



# 2012 Minerals Yearbook

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## NORWAY

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# THE MINERAL INDUSTRY OF NORWAY

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Norway's diverse geologic terrain contains a broad spectrum of mineral resources for possible exploration and development, including metals, industrial minerals, and mineral fuels. Norway's mineral resources included coal, iron ore, natural gas, nickel, petroleum, sand and gravel, stone, and titanium. The mines and quarries were mostly of regional significance and were located mainly along the coast. The natural gas and petroleum fields were located mainly offshore in the Norwegian area of the North Sea (U.S. Central Intelligence Agency, 2012).

## Minerals in the National Economy

The country's natural gas and petroleum industries have continued to contribute significantly to Norway's national economy. In 2012, the petroleum sector accounted for the largest portion of the country's exports and about 26% of Government revenue. In anticipation of the eventual decrease in natural gas and petroleum production, the Government was saving a significant amount of revenue from petroleum exports in a sovereign wealth fund (SWF) valued at more than \$700 billion. Norway's SWF was the second largest of all countries' SWFs after that of Luxembourg (U.S. Department of State, 2013).

## Mineral Trade

Even though Norway was not a member of the European Union (EU), it participated in the EU's internal economic market, the European Economic Area. Mineral trade was important to the economy and, in terms of export value, petroleum was Norway's most significant mineral commodity in 2012. Norway was the world's seventh-ranked petroleum exporter and the leading petroleum exporter in Western Europe. The country was the world's fourth-ranked natural gas producer and the world's second-ranked exporter of natural gas after Russia (U.S. Energy Information Administration, 2012).

The U.S. trade in goods with Norway in 2012 totaled \$3,501 million in exports and \$6,566 million in imports for a negative trade balance of \$3,065 million. U.S. exports to Norway included petroleum products valued at \$199 million; drilling and oilfield equipment, \$172 million; coal and other fuels, 93 million; fuel oil, \$43 million; and finished metal shapes, \$36 million. Norway's total exports to the United States included petroleum products valued at \$1.8 billion; crude petroleum, \$806 million; fuel oil, \$550 million; liquefied petroleum gases, \$346 million; and nickel, \$201 million (U.S. Census Bureau, 2012a, b).

## Production

Norway produced various mineral commodities, including aluminum, cadmium, cobalt, copper, ferroalloys, nickel, steel, and zinc metals; it was a global supplier of aluminum, ferroalloys, and petroleum. Production of natural gas increased in 2012, whereas production of primary aluminum, cobalt,

and petroleum production decreased (table 1). Aggregates, limestone, nepheline syenite, and sand and gravel were some of Norway's more economically important industrial mineral raw materials. The country's production of ilmenite accounted for about 6% of world production (Bedinger, 2013).

## Structure of the Mineral Industry

The Norwegian mineral industry was composed of a mixture of Government and privately owned operations. Table 2 lists the major mineral companies that were operating in Norway in 2012 and their respective mine and (or) plant locations and capacities.

## Commodity Review

### Metals

**Cobalt, Copper, Gold, and Platinum-Group Metals.**—Nordic Mining ASA's exploration efforts in northern Norway led to the discovery of magmatic mineralization in the Lokkarfjord and the Reinfjord areas on the Øksfjord Peninsula that contained cobalt, copper, gold, and platinum-group element mineralization. The Øksfjord Peninsula is part of the Seiland Igneous Province (SIP). The SIP shares many characteristics with other geologic formations that host deposits of copper, nickel, and platinum-group elements, such as the Bushveld Complex in South Africa, the Stillwater Complex in Montana, and the Fennoscandian Suhanko and Penikat intrusions in Finland. The SIP had not been significantly explored for minerals with commercial value (Nordic Mining ASA, 2012c).

Store Norske Gull AS, which was a subsidiary of Store Norske AS, was established to explore for gold on the Norwegian archipelago of Svalbard in the Arctic region. Store Norske had an exploration license area that consisted of 457 claims in Finnmark County and 52 claims in Troms County on the mainland of Spitsberg. The company's prospecting strategy included exploration for gold, nickel, and platinum-group elements (Store Norske Gull AS, 2012).

Arctic Gold AB of Sweden's main exploration project in northern Norway was the Bidjovagge gold prospect, which contained about nine partially mined ore bodies. Historical activity at Bidjovagge had discovered a mineral resource of about 1.4 million metric tons (Mt) with reported grades of 3.4 grams per metric ton (g/t) gold and 1.1% copper. Arctic Gold was investigating the possibility of expanding the mineral resources and proving an ore reserve that could be extracted using conventional methods (Arctic Gold AB, 2012).

