auspices of the Norwegian Polar Institute is of a general character and is not directed towards mineral resources.

Coal is currently being mined in Svalbard. Store Norske Spitsbergen Kulkompani AS produces coal near Longyearbyen and in Svea Mine, while Trust Arktikugol produces coal from a mine in Barentsburg. Historically, coal production is the only form of mining which has been carried out on a significant scale in Svalbard.

Predictable and efficient procedures shall be the rule for the handling of all regulations at national, regional and municipal levels in relation to the industry.

Crushers in olivine sand production at Sibelco Nordic's facilities at Åheim in Møre og Romsdal Photo: Sibelco Nordic, P.O. Dybvik



4 Strategic priorities

4.1 MAPPING MINERAL RESOURCES

The mineral industry must have up-to-date geological knowledge in order to be able to carry out exploration, deposit investigations and extraction. The authorities need such information in order to carry out tasks that are important for society in general. The Geological Survey of Norway is the Government's central agency for geological information.

The Geological Survey of Norway is required, as its primary tasks, to carry out geological overview mapping and to produce and distribute knowledge about Norway's bedrock, soils, groundwater and mineral resources. The agency acquires and makes available basic data, develops knowledge about new types of geological resource and their properties, and cooperates nationally and internationally with research organizations and industry. Information about mineral resources also provides local and regional authorities with a better basis for decisions relating to land- and resource management.

The Geological Survey of Norway communicates geological information to industry and to governmental authorities at different levels through publicly available databases, advisory services and guidance. Access to geological data of good quality is the basis for industry's exploration and deposit investigations. Such data gives companies a tool for finding commercially viable deposits.

Much of the currently available mapping of Norway's mineral resources is of a quality that provides mineral companies with a limited basis for assessing the probability of finding commercially viable deposits. Geophysical mapping of radioactivity and magnetic and electromagnetic fields using aircraft or helicopters gives the prospecting companies a significantly better information basis. Whereas Finland and Sweden have completed geophysical mapping of almost their entire land area, this type of data is available for only approximately 30 per cent of Norway. The Geological Survey of Norway started, in 2011, a programme for geophysical mapping in northern Norway (MINN - Mineral Resources in North Norway). When the MINN programme has been completed, approximately 75 per cent of the land area in the three northernmost counties will have been mapped. The current figure for southern Norway is 22 per cent. With all types of input included, the Geological Survey will, in 2013, use more than NOK 100 million on mapping of mineral

resources. This is more than double the amount used in 2000. Never has so much money been used on mapping in Norway as now. If this record level is maintained for the mapping programmes in the years to come, the goal of 75 per cent coverage of Norway can be achieved in 2018.

The Geological Survey of Norway has a vessel that is used to map and obtain geological data and information from the sea floor in coastal areas. The vessel is old and has high operating costs. The Ministry of Trade and Industry has focus on the efficiency of collection of information in this sector and that adequate marine base maps are available for use in planning projects in the coastal zone. This will give a better basis for decisions among others related to evaluating exploitation of shell-sand and gravel deposits and to the suitability of marine areas for disposal of waste rock. The Ministry will have a close dialogue with the Geological Survey and the relevant ministries to discuss how this service can be carried out in the most efficient way.

MEASURES:

Mapping in North Norway

A special mapping programme was started for North Norway in 2011. So far, NOK 75 million has been allocated for the mapping programme. The programme has already contributed to increased interest from international companies in Norway as a land with mineral potential.

Mapping in South Norway

The Government will implement a separate programme for geophysical mapping in South Norway. The long-term goal is to map 75 per cent of the land area in southern Norway. NOK 10 million has been allocated for this purpose in 2013.

Targeted communication of geological data

Information activities and good websites shall be prioritised topics for the Geological Survey of Norway. The agency shall, by 2014, have prepared an information strategy on mineral deposits in Norway directed towards Norwegian and foreign exploration and mining companies.

Cooperation on geological maps and databases in the High North

Countries with land areas north of 60°N are cooperating on the publication of a series of thematic maps and databases for the entire Arctic down to 60°N. This work is supported through the Barents 2020 support scheme. The objective is to make geological data more available and to harmonise the different countries' data.

FACTS

Stortinget (the Parliament) has, in 2011, 2012 and 2013 allocated NOK 25 million/year for a mapping programme for Northern Norway (MINN - Minerals in Northern Norway). The objectives are to increase knowledge about mineral resources in Northern Norway and to facilitate increasing mineral operations. The results from the mapping are published via the net portal www.prospecting.no, where data from the Directorate of Mining is integrated with geological data, base maps and land use information. The mapping programme has contributed to increased interest in mineral operations in Norway and to a significant increase in exploration activities. In 2011 and 2012, the Canadian company, Dalradian Resources, acquired exploration rights for about 17,000 square kilometres, and retained exploration permits for about 13,000 square kilometres in 2013. In a press release in January 2013, the company reported on promising findings of gold in Finnmark and silver near Kongsberg.

Instruments for measuring the magnetic and electro-magnetic characteristics of the bedrock are placed in a container that hangs 30 metres below the helicopter.
Photo: NGU

NGU measures the geophysical characteristics of the bedrock from helicopters that fly low over the terrain. Photo: NGU

4.2 INVESTMENT AND ACCESS TO CAPITAL

Mineral operations are usually capital-intensive and characterised by high risk during the phases of exploration and deposit investigation activities and in the start-up phase of new mining operations. It is estimated to take 7 to 10 years from the start of an searching programme until mining can begin and the project can generate income. Due to the long time aspect, it is normal, in the early phases, to finance the operation by means of equity. Financing by loans will, in most cases, only be possible once a basis for commercial operations has been established.

A lack of adequate equity is often a challenge in relation to becoming established in the market.

To supplement the market, the government offers a number of capital instruments through *Innovation Norway*. These instruments can be divided into loans, guarantees, subsidies and equity. Common to the capital instruments is that they shall contribute to triggering commercially and economically profitable projects which would not be started without governmental support, or would have been started later or with a lesser scale without public support. The involvement of the public support system can be significant in triggering private investment and for the establishment of new activities.

Investinor AS is a nationwide, state-owned investment company with an allocated equity of NOK 3.7 billion. The company contributes risk capital for internationally-oriented, competitive companies on business terms.

Argentum Fondsinvesteringer AS is a fully-owned state management company that invests in minority shares in specialist investment funds for active ownership, together with other fund investors. Decisions on what companies the fund will invest in lie with the individual fund. Argentum has management capital amounting to approximately NOK 6.5 billion. The company is a leading player in the Nordic private equity market and has a portfolio of 64 funds.

SIVA – The Industrial Development Corporation of Norway - offers to organise commercial investments in property for business activities. SIVA often works as a driving force for large projects by development, coordination and mobilisation activities. For the future, it is assumed that SIVA will strengthen its commitment to large industrial projects of local, regional and national significance. In the fiscal budget for 2013, the company's contributed capital is increased by NOK 250 million in order to strengthen the company's property activities. This may be significant for participants in the mineral industry, which usually has quite large projects. SIVA's activities also include support for networking and incubation activities within and between innovation- and industrial centres throughout the country. Incubation is a method for further developing promising business concepts that arise from the research- and knowledge centres and from industry. Network development and cooperation between participants may also be appropriate for companies in the mineral industry.

There are a significant number of foreign owners in the mineral industry in Norway. This is particularly true when it comes to the largest companies.

There are Norwegian owners in all the mineral sectors. These may have limited financial capital to start large new operations on their own. It is therefore important for the mineral industry to attract serious international companies with knowledge and investment potential which can contribute to the development of the Norwegian mineral industry.

INNOVATION NORWAY SCHEMES WHICH ARE RELEVANT FOR PARTICIPANTS IN THE MINERAL INDUSTRY

LOANS AND GUARANTEES

Low-risk loans
Low-risk loans can be used to finance fixed assets such as buildings, machinery and equipment. The loans are granted at market interest rates and payment conditions with repayment over up to 25 years. It is required that the borrower has a satisfactory economy and can provide good security for the low-risk loan, preferably in property, machinery and equipment or a guarantee. Low-risk loans may be granted throughout the country and to companies in all sectors.

Risk loans
Risk loans/innovation loans may be used as top-up loans for investment projects related to new business start-ups, innovation, reorganisation, internationalisation and development, that are difficult to finance in the private credit market. Innovation Norway's participation is meant to have a triggering effect so that the project can be carried out. Interest rates for risk loans/innovation loans are somewhat higher than the best loan terms in the private credit market, but are favourable seen in relation to the risk.

Guarantees
Guarantees for operating credit and investment loans can be given to small and medium-sized companies that have problems in obtaining loan financing in banks due to assumed high risk or lack of security. A guarantee from Innovation Norway can help convince a local bank to grant a loan or operating credit, and the guarantee can trigger the realisation of the development plans a company has, which, for a period of time, require a lot of capital. Guarantees can be used for most projects related to new ventures, innovation, reorganisation of current activities, internationalisation and development. The target group is usually companies with up to 250 employees in all sectors throughout the country. New ventures are given special priority.

GRANTS

Innovation Norway has subsidy schemes that can, in principle, be used throughout the country, but the subsidy budgets are largest in outlying regions. According to state support regulations, subsidies can be given for the following purposes:
SME- support for consultancy assistance and other services and activities

- Support for training
- Support for research, development and innovation
- Support for investments

Research and development contracts (for industry or public bodies)
Industrial research and development contracts shall stimulate innovative development cooperation in industry. This means close cooperation between two or more parties on demanding research and development projects, on the basis of a contractual and goal-oriented cooperation agreement. An industrial R&D contract is entered into between a customer company in the private sector and one or more supply companies. Innovation Norway contributes expertise in international business development and, financially, with support to minimise risk and to arrange for implementation of the project. The industrial R&D service has a small and medium business profile, but strategically important development projects under the auspices of large companies can also receive support. The service is also open for consortia on both the supplier and customer side.

Environmental technology scheme
This scheme shall promote Norwegian environmental technology in national and international markets and shall contribute to strengthening the competitive ability of Norwegian industry, among others through development and investment in pilot and demonstration facilities for new Norwegian environmental technology. The scheme covers the entire country and is directed at companies that wish to begin pilot and demonstration projects.

The scheme may be relevant for the mineral industry due to the environmental aspects linked to the industry. Subsidies through this scheme can contribute to considerable value creation, among other ways by developing alternative applications for waste rock and by making production processes more efficient, so reducing the tonnage of waste rock.

Clustering programmes (NCE and Arena)
Innovation Norway, the Research Council of Norway and the Industrial Development Corporation of Norway (SIVA) cooperate on the cluster programmes Norwegian Centres of Expertise (NCE) and Arena. NCE is a clustering programme for industry clusters that is among the world's foremost. Norway currently has 12 strong NCE clusters that have been selected in tough competition with other industrial groups.

The Arena programme is focused on the long-term development of regional industry networks. The objective is to stimulate increased innovation based on cooperation between companies, R&D and educational groups and public development organs. The projects that are accepted in the programme must be soundly rooted in industry and industry partners must take a leading role in the management of the projects.

In the period 2008 to 2011, Innovation Norway has granted a total of NOK 470 million in loans, subsidies and guarantees to participants in the mineral industry.

