



# 2008 Minerals Yearbook

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## NORWAY

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# THE MINERAL INDUSTRY OF NORWAY

By Harold R. Newman

Norway has a varied geology and a broad spectrum of mineral resources for exploration and exploitation. In terms of the value of exports, petroleum was Norway's most important mineral commodity. The growth of the country's natural gas and petroleum sector in the past has contributed significantly to Norway's economy. Higher oil prices boosted the trade and current account surpluses in 2008. The mining and quarrying industry, which was mostly a regional industry, was located mainly along the coast. The country's close proximity to the large European Union (EU) market was a competitive advantage for some raw materials, particularly aggregate, natural stone, and certain other industrial minerals (Federation of International Trade Associations, 2008).

## Minerals in the National Economy

Norway's mineral resources included coal, iron ore, natural gas, nickel, olivine, petroleum, and titanium. About 85 million metric tons (Mt) of various mineral resources were extracted in 2008 and were valued at more than \$2,013 million. In 2008, the total export value of the mineral industry, excluding mineral fuels, was \$1,271 million (Norwegian Geological Survey 2009a, p. 10).

Trade was important to the national economy. In 2008, the total value of exported goods was \$173.6 billion and the total value of imported goods was \$85.9 billion. Norway was the world's 28th ranked exporter. U.S. exports to Norway were valued at \$3,292 million; Norway's import trade with the United States was valued at \$7,315 million. U.S. exports included other nonferrous metals, \$217.9 million; oilfield and drilling equipment, \$205 million; iron and steel mill products, \$12 million; and specialized mining equipment, \$3.9 million (U.S. Census Bureau, 2008a, b; U.S. Central Intelligence Agency, 2009).

## Production

Norway produced aluminum, cadmium, cobalt, copper, ferroalloys, nickel, and zinc metals. Mine production included feldspar, graphite, ilmenite, iron ore, and limestone. Aggregate, calcium carbonate, nepheline syenite, olivine, and sand and gravel deposits were some of Norway's most economically important industrial mineral raw materials. Norway's North Cape Minerals A/S was the world's leading producer of olivine. The country's production of titanium accounted for 6.7% of world production and its production of petroleum accounted for greater than 3% of world production (Gambogi, 2009; Norwegian Geological Survey 2009b, p. 13).

## 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 2008 and their respective mine and (or) plant locations and capacities.

## Commodity Review

### Metals

**Aluminum.**—Alcoa Inc. of the United States and Orkla ASA announced that they had concluded an agreement on the exchange of assets in two jointly owned companies. Alcoa would take over Orkla's 50% equity in Elkem Aluminium ANS, which would give Alcoa a 100% share in Elkem Aluminium. Orkla would take over Alcoa's 45.45% interest in Sapa Profiles AB, which would make Sapa Profiles a wholly owned subsidiary of Orkla. Sapa Profiles was the world's leading producer of extruded aluminum profiles. The two stakes were assessed equally on a debt-free basis and the transaction had no significant effect on the cashflow of Alcoa or Orkla (Sapa Group, 2008).

Norse Hydro ASA announced that it had signed an agreement with Vattenfall Nordic for the supply of about 18 terawatt-hours of electricity during an 8-year period starting in 2013. This agreement was expected to secure the basis for continued operation of the Sør-Norge Aluminium AS (Søral) aluminum plant at Huses. Søral was a leading aluminum producer in Norway in 2008 (Molland, 2008).

**Nickel.**—The Nikkelverk refinery at Kristiansand, which was owned by Xstrata plc of Switzerland, processed primary nickel; associated cobalt, copper, and precious metals were recovered as byproducts. Nikkelverk used a chlorine leach and electrowinning process to separate and recover component metals, which is a cost-effective means of treating complex raw materials. The efficiency of this process allows greater flexibility in sourcing and treating custom feed. Nikkelverk had the capacity to process 86,000 metric tons per year (t/yr) of nickel, 39,000 t/yr of copper, and 5,200 t/yr of cobalt (Xstrata plc, 2008).

**Titanium.**—Titania A/S was one of the world's leading producers of ilmenite with about 6% of world production. It was the leading producer of ilmenite in Europe. Production from the Tellnes open pit mine resulted in about 915,000 metric tons (t) of ilmenite concentrate containing 44.7% titanium dioxide (Norwegian Geological Survey, 2009b, p. 20).

