



# 2013 Minerals Yearbook

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## NORWAY

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# THE MINERAL INDUSTRY OF NORWAY

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Norway's mineral production included coal, iron ore, natural gas, nickel, petroleum, sand and gravel, crushed stone, and titanium. Norway was the world's 3d-ranked natural gas exporter and the 12th-ranked net exporter of crude petroleum in 2013. 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 (table 1; U.S. Central Intelligence Agency, 2014; U.S. Energy Information Administration, 2014).

## Production

Norway produced various mineral commodities, including aluminum, cadmium, cobalt, copper, ferroalloys, nickel, steel, and zinc; and it was a global supplier of aluminum, ferroalloys, and petroleum. Production of cobalt and petroleum 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 7.4% of world production (Bedinger, 2015).

## 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 2013 and their respective mine and (or) plant locations and capacities.

## Mineral Trade

Norway was not a member of the European Union (EU), but it participated in the EU single 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 2013. Norway was the 12th-ranked petroleum exporter in the world and the largest, measured by volume, petroleum producer in Europe in 2013. The country was the third-ranked natural gas exporter in the world after Russia and Qatar (U.S. Energy Information Administration, 2014).

The U.S. trade in goods with Norway in 2013 totaled \$4,488 million<sup>1</sup> in exports and \$5,488 million in imports for a negative trade balance of about \$1 billion. U.S. mineral exports to Norway included, in order of value, petroleum products, drilling and oilfield equipment, coal and other fuels, fuel oil, and finished metal shapes. Norway's mineral exports to the United States included petroleum products, crude petroleum, fuel oil, liquefied petroleum gases, and nickel. In 2013, Norway exported \$97 billion in crude oil and natural gas and \$1.02 billion in mining and quarrying goods (Statistics Norway, 2014; U.S. Census Bureau, 2014a, b).

<sup>1</sup>Where necessary, values have been converted from Norwegian kroner (NOK) to U.S. dollars (US\$) at an annual average rate of exchange of NOK5.8823=US\$1.00 for 2013.

## Commodity Review

### Metals

**Cobalt, Copper, and Platinum-Group Metals.**—Nordic Mining ASA's exploration efforts in northern Norway led to the discovery of magmatic mineralization in the Lokkarfjord and Reinfjord areas of the Øksfjord Peninsula that contained cobalt, copper, gold, and platinum-group metals. 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, 2014c).

**Gold.**—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 exploration activity at Bidjovagge had resulted in the discovery of mineral resources of about 1.4 million metric tons (Mt) with reported grades of 3.4 grams per metric ton gold and 1.1% copper. Arctic Gold was investigating the possibility of increasing the mineral resource estimate and proving an ore reserve that could be extracted using conventional methods (Arctic Gold AB, 2014).

**Titanium.**—In 2013, Nordic Mining continued with its proposed rutile mine development project at Engebøfjellet. The 2.5-kilometer (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 of the radioactive elements thorium and uranium, which are usually present in deposits of eclogite. The mining operation would be developed in two stages; first, as an open pit operation, which would be active 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 expecting to produce 100,000 metric tons per year (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 a new Government regulation that allows for increased use of silica minerals in abrasive applications (Nordic Mining ASA, 2014a).

### Industrial Minerals

Norway was a significant regional producer of industrial minerals. Production of aggregate, gravel, and sand for domestic use and export was a significant contributor to the national economy.

**Silica.**—Nordic Mining ASA 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 3 Mt of crystalline hydrothermal quartz in a 12.6-km-long vein that reaches a depth of 150 meters. The quartz vein is situated in Proterozoic-age rocks located south of the Hardanger Fault Zone (HFZ). The HFZ is a 600-km-long Caledonian ductile shear zone (Nordic Mining ASA, 2014b).

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

Norway was characterized by an abundance of two forms of energy: hydroelectric power and mineral fuel resources. The bulk of domestic demand for energy was fulfilled with hydroelectric power; mineral fuels were produced mainly for export. Norway had a highly developed natural gas and petroleum sector. Norway was the leading petroleum producer and exporter in Europe.