Operating a front-loader, from Kjellmannsåsen at Bjørnevatn in Finnmark, Sydvaranger Gruve A/S. Photo: Bente Geving, Sydvaranger Gruve AS

MEASURES

Financial instruments
Innovation Norway and SIVA shall support the Government's strategy for the mineral industry by means of making arrangements to ensure that existing schemes are appropriate also for the mineral industry. The financial instruments shall contribute to triggering financing from other possible sources.

Innovation Norway
Innovation Norway offers, in addition to financial schemes, advice and networking cooperation. The Government expects Innovation Norway to have sufficient expertise about the mineral industry in order to be able to assist companies within the industry in a satisfactory manner.

Invest in Norway
An "Invest in Norway" function will be established within Innovation Norway in 2013 in cooperation with other relevant organs. The objective is to arrange for a better handling of inquiries from foreign companies which are considering locating in Norway. The measure may be relevant for participants in the mineral industry who wish to attract foreign investments.

Strengthening SIVA
SIVA's contributed capital has been increased by NOK 250 million in the fiscal budget for 2013. The funds shall enable SIVA to enter into large industrial property projects in order to contribute to the realisation of economically profitable investments and developments. SIVA's property activities have no sector guidelines. SIVAs board selects the projects to which the corporation shall make a commitment.

Mineral Cluster North
Mineral Cluster North has been chosen as one of seven new industrial clusters to receive the status as an Arena project.

Environmental technology scheme
Innovation Norway administers a separate environmental technology scheme. Mineral companies can apply for support for development and for investments linked to clean technology, more environmentally-friendly products and production processes, more efficient resource handling and technological systems that reduce environmental impacts.

Investinor
The Government contributes risk capital through Investinor AS, among other goals to support companies that exploit important natural resources or who contribute to reductions in environmental impact.

Strengthening and developing Norwegian companies in the mineral industry
The Government will consider how instruments in industrial policies can be used to strengthen and develop Norwegian companies in the mineral industry.

SYDVARANGER GRUVE AS

The work to reopen the Sydvaranger mine began in 2007. The owners self-financed the first start-up phase. Innovation Norway contributed, in addition, NOK 120 million in loans and guarantees. This triggered further loans from other banks and more equity from the owners.

MINERAL CLUSTER NORTH

In autumn 2012, seven new projects received the status as Arena projects. One of these was Mineral Cluster North, which includes important mining and mineral industry players from all of northern Norway. These share a desire to increase activity, value-creation and employment in the mineral industry. This will occur through increased strategic cooperation, the development of knowledge and international orientation. Major challenges on which the cluster is focusing include access to expertise and capital, and environmental issues.

4.3 EDUCATION AND EXPERTISE

The minerals industry is continuously becoming more knowledge-intensive. Mineral companies are dependent on having a well-qualified workforce, not least in the technological subjects. A well-qualified workforce is critical for the high productivity and competitiveness of mineral companies.

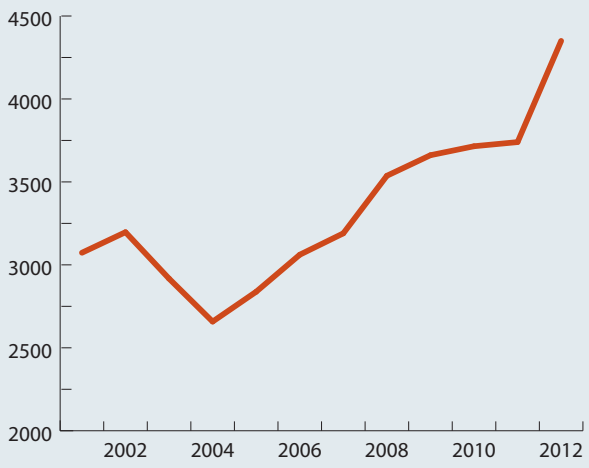
Requirements for innovation and expertise in the minerals industry increase in step with technological development, more stringent environmental and skills requirements, demand for increased efficiency and for sustainable exploitation of mineral resources. The new Minerals Act requires that operations on mineral deposits shall be carried out in accordance with good mining practice, and that all extraction of mineral resources shall be managed by persons who are responsible for the mining technology employed in the operation. This also contributes to more stringent requirements for the qualifications of those involved in the industry.

To achieve the ambition of developing a value-creating, profitable mineral industry, the industry must attract qualified staff and develop the skills of the existing workforce. In recent years, the mineral industry has grown and has experienced increasing problems in recruiting qualified personnel in particularly important professional areas. It is therefore a need to stimulate better recruitment within geology and mining technology.

INCREASE IN ADMISSION TO ENGINEERING STUDIES

Statistics from The Norwegian Universities and Colleges Admission Service (NUCAS) shows that there was 25 per cent more applicants to engineering studies in 2012 compared to the year before.

Development of admission to 3 year engineering studies



The Government has presented a separate science strategy [Science for the Future - Strategy for Strengthening Mathematics, Science and Technology (MST) 2010-2014]. The strategy has been developed in cooperation with key players in education, research, business and industry, employer and employee organisations. A central objective of the strategy is to strengthen interest for, and recruitment to mathematics, other sciences and technology. A primary objective of the strategy is to increase the recruitment of women to these subjects. The mineral industry, like other science-dominated industries, is male-dominated.

EDUCATIONAL COURSES OF PARTICULAR RELEVANCE FOR THE MINERAL INDUSTRY

The extraction and processing of minerals requires high technological and engineering knowledge and a skilled workforce. Most of the operations in the mineral extraction are located in outlying regions. It is therefore important that local and regional educational institutions have a good dialogue with the mineral industry about their needs for skilled labour. However, there are specialised institutes in several universities which can serve needs throughout the country.

Higher educational institutions

Norway's higher educational system offers studies in geology and other sciences that are relevant for the mineral industry in universities and colleges in different parts of the country. The Norwegian University of Science and Technology (NTNU) has one of Norway's most specialised environments with a separate Department for Geology and Mineral Resource Engineering, in which a five-year course in technical geosciences is offered as a study option within the broader field of mineral production and technical resource geology, as well as Ph. D. studies. Graduates with this training are commonly called mining engineers. There are currently major deficits in this type of expertise, both nationally and globally.

Bergringen (the Mining Circle) is a non-profit cooperative organisation of students at the Department of Geology and Mineral Resources Engineering, mining industry organisations and companies. Bergringen shall contribute to increasing interest in, and applications to higher education within these studies.

Report to the Storting no. 7 (2011–2012), The High North - visions and strategies - (The High North Report) speaks of the mineral industry as a possible growth industry in Northern Norway. The University of Tromsø offers geology studies at bachelor- and master's degree level, and Ph.D. studies, and plays a key role in the development of knowledge in the fields of exploration and prospecting.

Narvik University College plans to offer a preliminary course for engineers in Svalbard. The course has been developed in cooperation with the Longyearbyen local government, Store Norske Spitsbergen Kullkompani AS, LNS Spitsbergen AS and NITO - The Norwegian Society of

Engineers and Technologists. This is the first time that an educational institution, a trade union, a contractor, a mining company and local government have cooperated in developing an educational course. The parties hope, in this way, to achieve increased recruitment to engineering studies, particularly within the mineral industry.

The Government wants closer links between educational institutions and industry. From 2011, all public universities and university colleges are obliged to establish a council for cooperation with business and industry (RSA), and thus establish a forum for closer cooperation on education and research which are relevant for industry. This arena will also provide the mineral industry with the opportunity to discuss its needs for expertise with relevant educational institutions and to discuss the potential for exchanging knowledge with other geologically focused industries, primarily the petroleum industry.

Vocational colleges

Vocational colleges also have an important role in the education of a skilled workforce for the mineral industry. The Stjørdal vocational college is the country's only vocational college that offers a course which includes in-depth study of building, construction and mining technology. This is a middle-management training for those who already have a certificate of apprenticeship or long, relevant work experience (minimum 5 years). This course also provides an opportunity for general university and college admission certificates. Through optional courses, students who wish to, may work for a university admission certificate so that they meet the requirements made for gaining entrance to further studies in geology and rock mechanics at NTNU.

The vocational colleges are a county responsibility and the counties prioritise vocational college courses based on the expertise and workforce requirements needed in their regions. Dialogue between counties, vocational colleges and the mineral industry is therefore critical for ensuring that sufficient qualified labour is educated to meet the local mineral industry needs.

Educating a skilled workforce

The mineral industry has a great need for qualified professional staff. There is a need for professional qualifications within among others building and construction with specialisation in rock mechanics and mining, but also construction machine operation and road and construction work are skills in demand. Courses in Vg2 Construction and Vg3 Construction machines at Kirkenes Senior Secondary School have a "landslinjestatus". This means that all applicants for these courses have the same right to be accepted no matter where in the country they come from. Furthermore, Fauske Senior Secondary School has a national course in construction machines and construction machine repair which provides important qualified personnel for the mineral industry.
A vocational education entails two years at school and two years as an apprentice in a company, with the opportunity for an additional year to obtain general university and college admissions certificates. Alternatively, it is possible to continue education at a vocational school after two years with a certificate of completed apprenticeship.

Continuing education and training

The significance of the workplace as a learning arena is increasingly becoming more important because its activities, to a larger degree, entail expert knowledge that is not found in educational institutions. The operations of the mineral industry are spread over large geographical areas. In the formal educational system it is therefore important that arrangements are made for flexible, decentralised educational courses using, i.a. net-based teaching, so that it is possible to build formal competence in parallel with working. Within higher education, NTNU also offers supplementary training and continuing education courses in engineering geology for building- and construction-site managers in underground work. The Ministry of Local Government and Regional Development is making efforts to obtain better knowledge of what hinders or promotes supplementary training and continuing education in business and industry, independent of regions and industry.

COOPERATION BETWEEN THE UNIVERSITY OF TROMSØ AND THE MINERAL INDUSTRY

The Institute of Geology at the University of Tromsø has a large-scale cooperation with Store Norske Spitsbergen Grubekompani. At the initiative of Store Norske, a course in ore geology was established at the University of Tromsø: Store Norske financed a Professor II position. This has given 40-50 students at the University of Tromsø a basic education in ore geology. The professorship is also supported by funds from the Barents 2020 programme.

Employees at the Institute of Geology have, for several years, made geological observations on Vannøya in Troms county. Store Norske Gull has been able to use the results in its activities. After having secured the exploration rights for large parts of Vannøya, the company started core drilling in spring 2012. More students from the Institute of Geology will be linked to the work through their Masters studies.

The Geological Survey of Norway is also an important cooperative partner for the University of Tromsø, and several Ph.D .and Masters candidates receive co-supervision and economic support from the Geological Survey of Norway. In addition, there is cooperation with companies for whom students are an attractive work force in the summer in connection with mineral prospecting in Northern Norway.

Mounting a control valve in a cooling circuit. The work is being carried out by apprentices at Hustadmarmor AS: Photo: Hustadmarmor A/S

Recruiting employees
The mineral industry provides feedback about shortages in labour supply from key professional groups. In addition to steps that are directed towards improving recruitment to mathematics, science and technology studies nationally, immigration is one way of meeting needs. Many of those who are now being recruited to the mineral industry in certain professional groups come from abroad because there are too few people in Norway with the right type of expertise.

MEASURES

Study places in science and technology
The Government will consider establishing more study places in science and technology in connection with the annual fiscal budgets and will consider the development of resources for subjects at school level that are relevant for the mineral industry.

