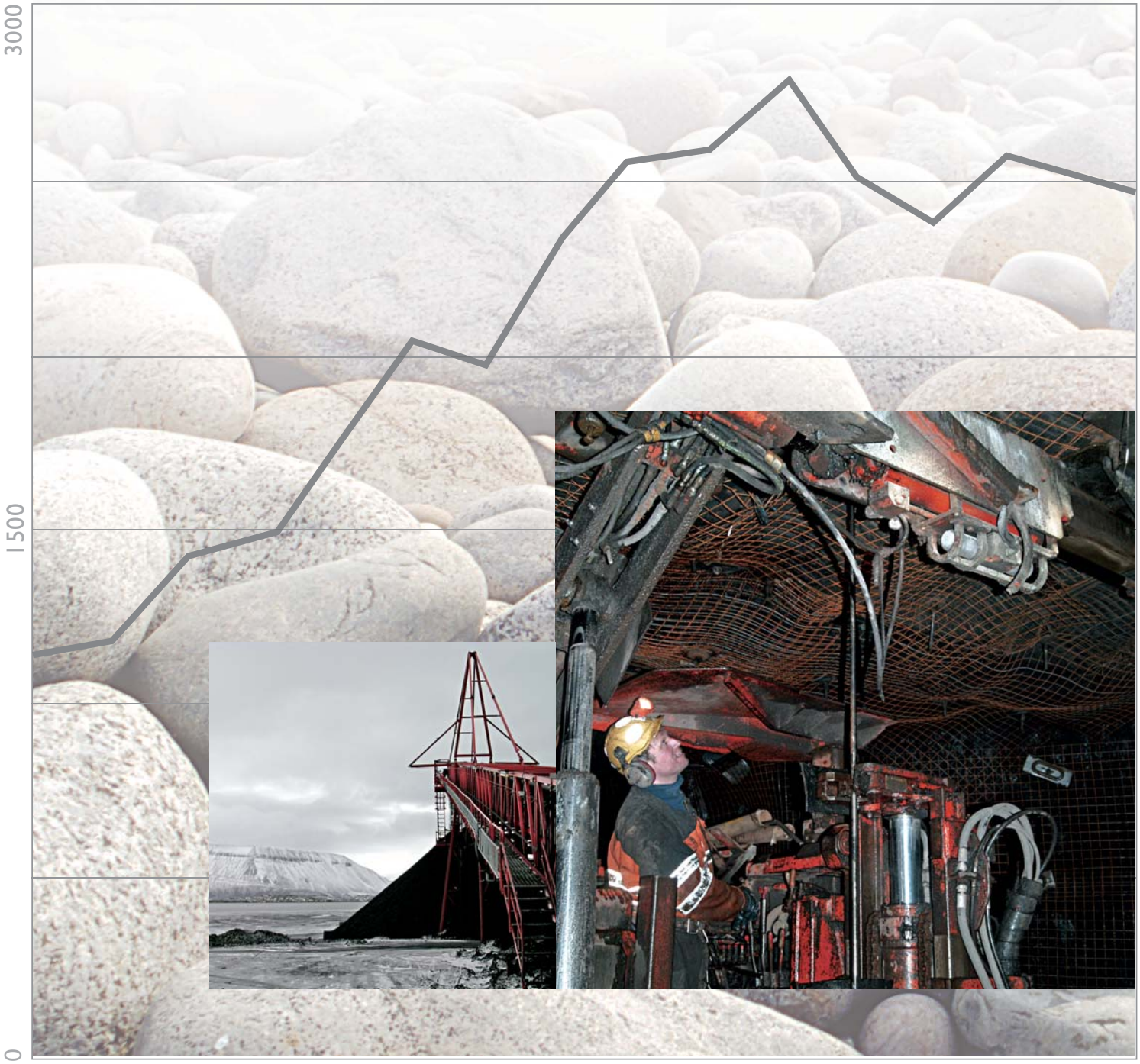
DIRECTORATE OF MINING
WITH COMMISSIONER OF MINES AT SVALBARD

NGU
Norges geologiske undersøkelse
Geological Survey of Norway

Mineral resources in Norway

Production data and annual report

2007



Publication no. 2 2008

Production of larvikite blocks at the Lundh Labrador AS quarry at Stålaker. Photo: Peer - Richard Neeb.

Larvikite

Norway's national rock

Norway's newly elected national rock has been used as a natural stone since the late 1800s. Its unique colour variation has made it one of the world's most attractive types of natural stone. Larvikite is thus an outstanding representative of Norwegian geology, culture and nature. The illustration shows blocks ready for export at Lundh Labrador's Stålaker Quarry.

Photoes on the front cover: Svea Nord, Svalbard, Halfdan Carstens

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FOREWORD

This report on industrial mineral production was prepared by the Geological Survey of Norway (NGU) and the Directorate of Mines with the Commissioner of Mines at Svalbard (BV) based on the mining industry's own production and sales figures for 2007. The response deadline was set at 20th May, 2008.

In all, seven hundred and fifty companies have submitted data on the various types of mineral resource, as presented in a number of figures and tables in the report. Compared to previous reports "Norwegian mineral production" from the Directorate of Mines and "Mineral resources in Norway" from NGU, the data set presented here has never been better, even though production data from a number of smaller deposits are still lacking.

The mineral production data for 2007 have been compiled by Peer-Richard Neeb, Gunn Sandvik, Knut Riiber and Geir Strand (NGU) and by Peter Brugmans and Brit Kaasbol from the Directorate of Mining.

Trondheim 03.07.2008

Morten Smelror
Director
Geological Survey of Norway

Per Zakken Brekke
Commissioner of Mines,
Directorate of Mines with Commissioner of Mines for Svalbard

1. ABSTRACT

Larvikite sculpture in city of Larvik. Photo: Peer - Richard Neeb.

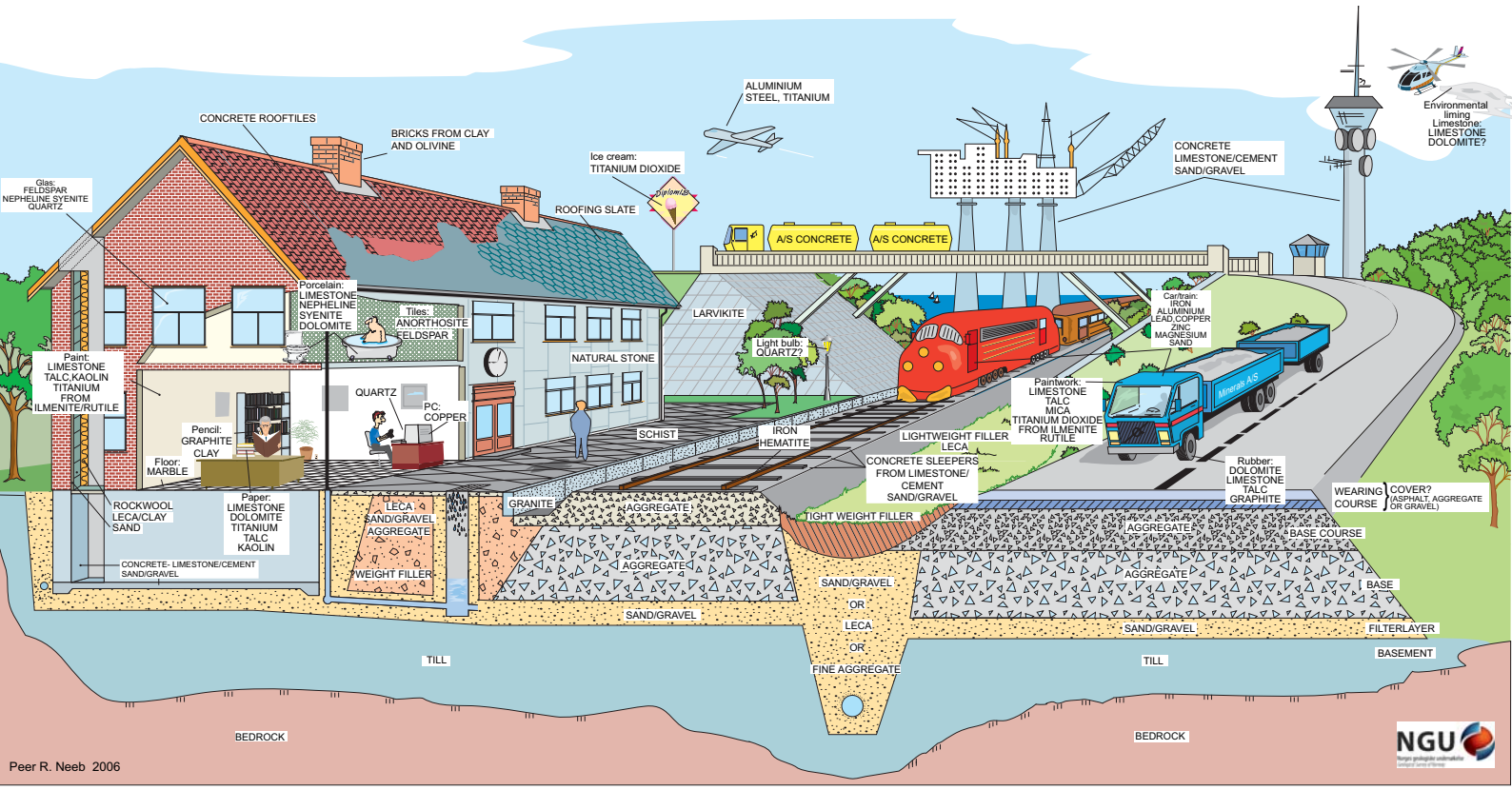
In 2007, the Norwegian mineral and mining industry had an annual turnover of NOK 10,400 million, and exported products valued at NOK 6,100 million. Eighty-five million metric tonnes of mineral raw materials were produced, by c. 4,800 employees in 745 companies.

Coal production on Svalbard has increased considerably in the last year. This is the second year for which we have received production figures for gravel and hard-rock aggregate from the whole country. Turnover has increased from NOK 3,000 million in 2006 to NOK 3,800 million in 2007.

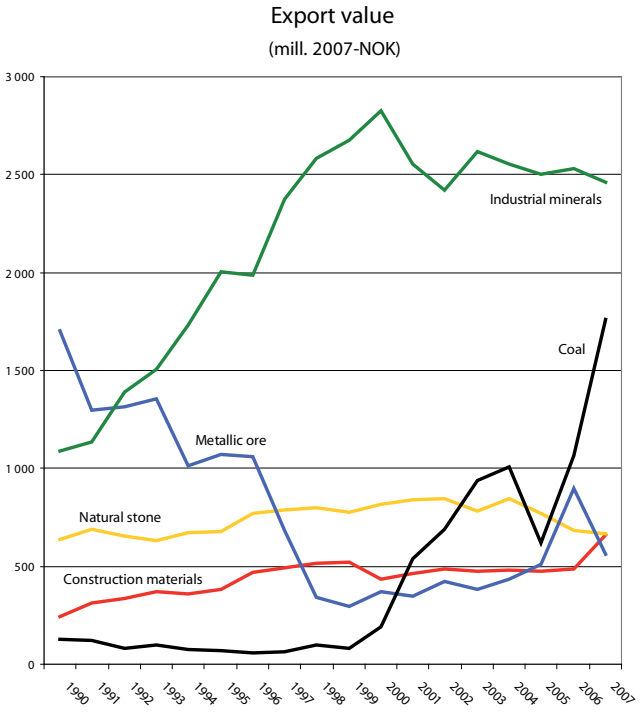
The mineral and mining industry is of great significance in outlying regions, with the highest turnovers in the counties of Møre og Romsdal, Rogaland, Nordland, Vestfold, and Finnmark.

3,378 applications for pre-claims were processed in 2007, the largest number in any year since the Directorate of Mines was established.

Mineral statistics are presented in figures, maps and tables.



Everyday use of mineral resources.



2. INTRODUCTION

The mineral and mining industry comprises companies involved in extraction and processing of minerals and rocks, from bedrock and/or superficial deposits. Five main groups of materials can be distinguished:

Industrial minerals (e.g. calcium carbonate rock (marble and limestone), olivine, nepheline syenite, quartz and dolomite)

Natural and dimension stone (e.g. larvikite, granite, marble, slate/ flagstone and building stone)

Building materials (sand, gravel, hard-rock aggregate, rock for ballast and clay)

Metallic ores (e. g. iron, nickel and ilmenite - titanium)

Energy minerals (e. g. coal and peat)

All of the above materials are essential for every-day life: modern society cannot exist without using mineral raw materials such as iron ore for production of steel, limestone for cement and paper, aggregate for road-building, sand and gravel for concrete, and coal for metallurgical processes and for energy production.

Per capita annual consumption of minerals and mineral products amounts to 12-15 metric tonnes, which, over an average life-time, adds up to c. 1,000 tonnes/person.

Initially, production data from mineral producers were collected by the Directorate of Mines (Bergvesenet - BV) and the Geological Survey of Norway (Norges geologiske undersøkelse - NGU) and were published annually in 'Norway's mining production' and 'Mineral resources in Norway', respectively. Since 2006, the annual overview has been published in collaboration between NGU and BV.

The primary goals in publishing mineral production data include:

Demonstration of the importance of the mineral industry to the Ministry of Trade and Industry, to other ministries and public authorities and to the general public.

Assistance to county and local authorities, and to industry in ensuring optimal land-use planning, including appropriate attention to mineral reserves in production and to resources which may be important in the future.

To provide an up-to-date annual overview of the mineral industry, to be available by the end of June the following year.

NGU and the Directorate of Mines have compiled the overview of mineral production data based on the response to enquiries to producers. The producers of gravel and aggregate contacted are mainly taken from the NGU Gravel and Aggregate Database, and on producers registered in the Directorate of Mines' database.