**Coal.**—Store Norske Spitsbergen Grubekompani A/S (SNSG) (wholly owned by Store Norske Spitsbergen Kulkompani A/S) 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. In 2013, the Gruve 7 Mine produced 64,687 metric tons (t) of salable coal, and the Svea Nord Mine produced 1,778,325 t. Development work at a new mine, the Lunckefjell Mine, started in December 2013, and 11,871 t of salable coal was produced. Norway continued to be a net exporter of coal; more than 50% of Norway's coal production was exported to Germany (Store Norske Spitsbergen Kulkompani A/S, 2014, p. 8–10).

**Natural Gas.**—Norway had estimated proven reserves of 2.09 trillion cubic meters of natural gas as of January 1, 2014. Norway's natural gas production had been increasing every year since 1993; however, production had decreased since 2011. 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, 2014).

**Petroleum.**—Norway, which has the largest petroleum reserves in Europe, was reported to have 5.83 billion barrels of proven reserves as of January 1, 2014. All the reserves were located offshore on the Norwegian Continental Shelf (NCS), which is divided into three sections that lie in the Barents Sea, the North Sea, and the Norwegian Sea, respectively. 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. According to the U.S. Energy Information Administration, new exploration and production activity was taking place in the Barents Sea (U.S. Energy Information Administration, 2014).

Wintershall Holdings GmbH of Germany (Wintershall) was continuing its growth in northern Europe with the receipt of eight new licenses in the North Sea. Wintershall was one of the leading license holders on the NCS. The company was proceeding with the Edvard Grieg, the Knarr, and the Maria development projects (Wintershall Holdings GmbH, 2014).

**Renewable Energy.**—Energi Norge [Energy Norway] is a nonprofit industry organization that is composed of 270 companies that produce, distribute, and trade electricity in Norway. Energy Norway's members together produce nearly 130 terawatt-hours (TWh) each year, which is 99% of all

power production in Norway. The majority of the electricity is generated using hydropower and renewable energy sources, such as wind power and biomass. According to Energy Norway, Norway has only 1% of Europe's population but 20% of the hydropower resources, 40% of the gas resources, and 60% of the oil resources of the continent. Energy Norway members also have approximately 2.5 million grid customers, which is about 91% of Norway's grid customers. The members of Energy Norway have about 15,000 employees (Energi Norge, 2014).

### **Outlook**

Norway is expected to continue to obtain nearly all its electricity from hydropower; however, increased use of 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.

Norway's hydrocarbon sector is likely to continue to be a significant source of revenue to the Government as petroleum exploration continues in the Barents Sea and the Norwegian Sea. The Norwegian Petroleum Directorate is expected to continue with efforts to open up new offshore areas, particularly in the Arctic region.