Dialogue on the mineral industry's long-term needs for expertise
The Government will strengthen its dialogue with the industry on long-term needs for education and recruitment in the industry, and will continue to focus on cooperation between the education system and professional life.

Development of expertise within the mineral industry
In cooperation with the industry, the Government will consider strengthening the development of expertise in the mineral industry to meet the requirements in the Minerals Act and also to ensure sustainability in mineral extraction.

Professorship in Minerals Engineering at NTNU
NTNU is Norway's foremost professional environment for higher education in the field of minerals and mining. The Government's view is that it is important to strengthen the educational capacity in minerals engineering at NTNU and has in 2013 contributed funds for a professorship in minerals engineering at NTNU. The Government will continue funding the professorship.

Professorship in Ore Geology and Mineral Resources at the University of Tromsø
In autumn 2011, the Government allocated a total of NOK 9 million over five years for a new professorship in ore geology and mineral resources at the University of Tromsø. The funding entails a strengthening of professional courses that make up the basic knowledge in exploration, deposit investigations and analysis of mineral resources and geological formations.

Cooperation with industry
The Government wants to foster closer connections between educational institutions and business and industry, and has, as of 2011, required that all public universities and colleges establish councils for cooperation with business and industry (RSA).

Increased recruitment of engineering students
The Government is making efforts, through the sciences strategy, to increase recruitment to engineering studies.

National-level courses
The Government provides funds to support studies open to secondary school pupils from the whole country ("landslinjetilbud"), including Vg2 Construction techniques and Vg3 Construction machine mechanic.

More knowledge about supplementary training
The Government has an ambition to provide more knowledge about what promotes and what hinders supplementary training and further education.

4.4 RESEARCH AND DEVELOPMENT

Research and knowledge development are necessary for the development of an efficient, profitable and environmentally-friendly mineral industry in Norway. Research in connection with exploration, extraction, processing and management of mineral resources in Norway takes place within business and industry, higher educational institutions, the institute sector and in governmental agencies. Companies in the mineral industry have varying research activities. This is, among other factors, due to the fact that the companies vary in size from large international corporations to small businesses. The need for research also varies with the type of activity. Many companies mining metallic ores and industrial minerals have demanding customers and challenges related to tailings disposal both of that require continual emphasis on research and development. Companies producing construction raw materials, such as crushed stone and gravel, often have other challenges, where research does not have as high priority.

Mineral operations can affect nature and the environment to a significant extent while active and after operations have ceased. If the Norwegian mineral industry is to be among the world's most environmentally friendly, it is important that the industry strives continuously for cleaner production with less use of chemicals, good solutions for tailings disposal and possibilities for the reduction of waste rock and its alternative uses. There is also a need for more knowledge about the environmental impact of mineral operations.

In the High North Report, it is stated that the Government will promote increased value creation and human activity in the North while at the same time maintaining environmental values and the diversity of nature. Notice is also given that the knowledge-base for safeguarding environmental concerns in land-based industrial development will be further developed. The Government will strengthen expertise and knowledge related to the environment and to the environmental impact of minerals operations.

Much of the research activity is concentrated at NTNU, but also the University of Bergen, the University of Oslo, the University of Tromsø, the Norwegian University of Life Sciences and the University Centre in Svalbard have activities within areas related to the mineral industry.

Among the research institutions, SINTEF and the Geological Survey of Norway, in particular, have research activities in the mineral field. Other national research institutions involved are the Norwegian Geotechnical Institute, the Institute for Energy Technology, the Norwegian Institute for Water Research (NIVA) and the research group Northern Research Institute NORUT. In the fields of safe seafood and marine eco-systems, the National Institute of Nutrition and Seafood Research (NIFES) and the Institute of Marine Research are central.

The Research Council of Norway has an important role as a research policy counsellor, funder of research and as a forum for dialogue. The Research Council funds all fields of research ,from basic research to innovation, and shall also contribute to the internationalisation of Norwegian research.

The Research Council's funding of research linked to mineral resources in 2011 amounted to about NOK 25 million. The funding covers several programmes and schemes, such as the Skattefunn scheme, User-driven Research based Innovation (BIA), Maximising Value Creation in the Natural Gas Chain (GASSMAKS), the Oceans and Coastal Areas (HAVKYST), Programme for Power Generation with Carbon Capture and Storage (CLIMIT), the centre scheme for research-driven innovation and the scheme for industry-related PhDs. The annual share of a European Science Foundation project[1] focussed on mineral resources is also included in the estimate. Skattefunn and industry Ph.D.s do not have application deadlines. Applications are processed as they come in, while other schemes are based on national competition with public announcement of the availability of funds.

Skattefunn is a tax deduction scheme based on entitlement, where the level of research is not a requirement. Companies that are registered in Norway can apply for tax deductions for their expenses in connection with research or development projects. Small- and medium-sized companies receive 20 per

1 The European Science Foundation is a European cooperative organisation which comprises a total of 79 member organisations from 30 European countries, the majority of them research councils and scientific academies. In addition to the Research Council of Norway, the Norwegian Academy of Science and Letters is also a member from Norway.

THE QUARTZ CORP NORWAY AS – A GROWING COMPANY THAT FOCUSES ON R&D

The Quartz Corp Norway (formerly Norwegian Crystallites AS) operates a mine and processing plant at Drag in Nordland County. The company is one of the two world leaders in production of the highest qualities of quartz and has about 70 employees. Quartz from local mines and from deposits in the USA is crushed and ground to powder which is cleaned to a very pure product. The quartz powder from Drag is exported to customers all over the world that use the products in advanced applications within the optics, solar-cell and electronics industries. The Quartz Corp is an expertise-based company which carries out a considerable amount of technological development in order to increase its knowledge of the raw materials and to improve the cleaning processes to be able to produce new and even better product qualities. The company has several development projects within geology, product development, process development and sustainability. The R&D activity is to a great extent carried out in close cooperation with Norwegian R&D environments, including NTNU's Department of Geology and Mineral Resources Engineering and the SINTEF division Materials and Chemistry.

cent of the project expenses as tax deductions via their tax assessments, while large companies receive 18 per cent. The expense limit for R&D projects that can be included as deductions is NOK 5.5 million per company per income year. The scheme includes a particular incentive for cooperation with research institutions. The annual limit is increased to NOK 11 million if the project is carried out with a research partner. The Research Council of Norway estimates the industry's share of the portfolio in Skattefunn to be 0.1 per cent. Companies in the mineral industry appear to make limited use of Skattefunn.

BIA is the Research Council of Norway's largest programme to stimulate increased research focus in business and industry. BIA supports the best research-based innovation projects throughout Norwegian business and industry in areas that are not covered by other Research Council programmes. The requirement for the level of research is higher than for Skattefunn. When selecting projects, emphasis is placed on the degree to which the projects represent innovation, research quality, economic value, international orientation and triggering effect on business and industry's own R&D efforts. The mineral industry has contractual responsibility in one of the current BIA projects.

INDUSTRY PH.D. - IN-COMPANY DOCTORATE

134 projects have since 2012 been initiated under the Industry PhD scheme, of which two projects are within the mineral industry:

Sibelco Nordic AS (previously North Cape Minerals AS)
More stringent HSE (Health, Safety and Environment) and product quality requirements are clear development trends within the mineral industry. A consequence of this is that mineral companies which aim to have a long-term perspective for their activities must strengthen their internal expertise with respect to knowledge of the mineralogy of the deposits and of how the minerals perform in treatment processes that are necessary to convert the raw materials to a sellable product. This requires increased processmineralogical knowledge. The objective of the project is to lay the foundations for increased economic growth for Sibelco Nordic's mineral resources, and to ensure good long-term management of these by strengthening the company's knowledge of its mineral deposits.

Norsk Mineral AS (previously Hustadkalk AS)
Norsk Mineral AS supplies crushed marble (calcium carbonate) to the mineral processing company Hustadmarmor AS. Norsk Mineral and Hustadmarmor want to investigate the relationship between raw material quality and the processing of the carbonates to high-value liquid fillers and coating agents. The objective is to find the explanation for undesirable variation in the quality of crushed carbonate raw material so as to be able to meet the customer's desire for stable quality.

Industry-related Ph.D.s belong to a relatively new scheme intended to ensure researcher recruitment to business and industry. The scheme is a three-year research education in which the candidates work for a doctorate. The scholarship holders are employed in a company and the subject of the research must be clearly relevant to the company. The companies that enter into agreements for industry-related Ph.D.s receive an annual economic subsidy from the Research Council of Norway which corresponds to a maximum at 50 per cent of applicable scholarship rates over three years.

The Government has received input from SINTEF, NGU and NTNU regarding a national R&D and innovation strategy concerning access to, exploitation, processing and use of mineral resources. These institutions recommend establishment of a new research programme in the Research Council of Norway, MINFORSK. The Research Council has assessed this field, based on among others its own analyses, input from the research institutions and dialogue with relevant parts of the industry. The assessment describes resource situation, evaluates environmental and societal challenges, and reviews the framework and content of a potential bolstered research effort. Important areas of research identified include the environment and aspects of management of all the phases of mineral production, geological models and exploration methods, extraction of the resources and production as well as technical solutions for processing them. These are all areas critically important for the further development of this industry. The Research Council will use the assessment in its future work.

The industry appears to have made only limited use of the opportunities found in for example, Skattefunn and other available instruments. The Government's view is that a significant part of the needs indicated by the industry can be met with the existing funding mechanisms. The Government, at present, does not consider it necessary to establish a specific effort focusing on the mineral industry and its research partners. The Research Council is expected to contribute to mobilisation of the players in relation to the mechanisms already available. Based on further active involvement from the industry the Ministry of Trade and Industry will consider initiation of a research programme focused on the mineral industry, with the objective of increasing economic growth in the industry within an environmentally sustainable framework in coexistence with other interests.

The Government's view is that Norway will profit greatly by prioritising international cooperation in the mineral sector.

The EU's Framework Programmes for research and technological development are the most comprehensive international cooperation in which Norwegian research centres participate. Norway takes part in the EU's Framework Programmes for research and technological development. Participation in the programmes provides Norwegian research stakeholders the same access as the research centres within the EU.

Analyses of soil samples can provide important information about the distribution of elements in rocks. From NGU's field work in Tysfjord, 2012. Photo: NGU

R&D activities related to mineral resources are an important focus area in the European Commission Raw Materials Initiative from 2008. The R&D efforts shall increase our knowledge regarding the development of a sustainable supply of mineral resources from European sources, and to the reduction in consumption of mineral raw materials by means of increased resource efficiency and recycling. The European Commission has signalled that a framework programme, Horizon 2020, which will start in 2014, will have stronger emphasis on the mineral sector.

The Government's view is that Norwegian companies and researchers have good opportunities to succeed in competing for EU research funds in the mineral sector. The Research Council of Norway plays an important role in enabling more research institutes and companies to participate in EU cooperation.

Nordic cooperation is important for the development of the mineral industry. The resource base for minerals in Norway, Sweden and Finland stretches across the borders. The three countries can find advantages in cooperation in several areas.

The Nordic Council of Ministers has taken the initiative to establish a common knowledge network for minerals - NordMin - which shall strengthen cooperation between centres of expertise, industry and government authorities in the Nordic countries. A shared Nordic platform will also have positive effects on participation in EU research activities. The Government supports strengthened Nordic cooperation in this area.