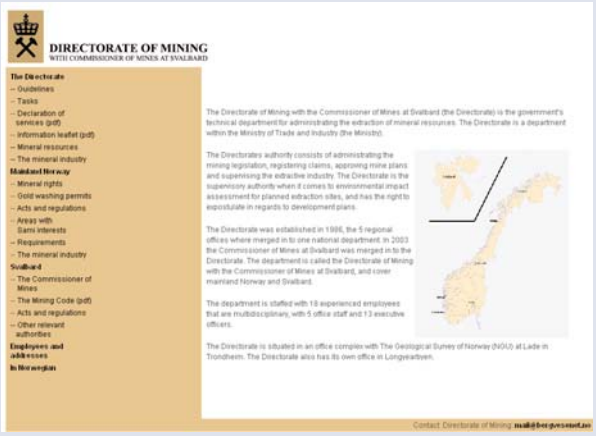
Where fewer than three companies are involved, NGU and the Directorate have come to an agreement with the producers on how the figures can be presented in figures and tables. Data on total production tonnage, annual turnover and employment are given priority. Data on health, environment and safety are presented in a specific table.

Data on mineral resources of national importance have been collated by NGU and are revised annually.

Peer - Richard Neeb, Team Leader

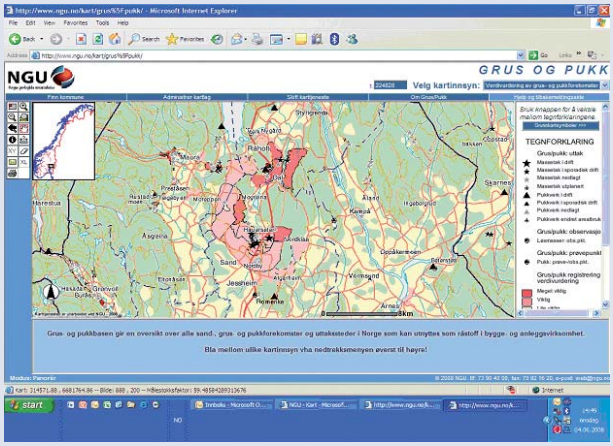
Peter Johannes Brugmans, Senior Engineer

www.ngu.no



www.bergvesenet.no

www.prospecting.no



www.ngu.no/grusogpukk

3. WEB SITES AND DATABASES

NGU maintains and continuously expands databases on i.a. Norway's mineral resources. Data on sand and gravel, hard-rock aggregate, natural stone, ore and industrial mineral deposits are all freely accessible at www.ngu.no, under the links: Resources and Maps and data.

The Directorate of Mines web site (www.bergvesenet.no) gives information on the Directorate as such and about the mining industry and related activity. The site also provides information on relevant regulations and has links to the actual law texts. The site also has information on mining on Svalbard and the regulations which apply there.

NGU and the Directorate of Mines have developed an English-language internet portal www.prospecting.no, in order to provide access to geological maps and data on deposits of industrial minerals, ores and natural stone, and data on mining claims and protected areas, etc. The site provides an overview of approved claims and pre-claims, with the exception of older claims according to legislation pre-1972 and applications being processed but not yet approved.

NGU has developed a provisional overview of mineral resources of national significance. These are deposits which have a substantial value, and which must be given appropriate attention in land-use planning processes. The criteria used to select the deposits of national interest are described in Chapter 7. The overview is revised annually.

Summary of the number of Norwegian mineral deposits that NGU has information on, together with the number of deposits considered of importance, where the information has been prepared for internet presentation.

Commodity type	**Prepared for internet presentation**
Industrial Minerals	2381
Metals	4520
Natural stone	1153
Aggregates	1134
Sand/gravel	9213
Total	**18401**

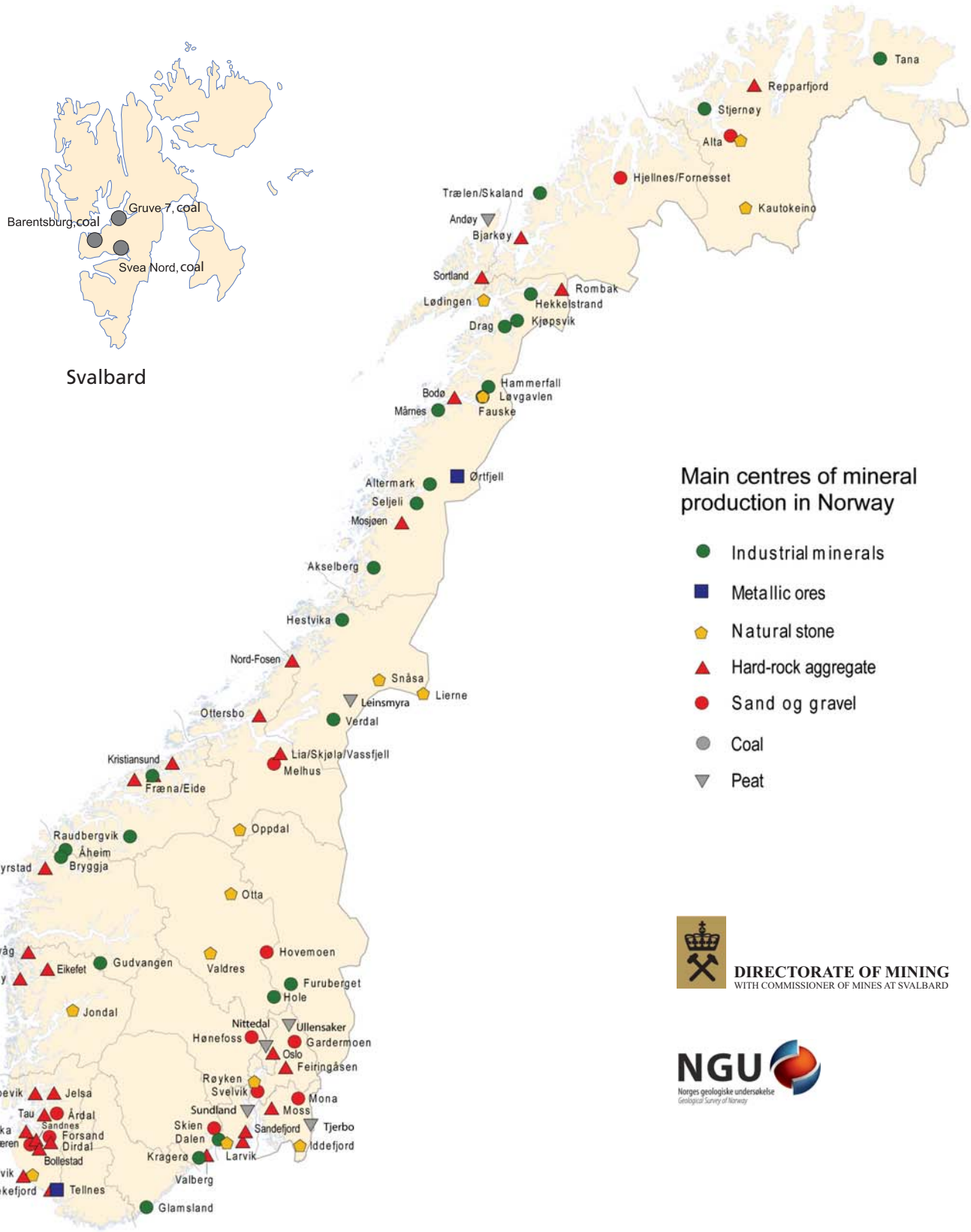
Summary of Directorate of Mining.

Number of pre-claims:

5652

Number of areas in the Planning and Building Act reserved for resource exploitation:

1997



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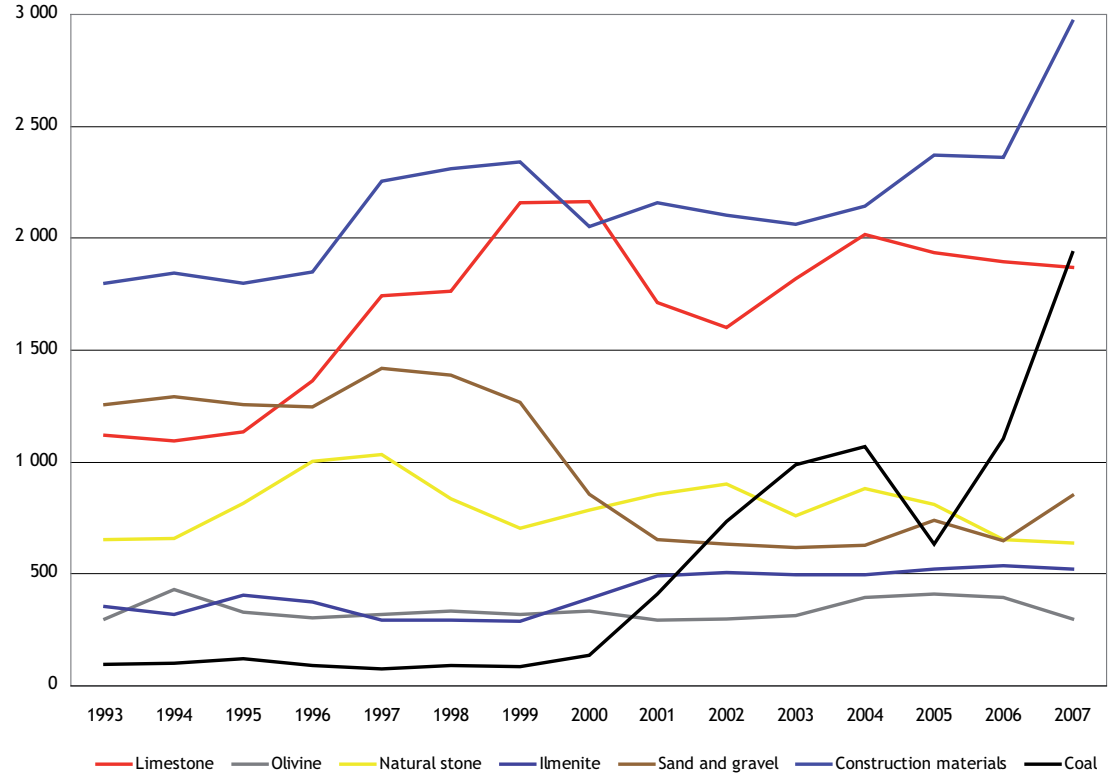
4. DEVELOPMENTS IN THE MINING AND QUARRYING INDUSTRY

The past 20-25 years have seen substantial structural changes in the industry. Production of industrial minerals has increased considerably and production of natural stone has increased moderately, whereas production of sand and gravel and hard rock-aggregate has increased significantly in the last year. Coal production on Svalbard has increased dramatically in recent years. Twenty years ago the state was a major owner in the mining industry, especially in metal mining, through its ownership of Norsk Jernverk/Rana Gruber and AS Sydvaranger and its subsidiaries. The state, after the sale of AS Olivin, no longer has ownership in the mineral industry on mainland Norway. Most of the large, export-oriented companies in the mineral industry today are partly or wholly owned by international companies. At current rates, the total production value of the mining and quarrying industry has seen approximately the same positive development as other land-based industries in recent years.

The mineral and mining industry is capital intensive, requiring a higher investment per employee than industry in general. Approximately 60% of the total mineral production (calculated on the basis of turnover) is exported, and the domestic share of production is the basis for an important mineral processing industry. Profitability varies between different branches throughout the industry, and between individual companies within each branch.

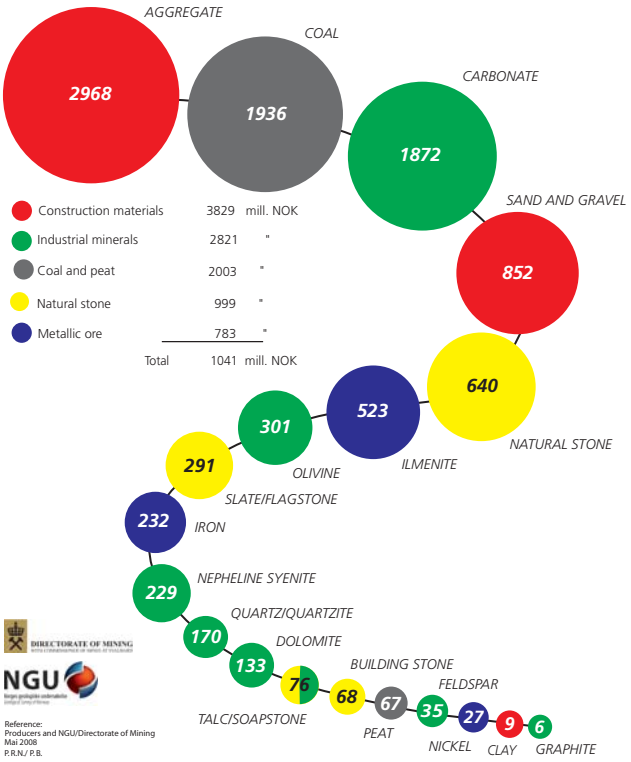
Production of Norway's most important mineral product

Values in mill. NOK (2007)