**Zinc.**—Crew Minerals ASA announced that it had secured the rights to a range of promising zinc deposits. The prospects included Grimsdalen, Killingdal North, Lergruvebakken, and Sivilvangen, which the company had acquired after completing geologic, geophysical, and structural reviews of the Roros and the Trondheim metallogenic provinces. Crew started exploration planning in 2008, and drilling was expected to begin in 2009 (Crew Minerals ASA, 2008).

## **Industrial Minerals**

Norway was a globally significant producer of industrial minerals from more than 30 mines. It was among the world's leading producers of olivine and nepheline syenite. Aggregate, gravel, and sand were some of Norway's important raw materials. Huustadmarmor AS was the world's leading producer of calcium carbonate slurry for the paper industry (Norwegian Geological Survey, 2009c, p. 15).

## **Mineral Fuels and Other Sources of Energy**

Norway had a highly developed natural gas and petroleum sector. Natural gas production has been steadily increasing and reached 99.1 billion cubic meters in 2008. Petroleum production, on the other hand, totaled 901,550 thousand barrels in 2008, which was about a 1% decline. One issue that had hampered the development of natural gas and petroleum reserves in the northern Barents Sea area was the lack of a defined maritime boundary between Norway and Russia. However, an agreement was worked out between Russia's state-owned company OAO Gazprom and Norway's state-owned StatoilHydro ASA whereby the companies would work together in exploring and developing their Arctic sea regions. A memorandum of understanding between the two state-owned companies was to be signed in early 2009 (U.S. Energy Information Administration, 2009a).

The Ministry of Petroleum and Energy announced that it had received applications from 46 qualified companies in the 20th licensing round. The Ministry expected to award licenses in the spring of 2009. There were 51 blocks in the Norwegian Sea and 28 blocks in the Barents Sea. Available licenses in the Barents Sea were considered important areas for further exploration that could lead to the opening of new exploration areas (Rigzone, 2008).

**Coal.**—Store Norske Spitsbergen Grubekompani AS (Store Norske), which owned 361 claims, reported estimated coal reserves of 100 Mt. The majority of the claims were concentrated in the central part of Spitsbergen. Store Norske was Norway's sole coal producer and the most northerly operator in the world. Norway continued to be a net coal exporter of production from two mines on Spitsbergen Island. About one-half of Store Norske's production was used in the country's only coal-fired power station on Spitsbergen Island (Store Norske Spitsbergen Kulkompani AS, 2008).

**Natural Gas.**—Norway had estimated proven reserves of 2.3 trillion cubic meters of natural gas as of January 2009. 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 and the Norwegian Seas. Norway's single largest natural gas field is the Troll-Oseberg field, which produced about 81 million cubic meters per day in 2008 and represented about one-third of Norway's natural gas production (U.S. Energy Information Administration, 2009b).

StatoilHydro's Snøhvit natural gas field project became the first development in the Barents Sea. The Snøhvit field was being tapped with subsea production facilities on the seabed, in water depths of 250 meters (m) to 345 m. A total of 20 wells were planned to produce gas from the Albatross, the Askeladd,

and the Snøhvit fields. The Snøhvit field comprises three reservoirs and contains 300 billion cubic meters of gas. Nine wells were planned, including eight for production and one for injecting carbon dioxide back below ground. Production from Snøhvit was expected to last from 30 to 35 years (Offshore Engineer, 2008).

**Petroleum.**—Norway, which has the largest petroleum reserves in Western Europe, was reported to have 6.7 billion barrels of estimated proven reserves as of January 2009. All the reserves are located offshore on the Norwegian Continental Shelf (NCS), which is divided into three sections: the Barents Sea, the North Sea, and the Norwegian Sea. The bulk of production took place in the North Sea, with smaller amounts in the Norwegian Sea. New exploration and production activities took place in the Barents Sea in 2008. Norway produced about 2.47 million barrels per day (Mbb/d) of petroleum, of which 91% (2.25 Mbb/d) was exported. This made Norway the world's third ranked petroleum exporter after Saudi Arabia and Russia and the sixth ranked net oil exporter in the world (U.S. Energy Information Administration, 2009c).

The Government reported that a total of 56 exploration wells had been spudded in 2008 compared with 32 exploration wells spudded in 2007. Almost every other well spudded on the NCS yielded a discovery, for a total of 25 new discoveries in 2008—a record-breaking year in the number of discoveries. Production continued to decline, however, as reserves were not being replaced. Beginning in 2008, most of the rigs on the NCS operated under long-term contracts (Norwegian Petroleum Directorate, 2009).