During the Norwegian chairmanship of the Barents Euro-Arctic Council (2011-2013) cooperation within mineral resources is a priority. Cooperation is already established between the geological surveys in the Barents region resulting in a common database for important metal deposits. The database is being developed to cover industrial minerals.

Other possible areas of cooperation are education, prospecting, technology, limitation of environmental impacts, consequences for reindeer husbandry and other nature-based industries and management systems. The Government has established a position as special envoy for education, research and technology cooperation at the Norwegian embassy in Moscow with the objective of strengthening cooperation with Russia in this area. The Government will make use of its chairmanship of the Barents Euro-Arctic Council to strengthen cooperation in the mineral sector. The Arctic Council is also an appropriate forum for cooperation with respect to the environmental consequences of the mineral industry and its implications for the interests of indigenous peoples in the Arctic and northern areas in general.

MEASURES

Mobilisation for increased use of R&D in the mineral industry
The Government recognizes the importance of developing sufficient systematic, long-term expertise in the research centres and the ability of the industry to utilise this knowledge in its own innovation activities. The Government expects that the Research Council of Norway, within the Council's current programmes, will mobilise the industry to increase its use of the Council's schemes.

Improved knowledge of the environmental consequences of mineral extraction
The Ministry of the Environment will, using the Fram Centre in Tromsø, take the initiative to strengthen expertise on, and knowledge of, the environmental consequences of mineral activities. The objective is to develop a strong professional environment which, by means of continuous, targeted R&D activities, will develop expertise and acquire knowledge about the environment and environmental consequences. This shall provide the basis for developing management strategies that can limit environmental consequences and ensure that concerns regarding nature and the environment, and activities linked to a sustainable use of nature are safeguarded in the best possible manner.

The Research Council of Norway as a driving force
The Research Council of Norway shall be a driving force for Norwegian participation in relevant European cooperation arenas such as the European Technology Platform on Sustainable Mineral Resources (ETP SMR), and the new Public Private Partnership in the process industry in the EU's Framework Programme for research and technological development. The Research Council of Norway shall ensure that Norwegian companies and institutions are informed about opportunities for European research cooperation.

Follow-up of EU Raw Materials initiative
Special envoys to the EU delegation in Brussels follow up research and industry developments within the EU Raw Materials Initiative and related activities which are relevant for the mineral industry.

Chair of the Barents Euro-Arctic Council
The Government will make use of its period of Chairmanship of the Barents Euro-Arctic Council to strengthen cooperation in the mineral sector.

Establishing a Nordic knowledge network - NordMin
The Nordic ministers of trade and industry decided in the autumn of 2012 that a shared Nordic knowledge network for minerals - NordMin - shall be established. The network shall contribute to strengthening Nordic cooperation in the mineral sector for the benefit of industry, governmental authorities and research and educational institutions.

4.5 SAFEGUARDING ENVIRONMENTAL CONCERNS

4.5.1 INTRODUCTION

Extraction of minerals can lead to landscape changes, noise and emission of dust and pollutants that can have negative impacts on habitat types, species and outdoor activities. Mining activity involves, in a number of cases, emission of chemicals.

Certain types of mineral activity lead to large amounts of waste rock that has no other use and which must be deposited. When depositing waste rock, it is important that environmental effects are thoroughly characterised, and that an environmentally sound solution for disposal of the waste rock and tailings is found.

The direct consequences for habitat types and for species diversity will primarily be loss or deterioration of the species habitat or the extent of the habitat types due to industrial activity and use of the terrain. Mineral extraction can also change or damage the conditions of life for species and habitat types in the surrounding areas, through changes in the drainage conditions, and through an increase or reduction of access to nutrients. For outdoor recreational activities, mineral extraction can entail a deterioration of the experience and reduced opportunities to make use of nature. The addition of foreign substances to the environment can have an impact in relation to the safety for human consumption of fish from fjords and fresh-water systems. Mineral extraction and deposition of waste rock can also have consequences for other activities.

4.5.2 SPECIFICS ON THE DISPOSAL OF WASTE ROCK

Extraction of metals and industrial minerals often entails significant amounts of surplus material. Extraction includes excavation of gangue to access the resources, and then crushing of large amounts of rock in order to extract the ore or the minerals (ore dressing). The fine-grained residual materials from ore dressing are called tailings. The minerals are ground to a fineness that makes it possible to extract the individual mineral grains. Thereafter, mechanical or chemical processes are used to increase the degree of purity of the products. Therefore, there will often still be chemicals in the tailings when they are deposited. The amount of gangue and tailings can be large for certain types of mineral. Handling of gangue and tailings will therefore be a key challenge in planning mineral extraction.

It is a goal to minimise the amount of waste rock. The waste rock may often have the potential to be used for other purposes. This, for example, can be as landfill in construction projects, as, covering for waste tips on land or polluted sediments on the seabed, use as other products such as agricultural lime or as additives in the production of other construction materials. Transport costs are however, in most cases, high and the unit prices for these particular products are low. This limits the possibilities for alternative use or onward sale. Even with optimal use of gangue and tailings it will usually be necessary to deposit waste rock that cannot be used or traded for another purpose. Companies should, both during planning and operation of mineral extraction that involves waste rock, make efforts to ensure increased usage of the waste rock for other purposes.

Backfilling of gangue or tailings in underground or open-cast mines can contribute to reducing the amounts of residual masses that must be deposited elsewhere. When rock is crushed, its volume increases by a factor of 1.3-1.5. Even with a large degree of backfilling where this is possible, there will still be a need for other forms of waste-rock deposition. Backfilling, where it is possible based on technical, economic and geological conditions may be a good solution. At the same time, backfilling should be avoided where there remain significant resources to be extracted from the deposit.

Backfilling shall be assessed as a supplement to other waste rock disposal solutions, whether on land or in the sea. Whether backfilling is a suitable measure must be assessed specifically in each individual case. This must be based on an overall assessment, taking into account among others remaining resources, costs incurred by the company and the environmental impact of other solutions.

Waste rock deposition must, because of the costs of transportation and infrastructure, be done in the immediate vicinity of the mine and concentration plant site. Available land areas are critical for the choice of disposal solution in addition to impact on the natural environment, costs, potential for re-use of the waste rock and possible consequences for other industrial activity and other interests.

Historically, gangue has been deposited on land, while tailings have been deposited in the sea or in a lake where the mine or quarry has been close to such areas. Landfills should preferably be in natural depressions in nature so that artificial barriers and dams that need to be serviced and maintained over long time periods are not needed. With mineral extraction in coastal areas, marine disposal can be a viable alternative.

Disposal on land and in the sea can both have environmental consequences. It is not possible to establish, on a general basis, what type of disposal solution is most environmentally responsible. The disposal solution must be assessed specifically, in each individual case. The conclusion will vary depending on the type of rock, form of operation, physical and chemical character of the tailings and gangue, the characteristics of the disposal site being considered, the area occupied and potential mitigating measures which can be implemented. The choice of disposal solution must be determined on the basis of a thorough, fact-based assessment of the effects on the natural environment, costs and possible consequences for other industry and other interests.

Marine disposal and run-off from land can have negative environmental impacts, also beyond the area of the mineral operations, including impacts on spawning and nursery areas for fish and shellfish and marine ecosystems. Such impacts must be the object of a thorough assessment. The same

applies to impacts on the safety of seafood for human consumption and on other activities. This also includes an assessment of the spreading of fine particles in tailings and the effects of these.

There has been an on-going discussion, over a long period of time, about which topics should be studied when assessing mineral extraction and deposit solutions. The Ministry of Trade and Industry, the Ministry of the Environment and the Ministry of Fisheries and Coastal Affairs have had a good dialogue with the mineral industry, the seafood industry and environmental organisations about this topic. The Government's view is that there is a need to continue and develop this dialogue. The goal is to create the foundation for a shared understanding of the issues and to find solutions that will provide a basis for development of both the seafood industry and the mineral industry within a framework of good environmental and resource management.

4.5.3 BALANCING THE POSITIVE EFFECTS OF MINERAL EXTRACTION AND ENVIRONMENTAL IMPACTS

Advantages and disadvantages shall be weighed in connection with the establishment of new mineral activities. On one side there is consideration of value creation, industrial development, local and regional ripple effects, tax revenues for society and other important societal interests, for example the supply of construction materials. On the other side must be weighed the impact on the natural environment, the possibility for alternative land usage, negative effects on other industries, cultural monuments or inhabitants in the form of dust, noise or environmentally hazardous discharges and other weighty public interests.

The municipality, as planning authority, must assess the total effects when it decides if land should be allocated to mineral extraction. The Government expects that in this process, the municipalities will maintain a good dialogue with those affected by a mine, so that the final decision on the application is made on the best possible knowledge base.

Many mineral operations lead to pollution that requires discharge permits. In the assessment of discharge permits, the environmental authorities shall consider the negative impact of the pollution related to the mineral operation, together with public advantages and disadvantages the operation will entail.

MEASURES

Establishing a meeting place for the mineral industry, the seafood industry, the environmental organisations and the authorities

The Ministry of Trade and Industry, in cooperation with the Ministry of the Environment and the Ministry of Fisheries and Coastal Affairs, will take the initiative to establish a forum for dialogue on environmental challenges and seafood safety in connection with mineral extraction and waste disposal, in which representatives of the mineral industry, the seafood industry, environmental organisations and relevant professional institutions in these sectors are represented. The goal is to lay the basis for a shared understanding of the challenges and to find solutions for further development of both the seafood industry and the mineral industry within the framework of sound environmental and resource management.

Clearer guidelines for subsequent use of, or restoration of areas

The Directorate of Mining shall, in cooperation with the Climate and Pollution Agency, prepare guidelines on planning for subsequent use or restoration of areas after mineral extraction is concluded.

Assessment of backfill

Backfilling shall be considered as a supplement to other disposal options whether on land or in the sea.

Better knowledge of marine disposal solutions

A two-year research project shall be carried out to strengthen knowledge on various aspects of marine disposal solutions. Independently of the research project, applications for marine disposal shall be processed in the usual way, and permits may be given if a total assessment favours this solution.

Disposal of tailings in lakes has taken place in several locations in Norway, for example linked to copper mining. Water functions as an oxygen barrier and helps to stabilise the tailings. Such disposal sites must be constructed so that particles from it are not carried downstream into the watercourse. Photo: NTB Scanpix

4.6 REPUTATION, SOCIAL RESPONSIBILITY AND THE LOCAL COMMUNITY

Mineral companies must actively take social responsibility. This means that social responsibility is anchored in the companies' strategies and is an integrated part of the operations. Operations must be carried out in an environmentally responsible manner and must be sustainable. This requires among others that the companies must use environmentally-friendly technology and have open processes about the company's activities with the local community and other affected parties. Dialogue with the host municipalities and the local population is an important part of the companies' work on reputation and social responsibility. Mining companies that have, or plan operation in areas in which there are Sámi interests must be attentive to the particular need for dialogue and social responsibility in these areas. Taking social responsibility means not only obligations for the mineral industry, but also gives opportunities, in that it provides a basis for increased acceptance of the companies' operations and for a good relationship with the local community.

Reputation, social responsibility and interaction with the local community, other industries and Sámi interests have come higher on the agenda for the mineral companies. Norwegian Mining and Quarrying Industries (Norsk Bergindustri) has worked out separate ethical guidelines to promote seriousness and orderliness in the sector. It is important that these guidelines are developed in step with the development of society.