**Iron Ore.**—Northern Iron Ltd. of Australia acquired the Sydvaranger iron project in 2007 for the production of magnetite ore concentrate to supply the European market. The project consisted of four magnetite iron deposits with Joint Ore Reserves Committee (JORC)-compliant estimated resources at Bjørnevatt, Fisketind Øst, Kjellmann, and Tverrdalen. Northern

Iron had an additional 20 prospects with iron mineralization located across a 12-kilometer (km) strike length. The Bjørnevatn Mine was in operation in 2012 and had a capacity of 2.8 million metric tons per year (Mt/yr) with an estimated mine life of 25 years (Northern Iron Ltd., 2012).

**Nickel.**—First Point Minerals Corp. of Canada announced that it had acquired two properties—the Fera prospect and the Leka prospect—after its exploration efforts identified anomalous nickel occurrences. The Fera prospect is located about 300 km north of Oslo, covers 152 square kilometers (km<sup>2</sup>), and hosts several variable-size ultramafic bodies. The largest ultramafic body measures 3 by 5 km in area and hosts disseminated awaruite, which is a naturally occurring nickel-iron alloy. The second property, the Leka prospect, is located 195 km north of Trondheim and is 39 km<sup>2</sup> in area. The company discontinued exploration at the Leka prospect after a number of awaruite occurrences were determined not to be of economic significance and reduced its holdings at the Fera prospect. As of yearend 2012, the company had retained a 100% interest in seven licenses over a 70 km<sup>2</sup> area. Also, a comprehensive mapping and sampling program that started in mid-year 2012 was continuing at yearend (First Point Minerals Corp., 2012).

**Silver.**—In 2012, Dalradian Resources Inc. of Canada was continuing with its exploration programs in the northern and the southern parts of Norway where Dalradian held exploration licenses for 1.7 million hectares across three greenstone belts, as well as an area that hosts a historic silver mining district. Dalradian was engaged in data acquisition and analysis for all its concessions, and field programs were underway on its Kautokeino and Kongsberg concession areas (Dalradian Resources Inc., 2012).

**Titanium.**—In 2012, Nordic Mining was continuing with its proposed rutile mine development project at Engebøfjellet. The 2.5-km-long rutile-bearing eclogite body was reported to contain a mineral resource of 154 Mt of eclogite at an average grade of 3.8% rutile. The rutile is disseminated in the eclogite. The Engebøfjellet eclogite deposit is practically free from the usual occurrence of the radioactive elements thorium and uranium. The mining operation would be developed in two stages; first, as an open pit operation for a period of 10 to 15 years, and next, as an underground operation with a mine life of about 35 years. Nordic Mining reported that it was planning to produce 100,000 t/yr of rutile concentrate and 100,000 t/yr of garnet concentrate following a 2015 startup of the mine. The decision to produce byproduct garnet was based on new Government regulations that allow for increased use of silica minerals in abrasive applications (Nordic Mining ASA, 2012a).

### **Industrial Minerals**

**Fluorspar.**—Tertiary Minerals plc of the United Kingdom announced that it had updated its JORC-compliant estimated inferred mineral resource at the Lassedalen project to 4 Mt grading 25% fluorspar. Tertiary was proceeding with detailed evaluation and with metallurgical testing to determine if acid-grade fluorspar could be produced at the Lassedalen project. Fluorspar is an essential raw material in the aluminum, chemical, and steel industries. The EU had noted in 2010 that

fluorspar was one of the 14 minerals that had a high supply risk (Ollett, 2012).

**Silica.**—Nordic Mining announced that it was planning to produce high-quality quartz at its Nesodden deposit near Kvinnerød in western Norway. Nordic Mining was continuing with detailed mapping of the deposit, which had estimated mineral resources of 2.7 Mt of crystalline hydrothermal quartz in a 12.6-km-long vein that reaches a depth of 150 meters (m). The quartz vein is situated in Proterozoic age rocks south of the Hardanger Fault Zone (HFZ). The HFZ is a 600-km-long Caledonian ductile shear zone. The quartz vein is about 600 m long and about 15 m wide with a depth of 150 m (Nordic Mining ASA, 2012b).