Dana Petroleum Norway AS (a subsidiary of Dana Petroleum plc of the United Kingdom) announced that it had been awarded an interest in eight offshore blocks. Seven are located in the North Sea and one is located in the Norwegian Sea. The awards were made through the 2008 Norwegian APA Licensing Round on the NCS. Dana held a substantial position offshore Norway, including 14 production licenses on the NCS that cover 25 blocks (Mbandi Information Services (Pty) Ltd., 2008).

Eni Norge AS's Goliat field was the first petroleum discovery to be developed in the Barents Sea. Eni Norge planned to bring the field onstream in 2013, and Goliat was expected to produce for at least 15 years. Goliat has two separate main reservoirs—the Kobbe and the Realgrunnen; both of these reservoirs contain petroleum with an overlying natural gas cap. The Kobbe formation lies about 1,800 m below sea level, and the Realgrunnen formation lies about 1,000 m below sea level. Estimates indicated that Goliat contained 174 million barrels (Mbb) of petroleum. The field was to be developed with a floating production and storage facility. Eni Norge considered the Barents Sea to be a more-long-term project for development than the other areas on the NCS, and the Barents Sea North was not open for exploration. Goliat would be the first field that Eni Norge would operate on the NCS (Norwegian Petroleum Directorate, 2008).

StatoilHydro brought its Volve field in the southern part of the Norwegian Sea onstream in early 2008. StatoilHydro was using the Maersk Inspirer (the world's largest jack-up platform and the only production jack-up in Norwegian waters) to produce the field. The oil would be stored in the Navion Saga tanker, and gas

would be sent to Sleipner A for storage. Petroleum output was expected to plateau at 50,000 barrels per day from eight wells, but StatoilHydro reported that another five wells were already being planned. Volve was expected to flow for 4 or 5 years and to recover 78.6 Mbbbl of petroleum and 1.5 billion cubic meters of natural gas (Petroleum Economist, 2008).

**Renewable Energy.**—Technology levels in 2008 made the expense of offshore wind power higher than other renewable energy sources. The cost per installed megawatt of offshore wind power was between €2.5 million and €3.5 million (\$3.5 million<sup>1</sup> and \$4.9 million). However, a report by the Norwegian Energy Council stated that, within a period of 10 years, offshore wind power would be profitable and that it could become a significant export industry for Norway. The Council believed that Norway could have access to 40 terawatts of renewable energy sources, of which one-half would be from offshore wind power (Barents Observer, 2008).

## Outlook

Exploring for and proving undiscovered resources is a prerequisite for recovering the mineral fuel resources on the NCS. Exploration drilling in frontier areas in the Barents Sea and the Norwegian Sea remains important and is likely to continue. The Norwegian Petroleum Directorate is expected to continue efforts to open up new offshore areas and to step up the search for undiscovered resources in existing areas. Norway's economy is highly dependant upon the country's hydrocarbon resources—they are the country's single largest source of revenue—and the Government is expected to continue to manage these resources.

Although Norway will most likely continue to obtain nearly all its electricity from hydropower, other renewable resources, such as wind power, are being investigated. Industrial minerals will continue to be important to the nation's economy.

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<sup>1</sup>Where necessary, values have been converted from European Union euros (€) to U.S. dollars (US\$) at a rate of €0.77=US\$1.00.