The municipalities are, as a starting point, responsible for area planning and for decisions on whether areas shall be allocated for mineral extraction. Local authorities expect positive ripple effects from the industry's activities, in the form of among others local employment and measures aimed at hiring local residents. Mineral companies considering starting operations should provide information on the positive effects of the planned activities.

Mineral operations will often have positive effects for several municipalities, not just the host municipality. Large operations can, however, result in costs for the host municipality in the form of a need for increased investments in infrastructure and an increased strain on municipal services. Small municipalities may also experience great change in a short period of time and may receive many more, varied types of workplace than the municipality's inhabitants themselves can cover. Potential host municipalities should therefore have a good dialogue with other affected municipalities. Together, they should assess what ripple effects the mineral operations can have for the municipalities and how they can possibly cooperate in handling the impact of the mineral operations.

The Government expects mining companies to have an active, constructive attitude to the local community and to all affected interests. The companies, in turn, must expect to be met with responsibility and orderliness from other participants.

Norway has orderly working and salary conditions in industry, a well-developed system of entitlements and openness and transparency in public administration. These are factors that may contribute to international mineral companies seeking predictable conditions for industrial activities and for their own reputations, to consider Norway as an attractive country in which to establish mineral operations.

Sawing block stones, anorthosite from Sirevåg in Rogaland. Photo: Rolv Dahl/NGU

There are several examples in Norway of older mining operations which require clean-up measures. Extraction of metals from sulphide ores, in particular, has led to run-off of acidic and metal-contaminated mine water and leach ate from landfills has reduced the water quality in rivers and lakes, leading to negative consequences for the ecosystem, especially fish in these bodies of water. This pre-history continues to represent a challenge to the industry's reputation. Today, it is expected that companies take responsibility for operating in an environmentally responsible way, avoiding any unnecessary strains on the community.

Increased knowledge of the environmental effects of mineral activities has led to increasingly more stringent environmental requirements. Norway is already among the countries in the world with the most stringent environmental requirements for industrial activities. This also applies to the minerals industry. This provides the foundation for environmentally responsible operations and contributes thereby to improving the industry's reputation.

Experience from several processes linked to the establishment of mineral operations in recent years has shown that there is a need for establishing a greater degree of shared understanding about what expectations the minerals industry and other interested parties can have in relation to processes linked to mineral extraction.

MEASURES

Preparing a "best practice" check-list
The Ministry of Trade and Industry will take the initiative to work out a check-list of "best practices" for search, exploration, development and extension of various types of mineral operation, including deposition and use of chemicals. The work will be carried out in close cooperation with the mineral industry, the seafood industry, environmental authorities, fisheries authorities and other interested parties.

Working with social responsibility
The Government expects the mineral industry to work in a targeted manner on its reputation, social responsibility and interaction with the local community and other interested parties. At the same time, mineral companies must be able to expect to be met with responsibility and orderliness from other interests in society. The mineral companies that have, or plan to establish mineral operations in areas where there are Sámi interests must be particularly aware of the need for dialogue and social responsibility in such areas.

Ethical guidelines
The Government expects that the Norwegian Mining and Quarrying Industries will develop its ethical guidelines in line with changes in society.

4.7 A PREDICTABLE FRAMEWORK FOR MINERAL OPERATIONS IN NORWAY

Mineral operations require planning, including extensive mapping and investigative programmes that can extend over many years. Predictable framework conditions and clear legislation are essential if mineral companies are to invest in Norway, to attract foreign capital and mineral expertise and to achieve the Government's goal of a value-creating, growth-oriented mineral industry. These elements are also prerequisites for securing a sustainable and socially responsible management and extraction of the mineral resources and for achieving the Government's goal that the Norwegian mineral industry shall be among the world's most environmentally-friendly.

Legislation shall ensure value creation and society`s needs for mineral resources, while at the same time balancing these goals relative to other considerations. This means that the positive effects of possible new mineral activities must be weighed in relation to consequences for other interests and other concerns. These may be other industries, the natural environment, cultural heritage, local communities, Sámi interests, etc.

A targeted effort with a view to regulations that provide satisfactory predictability and which will facilitate more time- and cost-efficient planning processes will contribute to reducing administrative costs for the industry, but will also lead to more efficient use of public resources.

4.7.1 LEGISLATION

The Minerals Act is a sector legislation for the mineral industry in Norway and establishes the basic framework for conducting mineral operations. The Act entered into force on 1st January 2010, and replaced five other acts. The new Minerals Act is an important step in the simplification of legislation in the mineral sector and in creating clear, predictable framework conditions for the mineral industry. The Act regulates exploration, deposit investigation and extraction of mineral resources, and the acquisition of mining rights. The purpose of the Minerals Act is to promote and ensure socially responsible administration and use of mineral resources in accordance with the principle of sustainable development. The Act has provisions that shall safeguard

FACTS

Simplification is a key element in the Government's industrial policy. The goal is to formulate regulations so that they do not impose unnecessary costs and disadvantages on Norwegian companies and to ensure that public services function in such a way that they support Norwegian industry's value creation. Value creation will be greatest if public regulations and requirements for information meet society's needs, but with a minimum requirement of resources from the companies.

Changing a drill bit at Titania's open cast mine at Tellenes in Rogaland. Photo: Titania AS /Linda Løvås

environmental concerns and ensure that clean-up after operations close takes place at the operator's cost and that this is addressed already during planning of the mining operation. Furthermore, the Act has provisions to ensure that Sámi interests are taken into consideration in connection with mineral operations.

The Minerals Act distinguishes between minerals owned by the State and those owned by the landowner. The State owns metals with a specific gravity of 5 g/cm^3 or greater, and the ores of these metals. This encompasses chromium, manganese, molybdenum, niobium, vanadium, iron, nickel, copper, zinc, silver, gold, cobalt, lead, platinum, tin, wolfram, uranium, cadmium and thorium, etc. Arsenic and titanium are also State-owned. All other minerals are owned by the landowner. Basically, landowners' minerals can be divided into three main categories: natural stone, construction raw materials and industrial minerals.

Municipal authorities, through the powers of the Planning and Building Act, regulate areas for extraction of raw materials. Extraction of minerals must take place within the framework of an approved zoning plan. The municipality must assess the total impact of the measures when deciding whether land is to be zoned for mineral extraction. If proposals to the municipal plan's land management component include new or extended areas for mineral extraction and/or disposal, their impact on the environment and society shall be investigated. This includes, i.a., impact on other industries, transport, pollution, nature diversity, marine resources, food safety and cultural monuments.

Detailed planning of the development takes place during preparation of zoning plans. Proposals for a zoning plan with the related environmental impact assessments are prepared and normally paid for by the company or individual who wishes to start mineral extraction. Total extraction of more than 2 million m^3 of rock, and smaller volumes that can result in significant impacts on the environment or the community, are covered by the regulations regarding environmental impact assessments.

The Planning and Building Act allows for the establishment of central government land-use plan. The State then assumes the regulatory authority of the municipal council. The State can, if there is a need for facilitating mineral extraction in areas where the municipalities do not want to plan for this, facilitate the activity by using central government land-use plan if this is justified by social considerations. The State may also request the municipality to prepare the land-use element of the municipal master plan or the zoning plan. The Government's view is that these are mechanisms that can be appropriate for further evaluation in order to contribute to implementation of important mineral extraction projects. They may also be relevant to secure valuable mineral resources for future exploitation.

In addition to the Minerals Act and the Planning and Building Act, mineral activities are also regulated by other acts. Permits or clarification may be necessary in relation to the Nature Diversity Act, the Pollution Control Act, the Food Production and Food Safety Act, the Motor Traffic Act, the Cultural Heritage Act and the Water Resources Act. Searching, exploration activities and extraction of minerals will generally be prohibited in protected areas, and in areas in which priority species are found. Particular care shall be taken in areas with selected habitat types.

The Nature Diversity Act is multi-sectoral and contains five principles for the sustainable use of nature: Requirements for knowledge, the precautionary principle, cumulative environmental effects, the user-pays principle, use of environmentally optimal technology and the location. These principles shall be used as guidelines when making decisions that affect nature diversity.

According to the Pollution Control Act, pollution is prohibited unless it is permitted by law, regulation or by means of a special permit. Pollution from extraction of minerals requires discharge permits. Discharge permits associated with extraction of the State's minerals are granted by the Climate and Pollution Agency, while the discharge permits associated with extraction of landowners' minerals are usually granted by the County Governor, unless alternative arrangement have been specifically determined. Pollution from extraction of crushed rock and gravel does not normally require special permission but is regulated by the pollution control regulations.

When considering whether a discharge permit should be granted and on what conditions, emphasis shall be placed on the negative effects of the pollution resulting from the operation being considered, compared with its advantages and other disadvantages. A discharge permit regulates, i.a., the use of chemicals. Operations using products that contain chemical substances that can lead to damage to health or environmental disturbance shall, pursuant to the Product Control Act, evaluate whether there are alternatives that entail a lower risk of such effects. The operator shall, if this is the case, select such an alternative provided that this does not cause unreasonable cost or inconvenience.

The waste regulations specifically regulate handling of waste rock from mining activities. If the establishment of a landfill will result in negative consequences for the environmental conditions of the groundwater, fresh water or coastal waters, the landfill must meet the water regulations' requirements for new developments and activities. According to the the Food Production and Food Safety Act, companies are obliged to notify the regulatory authorities if there is reason to suspect that a company's activities can lead to a danger that food will be injurious to health. Upper limits have been set for heavy metal contents in fish and seafood in the regulations pursuant to the the Food Production and Food Safety Act.

In accordance with "Procedures for Consultations between State Authorities and The Sámi Parliament (Norway)", the national authorities must consult with the Sámi Parliament and any other Sámi interests in cases that will directly affect Sámi interests. The consultation procedures have provisions about how the consultations shall be carried out. The obligation to consult Sámi interests may arise when considering permits for exploration or extraction of mineral resources in areas in which there are Sámi interests.

MEASURES

New Minerals Act

The Government has approved a new Minerals Act that replaces five old Acts. The Act was an important step in simplifying regulations in the mineral sector, and in creating transparent and predictable framework conditions for the mineral industry.

4.7.2 SOCIETY'S NEED FOR GOOD MANAGEMENT OF MINERAL RESOURCES

There is an increasing pressure on land in Norway. Often there are conflicting interests related to land use in municipalities Environmental concerns may argue for protection or restricted activity. Consideration of community needs such as housing, outdoor activities or other business activity may support restrictions on allocation of land for other uses than mineral operations. The need to secure valuable mineral deposits for future exploitation must also be considered in such processes. It is important to avoid situations in which mineral deposits of potentially great economic value are cut off from future exploitation and value creation without this being further assessed.

In "National expectations regarding regional and municipal planning", the Government reaffirms that planning must identify mineral resources of national and regional significance so that these can be assessed in such a way that there is no obstacle to future value creation. This approach shall act as a guideline for balancing considerations in the preparation of regional and municipal plans. The Government expects that counties (regional plan authorities) and municipalities will, in order to secure current and future needs for mineral resources, emphasise this issue in their land-use planning. The Government also wants regard for mineral resources to be a part of the relevant planning guidelines.

In order for mineral deposits to be properly considered in land-use planning, the planning authorities must have sufficient knowledge about the deposits and the potential for future value creation. Such knowledge is critical in weighing the use of land for different purposes. Some counties have their own regional or county geologist to assist the county and municipalities with valuable knowledge about the handling of mineral matters. Buskerud, Telemark and Vestfold counties have chosen, collectively, to have a regional geologist. They have also produced a separate strategy document for the regional geologist for 2013-2016, based on the cooperative geological programme of the three counties.