### **Mineral Fuels**

The energy situation in Norway was characterized by an abundance of two forms of energy: hydroelectric power and mineral fuel resources. Hydroelectric power met most of the domestic demand for energy; mineral fuels were produced mainly for export. Norway had a highly developed natural gas and petroleum sector. Natural gas production had been steadily increasing, and petroleum production was on the decline (table 1). Norway was the leading petroleum producer and exporter in Western Europe. At yearend 2011, Norway had the largest petroleum reserves in Western Europe with estimated proven reserves of 5.3 billion barrels (Gbbbl) (U.S. Energy Information Administration, 2012).

The Government awarded 60 new production licenses to 42 companies in the latest Awards in Predefined Areas (APA) licensing round. Companies were awarded 34 licenses in the North Sea, 22 licenses in the Norwegian Sea, and 4 licenses in the Barents Sea. The licenses are situated in mature areas on the Norwegian Continental Shelf, where 27 of the 42 companies were already operating. The overall APA area was expanded to 196,625 km<sup>2</sup> (Hovland, 2012).

**Coal.**—Store Norske Spitsbergen Grubekompani A/S (SNSG) continued to be Norway's sole coal producer. The company's two mines, the Gruve 7 Mine and the Svea Nord Mine, are located on the Arctic archipelago of Svalbard, which is situated about midway between mainland Norway and the North Pole. Norway continued to be a net exporter of coal, of which more than 50% was exported to Germany (ArcticEcon, 2012).

**Natural Gas.**—Norway had estimated proven reserves of 2.3 trillion cubic meters of natural gas as of January 2012. Norway's natural gas production had been increasing every year since 1994. The annual increases had been sustained by incorporating new fields in the Barents Sea and the Norwegian Sea. Norway's single largest natural gas field was the Troll-Oseberg field (U.S. Energy Information Administration, 2012).

Eni S.p.A. of Italy started production from the offshore Marulk natural gas field located about 80 km from the coast. The Marulk field was the first Norwegian field that Eni had directly operated. Marulk is a natural gas and condensate field in the Cretaceous Lange and Lysing formations; it had estimated reserves of 1.2 billion cubic meters. Development of the field was through two production wells completed subsea and tied

back to the floating production, storage, and offloading vessel on the Nome oilfield, which is located about 25 km northeast of the two wells (Eni S.p.A., 2012a).

**Petroleum.**—Norway, which has the largest petroleum reserves in Western Europe, was reported to have 5.3 Gbbl of proven reserves as of January 2012. All the reserves were located offshore on the NCS, which is divided into three sections: the Barents Sea, the North Sea, and the Norwegian Sea. The bulk of production had taken place in the North Sea, and smaller amounts had been produced in the Barents Sea and the Norwegian Sea (U.S. Energy Information Administration, 2012).

Faroe Petroleum plc of the United Kingdom announced that it had been awarded new prospective exploration licenses under the 2012 APA license round on the Norwegian Continental Shelf. Faroe was awarded five licenses in the North Sea area where the company already held a number of licenses, including the 2011 Butch discovery well (MBendi Information Services (Pty) Ltd., 2013a).

Lundin Petroleum AB of Sweden announced that its wholly owned subsidiary Lundin Norway AS was awarded seven exploration licenses in the 2012 APA licensing round. The awarded licenses included four licenses in the North Sea, two licenses in the Norwegian Sea, and one license in the Barents Sea. Lundin Norway would be the operator of five of the licenses and Lundin Petroleum would be the operator of two of the licenses. Lundin Petroleum was an independent natural gas and petroleum exploration and production company with assets primarily in Europe (MBendi Information Services (Pty) Ltd., 2013b).

In 2012, StatoilHydro ASA announced that it would spend about \$3 billion to finish completing 40 wells. StatoilHydro reported that its exploration activity level in 2012 was about the same as in 2011. Statoil completed 41 exploration wells in 2011, of which 22 were discoveries (Eni S.p.A., 2012b).

Wintershall Holdings GmbH of Germany was continuing its growth in northern Europe with the receipt of three new licenses in the North Sea. Wintershall already held 43 licenses, of which 24 licenses were as operator. As such, Wintershall was one of the leading licenses holders on the NCS. The company was proceeding with the Edvard Grieg, the Knaar, and the Maria development projects. Wintershall's Skarffjell discovery in April 2012 was estimated to have between 60 million and 160 million barrels of recoverable oil (Dupre, 2013).