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

(Thousand metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008	
<b>METALS</b>						
<b>Aluminum:</b>						
Primary	metric tons	1,321,700	1,376,500	1,422,000	1,304,400	1,360,000 <sup>e</sup>
Secondary	do.	348,700	362,400	349,200	350,000	350,000 <sup>e</sup>
Cadmium, smelter	do.	141 <sup>r</sup>	153 <sup>r</sup>	125 <sup>r</sup>	269 <sup>r</sup>	178
Cobalt, metal, refined	do.	4,670	5,021	4,927	3,939	3,719
Copper, metal, refined, primary and secondary	do.	35,600	38,500	39,700	34,212	32,000 <sup>e</sup>
<b>Iron and steel:</b>						
Iron ore and concentrate, Fe content		408	420	620	1,437 <sup>r</sup>	2,046
<b>Metal:<sup>e</sup></b>						
Pig iron		100	100	100	100	100
<b>Ferroalloys:</b>						
Ferromanganese		245	130	130	200 <sup>r</sup>	215
Ferrosilicomanganese		260	290	250	250	200
Ferrosilicon, 75% basis		300	165	93	90	90
Silicon metal		194	176	150	150	150
Other		15	60	60	60	60
Total		1,010	820	680	750 <sup>r</sup>	715
Steel, crude		695 <sup>2</sup>	701 <sup>2</sup>	679 <sup>2</sup>	740 <sup>2</sup>	560
Semimanufactures, rolled		640	650	600	650	600
<b>Nickel:</b>						
<b>Mine output:</b>						
Concentrate <sup>e</sup>	metric tons	--	130	400	600 <sup>r</sup>	900 <sup>2</sup>
Ni content	do.	181	100	362	246 <sup>r</sup>	369
Metal, primary	do.	71,400	84,900	81,974 <sup>r</sup>	87,590 <sup>r</sup>	88,741 <sup>2</sup>
<b>Titanium:<sup>e</sup></b>						
Ilmenite concentrate		860	860	850	882 <sup>2</sup>	915 <sup>2</sup>
TiO <sub>2</sub> content		387	388	385	390	395
Zinc, metal, primary	metric tons	140,901	151,285	160,670 <sup>r</sup>	157,027 <sup>r</sup>	145,469
<b>INDUSTRIAL MINERALS</b>						
Cement, hydraulic <sup>e</sup>		1,870	1,900	1,850	1,800	1,800
Clays		230	230	320	319	279
Feldspar		510 <sup>r,e</sup>	270 <sup>r</sup>	65	65	62
Graphite	metric tons	2,300 <sup>e</sup>	8,893	9,000	1,400 <sup>r</sup>	1,528 <sup>2</sup>
Lime, hydrated, quicklime <sup>e</sup>		100	100	100	100	100
Mica, flake <sup>e</sup>	metric tons	2,600	2,700	2,700	1,000	1,000
Nepheline syenite <sup>e</sup>		330 <sup>r</sup>	320 <sup>r</sup>	330 <sup>r</sup>	312 <sup>2</sup>	346 <sup>2</sup>
Nitrogen, N content of ammonia		420	300	350	350	350
Olivine sand <sup>e</sup>		3,100	3,100	3,000	2,562 <sup>r,2</sup>	2,554 <sup>2</sup>
Sand and gravel		1,500	1,500	13,418	15,325	14,817
<b>Stone, crushed:</b>						
Dolomite		850 <sup>e</sup>	513	525 <sup>e</sup>	826 <sup>r</sup>	744
Limestone		7,300 <sup>e</sup>	7,200 <sup>e</sup>	7,200 <sup>e</sup>	8,770 <sup>r</sup>	6,781
Quartz and quartzite		1,200 <sup>r</sup>	909	834 <sup>r</sup>	1,067 <sup>r</sup>	1,025
<b>Sulfur, byproduct:<sup>e</sup></b>						
Metallurgical		85 <sup>2</sup>	80 <sup>2</sup>	80	80	80
Petroleum		18	20	20	20	20
Total		103	100	100	100	100
Talc, soapstone, steatite		32 <sup>r</sup>	34 <sup>r</sup>	57 <sup>r</sup>	66 <sup>r</sup>	38
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Coal, all grades		300 <sup>e</sup>	300 <sup>e</sup>	236	322	343
Gas, natural, marketed <sup>3</sup>	million cubic meters	78,465	84,964	87,600 <sup>r</sup>	89,700 <sup>r</sup>	99,200
Peat, for agricultural use	do.	-- <sup>r</sup>	-- <sup>r</sup>	78 <sup>r</sup>	159 <sup>r</sup>	497

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008	
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude <sup>4</sup>	thousand 42-gallon barrels	1,024,400	964,290	965,000	923,940 <sup>r</sup>	901,550
Natural gas liquids <sup>c</sup>	do.	52,695 <sup>2</sup>	60,879 <sup>2</sup>	60,000	60,000	50,000
Refinery products: <sup>c</sup>						
Naphtha	do.	8,741 <sup>2</sup>	10,017 <sup>2</sup>	10,000	10,000	10,000
Gasoline	do.	23,913 <sup>2</sup>	28,078 <sup>2</sup>	28,000	28,000	28,000
Kerosene	do.	4,774 <sup>2</sup>	5,771 <sup>2</sup>	5,800	5,800	5,800
Distillate fuel oil	do.	45,765 <sup>2</sup>	50,121 <sup>2</sup>	50,000	50,000	50,000
Residual fuel oil	do.	13,823 <sup>2</sup>	11,806 <sup>2</sup>	12,000	12,000	12,000
Other products	do.	3,351 <sup>2</sup>	4,194 <sup>2</sup>	4,000	4,000	4,000
Refinery fuel and losses	do.	2,757 <sup>2</sup>	2,977 <sup>2</sup>	3,000	3,000	3,000
Total	do.	103,124 <sup>2</sup>	112,964 <sup>2</sup>	113,000	113,000	113,000

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

<sup>1</sup>Table includes data available through November 30, 2009.