The Directorate of Mining can raise objections to municipal plans in order to safeguard mineral deposits for future mineral operations. Objections may be submitted in issues that are of national or significant regional importance, or for other reasons which are of significant importance to the sphere of responsibility of the Directorate. Such objections must be based on solid facts and on sound mapping and classification of the deposits.

Increased development in already heavily populated areas has led to increased land conflicts between extraction of construction materials and other land use. At the same time, access to construction raw materials, such as crushed stone and gravel is critical for the development of infrastructure, housing and commercial buildings. In certain regions it can be shown that the distance between the point of extraction of the construction materials and their place of use is increasing. This, seen in isolation, leads to increased loads on the road network, increased pollution and increased costs for society due to more expensive construction and infrastructure projects.

The Government considers, in order to secure efficient, sustainable use of resources, that it is necessary for the counties and municipalities when they are preparing planning strategies to develop long-term, integrated plans for use of the mineral resources in the county. This will contribute to achieving the Government's goal of growth and increased value creation in the mineral industry.

Efficient coordination and planning are necessary for the mining of mineral resources. Municipalities should consider how current and future demand for mineral resources can be secured when revising the land-use element of the municipal master plan. The Government's view is that it is important that planning processes associated with mineral extraction are predictable and efficient, and that they are based on sound knowledge of the mineral resources, possible consequences for the environment and other society interests. A close dialogue between developers, the municipality and other relevant authorities and interests is necessary to achieve this. In counties with large mineral deposits, regional master plans ought to include management of mineral resources and guidelines for localisation of mines/quarries.

The Government's view is that such regional master plans are good tools for strengthening overriding, coordinated planning, aimed at securing future exploitation of mineral deposits. Regional master plans will contribute to increasing municipality and county expertise on mineral deposits, and will thus also provide greater predictability for mineral projects. At the same time, regional master plans will contribute to ensuring that considerations on nature diversity are well considered in the planning process.

Inter-municipal planning cooperation can, in a similar manner, be an appropriate means for ensuring integrated overall management of mineral resources, and the implementation of regional strategies in the mineral sector. State or regional authorities may also take the initiative to prepare plans pursuant to the Planning and Building Act to safeguard planning tasks of regional or national significance.

MEASURES

Securing future needs for mineral resources
To secure current and future needs for mineral resources, the Government expects that counties and municipalities will emphasise this consideration in their land-use planning. This is, not least, important for construction raw materials such as crushed stone and gravel deposits.

Consideration of mineral resources in planning guidelines and planning strategies
The Government expects consideration of mineral resources to be included in relevant planning guidelines and planning strategies.

Expectations for effective planning processes
The Government's view is that it is important that planning processes associated with mineral extraction are predictable and efficient, and that they are based on a sound knowledge of the mineral resources, possible consequences of extraction for the environment and other society interests.

Local cooperation
The Government's view is that regional master plans and inter-municipal planning cooperation are good tools for strengthening planning processes in order to secure future exploitation of mineral deposits.

Geological knowledge in the counties
The counties should consider augmenting their geological knowledge by, for example, use of a county geologist.

Management of nationally and regionally important deposits
Sound management of mineral resources is essential for achieving the goal of increased value-creation in the mineral industry. It is necessary, in order to ensure that the important mineral deposits are properly handled in land management processes, that the value of the resources is made clear. By 2014, the Geological Survey of Norway shall develop a classification system for mineral resources based on value-creation potential and regional needs for resources, in which the resources are classified as of regional or national significance. This shall be a tool for municipal, regional and national land-use planning.

Securing valuable mineral deposits for future use
The Government will assess more closely how valuable mineral resources can best be addressed in land-use planning weighed against other interests and forms of land use which are important to society. The objectives are to secure current and future needs for mineral resources and to facilitate value-creation and employment growth in outlying regions. The work will be conducted by the Ministry of the Environment and the Ministry of Trade and Industry. Use of measures in the Planning and Building Act and any need for improvement in the Act will be considered.

Updating subject guidelines for mineral extraction
The Ministry of the Environment, in cooperation with the Directorate of Mining, will revise "Subject guidelines: Exploitation of mineral deposits and planning pursuant to the Planning and Building Act" so that it has better coverage of topics related to underground operations.

FACTS

In Rogaland, the County Council adopted a regional master plan (previously called a county sub-plan) for construction raw materials on Jæren. The objective of the plan has been to secure access to construction raw materials in Rogaland over a long-term perspective, to prioritise between different land-use interests, to coordinate among municipalities that are part of the same regional market and to prioritise planning and securing land where the pressure on resources and land-use conflicts are greatest.

The plan contains a description of possible locations, assessment of available mineral resources on Jæren, discussion of the waste rock deposit needs and guidelines for planning. An impact and resource analysis has been made for each of the sites considered. This formed the basis for conflict assessments and classification into planning categories.

The planning basis was worked out in cooperation between the county, affected municipalities, the County Governor, the Geological Survey of Norway, the Directorate of Mining and representatives from the crushed stone and gravel industry. The final plan was approved by the Ministry of the Environment, which was of the opinion that it could be a model for corresponding plans in other counties.

Rogaland County is now working to prepare a corresponding regional master plan for construction raw materials in Ryfylke.

From Jens Stoltenberg's visit to the separation plant at Sydvaranger Gruve in Kirkenes, 6 June 2009. Photo: Bente Geving, Sydvaranger Gruve AS

4.7.3 PREDICTABLE AND EFFICIENT PROCESSES FOR IMPACT ASSESSMENTS

The purpose of the provisions on environmental impact assessments in the Planning and Building Act is to clarify the impact of plans and projects that may have significant consequences for the environment and for society. Impact assessments shall ensure that significant impacts on the environment and society are taken into account in the planning when deciding whether the plan or project can be implemented, and what conditions, if any, shall be stipulated. The knowledge contained in the impact assessments is also used in the evaluation of any discharge permits.

An impact assessment shall cover all decision-relevant conditions. This also includes alternative waste-rock disposal solutions. Such issues ought to be identified at an early stage, in order to ensure efficient progress in the assessment process. This implies that the proposal for the planning programme should be sent on a hearing to affected parties and that they actively participate in the hearing. The Government expects that affected parties provide input on decision-relevant conditions within the stipulated deadlines. Relevant input at an early stage can reduce time and costs for the developer, the municipality and other affected interests.

Impact assessments related to planning for mineral extraction are, in many cases, very extensive and require a number of sub-reports on various subjects. The total cost can be high.

Under previous legislation, the Directorate of Mining approved the company's proposal for an assessment programme and impact assessment, and carried out a hearing. On the basis of the assessment programme, the accompanying impact assessment and input during the hearing process, the Directorate made a recommendation to the municipality that was included in the case documents for the municipality's planning decisions.

Since 2005, the municipality has adopted the planning programme with an accompanying assessment programme and has sent these out on a hearing. The planning programme for new mineral extraction shall be submitted to the Directorate of Mining for comment. In cases which may involve conflict with national or important regional considerations, the planning programme shall also be submitted to the Ministry of the Environment for comments before it is adopted by the municipality.

Establishment of large mineral operations often occurs in small municipalities. Such cases are complex and require significant capacity and expertise. For a municipality, it may be the only time it coordinates such a task. Feedback from the industry can indicate that the municipality, in several planning processes, has come under pressure from various parties to have an impact assessment of conditions that are not necessarily relevant to the decision. For municipalities with limited resources and a small professional staff, it can be demanding to evaluate what is relevant to assess and what conditions are not relevant to the decision. This may delay the planning process and may lead to an incomplete impact assessment or to use of time and resources to investigate matters that are not relevant to the decision.

The Government wants the Directorate for Mining to play a more active role in impact assessments related to large mineral projects. There is a need for closer cooperation between the Directorate and the municipalities in these cases. This requires that the municipality and the Directorate agree on a plan for the implementation of the impact assessment process in accordance with the Planning and Building Act. If the municipality wishes, the Directorate may, however, take responsibility to carry out the impact assessment process in whole or in part. In any case, the municipality will continue to be the decision-making planning authority. To ensure rapid clarification of responsibilities between the municipality and the Directorate, the developer must submit the proposal for the planning programme to both parties simultaneously.

This proposal will provide greater flexibility for major impact assessment processes related to potential mineral extraction. It will also ensure effective coordination with professional bodies and relevant centres of expertise early in the work, and give more time- and cost-efficient processes for all parties involved. This proposal requires changes in the regulations concerning impact assessments.

Responsibility for the impact assessments being of a high professional standard and relevant to the decision to be made lies largely with the developer of such projects. The developer should, in the assessment programme that is sent on a hearing, explain how the assessment task will be carried out so that the consultative bodies can make specific inputs to this, rather than only giving general ideas about what they want assessed. The mineral companies themselves, can, by emphasising this, contribute to more time- and cost-efficient processes.

FACTS

The planning of mineral extraction requires large investments. A significant part of the costs is incurred before an investment decision can be made.

The company Nussir ASA plans to start extraction of copper in Kvalsund municipality in Finnmark and expects to start operations in 2015. The planning process began in autumn 2009. Twenty sub-studies in all have been prepared as part of the impact assessment including studies on the community, marine life, noise and dust, biodiversity, description of tailings, reindeer husbandry, factors related to the coastal Sámi, landscape and deposition of waste rock/tailings. The company has spent a total of NOK 100 million on the project in the last six years. Of this, about NOK 60 million have been used for exploration of the metal deposits, NOK 15 million for rights, NOK 10 million for other operations and NOK 15 million for the planning process. The company expects to use a further NOK 50 million before a final investment decision is made. Other organisations spent an estimated additional NOK 50 million on explorations of the deposits in the 1980s and 1990s.

MEASURES

Predictable and efficient planning processes
The Government's objective is to reduce the industry's administrative costs related to regulatory requirements. The Government will identify measures to make the planning processes more efficient, aiming at greater predictability and more time- and cost-effective decision-making processes. The Ministry of the Environment will, in cooperation with the Ministry of Trade and Industry and the Ministry of Local Government and Regional Development, set up a working group for this task. The working group will consider the use of instruments in the Planning and Building Act, and any need for improvement in the Act. The ministries concerned will be involved in this work.

Closer cooperation between municipalities and the Directorate of Mining in relation to impact assessments for large mineral operations
Proposals for planning programmes for large mineral operations shall be sent to both the municipality and to the Directorate of Mining. The municipality and the Directorate shall agree on arrangements for carrying out the impact assessment pursuant to the Planning and Building Act. The Directorate may, if the municipality wishes, take responsibility for carrying out the impact assessment. The municipality will, however, still be the decision-making planning authority.

Clear requirements for impact assessments
The Government will prepare guidelines and check-lists to clarify the issues to be assessed in the planning of mineral extraction and waste rock/tailings disposal solutions. The Directorate of Mining will, in cooperation with the Climate and Pollution Agency, be responsible for working out the material. The work will be carried out in cooperation with relevant government authorities, including the Directorate of Fisheries and the Norwegian Food Safety Authority, the mineral industry and other affected industries.