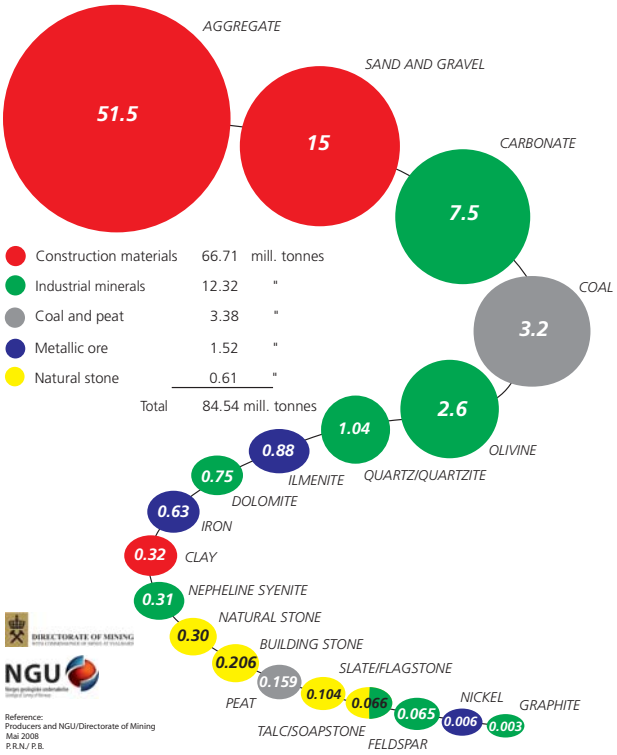
PRODUCTION OF NORWAY'S MOST IMPORTANT MINERAL PRODUCTS

(2007, FOB MILL NOK)
TOTAL 10.4 BILLION NOK



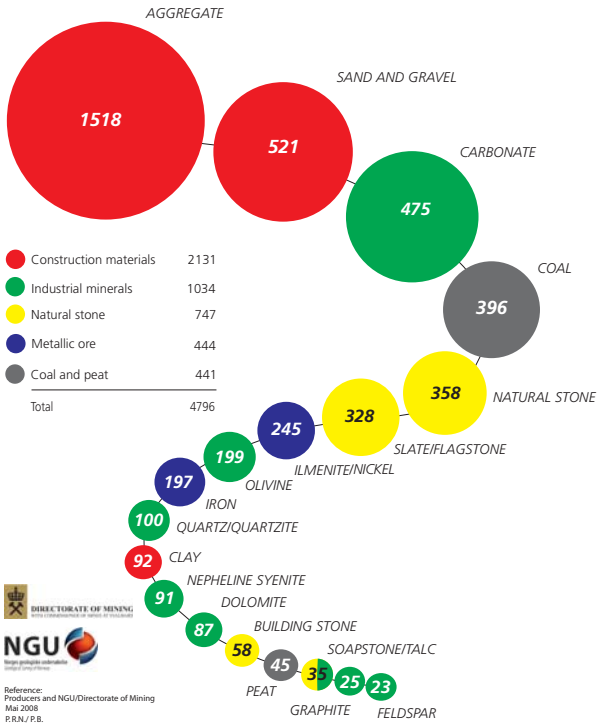
PRODUCTION OF NORWAY'S MOST IMPORTANT MINERAL PRODUCTS

(2007, MILL. METRIC TONNES)



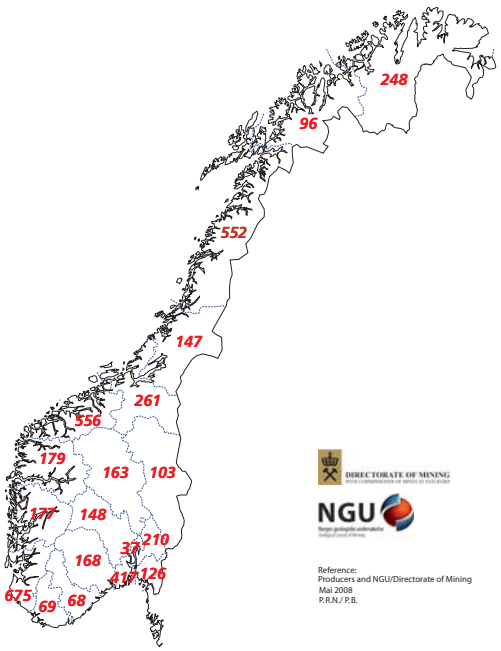
EMPLOYEES IN THE MINERAL INDUSTRY

2007



EMPLOYEES IN THE MINERAL INDUSTRY

2007: 4796 employed,
and at Svalbard 396



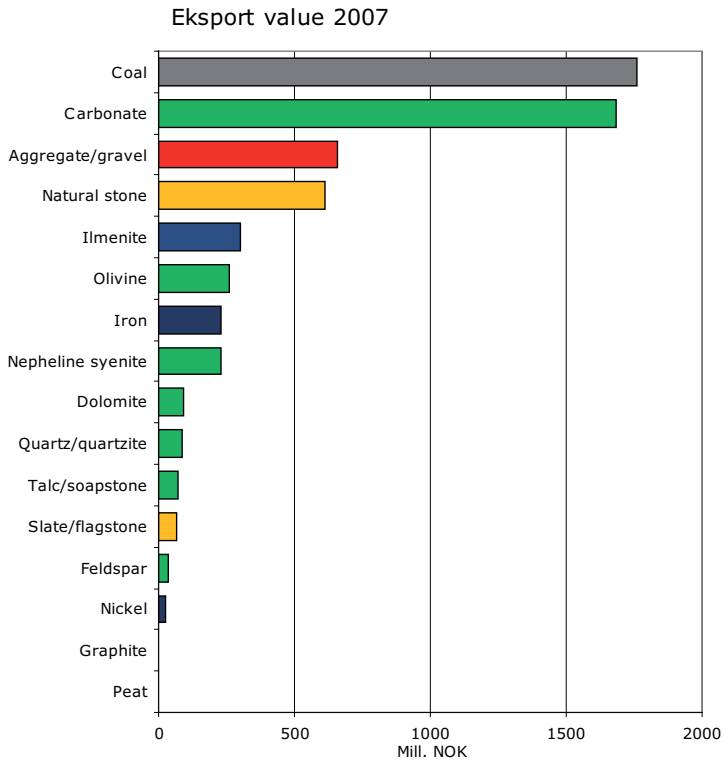
4. MINING AND QUARRYING INDUSTRY IN 2007

General overview

Approximately 85 million tonnes of mineral resources were extracted in Norway in 2007, representing a total value of NOK 10,400 million. Turnover of industrial minerals was unchanged from 2006 to 2007, at NOK 2,800 million and turnover of natural stone decreased from NOK 1,000 to NOK 900 million. Turnover of metallic ores fell from NOK 1,100 to 800 million. Turnover of gravel and hard-rock aggregate for the building industry showed a marked increase from NOK 3,000 to NOK 3,800 million in 2007. Turnover of coal increased from NOK 1,100 to NOK 1,900 million, and of peat from NOK 60 to NOK 67 million.

The total export value for the industry in 2007 was NOK 6,100 million, representing 59% of the overall turnover. The export value for industrial minerals was NOK 2,500 million, of which calcium carbonate slurry, olivine and nepheline syenite are the most important products. The natural stone industry exported stone blocks for NOK 611 million (of which NOK 562 million relates to larvikite), and slate/flagstone and building stone for NOK 67 million. Similar data for hard-rock aggregate, rock for ballast and gravel indicate an export value of NOK 660 million, whereas exports from ore production amounted to NOK 558 million, consisting of ilmenite, iron and nickel. Finally, export of coal to Europe represented a value of NOK 1,800 million. The mining and quarrying industry is a typical regional industry, especially strongly represented along the coast. The industry gives employment to about 4,800 full-time employees, in a total of 745 companies. Measured according to turnover, the most important mineral-producing counties are Møre og Romsdal, Rogaland, Nordland, Vestfold and Finnmark.

The individual products are shown collectively and according to the producing county in Tables 1 - 14.



- Extraction of various mineral resources:
  C. 85 million tonnes
- Production value:
  10,45 billion NOK
- Export:
  6,1 billion NOK
  59 per cent
- Number of companies:
  641
- Other companies:
  104
- Number of employees:
  4800

Quartzite quarry in Finnmark, Elkem Tana AS.

5.1 Industrial minerals

Industrial minerals are minerals and rocks, which form a basis for industrial applications because of their non-metallic, chemical and/or physical properties. Applications are numerous, and include many common products used in every-day life, such as paper, plastic, ceramics, glass and paint.

The total turnover of industrial minerals in 2007 amounted to NOK 2,820 million, for a production of 12.3 million tonnes. 1034 persons were employed. Most of the production is exported; mainly calcium carbonate slurry, olivine and nepheline syenite. According to the producers, the total export value amounted to NOK 2,460 million.

Norway is among the world's leading producers of olivine and nepheline syenite. A total of 2.6 million tonnes of olivine were produced, mostly by North Cape Minerals from production sites at Åheim and Raubergvika in Møre og Romsdal, and Bryggja in Nordfjord in Sogn og Fjordane. Olivine serves as a flux in iron ore smelting, increasing production capacity in the smelting process. Olivine replaces the carbonate mineral dolomite in steel production, thus strongly reducing CO_2 emission, while also forming slag.

Nepheline syenite is produced on Stjernøy in Alta municipality, also by North Cape Minerals, and is mainly used in the glass and ceramics industries. The same company produces quartz and feldspar at Glamsland near Lillesand. The main owners of the company are UNIMIN/Sibelco, which have a large share of the world markets for quartz, feldspar, olivine and nepheline syenite.

Eighteen companies produce calcite marble and 4 produce dolomite: they have altogether 562 employees. Norway has become a major producer of calcium carbonate for fillers, with Hustadgruppen as the main supplier. The extracted carbonate rock is transported to Hustadmarmor AS in Møre where calcium carbonate slurry is produced. Most of the production is exported. Hustadmarmor is the world's largest producer of calcium carbonate slurry for the paper industry, for which production data have been included in this overview.

In addition, substantial amounts of carbonate rock are produced for other applications, cement production, burnt lime, and lime for soil improvement and environmental acid neutralization. The overall production value for these applications amounted to NOK 214 million. Regarding cement production, the value of the burnt clinker product is not included.

Quartz and quartzite are produced by 6 companies, with 100 employees. In 2007, 1 million tonnes were produced, representing a value of NOK 170 million. Quartz is used as a raw material for the production of glass, ceramics and porcelain, and, in the metallurgical industry for a range of silicon-based products. Quartz is used in semiconductor technology, quartz glass, solar cells and in the manufacture of fibre-optical cable. It is also used as filler in plastic, rubber and paint. Elkem Salten is preparing to open a new quartz quarry near Nasa in Rana municipality, and Norwegian Crystallites has started trial production at Svanvik in Sør-Varanger municipality in adition to their curent production in Drag, Nordland.

Talc is produced by Norwegian Talc Altemark AS in Rana municipality, and is processed in Knarrvik in Hordaland. Kvam Talk AS in Gudbrandsdalen is also in production.

Graphite is produced by Skaland Grafittverk AS on the island of Senja, and the company has now opened a new graphite mine at Trælen on Senja.

Production of larvikite blocks at the Lundh Labrador AS quarry at Klaastad. Photo: Peer-Richard Neeb.

5.2 Natural stone

Natural stone is defined as all stone that can be cut, split or hewn for outside use, in buildings and in monuments. There is further division between dimension or block stone, slate and building stone.

In 2007, the industry produced dimension stone representing a value of NOK 640 million, slate/flagstone with a value of NOK 291 million and building stone with a value of NOK 68 million. Prior to 2007 the industry produced soapstone for use in hearths and ovens at Otta, but in 2007 the company quarried its soapstone in Sweden. The whole Norwegian stone industry provides employment for 685 people. The total export value of dimension stone amounted to NOK 611 million, of which NOK 562 million was for larvikite, while the export value of slate was NOK 56 million.

Larvikite, selected as Norway's national stone early this year, is produced from several quarries in the vicinity of Larvik and dominates Norwegian dimension stone production: the larvikite is a resource of unique quality, fetching high prices on the world market. Turnover was NOK 570 million in 2007, from 7 companies with 305 employees. Lundhs Labrador is the largest producer. Most of the production was exported as rough blocks to Italy, China, Spain and France. New technology has made production more efficient, and the favourable location of the deposits, near the coast, adds to the profitability of the industry. Production has been variable in recent years.

Dimension stone is also produced from: Gneiss in Finnmark and Sogn og Fjordane, syenite at Lødingen in Nordland, anorthosite in Rogaland, granites in Buskerud, Oslo, and Østfold, trondhjemite in Sør Trøndelag, soapstone at Bardu, and finally from marble in the Fauske area. Altogether, 11 companies with 50 employees produced dimension stone with a value of NOK 67 million in 2007. Many of the smaller stone producers have not submitted production data for 2007, so that the actual overall production tonnage and its value are probably higher than reported.

Slate/flagstone and building stone are produced from many different localities throughout the country. In 2007, 32 companies with 387 employees produced slate/flagstone with a value of NOK 291 million and building stone with a value of NOK 68 million.

The most important products for the industry are flagstone from Alta and Oppdal and phyllitic slate from Otta. All the material produced is processed near the quarries. C. 32% of the production is exported, and the flagstone is recognized as being very resistant to wear, making it particularly suitable for areas with heavy traffic.

Some growth is expected in demand for slate/flagstone for export, whereas dimension stone is experiencing increased competition. Over the past few years, the domestic market has varied somewhat regarding dimension stone for building and outdoor structures. In recent decades, the Norwegian stone industry has consolidated into fewer, larger units, especially within production of slate/flagstone and larvikite. In addition to the production centres mentioned above, a number of small contracting companies produce building stone for their own use.

Aggregate quarry in rhomb porphyry, Bjørndalen Bruk AS at Nittedal. Photo: Peer-Richard Neeb.

5.3 Building materials

Sand and gravel, hard-rock aggregate and clay

Hard-rock aggregate and gravel are used in building and construction. The materials are extracted from bedrock by blasting or from natural sand and gravel deposits. The material is crushed and sorted to the most appropriate size for use in buildings, roads and other constructions.

It can no longer be claimed that Norway has unlimited resources of sand, gravel and rock for crushing. Information on the deposits of sand, gravel and rock for crushing are of major importance for area development planning. Areas with suitable deposits are frequently allocated to other purposes than material extraction in municipal land-use plans. It is essential that authorities have information about these deposits so that all aspects can be considered in the planning process. NGU's online Gravel and Aggregate Database has proven to be very useful for this purpose.

Hard-rock aggregate can be used for the same building and construction applications as natural sand and gravel, but is more expensive due to the cost of blasting and crushing. Nevertheless, consumption of hard-rock aggregate for such applications is increasing. This can partly be attributed to local scarcity of sand and gravel, but is also due to more demanding quality specifications, that cannot always be met by natural gravel and sand.
To minimize transport costs, most sand/gravel and hard-rock aggregate is produced locally, near the place where it is to be used. Of the total production, 46% is used for road construction and 19% is used for concrete aggregate. Approximately one third is used for rock fill at construction sites, as well as for rock fill and cover of subsea piping on the Norwegian continental shelf.