## Outlook

Norway's hydrocarbons sector is likely to continue to be a significant source of revenue to the Government as petroleum exploration continues in the Barents Sea, the Norwegian Sea, and new offshore exploration areas in the Arctic region. The Norwegian Petroleum Directorate is expected to continue with efforts to open up new offshore areas, particularly in the Arctic region. Norway is expected to continue to obtain nearly all its electricity from hydropower; however, other renewable resources, such as wind power, are being investigated. Industrial minerals are expected to continue to be important to the Nation's domestic economy.

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TABLE 1  
NORWAY: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Commodity	2008	2009	2010	2011	2012 <sup>e</sup>	
METALS						
Aluminum:						
Primary	metric tons	1,368,000	1,139,000 <sup>r</sup>	1,060,000	1,982,000 <sup>r</sup>	1,800,000
Secondary <sup>e</sup>	do.	350,000	350,000	300,000	300,000	250,000
Cadmium, metal	do.	178	249	300	309	300
Cobalt, metal, refined	do.	3,719	3,510	3,208	3,067	2,969 <sup>2</sup>
Copper, metal, refined, primary and secondary	do.	32,000	33,900	32,000 <sup>e</sup>	32,000 <sup>e</sup>	36,000
Iron and steel:						
Iron ore and concentrate, gross weight <sup>3</sup>		746	896	3,266	2,532 <sup>r</sup>	3,421 <sup>2</sup>
Metal:						
Ferroalloys:						
Ferromanganese		308 <sup>r</sup>	197 <sup>r</sup>	297 <sup>r</sup>	338 <sup>r</sup>	300
Ferrosilicomanganese		262 <sup>r</sup>	231 <sup>r</sup>	249	266 <sup>r</sup>	250
Ferrosilicon, 75% basis <sup>e</sup>		185 <sup>2</sup>	233 <sup>2</sup>	230	230	250
Silicon metal <sup>e</sup>		155	150	175	175	150
Steel, crude		560	579	514	620	600
Mercury <sup>e</sup>	metric tons	33 <sup>2</sup>	30	25	25	25
Nickel:						
Mine output, concentrate, Ni content	do.	377	369	351 <sup>r</sup>	339 <sup>r</sup>	351 <sup>2</sup>
Metal, primary	do.	88,741	88,577	92,100 <sup>r</sup>	92,427 <sup>r</sup>	91,687 <sup>2</sup>
Titanium:						
Ilmenite concentrate		915	671	864	870 <sup>r</sup>	831 <sup>2</sup>
TiO <sub>2</sub> content		403	289	371	400 <sup>e</sup>	400
Zinc, metal, primary	metric tons	145,469	137,622	147,775	153,200 <sup>r</sup>	153,000 <sup>2</sup>
INDUSTRIAL MINERALS						
Cement, hydraulic <sup>e</sup>		1,800	1,700	1,700	1,800	1,700
Clays		279	227	230 <sup>e</sup>	230 <sup>e</sup>	225
Feldspar		62	71	56	25 <sup>r</sup>	-- <sup>2</sup>
Graphite, flake	metric tons	4,100	4,562	6,270	7,789 <sup>r</sup>	6,992 <sup>2</sup>
Lime, hydrated, quicklime <sup>e</sup>		110	100	100	100	125
Mica, flake <sup>e</sup>	metric tons	2,000 <sup>r</sup>	1,000	--	--	--
Nepheline syenite		346	270 <sup>e</sup>	327	330	320 <sup>2</sup>
Nitrogen, N content of ammonia		350	300	300	300	300
Olivine sand		2,554	1,267	2,560	2,237 <sup>2</sup>	1,650 <sup>2</sup>
Sand and gravel		14,817	13,047	13,011	13,215	14,262 <sup>2</sup>
Stone, crushed <sup>r,3</sup>		52,338	51,378	54,134	63,855	67,670
Sulfur, byproduct: <sup>e</sup>						
Metallurgical		95 <sup>r</sup>	90 <sup>r</sup>	80	90 <sup>r</sup>	90
Petroleum		20	20	20	19 <sup>r</sup>	20
Total		115 <sup>r</sup>	110 <sup>r</sup>	100	109 <sup>r</sup>	110
Talc, soapstone, steatite	metric tons	30,000 <sup>r,3</sup>	23,350 <sup>r,3</sup>	6,400	8,191	7,983 <sup>2</sup>
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades		3,429	2,437	1,685	1,640 <sup>r</sup>	1,583
Gas, natural, marketed <sup>4</sup>	million cubic meters	99,200	99,000	105,280	101,376 <sup>r</sup>	106,710 <sup>2</sup>
Peat, for agricultural use <sup>e</sup>	do.	497 <sup>2</sup>	480	490	500	500
Petroleum:						
Crude <sup>5</sup>	thousand 42-gallon barrels	901,550	854,830	777,450	732,555 <sup>r</sup>	694,230 <sup>2</sup>
Refinery products:						
Naphtha <sup>e</sup>	do.	10,000	10,000	10,000	10,000	10,000
Gasoline	do.	20,640 <sup>r</sup>	32,215 <sup>r</sup>	28,142 <sup>r</sup>	28,000	28,000
Kerosene	do.	5,420 <sup>r</sup>	4,752 <sup>r</sup>	3,942 <sup>r</sup>	4,000 <sup>r</sup>	5,000
Distillate fuel oil	do.	45,479 <sup>r</sup>	43,995 <sup>r</sup>	43,545 <sup>r</sup>	44,000 <sup>r</sup>	45,000
Residual fuel oil	do.	17,411 <sup>r</sup>	13,140 <sup>r</sup>	12,301 <sup>r</sup>	12,000	12,000
Other products	do.	1,800 <sup>r</sup>	1,700 <sup>r</sup>	1,750 <sup>r</sup>	1,800 <sup>r</sup>	1,800
Total <sup>e</sup>	do.	101,000 <sup>r</sup>	106,000 <sup>r</sup>	99,700 <sup>r</sup>	99,800 <sup>r</sup>	102,000