4.7.4 EXPLORATION FOR MINERALS OWNED BY THE STATE

The Minerals Act has a simple procedure for processing applications for the right to explore for minerals owned by the State. The purpose is to contribute to more mineral deposits being investigated, which again can provide the basis for extraction. A progressive fee was introduced in the Minerals Act for exploration rights to the State's minerals in order to stimulate exploration and to help prevent prospecting companies from occupying an area longer than necessary.

The Minerals Act allows several players to have the right to explore in the same area. The exploration company/individual with the best priority - in practice the one who applied first - has first right to conduct exploration work. Others can explore only after consent from the operator with the best priority. The fee that is to be paid for the right to explore is nonetheless the same, regardless of priority.

According to the Minerals Act, the right to explore may only be denied if the applicant has previously breached significant provisions in the mineral regulations. The current regulations do not always ensure efficient exploration in areas where exploration rights have been granted. More stringent requirements, for example that the applicant must submit a specified plan for the exploration programme and documentation of relevant expertise, will give the mining authorities better administrative tools and a more efficient management.

MEASURES

Review of the rules for exploration rights for minerals owned by the State
The Ministry of Trade and Industry will consider amendments to the rules for exploration rights for minerals owned by the State. Considerations of cost-efficiency, value-creation and industrial development, and the public need for control will be emphasised in this work.

4.7.5 THE DIRECTORATE OF MINING

An efficient, competent and forward-looking minerals management is a competitive advantage for the Norwegian mineral industry and will contribute to more predictable framework conditions for mineral operations and a better management of resources.

The Directorate of Mining with the Commisioner of Mines at Svalbard is the Government's main professional agency for the management and exploitation of mineral resources in Norway, including Svalbard. The Directorate shall contribute to the realisation of the Government's overall objectives for increased value creation based on socially responsible extraction of minerals. The agency grants exploration and extraction permits (rights) for the State's minerals, and operating licences for extraction of all types of minerals, and is consulted in cases relating to mineral resources being assessed in relation to the Planning and Building Act.

The Directorate of Mining has important tasks in relation to determining the content of planning programmes and impact assessments according to the Planning and Building Act where these relate to mineral operations. The Directorate can submit objections if the plans may have negative consequences for the mineral operation and for future exploitation of mineral resources.

The Directorate also grants permits according to the Minerals Act and has responsibility for supervision to ensure that mineral extraction is conducted in accordance with the Act. The Directorate also manages environmental and security measures at closed mines where the State has a responsibility. The Minerals Act and increased activity in the industry have led to new tasks and an increased work load for the agency.

To achieve the Government's goals for growth and greater predictability for the industry, it is important to have a competent and efficient mineral management. Pricewaterhouse-Coopers carried out an external evaluation of the Directorate

of Mining in the autumn of 2011 on commission from the Ministry of Trade and Industry. The evaluation shows that there is a need for strengthened performance management of the agency's tasks, better organisation, increased capacity and enhanced expertise in the agency. The report states that the Directorate did not have sufficient resources to perform all its statutory duties. Furthermore, the report showed that the agency must be strengthened in order to carry out its overall role in the management of Norway's mineral resources, and to monitor the industry in a better and more systematic manner. This is also necessary if the agency is to guide the industry, municipalities and other players in relation to mineral issues The evaluation has been followed up with increased allocations in the fiscal budgets for 2012 and for 2013. A greater focus on efficient case management, guidance and communication will lay a foundation for new industrial development, and increased mineral production in established operations.

The Ministry of Trade and Industry believes that it is necessary to increase the staff of the Directorate of Mining and that the agency must work hard to strengthen its expertise in relevant fields.

MEASURES

Increased staffing in the Directorate of Mining
The Directorate of Mining shall be strengthened. The objective is that the agency shall be able to perform its tasks in an efficient, good manner. The increase will be implemented gradually.

Competence plan
The Directorate of Mining shall prepare a competence plan that will make the agency well-equipped to carry out its tasks. The plan should include how the agency can best utilise its collective expertise, including expertise in fields related to the natural environment, pollution, law and economics.

Enhanced cooperation between the Directorate of Mining and the Geological Survey of Norway
The Directorate of Mining and the Geological Survey of Norway cooperate in several areas. The Directorate needs stronger expertise in several key professional fields. Cooperation between the two organisations will be strengthened and expanded in order to provide broader access to expertise and increase efficiency in the implementation of key functions.

Increased user-orientation
The Directorate of Mining shall implement measures aimed at increased user-orientation and improved communication and access for the mineral industry, municipalities and other users. The objectives are to reduce the industry's administrative burdens and to improve access to relevant knowledge and information about establishing and managing mineral operations in Norway.

Focus on digital solutions
The Directorate of Mining will increase its focus on digital solutions in order to provide more efficient case handling and better guidance of, and communication with the mineral industry and other users.

4.7.6 TAXES AND FEES

Mineral activities generate cash flows to the state through the general tax and fee regulations, in the same way as other industries. Municipalities, in addition, may set property taxes. Special fees for exploration for, and extraction of minerals are set in the Minerals Act.

Those with exploration or extraction permits for minerals owned by the State pay an annual fee to the State to maintain these rights. Those who extract such minerals pay an additional annual fee of 0.5 per cent of the sales value of that which is extracted to the landowner. An increased landowner fee of 0.25 per cent applies for extraction of minerals owned by the State from land owned by Finnmarkseiendommen (Finnmark Estate Agency).

The Minerals Act gives the Ministry of Trade and Industry the legal authority to issue regulations on the payment of an annual fee to the State for the extraction of minerals owned by the State. Currently no such fee has been set.

Exploration and extraction of landowners' minerals do not, at present, generate any special fees for the State, but fees are payable to the landowner who owns the resources. The amount of compensation is determined in the contract between the landowner and the company that is exploring or extracting the minerals.

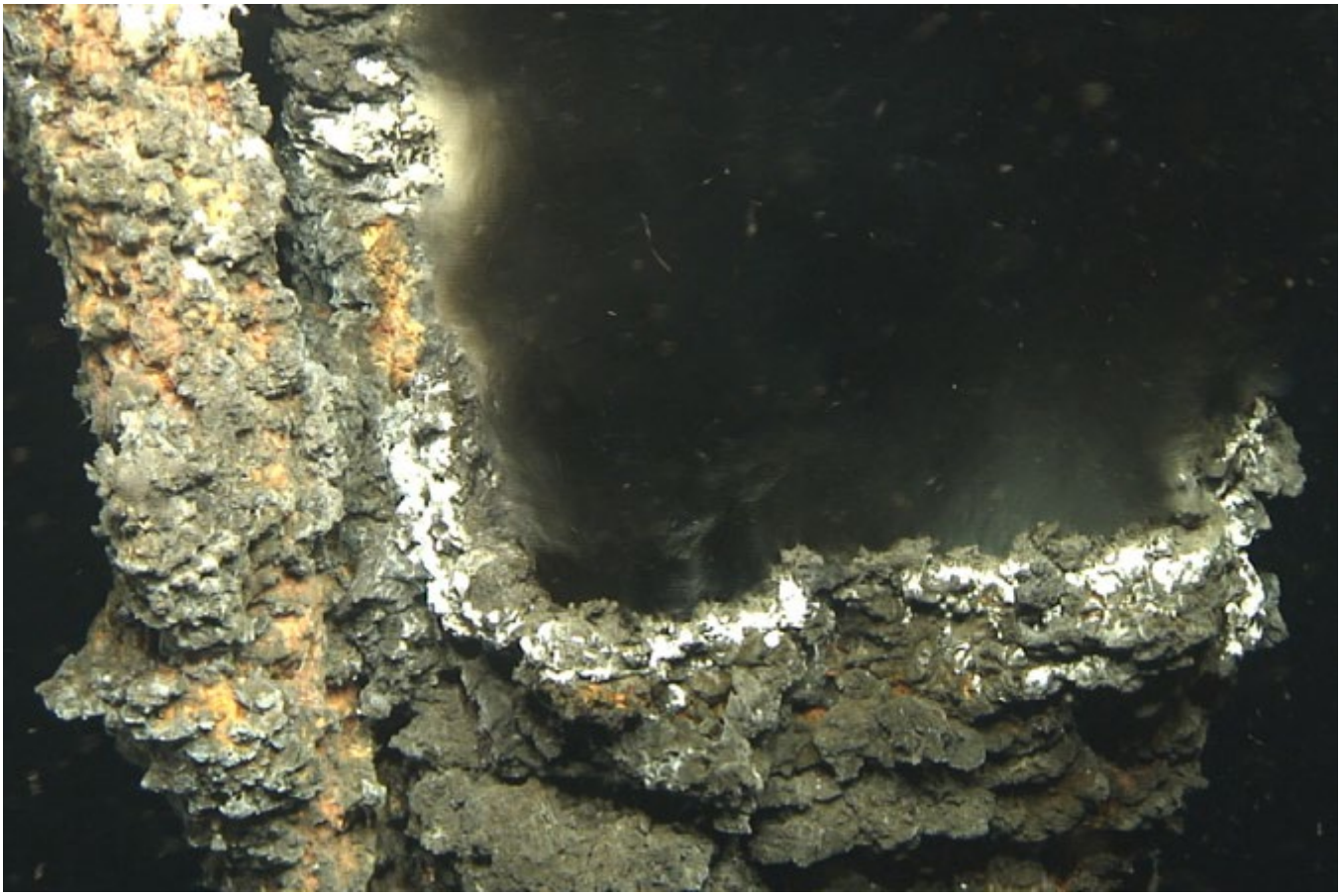
4.8 SUBSEA MINERAL RESOURCES

Subsea areas may contain important mineral deposits with the potential for possible future profitable exploitation. Of particular interest are volcanogenic metal deposits, so-called "black smokers". Such deposits are found along the Mid-Atlantic Ridge, including near Jan Mayen and northwards, but their extent has not yet been mapped.

Norway has strong competence and companies in the field of subsea- and deep-water technology used in the oil and gas industry. This expertise provides opportunities for the development of technology for searching, exploration, and possible future exploitation of mineral resources on the seabed.

Mapping under the auspices of the Skagerrak project and several other projects has demonstrated areas of sand and gravel in the North Sea and the Skagerrak. Deposits are also found along the Norwegian coast, both outside and inside the baseline. Exploitation of sand and gravel from the seabed takes place in several countries around the North Sea, but not in Norwegian waters. Mapping in the MAREANO programme shows that there are resources of this type in the Barents Sea and off Lofoten and Vesterålen. Shell sand is another mineral resource in the coastal zone. Extraction takes place on a small scale in the Agder counties and along the west coast. Norwegian waters have been mapped to only a limited extent in this respect. There may therefore be other mineral resources with potential for commercial exploitation.

Mineral activities at sea may gain increasing significance. The existing regulations for subsea exploration and exploitation of mineral resources on the Norwegian Continental Shelf are incomplete and are not suited to the current situation. There is a need to reform the regulations.