NGU has mapped about 9,200 sand and gravel deposits, and some 1,100 deposits for extraction of hard-rock aggregate. The online database is located at **www.ngu.no/grusogpukk.** Some 1,200 of the actual producers have been asked to supply production data for 2007; c. 337 sand and gravel producers have responded, and 310 producers of hard-rock aggregate, an increase in response of c. 15% relative to 2006. The production value of sand, gravel and hard-rock aggregate in 2007 was NOK 3,840 million (NOK 3,000 million in 2006), based on extraction of 67 million tonnes (59 million tonnes in 2006). The actual figures are probably much higher.

About 52 million tonnes of hard-rock aggregate have been sold, with a total value of NOK 2.900 million: 31% is used for road making, 19% for surface paving, 12% in concrete, and 38% for other uses. The production of sand and gravel was 14.9 million tonnes, representing a value of NOK 852 million: 16% is used in road making, 9% for surface paving, 51% in concrete, and 24% for other applications. This is the second year for which production figures for this whole sector have been obtained. The industry employs about 2,050 persons, in 650 companies of widely ranging size.
Altogether, 26% of hard-rock aggregate production, by volume is exported, of which 50% for use in road making, 27% in concrete and 23% for other applications. Since 1990, export to the European mainland has increased by 175% in volume. In 2007, total export tonnage amounted to 13.4 million tonnes of hard-rock aggregate and 0.2 million tonnes of sand and gravel, with a value of NOK 660 million. The most important export destinations were Germany, Denmark, the United Kingdom, the Netherlands and Poland. In addition, another 3.0 million tonnes of hard-rock aggregate was produced for use on the Norwegian and British/Dutch continental shelf areas.
About 160 companies of significant size produce tonnages varying from 100,000 to 4.8 million tonnes of sand and gravel and hard-rock aggregate annually. Forty of these produce sand and gravel and 120 produce hard-rock aggregate. The largest of these are all located in southern Norway, including Feiring Bruk AS, Franzefoss Pukk AS, Mesta AS, NorStone AS, Norsk Stein AS, NCC Roads Norge AS, Kolo-Veidekke AS, Halsvik Aggregates AS, Bremanger Quarry AS and Oster Grus og Sand AS.

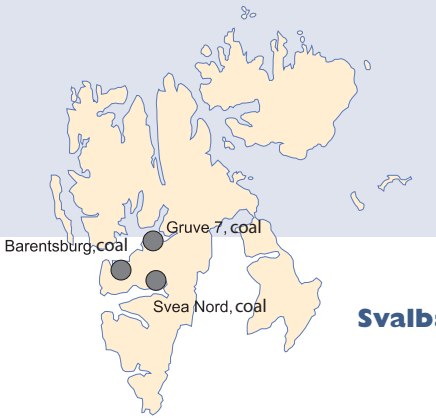
Clay is used for the production of lightweight prefabricated building blocks, branded Leca: clay is extracted by Maxit AS/Leca at Enebakk, exclusively for Leca Rælingen in Akershus. Near Bratsberg in Bø, Telemark, clay is produced for production of building bricks. The total value of the 319,000 tonnes of clay produced, before burning and processing, amounts to NOK 9 million. The companies had 92 employees.
Gravel and aggregate production are compiled in Tables 8 to 13, according to product-type and county: an overview of the royalty to the ground owners is also shown.

5.4 Metallic ores

Ilmenite mine at Tellnes in Sokndal municipality, Rogaland county. Photo: Titania AS.

Metallic ores are rocks that contain metal-bearing minerals in such a quantity that the metals can be extracted economically. Total production for metallic ores fell from NOK 1,120 in 2006 to NOK 783 million in 2007. The export value was NOK 558 million. 1.52 million tonnes of ore concentrate were produced. The industry had 444 employees.
Production in Norway has changed in recent years and at present only two deposits are in production. Titania AS in Sokndal in Rogaland is Europe's largest producer of ilmenite (iron-titanium oxide) which, after further refinery to titanium dioxide, is used as white pigment in paints, plastics and paper; some nickel concentrate is produced from the same deposit. Norway has very large resources of titanium minerals, including a rutile deposit near Førde that has gained international attention in recent years.
In the early 1980s, iron ore was the most important mineral raw material being produced in Norway. Iron ore production has subsequently declined. The only iron ore mine currently in operation, Rana Gruber AS in Nordland has changed its production process and now focuses on fines concentrate and speciality products requiring substantial processing. Due to the high price for iron ore, there has been considerable interest in purchase of Rana Gruber AS: the new owner is Leonard Nilsen & Sønner AS. Interest in the iron ore at Bjørnevatn near Kirkenes is considerable, with the establishment of a new company, Sydvaranger Gruve AS (Northern Iron, which is Australian). Production is scheduled to commence in 2009.

Production of nickel-copper and cobalt concentrate at the Bruvann mine of Nikkel og Olivin AS in Ballangen municipality was discontinued in the autumn of 2003 after several years with low prices. The company had produced nickel-copper and cobalt concentrates. Several companies, both Norwegian and international, are exploring for nickel-copper-platinum metal deposits, from Senja in the north to Evje in the south.
After the gold mine at Bidjovagge near Kautokeino was closed in 1992 there has been renewed interest in gold exploration at Pasvik, Kvænangen, Mo i Rana, Setesdal and Bindal. Within the past two years, there has been trial production at Bindal. Store Norske Gull AS is working on exploration projects in Finnmark (Cu-Au) and Senja (Ni-Cu). There is small-scale production of molybdenum at Knaben in Vest-Agder. In addition to the projects already mentioned there is considerable interest for exploration for, i.a. copper, molybdenum, iron, uranium and thorium.



Svalbard

5.5.1 Coal

Energy minerals comprise all mineral compounds that release heat upon combustion, including oil, gas, coal, oil shale and peat. The world's known coal reserves are estimated to last for another 147 years, whereas reserves of oil and gas are sufficient for 41 and 63 years respectively at current production levels. Economically mineable coal deposits have been found in c. 70 countries. Over 68% of the oil reserves and 67% of the gas reserves are located in the Middle East and Russia. Mineable coal reserves have been identified in 70 countries. The world's coal production was 5,400 million tonnes in 2006, an increase of 92% in the last 5 years. New exhaust gas scrubbing technology reduces pollution from coal combustion.

Demand for coal has continued to increase, especially because of economic growth in China and India. The price of coal has now reached a level that would have been regarded as unrealistic only a few years ago. Interest for coal production on Svalbard developed towards the end of the 19th century. There has been coal production on Svalbard with export to Norway and other countries since 1906, only interrupted by WWII. A total of c. 64 million tonnes have been produced since regular production began.

Two companies currently mine coal on Svalbard, Store Norske Spitsbergen Grubekompani AS (SNSG) has Gruve 7 in operation near Longyearbyen, and Svea Nord, and the Russian company, Trust Artikugol, which mines at Barentsburg.

Svea Nord was opened in 2001. Production at Gruve 7 and Svea Nord was 3.2 million tonnes in 2007, with a value of NOK 1,900 million: the company had 396 employees. About 30% of Svalbard coal goes to the metallurgical industry; the remainder is used for energy and for cement production. SNSG exports coal to Germany, Denmark, Finland, the United Kingdom, France, Norway, Sweden and Iceland.

SNSG is currently planning a new mine at Lunckefjell, north of Svea Nord, and is also mapping other deposits for possible exploitation in the future.

Peat

Peat, in the sense of peat for fuel, is a humus- and carbon-rich substance found under the water table in bogs. Peat is actually coal at an early stage of development, formed in the period after the last Ice Age, which ended c. 10,000 years ago. Peat was an important fuel throughout the Middle Ages,

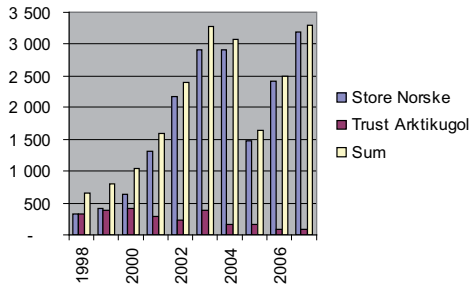


Fig. 5.5.1. Total coal production on Svalbard from 1998-2007.

but there are no good records of consumption prior to 1900. Prior to WW II production was c. 1.5 million m^3. During the fuel crisis caused by the war production rose to 2.1 million m^3, or c. 2 TWh in fuel value, in 1943. Annual production in the 1970s and 1980s was 2,000-3,000 m^3. Total reserves have been calculated to be c. 5,000 million m^2. This corresponds to c. 300 million tonnes of coal, and has a calculated fuel value of 8,000 TWh, i.e. a major energy reserve in Norway: Source: www.energilink.no.

Production in Norway is quite modest and is restricted to so-called white moss bogs. Most of the production is nowadays used for soil improvement in gardens.

159,000 tonnes was sold in 2007, with a value of NOK 67 million, from 6 producers with a staff of 44. The deposits in production are in Østfold, Akershus, Hedmark, Vestfold, Nord Trøndelag and Nordland counties.

6. MANAGEMENT FUNCTIONS (BV)

The Directorate of Mines has several management tasks related to the mining industry. The following descriptions give an overview of some of these.

6.1 Pre-claims and claims

Norwegian legislation distinguishes between claimable and non-claimable minerals. Claimable minerals are owned by the state: they are defined by the Mining Act of 30 June 1972 (mining law). Claimable minerals include all metals with a specific gravity higher than 5 g/cm$_3$, and any minerals containing these metals, as well as titanium and arsenic and minerals containing these metals, and pyrrhotite and pyrite. Bog ores and alluvial gold are exempt from the Mining Act. The online portal www.prospecting.no which is a cooperative service provided by the Directorate of Mining and the Geological Survey of Norway (NGU) shows active claims and pre-claims, but not applications which are being processed. The overview of claims and pre-claims is updated weekly.

6.1.1 Pre-claims

The interest for new claims increased considerably in 2007 relative to 2006: 3,378 new pre-claim applications were submitted, as against 1,743 in 2006. This is the largest number of pre-claim applications in any year since the Directorate was established. Nickel, gold, copper, molybdenum, iron and thorium are the metals which attract most interest. By the end of 2007, 5,652 pre-claims were held in Norway.

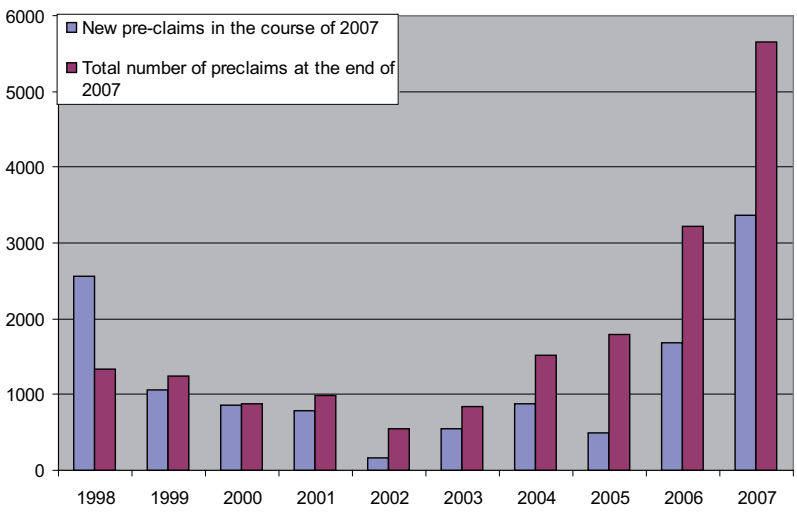


Fig. 6.1 Number of pre-claims in the period 1998-2007.

In the past year, exploration activities related to pre-claiming occurred mainly in two areas, south-eastern and northern Norway. It is of major importance that the claimant is required to submit reports on the results of the exploration to the Directorate of Mining after the investigations have been completed. These reports become public domain if and when the pre-claim expires naturally (ie. is not renewed). These are then an important source of information for companies when interest in that particular area or adjacent areas revives and new phases of exploration commence.

6.1.2 Claims

Four claims at Knaben in vest-Agder county were approved in one tender in 2007. By the end of the year, 163 claims were held in Norway, exclusive of Svalbard, of which 99 new-type claims conform to current legislation as effective after 30 June 1972 (so-called 'flateutmål') and 64 are old-type claims predating 1972 (so-called lengdeutmål').

6.1.3 Lease of state claims

The Directorate entered into an agreement for lease of the state claims in Ballangen municipality in Nordland.

6.2 Non-claimable minerals

Non-claimable minerals are not subject to the Mining Act, and are thus in principle the property of the landowner. Exploration and production of such minerals is therefore the responsibility of the landowner, or of others, upon agreement with the landowner.

In practice, non-claimable minerals can be grouped as Building materials (sand and gravel and hard-rock aggregate), industrial minerals and natural stone. Alluvial gold and bog ores are also classified as non-claimable.

Acquisition of deposits of non-claimable minerals is covered in the Concession Act of 2003 that regulates acquisition of real estate and fixed property. Rights of ownership and/or extraction of carbonate and quartz deposits are laid down in the Limestone Act of 1914, and in the Quartz Act of 1949 respectively. Extraction of alluvial gold on state-owned property is governed by separate legislation.

6.2.1 Rights defined in the Carbonate Act

Acquisition of carbonate deposits is regulated in the Carbonate Act of 03 July 1914 nr. 5. A concession is required if total production from one or more deposits in the same municipality exceeds 100,000 tonnes. Similar rules apply to acquisition of shares in companies, which own carbonate concessions. If the total ownership after the acquisition exceeds 20% of all shares, then the acquisition is subject to aforementioned Carbonate Act. A concession is also required for agreements involving supply of carbonate rock for periods exceeding 5 years. The Carbonate Act also applies to marble and dolomite. In 2007, 5 concessions according to the Carbonate Act have been approved, 2 relating to acquisition of deposits and 3 relating to transfer of shares.

6.2.2 Rights defined in the Quartz Act of 1949

Acquisition of quartz deposits is regulated by the Quartz Act of 17 June 1949. There is no lower limit for the production volume requiring a concession. The same applies to acquisition of shares from quartz concession owners. If the total ownership after the acquisition exceeds 20% of all shares, then the acquisition is subject to the aforementioned Quartz Act. A concession is also required for agreements involving supply of quartz for periods exceeding 2 years. The Quartz Act also applies to quartzite and rock crystal. One concession according to the Quartz Act was approved in 2007: it related to acquisition of shares in a company with quartz concessions.