### **References Cited**

- Arctic Gold AB, 2014, About Arctic Gold: Arctic Gold AB. (Accessed June 24, 2014, at <http://www.arcticgold.se/about.html>.)
- Bedinger, G.M., 2015, Titanium mineral concentrates: U.S. Geological Survey Mineral Commodity Summaries 2015, p. 172–173.
- Energi Norge, 2014, Energy Norway: Energi Norge. (Accessed June 25, 2014, at <http://www.energinorge.no/english/>.)
- Nordic Mining ASA, 2014a, Engebø rutile: Nordic Mining ASA. (Accessed June 26, 2014, at <http://www.nordicmining.com/engeboe-rutile-english/category317.html>.)
- Nordic Mining ASA, 2014b, Kvinherad quartz: Nordic Mining ASA. (Accessed June 26, 2014, at <http://www.nordicmining.com/nordic-mining-kvinherad-quartz/category276.html>.)
- Nordic Mining ASA, 2014c, Øksfjord Peninsula: Nordic Mining ASA. (Accessed June 26, 2014, at <http://www.nordicmining.com/new-nickel-copper-and-platinum-group-element-discoveries-in-north-norway/category139.html>.)
- Statistics Norway, 2014, Annual national accounts 2013: Statistics Norway, May 20. (Accessed July 28, 2015, at <http://www.ssb.no/en/nasjonalregnskap-og-konjunkturer/statistikker/nr/aar/2014-05-20?fane=tabell&sort=nummer&tabell=178442>.)
- Store Norske Spitsbergen Kulkompani A/S, 2014, Annual report 2013: Store Norske Spitsbergen Kulkompani A/S, April, 52 p. (Accessed July 28, 2015, at <http://snsk.custompublish.com/getfile.php/2679556.1589.dtbxtwbceff/2013%5B1%5D.pdf>.)
- U.S. Census Bureau, 2014a, U.S. exports to Norway by 5-digit end use code: U.S. Census Bureau. (Accessed June 26, 2014, at <http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c4039.html>.)
- U.S. Census Bureau, 2014b, U.S. imports from Norway by 5-digit end use code: U.S. Census Bureau. (Accessed June 26, 2014, at <http://www.census.gov/foreign-trade/statistics/product/enduse/imports/c4039.html>.)
- U.S. Central Intelligence Agency, 2014, Norway, in *The world factbook*: U.S. Central Intelligence Agency. (Accessed June 23, 2014, at <https://www.cia.gov/library/publications/the-world-factbook/geos/no.html>.)
- U.S. Department of State, 2014, Norway: U.S. Department of State fact sheet. (Accessed June 23, 2014, at <http://www.state.gov/r/pa/ei/bgn/3421.htm>.)
- U.S. Energy Information Administration, 2014, Norway: U.S. Energy Information Administration country analysis brief. (Accessed June 26, 2014, at <http://www.eia.gov/beta/international/analysis.cfm?iso=NOR>.)
- Wintershall Holding GmbH, 2014, Wintershall is awarded eight new licenses in Norway: Wintershall Holding GmbH. (Accessed September 8, 2014, at <http://www.wintershall.com/en/press-news/detail/news/wintershall-is-awarded-eight-new-licenses-in-norway.html>.)

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

(Thousand metric tons unless otherwise specified)