See footnotes at end of table.

TABLE 1—Continued  
NORWAY: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

<sup>6</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>7</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>Table includes data available through June 30, 2013.

<sup>2</sup>Reported figure.

<sup>3</sup>Source: British Geological Survey.

<sup>4</sup>Reported as total methane sales.

<sup>5</sup>Excluding natural gas liquids.

TABLE 2  
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Hydro Aluminium ANS (Norsk Hydro ASA, 70%)	Smelters at Ardal, Hoyanger, Karmoy, and Sunndal	600
Do.	do.	Rolling mill at Holmestrand	90
Do.	Alcoa Inc.	Smelters at Farsund and Mosjoen	250
Do.	Sor-Norge Aluminium A/S 50%, and Hydro Aluminium ANS, 49%)	Smelter at Odda	50
Cadmium	metric tons Norzink A/S (Outokumpu Oyj, 100%)	Smelter at Eitheidsneset	5
Cement	Norcem A/S	Plants at Brevik and Kjøpsvik	2,150
Coal	Store Norske Spitsbergen Grubekompani A/S	Mines at Longyearbyen and Svea	450
Cobalt	Nikkelverk A/S (Xstrata plc, 100%)	Smelter at Kristiansand	5
Copper:			
Ore, Cu content	Nikkel og Olivin A/S (Outokumpu Oyj, 100%)	Mine at Narvik	1
Metal	Nikkelverk A/S (Xstrata plc, 100%)	Smelter at Kristiansand	40
Dolomite	Franzefoss Bruk A/S	Mine at Ballagen	350
Do.	Norwegian Holding A/S	Mines at Hammerfall, Logavlen, and Kvitblikk	500
Feldspar	Franzefoss Bruk A/S	Mine at Lillesand	100
Ferroalloys	Elkem Salten (Elkem A/S, 100%)	Ferrosilicon plant at Straumen	90
Do.	Elkem Bjolvefossen (Elkem A/S, 100%)	Ferrosilicon plant at Alvik	60
Do.	Elkem Thamshavn (Elkem A/S, 100%)	Ferrosilicon plant at Orkanger	60
Do.	Finnfjord Smelteverk A/S, Rana Metal (FESIL ASA, 100%)	Ferrosilicon plant at Mo i Rana	110
Do.	A/S Hafslung Metal (FESIL ASA, 100%)	Ferrosilicon plant at Sarpsborg	75
Do.	Ila og Lilleby Smelteverk (FESIL ASA, 100%)	Ferrosilicon plant at Finnsnes	20
Do.	Oye Smelteverk (Tinfos Jernverk A/S, 100%)	Silicomanganese plant at Kvinesdal	235
Graphite, flake	Skaland Graphite AS	Skalane Mine and plant at Skaland	12
Iron, metal	Ulstein Jernstoperi A/S	Hordvikneset	10
Iron ore	Rana Gruber A/S (Norsk Jernverk Holding A/S, 100%)	Mine at Mo i Rana	2,000
Do.	Arctic Bulk Minerals A/S	Mine and plant at Kirkenes	1,500
Do.	Northern Iron Ltd.	Mine at Bjørnevatn	2,800
Lime	Hylla Kalkverk (Nikolai Bruch A/S, 100%)	Verdal/Trondheim mine and plant	80
Do.	A/S Norsk Jernverk	Plant at Mo i Rana	48
Do.	Ardal og Sunndal Verk A/S	More og Romsdal plant at Surnadal	20
Do.	Brevik Kalkverk A/S	Alesund plant at Larsnes	20
Do.	Mjoendalen Kalkfabrik	Plant at Asen/Drammen	7
Limestone	Norcem A/S	Dalen, Bjørntvedt, and Kjøpsvik Mines	1,600
Do.	Vardelskalk A/S (Franzefoss Burk A/S, 100%)	Sandvika Mine	800
Do.	Brevik Kalkverk A/S	Visnes and Glaerum Mines	500
Magnesium	Norsk Hydro ASA (Government, 51%)	Plants at Porsgrunn and Sauda	50
Manganese, alloys	Eramet SA	do.	500