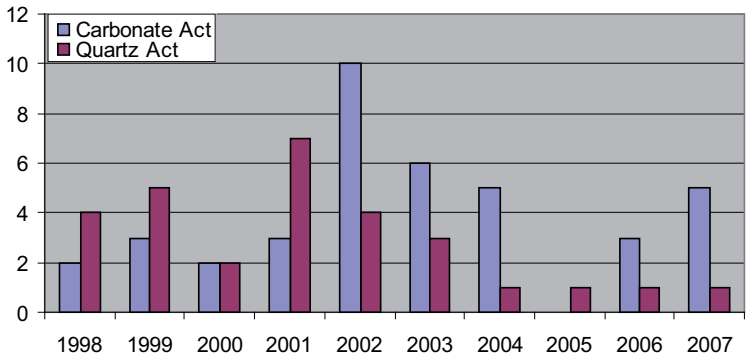


Fig. 6.2 Overview of active concessions according to both the Carbonate Act and the Quartz Act in the period 1998-2007

Blocks of ice-sculptured larvikite in Larvik Granite's quarry at Klaastad near Larvik. Photo: Peer-Richard Neeb.

7. MINERAL DEPOSITS OF NATIONAL SIGNIFICANCE (NGU)

NGU has prepared an overview of mineral resources of national significance. Most of these are also of importance as sources of exports to Europe and the rest of the world. Examples include nepheline syenite on Stjernøy in Finnmark, marble from Brønnøy in Nordland, Larvikite from Larvik, ilmenite from Tellnes in Rogaland and gneiss for aggregate production from Jelsa in Rogaland. Such deposits have a substantial value and should be given a satisfactory treatment if needed in land-use planning processes. Criteria for the selection of deposits include:

Deposits with a potential for sizeable exports, including export after initial processing in Norway,

Deposits with a potential for becoming significant producers for major home markets, and

New deposits which can be expected to come into full production within 50 years.

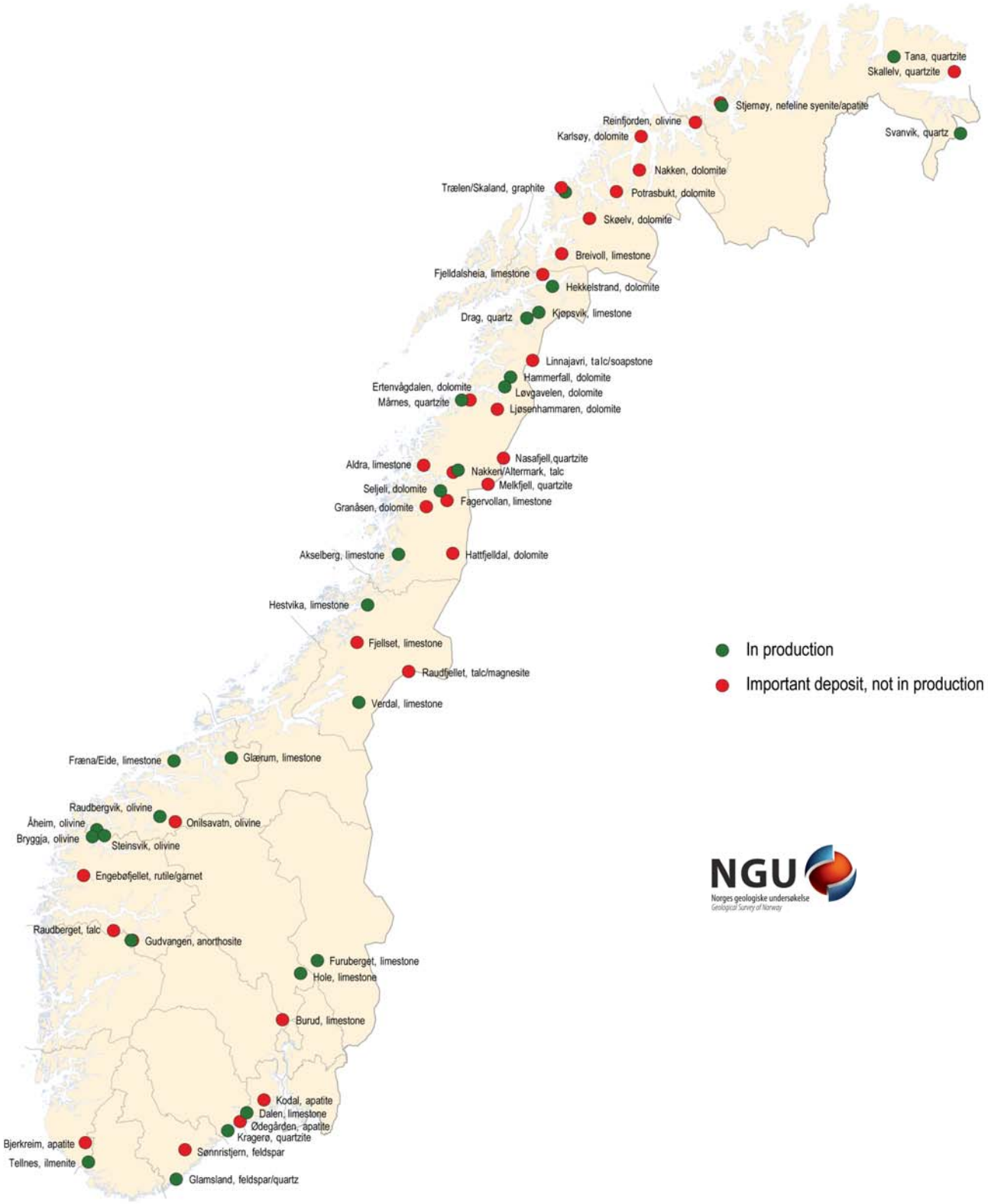
*I*t is very important to ensure that important mineral deposits are given satisfactory consideration in municipal plans. The manner in which this should be done will vary from deposit to deposit. There is a continuing need for accurate, up-to-date information on new deposits. NGU revises its overview of mineral resources of national significance annually, an overview which may contribute to answering the question:

What are the possibilities for future production?

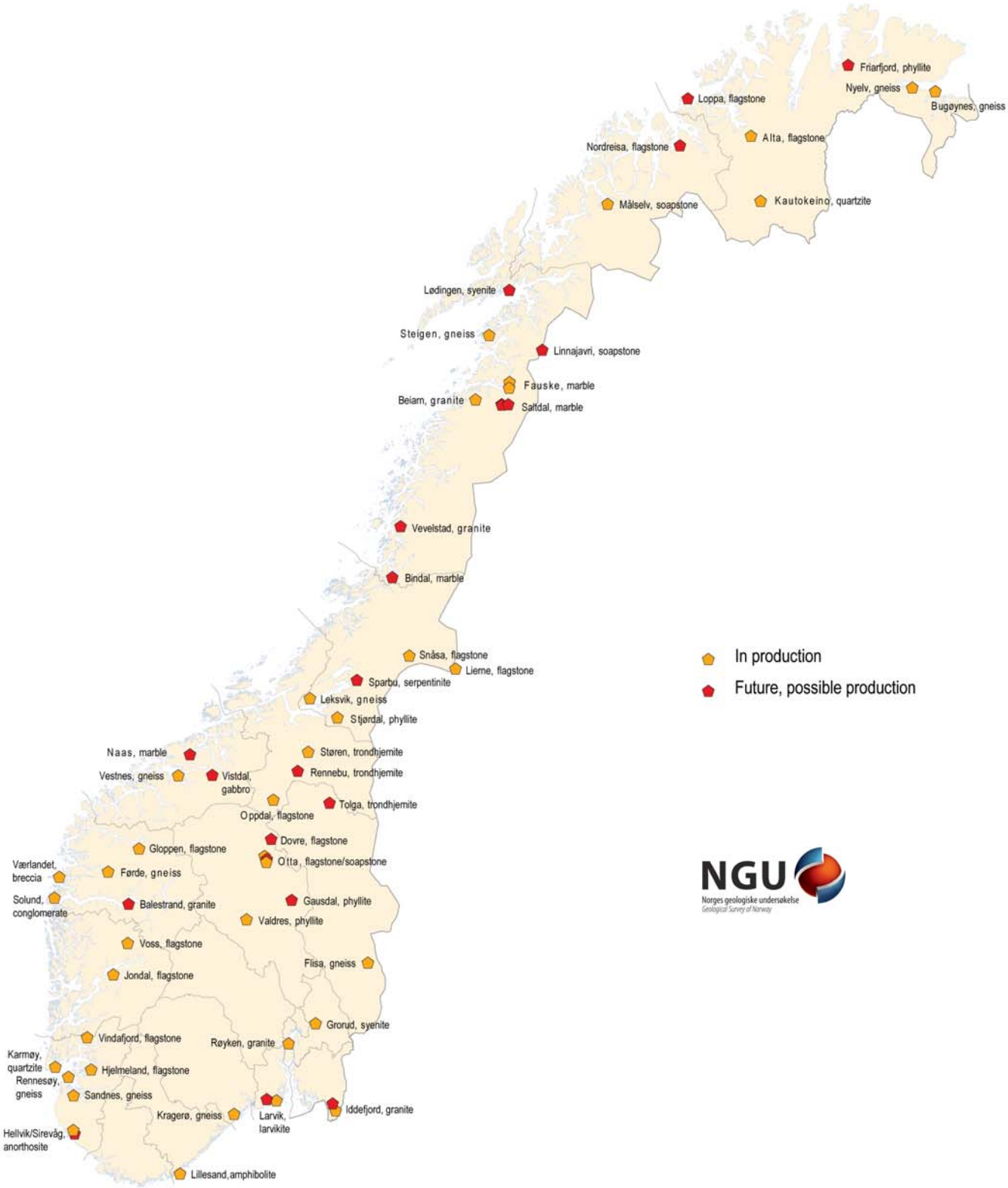
NGU's overview should contribute to a sound, long-term management of mineral resources at national, county and municipal levels.

The Directorate's databases show that 1,997 areas have been reserved for mineral-resource extraction in municipal plans, including current operations and areas for future extraction. The Directorate is entitled to express an opinion in planning processes, according to the plan- and building law. It refers municipalities to the Gravel- and Aggregate database in relation to municipal plans, as well as referring to other important deposits, which should be available for exploitation.

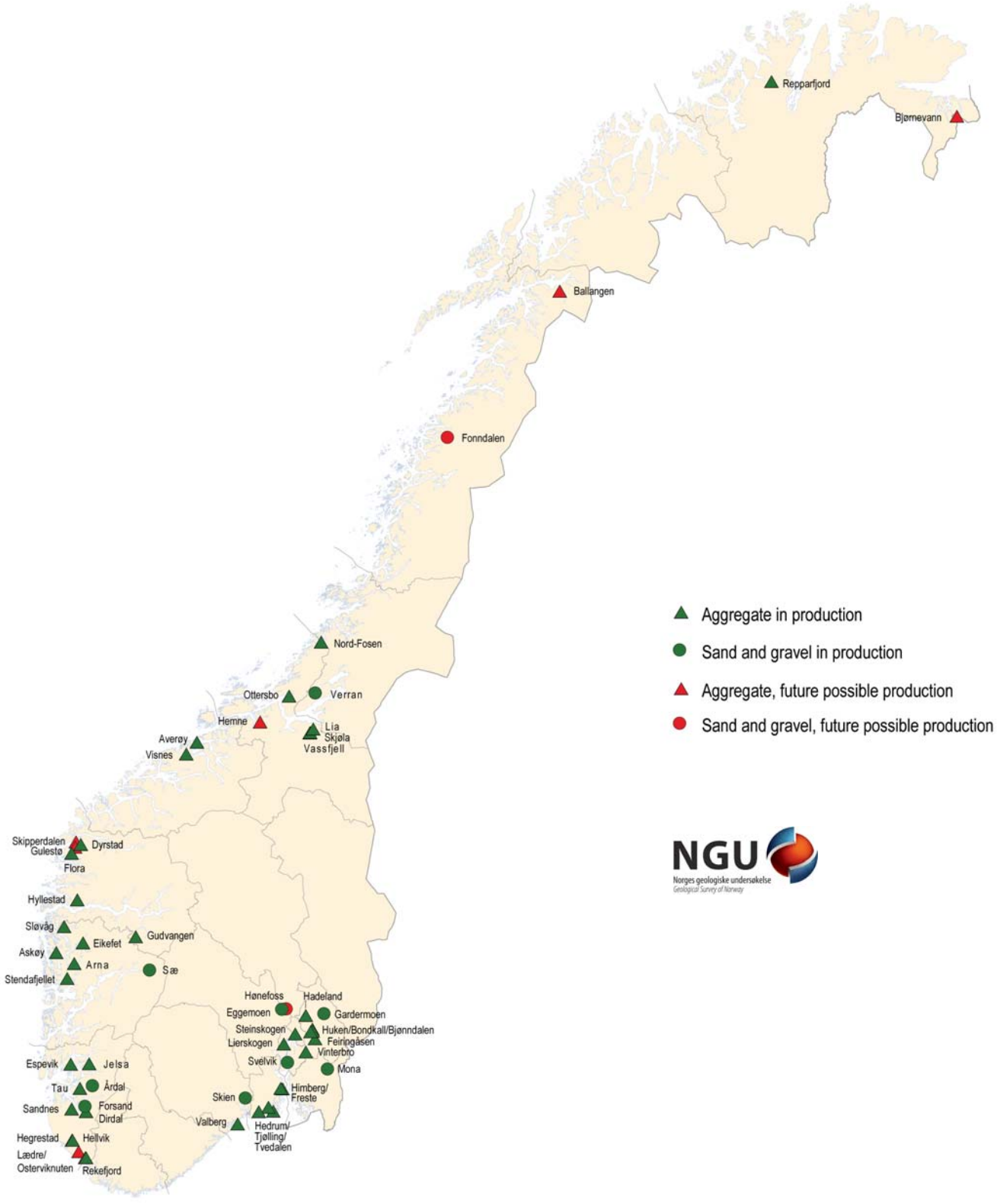
7.1 Industrial mineral deposits of national interest