Commodity	2009	2010	2011	2012	2013 <sup>e</sup>	
<b>METALS</b>						
<b>Aluminum:</b>						
Primary	metric tons	1,139,000	1,298,000 <sup>r</sup>	1,389,000 <sup>r</sup>	1,145,000 <sup>r</sup>	1,150,000
Secondary <sup>c</sup>	do.	350,000	300,000	300,000	250,000	250,000
Cadmium, metal	do.	249	300	309	310 <sup>r</sup>	290
Cobalt, metal, refined	do.	3,510	3,208	3,067	2,969	3,400 <sup>2</sup>
Copper, metal, refined, primary and secondary	do.	33,900	32,000 <sup>e</sup>	32,000 <sup>e</sup>	36,000	36,000
<b>Iron and steel:</b>						
Iron ore and concentrate, Fe content		896	3,105 <sup>r</sup>	2,532	3,421	3,400
<b>Metal:</b>						
<b>Ferroalloys:</b>						
Ferromanganese		197	297	338	326 <sup>r</sup>	320
Ferrosilicomanganese		231	249	266	271 <sup>r</sup>	270
Ferrosilicon, 75% basis <sup>c</sup>		233 <sup>2</sup>	230	230	250	285
Silicon metal <sup>c</sup>		150	175	175	150	150
Steel, crude		579	514	620	600	600
Mercury <sup>c</sup>	metric tons	30	25	25	25	25
<b>Nickel:</b>						
Mine output, concentrate, Ni content	do.	369	351	339	351	350
Metal, primary	do.	88,577	92,100	92,427	91,687	90,000
<b>Titanium:</b>						
Ilmenite concentrate		671	864	870	831	830
TiO <sub>2</sub> content		289	371	400 <sup>e</sup>	400 <sup>e</sup>	400
Zinc, metal, primary	metric tons	137,622	147,775	153,200	152,647	152,000
<b>INDUSTRIAL MINERALS</b>						
Cement, hydraulic		1,093 <sup>r</sup>	1,298 <sup>r</sup>	1,387 <sup>r</sup>	1,500 <sup>e,r</sup>	1,500
Clays		227	230 <sup>e</sup>	230 <sup>e</sup>	225	225
Feldspar		71	56	25	--	--
Graphite, flake	metric tons	4,562	6,270	7,789	6,992	7,000
Lime, hydrated, quicklime <sup>c</sup>		100	100	100	125	125
Mica, flake <sup>c</sup>	metric tons	1,000	--	--	--	--
Nepheline syenite		270 <sup>e</sup>	327	330	320	300
Nitrogen, N content of ammonia		300	300	300	300	300
Olivine sand		1,267	2,560	2,237	1,650	1,600
Sand and gravel		13,047	13,011	13,215	1,426	1,400
<b>Stone, crushed:</b>						
Dolomite		579	604	682	643	640
Limestone		6,151	6,129	5,956	5,856	5,800
Quartz and quartzite		1,022	1,055	1,162 <sup>e</sup>	1,083	1,000
<b>Sulfur, byproduct:<sup>c</sup></b>						
Metallurgical		90	80	90	90	90
Petroleum		20	20	19	20	20
Total		110	100	109	110	110
Talc, soapstone, steatite	metric tons	2,300	6,400	8,191	7,983	8,000
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Coal, all grades		2,437	1,685	1,640	1,583	1,855 <sup>2</sup>
Gas, natural, marketed <sup>3</sup>	million cubic meters	99,000	105,280	101,376	106,710	106,700
Peat, for agricultural use <sup>c</sup>	do.	480	490	500	500	500
<b>Petroleum:</b>						
Crude <sup>4</sup>	thousand 42-gallon barrels	854,830	777,450	732,555	694,230	558,413 <sup>2</sup>
<b>Refinery products:</b>						
Naphtha	do.	NA <sup>r</sup>	NA <sup>r</sup>	NA <sup>r</sup>	NA <sup>r</sup>	NA
Gasoline	do.	30,149 <sup>r</sup>	28,142	32,303 <sup>r</sup>	30,920 <sup>r</sup>	30,900
Jet fuel	do.	4,745	3,942	4,380	4,636	4,600
Kerosene	do.	1,351	1,971	511	1,351	1,350

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	2009	2010	2011	2012	2013 <sup>c</sup>	
Petroleum:—Continued						
Refinery products:—Continued						
Distillate fuel oil	thousand 42-gallon barrels	45,881 <sup>r</sup>	43,545	49,567 <sup>r</sup>	46,866 <sup>r</sup>	46,800
Residual fuel oil	do.	13,140	12,301	11,425 <sup>r</sup>	10,366 <sup>r</sup>	10,300
Other products	do.	18,287 <sup>r</sup>	17,776 <sup>r</sup>	17,447 <sup>r</sup>	20,805 <sup>r</sup>	20,800
Total <sup>e</sup>	do.	1,070,000 <sup>r</sup>	994,600 <sup>r</sup>	953,700 <sup>r</sup>	920,000 <sup>r</sup>	782,000

<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. NA Not available. -- Zero.

<sup>1</sup>Table includes data available through June 27, 2014.