See footnotes at end of table.

TABLE 2—Continued  
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Natural gas	million cubic meters	Statoil ASA	Gama, Gullfaks, Sleipner Ost, and Statfjord fields	12,270
Do.	do.	ConocoPhillips Skandinavia A/S (operator)	Ekofisk field	9,900
Do.	do.	Elf Petroleum Norge A/S	Frigg, Heimdal, and Ost-Frigg fields	5,750
Do.	do.	Statoil ASA	Mikkel field	2,100
Do.	do.	Total S.A., 40%; Petoro S.A., 30%; Marathon Petroleum Norge AS, 20%; Norsk Hydro Produksjon A/S, 10%	Skirne field	1,550
Do.	do.	Esso Norge A/S	Odin field	1,000
Do.	do.	Amoco Norway A/S	Hod and Valhallfields	910
Nepheline syenite		North Cape Mineral A/S (Unimin Corp., 84%)	Mine at Stjernoy	350
Nickel:				
Ore, concentrate, Ni content		Nikkel og Olivin A/S (Outokumpu Oyj, 100%)	Mine at Narvik	5
Do.		Titania A/S (Kronos Norge A/S, 100%)	Mine at Tellnes	0.5
Metal		Nikkelverk A/S (Xstrata plc., 100%)	Smelter at Kristiansand	85
Olivine		Sibelco Nordic AS	Grubse and Raubergvik Mines and plant at Aheim	2,500
Do.	do.		Stranda Mine and plant	300
Do.		Franzefoss Bruk A/S	Lefdal Mine at Bryggja	500
Petroleum	42-gallon barrels per day	BP Petroleum Development of Norway	Ulaf fields	155,000
Do.	do.	A/S Norske Shell	Draugen field	90,000
Do.	do.	Esso Norge A/S (Exxon Mobil Corp., 100%)	Slagen Refinery at Slagentangen	6,000
Do.	do.	Statoil Mongstad A/S (Statoil ASA, 100%)	Mongstad Refinery	12,000
Pyrite		Folldal Verk A/S (Norsulfid A/S, 100%)	Mine at Hjerkin	10
Quartzite		Elkem Tana (Elkem A/S, 100%)	Mine at Tana	540
Do.		Elkem Marnes (Elkem A/S, 100%)	Mine at Sandhornoy	200
Do.		Vatnet Kvarts A/S	Mine at Nordland	150
Do.		Snekkevik Kvartsbrudd	Mine at Kragero	110
Silicon metal		Lilleby Metall A/S (FESIL ASA, 100%)	Plant at Trondheim	9
Do.		FESIL ASA	Plant at Holla	50
Steel		Fundia AB (Norsk Jenverk, 50%, and Rautaruukki Group, 50%)	Plants at Christiania, Mandal Stal, and Spigerverk	600
Talc		A/S Norwegian Talc (Pluess-Staufe AG, 51%)	Mine and plant at Altermark/Knarrevik Mo i Rana, and Framfjord	90
Do.		Kvam Minerals A/S	Mine and plant at Kvam	6
Titanium, concentrate		Titania A/S (Kronos Norge A/S, 100%)	Mine at Tellnes	915
Zinc, metal		Boliden Odda A/S (Boliden AB, 100%)	Smelter at Odda	200
Do., do. Ditto.				