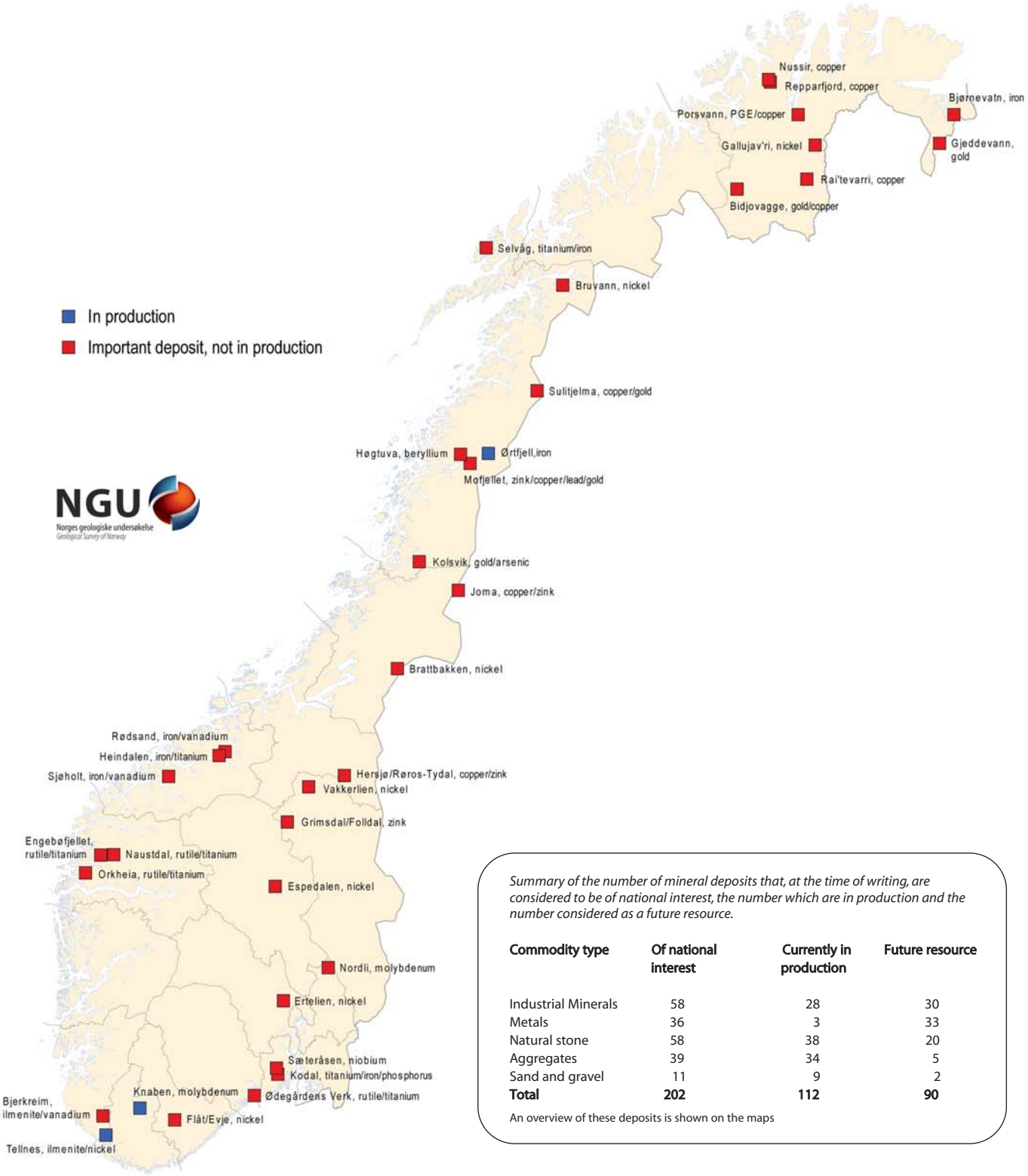
7.2 Natural stone deposits of national interest



7.3 Sand, gravel and aggregate deposits of national interest



7.4 Metallic ore deposits of national interest



Summary of the number of mineral deposits that, at the time of writing, are considered to be of national interest, the number which are in production and the number considered as a future resource.

Commodity type	Of national interest	Currently in production	Future resource
Industrial Minerals	58	28	30
Metals	36	3	33
Natural stone	58	38	20
Aggregates	39	34	5
Sand and gravel	11	9	2
Total	**202**	**112**	**90**

An overview of these deposits is shown on the maps

8. CHALLENGES FOR THE FUTURE

Norway has a varied geology, offering great potential for mineral production. The long shoreline and proximity to the European market are important. Norway is a considerable mineral producer by European standards and will probably increase in importance in the future due to the ever-increasing competition for long-term access to metals, industrial minerals and building materials. Norway itself has a high consumption of mineral products. The mining and quarrying industry creates very substantial values, with great importance for outlying regions.

Strong economic growth in Asia, especially in the World's two most heavily populated nations, China and India, has led to shortages and high prices for many natural resources. Prices for metals such as gold, copper, nickel and iron have doubled or tripled in price in the last two to three years. Prices have also increased for industrial minerals, coal and uranium. These price increases have led to a substantial increase in exploration for new resources.

These price increases and the stronger focus on exploration and investigation of new deposits have led to an increase in the need for geoscientific knowledge, relating to the location of economic mineral deposits and the processes leading to their formation. NGU will contribute to the exploration and development of new mineral resources for the future.

International exploration companies have, so far, been most interested in Norway's nickel resources and NGU has carried out helicopter-borne geophysical surveys over many of Norway's nickel provinces for the exploration companies. NGU and BV now register an increasing interest from international companies in exploration for copper and gold. The portal www.prospecting.no, developed by NGU and BV came on line at the right time for use as an aid in their search for new, potential exploration areas.

Norway also has a range of speciality mineral deposits that are not readily available elsewhere in Europe. These include industrial minerals such as nepheline (syenite) and olivine, the ore minerals ilmenite and rutile, larvikite and another anorthosite with colour play for use as natural stone and white anorthosite and Devonian sandstone for use as hard-rock aggregate. Innovative technological research on the use of these raw materials could provide a basis for new domestic processing industries. Currently, the total potential value of proven mineral resources in surficial deposits and in bedrock on the Norwegian mainland exceeds NOK 1,000,000 million. The mineral and mining industry faces some major challenges, including:

Competition for skilled employees.
Exploration and development of future mineral deposits.

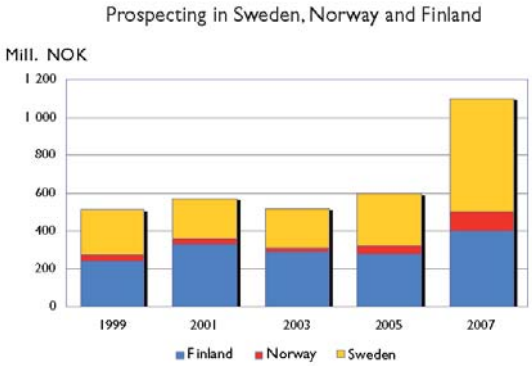


Figure 8 Investment in prospecting in the Nordic countries, 1999 - 2007 (Raw Materials Group, 2007)

Increased research efforts in all areas - from understanding of the deposits, via processing of the products to responsible deposition of waste.

Securing the availability of future mineral deposits in area development planning processes.

In the period 1960-1990, exploration in Norway was rather extensive, after which activity declined, up until 2005. Exploration increased from NOK 40 million in 2006 to c. NOK 100 million in 2007. Expenditure on prospecting was much higher in Sweden (NOK 600 million) and Finland (NOK 400 million) (Raw Materials Group, 2007).

Quality requirements for mineral products increase steadily. The industry copes by either enhancing processing of their products, or by finding new deposits with purer resources. This development necessitates improved skills in the industry and in

research institutions. The Research Council of Norway supported the project "From quartz sand to solar cells" , which was completed in 2005. The project is an example of the type of research needed in order to add value to resources in the future. A major increase in research and development efforts will be required to achieve the same effect for other mineral resources.

In the oil and gas industry, it is common to calculate the in-situ value of the oil and gas in a reservoir as the product of the extractable reserves and a given price. The same exercise, when applied to the mineral and mining industry, shows that many deposits represent very substantial values, in some cases of the order of NOK 100,000 million.

Measured in land usage, the mineral and mining industry takes little space. Data from Sweden indicate that the industry uses only 0.05% of the total area. Most of this area is related to extraction of sand and gravel. However, the locations of mineral companies are constrained by the location of the deposits: they cannot be moved elsewhere.

Society has long neglected important aspects of management of mineral resources. This is clear when we compare public management of mineral resources with the efforts made in relation to other types of natural resource or sectors, including forestry, agriculture and nature reserves. While there is extensive land management consideration in relation to these types of resources and the areas where they occur, mineral resources are typically omitted from area development plans, despite the tremendous value they may represent. This is yet another reason for mapping currently known deposits as well as areas with a potential for new deposits in greater detail.

INDUSTRIAL MINERALS

Industrial minerals are defined as mineral and rocks with economic value, which are produced because of their non-metallic, physical and chemical properties, except for fossil fuels, water and gemstones. Industrial minerals are used in many products, i.a. as filler in paint, paper and plastic and as major constituents in ceramics, glass and cement.

NATURAL STONE

Natural stone is defined as all stone that can be cut, split or hewn into slabs or blocks for outside use, as building material, and for ornamental or decoration purposes. There is further distinction between slate/flagstone and dimension stone. Slate/flagstone comprises a group of rock types, which have a naturally occurring platy cleavage. Common types of slate/flagstone include shale, phyllite, mica schist, and flagstone. Dimension stone is extracted as large blocks, which are then sawn or cleaved into slabs or other forms. Important types of dimension stone include larvikite, marble, granite, limestone and sandstone. Building stone is produced from slate, flagstone, gneiss and granite which can be cleaved along a plane of schistosity.

BUILDING MATERIALS

These materials include sand, gravel, hard-rock aggregate and clay. Sand and gravel are terms used interchangeably for surficial materials used in building and construction. Particle size fraction determines the nomenclature used in a geological context: 0.06-2mm sand, 2-64mm gravel, and 64-256mm is designated as stone.

HARD-ROCK AGGREGATE

The most common rock types suitable for production of hard-rock aggregate include: gneiss, granite, quartzite, gabbro and syenite.

METALLIC ORES

Metallic ores comprise all rock types containing minerals and metals with a specific gravity higher than 5 g/cm3, occurring in large enough amounts to make extraction economically feasible. Norway has a long-standing tradition of ore extraction, dating back to the 1600s, with Røros (copper) and Kongsberg (silver) among the best-known historical mining centres.

ENERGY MINERALS

Energy minerals comprise all rock types and minerals that release energy on combustion: coal, which occurs on Svalbard, and peat found throughout Norway belong here. Coal is used in the metallurgical industry and in the manufacture of cement. Peat is mainly used in gardening and in agriculture.

APPENDICES

Table 1. Mineral statistics, 2007

Table 1											
Mineral statistics 2007		**EXTRACTION(1000 tonnes)**			**SALE/DELIVERED(1000 tonnes)**			**SALES VALUE(FOB 1.000 NOK)**			**No. of empl.**
	No. of produ-cers	**Production**	**Waste rock**	**Total**	**Domistice**	**Export**	**Total**	**Domistice**	**Export**	**Total**	**Total**
Building material											
Crushed rock	306	42 029	1 005	43 035	38 177	13 356	51 533	2 317 519	650 610	2 968 129	1 518
Sand/gravel	335	11 361	205	11 566	14 694	161	14 855	842 834	8 941	851 776	521
Clay	3	323		323	319		319	8 652		8 652	92
Total	**644**	**53 713**	**1 211**	**54 924**	**53 191**	**13 517**	**66 707**	**3 169 006**	**659 551**	**3 828 557**	**2 131**
Natural stone											
Dimension stone	19	371	3 254	3 625	24	276	299	29 480	610 820	640 300	359
Buildingstone	19	169	131	300	206	-	206	68 348	-	68 348	58
Slate/flagstone	13	103	180	283	80	24	104	223 408	67 173	290 581	328
Total	**51**	**643**	**3 565**	**4 208**	**310**	**299**	**609**	**321 236**	**677 993**	**999 228**	**746**
Industrial minerals											
Dolomite	4	826	73	900	282	467	750	41 017	91 909	132 927	87
Feldspar	1	-	-	-	1	64	65	100	35 000	35 100	23
Graphite	1	14	2	16	0	3	3	150	6 060	6 210	25
Limestone	18	8 770	1 850	10 620	6 917	604	7 521	186 956	1 685 491	1 872 448	475
Quartz/quartzite	6	1 067	192	1 259	783	258	1 041	85 140	84 946	170 086	100
Nepheline syenite	1	542	2	543	-	312	312	-	229 000	229 000	91
Olivine	4	2 625		2 625	288	2 274	2 562	40 310	260 842	301 152	199
Soapstone/Talc	4	57	9	66	36	30	66	7 303	68 859	76 162	35
Total	**39**	**13 901**	**2 127**	**16 029**	**8 307**	**4 013**	**12 320**	**360 977**	**2 462 108**	**2 823 085**	**1 034**
Ores											
Iron	2	1 437	192	1 629	-	630	630	-	231 861	231 861	197
Ilmenite	1	3 107	4 656	7 763	376	507	882	224 006	299 216	523 223	245
Nickel	1	22	33	56		6	6		27 406	27 406	2
Total	**4**	**4 566**	**4 881**	**9 447**	**376**	**1 143**	**1 518**	**224 006**	**558 483**	**782 489**	**444**
Energy minerals											
Coal	1	4 073	-	4 073	160	3 063	3 223	177 137	1 758 898	1 936 035	396
Peat	6	219	-	219	159	1	159	66 786	562	67 348	45
Total	**7**	**4 293**	**-**	**4 293**	**319**	**3 063**	**3 382**	**243 923**	**1 759 460**	**2 003 383**	**441**
Total	**745**	**77 117**	**11 784**	**88 901**	**62 502**	**22 035**	**84 536**	**4 319 148**	**6 117 594**	**10 436 742**	**4 796**