<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 2013

(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 and Husnes	1.02
Do.	do.	Rolling mill at Holmestrand	90
Do.	Alcoa Inc.	Smelters at Lista and Mosjoen	282
Cadmium	metric tons Boliden Odda A/S (Boliden AB, 100%)	Smelter at Eitrheimsneset	0.3
Cement	Norcem A/S (HeidelbergCement Group)	Plants at Brevik and Kjøpsvik	1,700
Coal	Store Norske Spitsbergen Grubekompani A/S (SNSG)	Mines at Longyearbyen and Svea	1,900
Cobalt	Nikkelverk A/S (Glencore Xstrata plc, 100%)	Refinery at Kristiansand	3
Copper, metal	do.	do.	40
Dolomite	Franzefoss MiljokalkA/S	Mine at Ballangen	350
Do.	Omya Hustadmarmor A/S	Mines at Hammerfall and Seljeli	900
Ferroalloys	Elkem Bjolvefossen (China Bluestar)	Ferrosilicon plant at Alvik	NA
Do.	Elkem Bremanger (China Bluestar)	Ferrosilicon plant at Svelgen	NA
Do.	Finnfjord Smelteverk A/S	Ferrosilicon plant at Finnsnes	100
Do.	FESIL Rana Metall ASA (MFC Group)	Ferrosilicon plant at Mo i Rana	90
Do.	Hafsil AS	Ferrosilicon powder plant at Sarpsborg	5
Do.	Eramet Norway	Ferromanganese plant at Porsgrunn	115
Do.	do.	Ferromanganese plant at Sauda	170
Do.	Glencore Manganese (Glencore Xstrata plc., 100%)	Ferromanganese plant at Mo i Rana	120
Graphite, flake	Skaland Graphite AS (LNS Group)	Traelen Mine and plant at Skaland	9
Iron, metal	Ulstein Jernstoperi A/S (Bergen Engines A/S)	Hordvikneset	10
Do.	TiZir	Pig iron production at Tyssedal	110
Iron ore	Rana Gruber A/S (LNS Group)	Mine at Mo i Rana	4,600
Do.	Northern Iron Ltd.	Mine at Bjørnevattn	6,000
Lime	Hylla Kalkverk (Franzefoss Minerals, 100%)	Verdal plant	200
Limestone	Norcem A/S (HeidelbergCement Group)	Dalen, Bjornstvedt, and Kjøpsvik Mines	1,600
Do.	Bronnoy Kalk	Akselberg Mine	2,200
Do.	Vardelskalk A/S (Franzefoss Burk A/S, 100%)	Sandvika Mine	800
Do.	Visnes Kalk	Lyngstad quarry	600
Do.	Franzefoss Minerals	Hamar and Hole quarries	50

See footnotes at end of table.

TABLE 2—Continued  
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Manganese, alloys		Eramet Norway	Silicomanganese plant at Kvinesdal	160
Do.		do.	Silicomanganese plant at Porsgrunn	65
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, 40%; Petoro, 30%; Marathon Petroleum Norge AS, 20%; Norsk Hydro ASA, 10%	Skirne field	1,550
Do.	do.	Esso Norge A/S	Odin field	1,000
Do.	do.	Amoco Norway A/S	Hod and Valhall fields	910
Nepheline syenite		Sibelco Nordic AS	Mine at Stjernoy	350
Nickel:				
Ore, concentrate, Ni content		Titania A/S (Kronos Norge A/S, 100%)	Mine at Tellnes	0.35
Metal		Nikkelverk A/S (Glencore Xstrata plc., 100%)	Refinery at Kristiansand	85
Olivine		Sibelco Nordic AS	Mines and plant at Aheim	2,000
Petroleum				
Do.	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
Quartzite		Elkem Tana (China Bluestar)	Mine at Tana	1,200
Do.		Elkem Marnes (China Bluestar)	Mine at Marnes	200
Do.		Georg Tveit A/S (Eramet Norway, 75%)	Mine at Kragero	110
Silicon metal		Elkem Salten (China Bluestar)	Silicon plant at Straumen	70
Do.		Elkem Thamshavn (China Bluestar)	Silicon plant at Orkanger	45
Do.		Holla Metall (Wacker Chemicals Norway A/S)	Plant at Holla	50
Steel		Celsa Armeringsstal	Plant at Mo i Rana	600
Titanium, ilmenite 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.