Black, metal-rich water at 300o C flows from a so-called «chimney» on the seabed, 300 km west of Bear Island. Deposits of copper, zinc and gold with a value of NOK 1 - 5 billion have been proved along the Mid-Oceanic Ridge in the middle of the Atlantic,. Photo: Centre of Excellence in Geobiology

4.9 MINERAL ACTIVITIES IN AREAS WHERE THERE ARE SÁMI INTERESTS

Sámi interests and especially reindeer husbandry are found in large areas in Norway, especially in the northernmost counties. Reindeer husbandry today takes place in about 140 of the country's municipalities, over an area that amounts to about 140,000 km^2, or about 40 per cent of mainland Norway, extending from Finnmark in the north to Engerdal in Hedmark in the south. From Finnmark to Sør-Trøndelag, reindeer husbandry takes place on a little over 80 per cent of the land area.[2]

The Government has launched a special mapping programme for Nordland, Troms and Finnmark (the MINN programme) The mapping has shown that in these counties there are mineral deposits that can provide the basis for new, profitable industry, and which can provide society with mineral resources. Mineral activities can be land-intensive and may involve environmental challenges. Such activities may also increase pressure on Sámi culture, reindeer husbandry and other forms of employment. The Government assumes that mineral activities will be operated in an environmentally responsible manner and in balanced coexistence with reindeer husbandry and other Sámi interests in such areas. The rights of the Sámi as an indigenous people shall be respected. There is a need for a better knowledge base relating to mineral activities in areas where there are Sámi interests.

One of the conditions for good coexistence is that companies engaged in mineral activities in areas where there are Sámi interests take social responsibility , engage in open dialogue and operate responsibly. This can be achieved by adhering to the OECD guidelines for multinational companies and the "UN Guiding Principles on Business and Human Rights". These address, i.a., human rights, publicity about significant aspects of the activities, local capacity building and safeguarding of concerns about the environment, health and safety.

Development of mineral activities requires a constructive, fact-based dialogue and mutual willingness to adapt. Promotion of good coexistence is the responsibility of all parties concerned. It is also essential that the parties, at an early stage in the development of a potential mineral project, have good contact with the aim of identifying both opportunities and challenges associated with such activities. Reindeer husbandry and other Sámi interests are affected by

2 NOU 2007:13 "The new Sámi right" subsection 10.2.1.

Reindeer husbandry takes place over significant land areas in Norway. Photo: Getty Images

many plans and projects. These include construction of windmills, cabin sites, hydropower development, infrastructure such as road construction and power lines, and mineral extraction. This involves challenges in terms of capacity and expertise in relation to active Sámi participation in the planning processes associated with such developments. The Government will arrange for Sami participants to be able to participate actively in the planning processes. The capacity and expertise of the Sámi interests must be developed in order to support active involvement in, for example, planning processes.

The Government has, in its High North Strategy, pointed out the need to develop ethical guidelines for economic activities in the North, see "New Building Blocks in the North. The Next Step in the Government's High North Strategy" subsection 7.3. This states that the government will initiate work on the development of ethical guidelines for the protection of the interests of indigenous peoples with respect to economic activity in the North. The development work will take place under the auspices of the Árran - Lulesámi centre, the Sámi University College and the University of Tromsø in cooperation with the energy group at the University of Nordland. Industry and business and trade organisations shall be involved in developing the ethical guidelines. In 2012, Árran was allocated funding from the Barents 2020 scheme to support initiation of a pilot project, which will develop a proposal for a multi-year main project.

The Government believes that ethical guidelines are important in creating awareness in the industry of the need to act in an orderly and responsible manner with respect to the local community and other affected parties. At the same time, the sector should ensure the development of these ethical guidelines in line with changes in society and the development in this area as such.

The Minerals Act contains regulations for securing Sámi interests. The Act stipulates that the administration and use of mineral resources must occur in a manner which safeguards the foundation of Sámi culture, commercial activity and social life. The Act shall be applied in accordance with the rules of international law relating to indigenous peoples and minorities. These provisions generally apply to the entire country, and apply in all areas where there are Sámi interests.

Consideration of Sámi interests in matters concerning mineral activities is also safeguarded in other regulations. The Sámi Parliament of Norway may make objections to proposals for the land-use element of the municipal master plan and zoning plans in issues that are of significant importance to Sámi culture and commercial activities. The municipality is the planning authority that determines whether an area should be regulated for mineral extraction. Also at this stage, Sámi interests are safeguarded.

Special rules for Finnmark are established in the Minerals Act to strengthen the protection of the Sámi culture and commercial activities. The rules include specific duties to give notice and requirements for special permits to initiate exploration activities. In assessing such applications, and applications for extraction permits, pilot extraction and operating licences special considerations shall be given to the interests of Sámi culture, reindeer husbandry, commercial activity and social life. An increased landowner's fee shall be paid for the extraction of minerals own by the State from land owned by Finnmarkseiendommen (Finnmark Estate Agency).

The Government is in the process of following up the report from the Sámi Rights Commission 2 in NOU 2007:13 The new Sámi law. The Commission has submitted proposals for amendments to the minerals legislation and in a number of other sector acts. In addition, the Commission has proposed a new case management and consultation act. The Ministry of Justice and Public Security and the Ministry of Government Administration, Reform and Church Affairs have primary responsibility for follow-up of the proposals from Sámi Rights Commission 2, but follow-up takes place in cooperation with relevant ministries. The Ministry of Trade and Industry will have primary responsibility for following up proposals for amendments to the Minerals Act.

To the extent that follow-up of the strategy for the mineral industry leads to other measures that could affect Sámi interests directly, consultations will be carried out with the Sámi Parliament of Norway and other Sámi interests in line with the Procedures for consultations between state authorities and the Sámi Parliament.

MEASURES

Protecting Sámi interests in connection with mineral operations outside Finnmark

As part of the follow-up the Sámi Rights Commission 2, the Government will consider whether the Minerals Act should be amended with the inclusion of specific rules to protect Sámi interests in connection with mineral operations outside Finnmark. The Ministry of Trade and Industry will initiate consultations on the matter with the Sámi Parliament of Norway and the Sami Reindeer Herders' Association of Norway in the spring of 2013, and will prepare the ground for an efficient process. This process will be implemented in cooperation with the Ministry of Government Administration, Reform and Church Affairs. The work will also consider the experience gained in the administration of the rules in the Minerals Act that are applicable to mineral activities in Finnmark. The Government has not taken a position with respect to whether any amendments should be made to the Minerals Act.

Strengthened knowledge base relating to mineral activities in areas with Sámi interests

When considering initiation of exploration activities and the establishment and running of mineral operations, it is important that all interested parties have access to a solid knowledge base and to the status of expertise appropriate to the activities. This will provide a common basis for assessing the opportunities and challenges related to the activities.

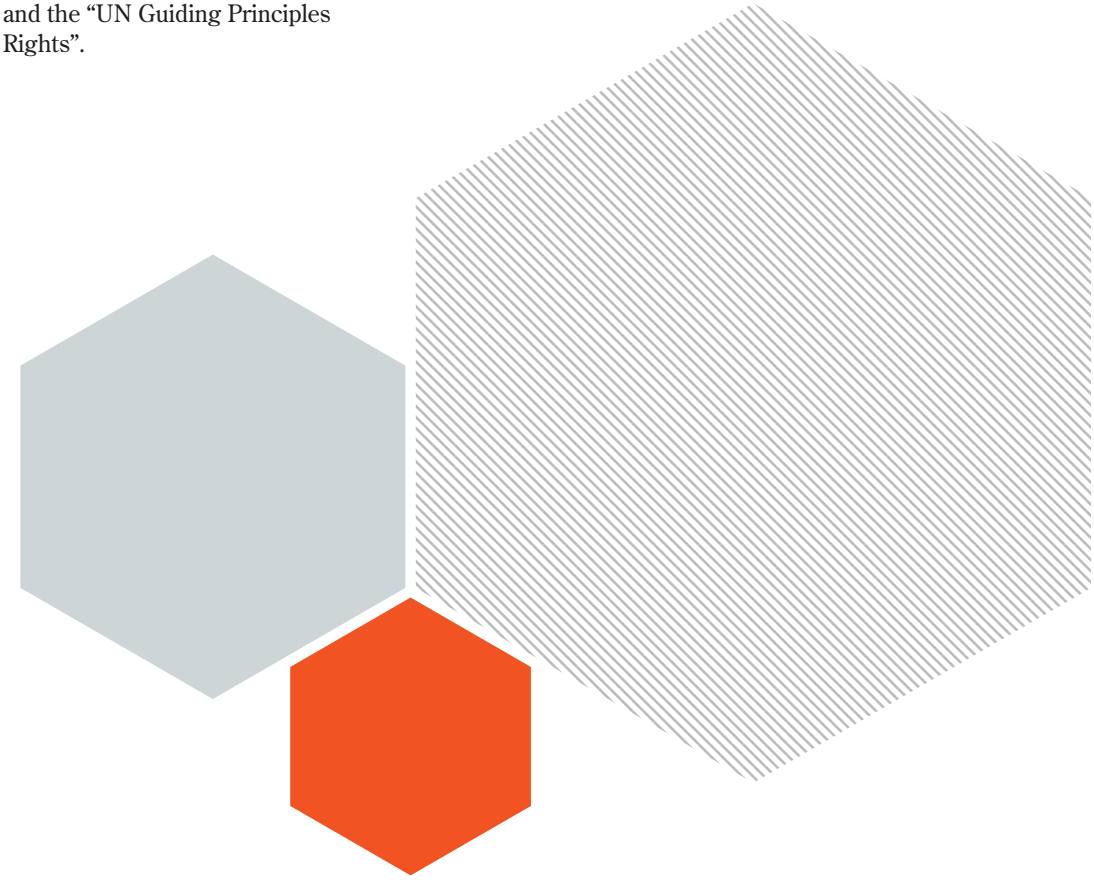
The Ministry of Trade and Industry will give the Directorate of Mining in cooperation with Sesam (Centre for Sami Studies at the University of Tromsø) the task of working out a satisfactory knowledge base on the effects of mineral activities on reindeer husbandry and other Sámi interests. The work shall be rooted with the mineral authorities, the industry and Sámi and other affected interests. The Ministry of Trade and Industry will invite the Sámi Parliament of Norway and the Norwegian Sami Reindeer Herders' Association to consultations on defining the mandate for this task.

Building capacity and expertise for Sámi interests
The Ministry of Trade and Industry will discuss with the Protect Sápmi Foundation the possibility of support during a start-up period. The Foundation will assist Sámi interests with expert assistance in processes relating to land-use planning and development initiatives.

Ethical guidelines
The Government will initiate work on the development of ethical guidelines for the protection of indigenous peoples' interests with respect to economic activity in the North as part of the implementation of the High North Strategy. Árran is allocated funds to initiate a pilot project.

The Government expects companies that operate in areas where there are Sámi interests to take social responsibility. This can be done by following the OECD guidelines for multinational companies and the "UN Guiding Principles on Business and Human Rights".

The Arctic Council
The Arctic Council is a forum which is open for discussion of the effects of mineral activities in the Arctic and northern areas, in relation to value creation, employment, the natural environment and indigenous peoples' interests.



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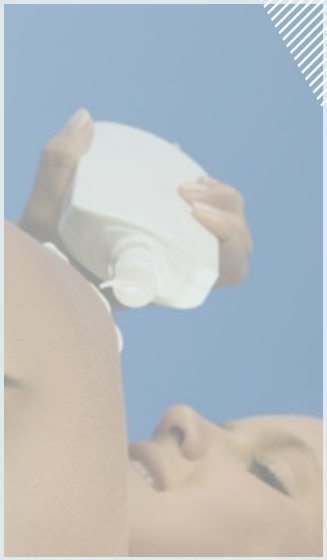

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The Government wants Norway to be an attractive country for mining activities. This is the background for presenting a strategy for the mineral industry.

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