Table 2. Value of production sold (NOK), 2007

Table 2						
Value of production sold, (NOK) 2007						
COUNTY/REGION	**Building material**	**Natural stone**	**Industrial minerals**	**Ores**	**Energy minerals**	**Total**
01 Østfold	223 676 988	2 473 755	-	-	3 767 500	229 918 243
02 Akershus	377 046 747	-	-	-	3 299 450	380 346 197
03 Oslo	69 368 000	150 000	-	-	-	69 518 000
04 Hedmark	145 068 312	1 846 000	13 004 265	-	43 827 610	203 746 187
05 Oppland	124 780 600	86 424 000	19 156 000	-	-	230 360 600
06 Buskerud	284 819 006	4 188 000	-	-	-	289 007 006
07 Vestfold	187 372 769	571 502 081	10 797 840	-	1 113 000	770 785 690
08 Telemark	142 334 909	800 000	82 813 787	-	-	225 948 696
09 Aust-Agder	83 994 688	-	51 100 000	-	-	135 094 688
10 Vest-Agder	55 793 698	-	-	-	-	55 793 698
11 Rogaland	858 111 811	71 080 000	-	552 989 426	-	1 482 181 237
12 Hordaland	218 024 878	33 196 752	113 286 938	-	-	364 508 568
14 Sogn og Fjordane	253 621 850	13 330 000	29 800 000	-	-	296 751 850
15 Møre og Romsdal	216 185 329	3 565 000	1 971 042 280	-	-	2 190 792 609
16 Sør-Trøndelag	200 917 586	119 790 000	-	-	-	320 707 586
17 Nord-Trøndelag	115 813 001	12 050 500	33 477 126	-	780 000	162 120 627
18 Nordland	119 028 645	2 115 000	190 256 120	229 500 000	14 560 000	555 459 765
19 Troms	114 330 516	-	9 890 597	-	-	124 221 113
20 Finnmark	38 267 301	76 717 000	298 460 000	-	-	413 444 301
21 Svalbard	-	-	-	-	1 936 035 419	1 936 035 419
Total	**3 828 556 634**	**999 228 088**	**2 823 084 953**	**782 489 426**	**2 003 382 979**	**10 436 742 080**

Table 3. Tonnage produced, 2007

Table 3						
Tonnage produced, 2007						
COUNTY/REGION	**Building material**	**Natural stone**	**Industrial minerals**	**Ores**	**Energy minerals**	**Total**
01 Østfold	3 790 845	3 237	-	-	6 850	3 800 932
02 Akershus	5 567 083	-	-	-	4 400	5 571 483
03 Oslo	1 041 194	400	-	-	-	1 041 594
04 Hedmark	2 185 022	726	31 000	-	40 000	2 256 748
05 Oppland	1 983 467	33 059	113 976	-	-	2 130 502
06 Buskerud	4 113 489	5 026	-	-	-	4 118 515
07 Vestfold	2 992 162	263 641	674 865	-	7 420	3 938 088
08 Telemark	2 537 840	5 000	1 918 886	-	-	4 461 726
09 Aust-Agder	1 458 336	-	90 000	-	-	1 548 336
10 Vest-Agder	988 671	-	-	-	-	988 671
11 Rogaland	16 792 943	91 180	-	903 391	-	17 787 514
12 Hordaland	4 333 334	57 297	91 062	-	-	4 481 693
14 Sogn og Fjordane	4 451 717	21 365	246 000	-	-	4 719 082
15 Møre og Romsdal	4 480 241	40 500	3 511 422	-	-	8 032 163
16 Sør-Trøndelag	3 576 425	46 854	-	-	-	3 623 279
17 Nord-Trøndelag	2 342 195	9 136	866 818	-	10 540	3 228 689
18 Nordland	1 897 248	5 020	3 802 011	614 760	90 000	6 409 039
19 Troms	1 467 881	490	3 350	-	-	1 471 721
20 Finnmark	707 174	26 506	970 372	-	-	1 704 052
21 Svalbard	-	-	-	-	3 222 718	3 222 718
Total	**66 707 267**	**609 437**	**12 319 762**	**1 518 151**	**3 381 928**	**84 536 545**

Table 4. Number of employees

Table 4						
Number of employees 2007						
COUNTY/REGION	**Building material**	**Natural stone**	**Industrial minerals**	**Ores**	**Energy minerals**	**Total**
01 Østfold	119	3	-	-	4	126
02 Akershus	209	-	-	-	1	210
03 Oslo	36	2	-	-	-	37
04 Hedmark	71	6	6	-	21	103
05 Oppland	71	79	12	-	-	163
06 Buskerud	144	4	-	-	-	148
07 Vestfold	88	306	18	-	4	417
08 Telemark	114	2	52	-	-	168
09 Aust-Agder	36	-	32	-	-	68
10 Vest-Agder	69	-	-	-	-	69
11 Rogaland	392	32	-	251	-	675
12 Hordaland	110	31	36	-	-	177
14 Sogn og Fjordane	147	8	24	-	-	179
15 Møre og Romsdal	123	6	428	-	-	556
16 Sør-Trøndelag	128	133	-	-	-	261
17 Nord-Trøndelag	93	20	33	-	1	147
18 Nordland	99	7	240	193	14	552
19 Troms	59	6	31	-	-	96
20 Finnmark	24	100	123	-	-	247
21 Svalbard	-	-	-	-	396	396
Total	**2 131**	**745**	**1 034**	**444**	**441**	**4 795**

Table 5. Tonnage produced, 1999 - 2007

Tabell 5
Tonnage produced, 1999 - 2007, 1000 tonnes

Rock/mineral	1999	2000	2001	2002	2003	2004	2005	2006	2007
Olivine	3 190	3 600	3 200	3 100	3 300	3 400	3 100	2 923	2 562
Nepheline syenite	300	330	340	330	320	330	320	1 167	312
Quartz/quartzite	1 150	1 530	1 290	1 140	1 100	1 200	1 100	834	1 041
Soapstone/talc	-	-	47	43	48	32	34	57	66
Feldspar/anorthosite	93	126	160	210	530	510	270	65	65
Graphite	3	9	9	14	-	6	9	9	3
Limesone	6 870	6 100	5 500	5 500	6 300	6 300	6 300	6 221	7 521
Dolomite	820	950	810	570	570	600	610	762	750
Total industral minerals	**12 426**	**12 645**	**11 356**	**10 907**	**12 168**	**12 378**	**11 743**	**12 038**	**12 320**
Ilmenite	590	691	777	827	859	870	810	850	882
Nickel concentrate	21	17	21	14	8	8	8	8	6
Iron	524	470	380	480	390	590	700	620	630
Total metallic ores	**1 135**	**1 178**	**1 178**	**1 321**	**1 257**	**1 468**	**1 518**	**1 478**	**1 518**
Coal	400	630	1 720	2 200	2 800	2 900	1 620	2 359	3 223
Peat	-	-	-	-	-	-	-	78	159
Total energy minerals	**400**	**630**	**1 720**	**2 200**	**2 800**	**2 900**	**1 620**	**2 437**	**3 382**
Dimension stone	250	230	210	380	330	340	390	800	299
Slate/flagstone	9	100	180	160	250	260	470	99	225
Buildingstone	-	-	-	-	-	-	-	166	85
Total natural stone	**259**	**330**	**390**	**540**	**580**	**600**	**860**	**1 065**	**609**
Crushed rock	39 000	34 000	38 000	35 000	36 000	37 000	38 000	45 947	51 533
Sand/gravel	23 000	19 000	15 000	15 000	15 000	15 000	15 000	13 418	14 855
Clay	410	410	440	450	370	230	230	320	319
Total building material	**62 410**	**53 410**	**53 440**	**50 450**	**51 370**	**52 230**	**53 230**	**59 685**	**66 707**
Total	**76 630**	**68 193**	**68 084**	**65 418**	**68 175**	**69 576**	**68 971**	**76 703**	**84 536**

Table 6. Value of production, 1999-2007

Table 6
Value of production 1999 - 2007

Rock/mineral	1999 MNOK	2000 MNOK	2001 MNOK	2002 MNOK	2003 MNOK	2004 MNOK	2005 MNOK	2006 MNOK	2007 MNOK
Olivine	275	297	270	278	297	377	398	391	301
Nepheline syenite	213	220	232	219	221	211	235	247	229
Quartz/quartzite	108	145	148	140	135	158	143	137	170
Soapstone/talc	-	76	50	48	54	53	50	120	76
Feldspar/anorthosite	-	46	51	52	73	79	51	35	35
Graphite	42	23	19	19	-	13	19	17	6
Limesone	1 860	1 927	1 571	1 488	1 731	1 925	1 877	1 874	1 873
Dolomite	60	93	68	57	51	60	61	115	133
Total industral minerals	**2 558**	**2 827**	**2 409**	**2 301**	**2 562**	**2 876**	**2 834**	**2 936**	**2 823**
Ilmenite	250	345	345	470	472	473	508	533	523
Nickel concentrate	96	109	109	93	8	17	15	25	27
Iron	105	94	94	91	74	131	185	562	232
Total metallic ores	**451**	**548**	**548**	**654**	**554**	**621**	**708**	**1 120**	**782**
Coal	74	122	378	654	938	1 021	615	1 095	1 936
Peat	-	-	-	-	-	-	-	59	67
Total energy minerals	**74**	**122**	**378**	**654**	**938**	**1 021**	**615**	**1 154**	**2 003**
Dimension stone	609	699	787	836	722	842	788	601	640
Slate/flagstone	187	209	200	234	219	233	275	281	68
Buildingstone	-	-	-	-	-	-	-	76	291
Total natural stone	**796**	**908**	**987**	**1 070**	**941**	**1 075**	**1 063**	**958**	**999**
Crushed rock	2 019	1 825	1 980	1 950	1 960	2 040	2 300	2 390	2 968
Sand/gravel	1 094	760	600	590	590	1 925	720	645	852
Clay	6	6	6	10	9	8	7	9	9
Total building material	**3 119**	**2 591**	**2 586**	**2 550**	**2 559**	**3 973**	**3 027**	**3 044**	**3 829**
Total	**6 998**	**6 996**	**6 908**	**7 229**	**7 554**	**9 566**	**8 247**	**9 212**	**10 436**

Table 7. Number of employees, 1999 - 2007

Table 7
Number of emplyees 1999 - 2007

Rock/mineral	1999 No. of empl.	2000 No. of empl.	2001 No. of empl.	2002 No. of empl.	2003 No. of empl.	2004 No. of empl.	2005 No. of empl.	2006 No. of empl.	2007 No. of empl.
Olivine	193	298	218	205	199	225	210	184	199
Nepheline syenite	120	112	114	107	105	97	100	91	91
Quartz/quartzite	71	80	92	94	92	94	84	88	100
Soapstone/talc	95	-	101	102	75	67	67	67	35
Feldspar/anorthosite	26	33	37	34	43	45	42	22	23
Graphite	32	36	32	-	-	26	26	25	25
Limesone	450	446	398	401	417	421	479	513	475
Dolomite	45	61	60	51	63	68	70	78	86
Total industral minerals	**1 032**	**1 066**	**1 052**	**994**	**994**	**1 043**	**1 078**	**1 068**	**1 034**
Ilmenite	195	212	203	236	247	246	245	277	245
Nickel concentrate	95	90	102	2	-	-	-	3	2
Iron	166	165	160	160	160	160	178	188	197
Total metallic ores	**456**	**467**	**465**	**398**	**407**	**406**	**423**	**468**	**444**
Coal	226	223	248	225	233	362	430	411	396
Peat	-	-	-	-	-	-	-	48	45
Total energy minerals	**226**	**223**	**248**	**225**	**233**	**362**	**430**	**459**	**441**
Dimension stone	507	532	459	465	474	470	465	367	358
Slate/flagstone	388	309	350	357	378	325	347	359	58
Buildingstone	-	-	-	-	-	-	-	75	328
Total natural stone	**895**	**841**	**809**	**822**	**852**	**795**	**812**	**801**	**745**
Crushed rock	1 114	1 200	1 200	1 242	1 340	1 205	1 312	1 291	1 518
Sand/gravel	2 102	1 482	1 343	1 353	1 178	1 333	1 355	571	521
Clay	226	188	180	-	-	78	59	40	92
Total building material	**3 442**	**2 870**	**2 723**	**2 595**	**2 518**	**2 616**	**2 726**	**1 902**	**2 131**
Total	**6 051**	**5 467**	**5 297**	**5 034**	**5 004**	**5 222**	**5 469**	**4 698**	**4 795**