<sup>2</sup>Reported figure.

<sup>3</sup>Reported as total methane sales.

<sup>4</sup>Excluding natural gas liquids.

TABLE 2  
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(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 A/S, 70%)	Smelters at Ardal, Hoyanger, Husnes, Karmoy and Sunndal	600
Do.	do.	Plant at Holmestrand	90
Do.	Elkem Aluminium ANS (Alcoa Inc., 100%)	Smelters at Farsund and Mosjoen	250
Do.	Sør-Norge Aluminium A/S (Norse Hydro A/S, 50%, and Rio Tinto Alcan, 50%)	Smelter at Husnes	165
Cadmium	Norzink A/S (Outokumpu Oyj, 100%)	Smelter at Eitrheimsneset	0.3
Cement	Norcem A/S	Plants at Brevik and Kjøpsvik	2,150
Coal	Store Norske Spitsbergen Kulkompani A/S	Mines at Longyearbyen and Svea	450
Cobalt	Nikkelverk A/S (Falconbridge Nickel Mines Ltd., 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 Kvitblikl	500
Feldspar	Franzefoss Bruk A/S	Mine at Lillesand	100
Ferroalloys	Elkem Salten (Elkem A/S, 100%)	Ferrosilicon plant at Straumen	90
Do.	Elkem Bjølvefossen (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
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

See footnote at end of table.

TABLE 2—Continued  
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
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 Mine at Surnadal	20
Do.		Breivik Kalkverk A/S	Alesund Mine at Larsnes	20
Do.		Mjoendalen Kalkfabrik	Plant at Asen/Drammen	7
Limestone		Norcem A/S	Dalen, Bjornvedt, and Kjopsvik Mines	1,600
Do.		Vardelskalk A/S (Franzefoss Burk A/S, 100%)	Sandvika Mine	800
Do.		Breivik Kalkverk A/S	Visnes and Glaerum Mines	500
Magnesium		Norsk Hydro A/S (Government, 51%)	Plants at Porsgrunn and Sauda	50
Manganese, alloys		Eramet SA	do.	500
Natural gas	million cubic meters	StatoilHydro ASA	Gama, Gullfaks, Sleipner Ost, and Statfjord fields	12,270
Do.	do.	Phillips Petroleum Company Norway	Ekofisk field	9,900
Do.	do.	Elf Petroleum Norge A/S	Frigg, Heimdal, and Ost-Frigg fields	5,750
Do.	do.	Norsk Hydro Produksjon A/S	Troll-Oseberg field	2,600
Do.	do.	StatoilHydro 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.	BP Petroleum Development of Norway	Gyda and Ula fields	1,040
Do.	do.	Esso Norge A/S	Odin field	1,000
Do.	do.	Amoco Norway A/S	Hod and Valhall fields	910
Nepheline syenite		North Cape Mineral A/S (Unimin Corp., 84%)	Mine at Stjernoy	350
Nickel:				
Ore, Ni content		Nikkel og Olivin A/S (Outokumpu Oyj, 100%)	Mine at Narvik	3
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		North Cape Minerals A/S (Sibelco Group, 89%, and Franzefoss A/S, 11%)	Aheim Mine and plant	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	StatoilHydro ASA (Government, 100%)	Gullfaks, Statfjord, Tommeliten, and Veslefrikk fields	1,069,300
Do.	do.	Norsk Hydro Produksjon A/S	Brage, Mime, and Oseberg fields	566,200
Do.	do.	Phillips Petroleum Company Norway	Ekofisk field	237,500
Do.	do.	Saga Petroleum A/S	Snorre field	170,000
Do.	do.	BP Petroleum Development of Norway	Gyda and Ula fields	155,000
Do.	do.	A/S Norske Shell	Draugen field	90,000
Do.	do.	ExxonMobil Refining & Supply Co.	Slagen refinery	110,000
Do.	do.	Statoil Mongstad	Mongstad refinery	200,000
Pyrite		Folldal Verk A/S (Norsulfid A/S, 100%)	Mine at Hjerkind	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 Jernverk, 50%, and Rautaruukki Group, 50%)	Plants at Christiania, Mandal Stal, Mo i Rana, and Spigerverk	600
Talc		A/S Norwegian Talc (Pluess-Staufer AG, 51%)	Mine and plant at Altermark/Knarrevik 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	4,000
Zinc, metal		Norzik A/S (Outokumpu Oyj, 100%)	Smelter at Odda	150
Do., do. Ditto.				