Table 8. Production of gravel and sand by county, 2007

Table 8											
PRODUCTION OF GRAVEL AND SAND BY COUNTY 2007											
		EXTRACTION(metric tonnes)			SALE/DELIVERED (metric tonnes)			SALES VALUE (FOB NOK)			No. of employees
COUNTY/REGION	No. of producers	Production	waste rock	total	Domistice	Export	Total	Domistice	Export	Total	Total
01 Østfold	7	328 000	8 400	336 400	687 634	-	687 634	26 851 300	-	26 851 300	12
02 Akershus	9	1 074 734	16 000	1 090 734	1 027 836	-	1 027 836	63 523 470	-	63 523 470	28
03 Oslo	1	10 000	-	10 000	10 000	-	10 000	385 000	-	385 000	3
04 Hedmark	12	313 104	-	313 104	426 174	-	426 174	24 732 692	-	24 732 692	19
05 Oppland	34	796 005	1 463	797 468	1 059 504	-	1 059 504	59 301 555	-	59 301 555	38
06 Buskerud	29	1 687 703	1 862	1 689 565	1 863 335	2 883	1 866 218	121 085 811	98 780	121 184 591	72
07 Vestfold	2	5 500	-	5 500	25 172	-	25 172	1 189 000	-	1 189 000	2
08 Telemark	22	308 422	-	308 422	777 722	150	777 872	38 334 500	7 500	38 342 000	19
09 Aust-Agder	7	298 108	84 333	382 441	649 692	-	649 692	29 663 056	-	29 663 056	12
10 Vest-Agder	5	16 990	-	16 990	22 090	-	22 090	936 242	-	936 242	1
11 Rogaland	24	2 963 934	51 013	3 014 947	2 946 079	140 140	3 086 219	196 028 195	7 995 020	204 023 215	87
12 Hordaland	10	480 422	-	480 422	679 872	-	679 872	37 720 728	-	37 720 728	20
14 Sogn og Fjordane	18	191 940	-	191 940	304 031	-	304 031	20 774 310	-	20 774 310	23
15 Møre og Romsdal	23	728 415	10 365	738 780	1 081 191	18 000	1 099 191	45 912 829	840 000	46 752 829	42
16 Sør-Trøndelag	34	636 905	6 758	643 663	788 586	-	788 586	42 016 593	-	42 016 593	41
17 Nord-Trøndelag	28	557 412	12 900	570 312	746 182	-	746 182	38 187 319	-	38 187 319	43
18 Nordland	20	78 741	1 800	80 541	278 819	-	278 819	14 749 900	-	14 749 900	14
19 Troms	33	546 717	10 300	557 017	881 240	-	881 240	58 716 506	-	58 716 506	29
20 Finnmark	17	337 981	-	337 981	438 674	-	438 674	22 725 266	-	22 725 266	17
Total	**335**	**11 361 033**	**205 194**	**11 566 227**	**14 693 833**	**161 173**	**14 855 006**	**842 834 272**	**8 941 300**	**851 775 572**	**521**

Table 9. Production of hard-rock aggregate by county, 2007

Table 9											
PRODUCTION OF HARD-ROCK AGGREGATE BY COUNTY 2007											
		EXTRACTION (metric tonnes)			SALE/DELIVERED (metric tonnes)			SALES VALUE(FOB NOK)			No. of employees
COUNTY/REGION	No. of producers	Production	waste rock	total	Domistice	Export	Total	Domistice	Export	Total	Total
01 Østfold	20	2 725 775	11 500	2 737 275	2 981 011	122 200	3 103 211	190 058 420	6 767 268	196 825 688	106
02 Akershus	18	4 133 784		4 133 784	4 246 247		4 246 247	306 198 277		306 198 277	126
03 Oslo	3	1 149 692		1 149 692	1 031 194		1 031 194	68 983 000		68 983 000	33
04 Hedmark	15	1 551 425	60 000	1 611 425	1 758 848		1 758 848	120 335 620		120 335 620	52
05 Oppland	15	1 001 409	1 546	1 002 955	923 963		923 963	65 479 045		65 479 045	33
06 Buskerud	21	2 065 105	37	2 065 142	2 247 271		2 247 271	163 634 415		163 634 415	72
07 Vestfold	17	1 698 058	11 000	1 709 058	2 367 390	599 600	2 966 990	141 736 049	44 447 720	186 183 769	86
08 Telemark	14	1 673 019	152	1 673 171	1 057 703	677 000	1 734 703	56 455 440	46 260 000	102 715 440	57
09 Aust-Agder	5	552 507	171 666	724 173	808 644		808 644	54 331 632		54 331 632	24
10 Vest-Agder	9	966 581		966 581	966 581		966 581	54 857 456		54 857 456	68
11 Rogaland	23	11 856 046	99 376	11 955 422	5 980 724	7 726 000	13 706 724	322 268 596	331 820 000	654 088 596	306
12 Hordaland	9	1 359 318	36 147	1 395 465	2 276 462	1 377 000	3 653 462	126 391 150	53 913 000	180 304 150	90
14 Sogn og Fjordane	18	2 283 579	248 034	2 531 613	1 306 209	2 841 477	4 147 686	66 033 126	166 814 414	232 847 540	124
15 Møre og Romsdal	24	2 778 485	127 139	2 905 624	3 374 450	5 600	3 380 050	169 154 635	227 865	169 382 500	81
16 Sør-Trøndelag	30	2 488 354	13 000	2 501 354	2 781 184	6 655	2 787 839	158 541 623	359 370	158 900 993	87
17 Nord-Trøndelag	26	1 422 006	133 706	1 555 712	1 596 013		1 596 013	77 625 682		77 625 682	50
18 Nordland	25	1 517 644	85 852	1 603 496	1 618 429		1 618 429	104 278 745		104 278 745	85
19 Troms	12	556 738	6 300	563 038	586 641		586 641	55 614 010		55 614 010	30
20 Finnmark	2	249 700		249 700	268 500		268 500	15 542 035		15 542 035	7
Total	**306**	**42 029 225**	**1 005 455**	**43 034 680**	**38 177 464**	**13 355 532**	**51 532 996**	**2 317 518 956**	**650 609 637**	**2 968 128 593**	**1 518**

Table 10. Size and royalty distribution for gravel producers based on tonnage sold in 2007

Table 10										
SIZE AND ROYALTY DISTRIBUTION FOR GRAVEL PRODUCERS BASED ON TONNAGE SOLD IN 2007										
	PRODUCTION					ROYALTY (NOK/tonnes)				
Size (metric tonnes)	Producers	%	Production	%	Average	Producers	Min	Max	Ave-rage	Median
1 - 10000	171	51,0	602 552	4,1	3 524	99	0,01	26,10	7,32	6,30
10001 - 50000	95	28,4	2 384 713	16,1	25 102	80	0,35	25,00	7,14	6,00
50001 - 100000	29	8,7	2 084 130	14,0	71 867	22	1,75	12,87	6,61	5,90
100001 - 250000	28	8,4	4 477 262	30,1	159 902	22	3,32	13,79	6,86	6,20
250001 - 500000	9	2,7	2 917 539	19,6	324 171	9	3,03	10,00	6,14	5,20
500001 -1000000	2	0,6	1 220 810	8,2	610 405	1	7,00	7,00	7,00	7,00
1000001 -	1	0,3	1 168 000	7,9	1 168 000	1	6,23	6,23	6,23	6,23
TOTAL	**335**	**100**	**14 855 006**		**44 343**	**234**				

Table 11. Size and royalty distribution for hard-rock aggregate producers based on tonnage sold in 2007.

Table 11										
SIZE AND ROYALTY DISTRIBUTION FOR HARD-ROCK AGGREGATE PRODUCERS BASED ON TONNAGE SOLD IN 2007										
	PRODUCTION					ROYALTY (NOK/tonnes)				
Size (metric tonnes)	Producers	%	Production	%	Average	Producers	Min	Max	Ave-rage	Median
1 - 10000	49	16,0	206 779	0,4	4 220	23	1,40	14,00	4,46	4,00
10001 - 50000	94	30,7	2 692 209	5,2	28 641	59	0,30	14,00	3,36	2,66
50001 - 100000	44	14,4	3 180 752	6,2	72 290	30	0,50	10,15	3,57	3,04
100001 - 250000	63	20,6	10 124 223	19,6	160 702	46	0,50	8,00	2,47	2,04
250001 - 500000	36	11,8	12 586 654	24,4	349 629	28	0,80	9,00	2,72	2,14
500001 -1000000	13	4,2	8 355 379	16,2	642 721	9	0,19	5,00	1,80	1,31
1000001 -	7	2,3	14 387 000	27,9	2 055 286	4	0,36	2,05	0,83	0,46
TOTAL	**306**	**100**	**51 532 996**		**168 408**	**199**				

Table 12. Consumption /sector for gravel in 2007

Table 12									
CONSUMPTION/SECTOR FOR GRAVEL IN 2007									
COUNTY/REGION	Sale (metric tonnes)	ROAD MAKING		ASPHALT		CONCRETE		OTHER USES	
		%	metric tonnes	%	metric tonnes	%	metric tonnes	%	metric tonnes
01 Østfold	687 634	15,3	104 818	2,1	14 780	58,0	399 000	24,6	169 036
02 Akershus	1 027 836	22,0	226 055	19,8	203 462	33,0	339 230	25,2	259 089
03 Oslo	10 000	100,1	10 000						
04 Hedmark	426 174	24,7	105 155	25,1	107 021	23,7	100 984	26,5	113 014
05 Oppland	1 059 504	18,7	198 004	8,8	93 244	20,5	216 820	52,0	551 435
06 Buskerud	1 866 218	6,6	123 105	0,7	13 211	73,4	1 369 006	19,3	360 896
07 Vestfold	25 172	2,2	550	31,4	7 901	11,7	2 951	54,7	13 770
08 Telemark	777 872	9,0	69 946	2,1	16 080	73,0	568 000	15,9	123 846
09 Aust-Agder	649 692	24,4	158 083	11,7	76 000	45,1	293 165	18,8	122 444
10 Vest-Agder	22 090					44,0	9 710	56,0	12 380
11 Rogaland	3 086 219	3,1	95 162	6,1	187 817	82,2	2 536 210	8,7	267 030
12 Hordaland	679 872	17,3	117 350	8,2	55 800	37,1	252 515	37,4	254 207
14 Sogn og Fjordane	304 031	12,7	38 681	16,0	48 520	49,3	150 028	22,0	66 802
15 Møre og Romsdal	1 099 191	20,9	229 594	19,4	213 217	48,3	531 418	11,4	124 962
16 Sør-Trøndelag	788 586	21,3	167 715	2,1	16 750	36,3	286 099	40,3	318 021
17 Nord-Trøndelag	746 182	35,6	265 685	5,7	42 368	20,2	150 824	38,5	287 306
18 Nordland	278 819	12,9	36 063	6,7	18 655	58,1	161 920	22,3	62 182
19 Troms	881 240	34,0	299 071	10,8	95 455	14,8	130 004	40,5	356 710
20 Finnmark	438 674	30,4	133 355	31,8	139 380	27,8	122 110	10,0	43 830
TOTAL	**14 855 006**	**16,0**	**2 378 392**	**9,1**	**1 349 661**	**51,3**	**7 619 994**	**23,6**	**3 506 960**

Table 13. Consumption /sector for hard-rock aggregate in 2007

Table 13									
CONSUMPTION/SECTOR FOR HARD-ROCK AGGREGATE IN 2007									
COUNTY/REGION	Sale (metric tonnes)	ROAD MAKING		ASPHALT		CONCRETE		OTHER USES	
		%	metric tonnes	%	metric tonnes	%	metric tonnes	%	metric tonnes
01 Østfold	3 103 211	33,0	1 022 356	27,2	843 573	10,7	332 874	29,1	904 409
02 Akershus	4 246 247	50,3	2 132 879	10,5	445 383	12,1	514 318	27,2	1 153 668
03 Oslo	1 031 194	58,7	605 228	14,0	144 679	4,7	48 000	22,6	233 287
04 Hedmark	1 758 848	38,7	680 768	5,8	102 657	5,0	87 794	50,5	887 630
05 Oppland	923 963	30,8	284 282	10,7	98 574	5,7	53 030	52,8	488 077
06 Buskerud	2 247 271	30,8	692 345	9,1	204 298	17,0	381 077	43,1	969 551
07 Vestfold	2 966 990	13,0	384 464	11,5	341 730	4,3	127 026	71,2	2 113 769
08 Telemark	1 734 703	15,1	261 409	49,9	865 900	5,9	102 850	29,1	504 544
09 Aust-Agder	808 644	33,5	270 822	13,7	110 542	3,8	30 731	49,0	396 550
10 Vest-Agder	966 581	24,3	234 481			4,6	44 230	71,2	687 871
11 Rogaland	13 706 724	24,4	3 338 192	31,7	4 351 844	15,9	2 176 464	28,0	3 840 224
12 Hordaland	3 653 462	25,5	932 360	36,1	1 317 600	4,0	146 530	34,4	1 256 972
14 Sogn og Fjordane	4 147 686	37,5	1 552 397	0,3	13 955	32,8	1 360 700	29,4	1 220 634
15 Møre og Romsdal	3 380 050	40,0	1 352 088	1,2	38 921	2,0	66 961	56,9	1 922 081
16 Sør-Trøndelag	2 787 839	31,5	878 465	14,0	389 034	8,7	242 924	45,8	1 277 416
17 Nord-Trøndelag	1 596 013	40,1	639 413	8,6	137 700	6,4	102 890	44,9	716 010
18 Nordland	1 618 429	40,0	647 149	15,6	252 509	10,5	170 517	33,9	548 254
19 Troms	586 641	47,9	280 807	7,3	42 542	4,1	23 944	40,8	239 349
20 Finnmark	268 500							100,0	268 500
HELE LANDET	**51 532 996**	**31,4**	**16 189 905**	**18,8**	**9 701 441**	**11,7**	**6 012 860**	**38,1**	**19 628 796**

Table 14 Employment, injury and sick leave statistics for 2007

Table 14																
EMPLOYMENT, INJURY AND SICK LEAVE STATISTICS FOR 2007																
		MAN LABOUR YEAR							PERSONAL INJURIES			INJURIES PER MILLION MAN-HOURS			DAYS LOST DUE TO ILLNESS	
			Own			Hired										
	No. of producers	Admini-stration	Produc-tion	Total	Admini-stration	Produc-tion	Total	Tot.	Own	Hired	Tot.	Own	Hired	Tot.	(No. of days)	% of worked hours
Building material	546	337	1 620	1 958	11	252	262	2 220	48	5	53	14,4	11,2	14,0	9 894	2,23
Natural stone	46	79	583	662	1	28	29	691	13	-	13	11,6	-	11,1	7 399	4,93
Industrial minerals	37	63	811	874	5	188	193	1 067	17	1	18	11,4	3,0	9,9	6 574	3,32
Ores	2	78	358	360	-	8	8	368	9	-	9	14,7	-	14,4	3 792	4,65
Energy minerals	7	152	285	437	-	4	4	441	16	-	16	21,5	-	21,4	7 091	7,16
Total	**638**	**709**	**3 657**	**4 290**	**17**	**479**	**496**	**4 786**	**103**	**6**	**109**	**14,1**	**7,1**	**13,4**	**34 750**	**3,57**

Gruve 7, Svalbard. Photo: Peter J. Brugmans.

Gruve 7, Adventdalen. Photo: Peter J. Brugmans

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