



2014 Minerals Yearbook

NORWAY

THE MINERAL INDUSTRY OF NORWAY

By Alberto Alexander Perez

Norway is a northern European country, which, while not a member of the European Union (EU), participated in the EU's euro area single market through the European Economic Area. Mineral trade was important to the economy in 2014, and, in terms of the export value, petroleum was Norway's most valuable mineral commodity. In 2014, Norway was the 15th-ranked crude petroleum producer in the world and, in terms of the volume of output, the leading crude petroleum producer in Europe. Norway's production of ilmenite accounted for about 8% of world production (U.S. Energy Information Administration, 2015b; Bedinger, 2016).

Norway relied heavily on its production and export of hydrocarbons to finance its economy; nonetheless, despite the volatility in crude oil prices in 2014, the country's real gross domestic product increased to \$499.8 billion¹ in 2014 from \$487 billion in 2013. The principal mineral commodities produced in Norway were coal, iron ore, natural gas, nickel, petroleum, sand and gravel, stone, and titanium. 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. Energy Information Administration, 2014; Statistics Norway, 2015).

Minerals in the National Economy

In 2014, the natural gas and crude petroleum sector accounted for the largest portion of the country's exports and, 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), which was valued at more than \$870 billion. Norway's SWF was the second largest of all the SWFs after Luxembourg. Several United States companies had invested in and were part of Norway's petroleum sector, and several Norwegian companies participated in the petroleum sector of the United States. United States trade in goods with Norway in 2013 (the latest year for which information was available) totaled \$4.488 billion in exports and \$5.488 billion in imports, for a negative trade balance of about \$1 billion. United States mineral exports to Norway included 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 (U.S. Census Bureau, 2014a, b; Statistics Norway, 2015; U.S. Central Intelligence Agency, 2015).

¹Where necessary, values have been converted from Norwegian kroner (NOK) to U.S. dollars (US\$) at an annual average exchange rate of NOK 6.3051=US\$1.00. All values are nominal, at current prices, unless otherwise stated.

Production

Norway's production of graphite increased by 33.8% in 2014. Other significant increases in mineral production included quartz and quartzite (increased by 24.5%), zinc metal (15.4%), iron ore (13%), primary aluminum (8.2%), dolomite (8%), ilmenite (4.6%), and copper metal (4.1%). The production of olivine sand decreased by 18%. Other significant decreases in mineral production included that of coal (by 8.3%) and cadmium metal (6.5%) (table 1).

Structure of the Mineral Industry

Norway's 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 2014 and their respective mine and (or) plant locations and capacities.

Commodity Review

Metals

Cobalt, Copper, and Platinum-Group Metals.—Nordic Mining ASA's exploration efforts in northern Norway were concentrated in the Lokkarfjord and the Reinfjord areas of the Øksfjord Peninsula, and the deposits in these areas were reported to contain 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 provinces 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 of commercial value (Nordic Mining ASA, 2014c).

Titanium.—In 2014, Nordic Mining continued with its proposed rutile mine development project at Engebøfjellet. The mining operation would be developed in two stages: first, with 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. The 2.5-kilometer (km)-long rutile-bearing eclogite body was reported to contain a mineral resource of 154 million metric tons (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. 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 (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.

Quartz and Quartzite.—Nordic Mining planned to produce high-quality quartz at its Nesodden deposit near Kvinnherad in western Norway. The deposit had been estimated to have mineral resources of 3 Mt of crystalline hydrothermal quartz on a 12.6-km-long vein that reached a depth of 150 meters (m). The quartz vein is situated in Proterozoic 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, 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 and was the leading petroleum producer and exporter in Western Europe.

Coal.—Store Norske Spitsbergen Grubekompani AS (SNSG), which was wholly owned by Store Norske Spitsbergen Kulkompani AS, continued to be Norway's sole coal producer. The company's two mines, the Gruve 7 Mine and the Svea Nord Mine, were located on the Arctic archipelago of Svalbard, which is situated about midway between mainland Norway and the North Pole. In 2013 (the latest year for which data were available), 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 AS, 2014, p. 8–10).

Petroleum.—Norway, which has the largest petroleum reserves in Europe, was reported to have 5.8 billion barrels of proven reserves in 2014. All the reserves were located offshore on the Norwegian Continental Shelf, 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. According to the U.S. Energy Information Administration, new exploration and production activity was taking place in the Norwegian Sea and the Barents Sea (U.S. Energy Information Administration, 2014; 2015a).

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. Combined, Energy Norway's members produce nearly 130 terawatt-hours 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

Despite the volatility in international prices of crude petroleum, Norway is expected to continue to rely heavily on its petroleum exports to keep its economy growing. It is likely that Norway will increase its investment in and development of the natural gas industry to increase its production and exports, which could compensate for decreasing revenues from lower crude oil prices. The Norwegian Petroleum Directorate is expected to continue with efforts to open up new offshore areas, particularly in the Arctic region. 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 COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity	2010	2011	2012	2013	2014	
METALS						
Aluminum:						
Primary	metric tons	1,298,000	1,389,000	1,145,000	1,154,900 ^r	1,250,000 ^e
Secondary ^e	do.	300,000	300,000	250,000	250,000	250,000
Cadmium, metal	do.	300	309	310	310 ^r	290 ^e
Cobalt, metal, refined	do.	3,208	3,067	2,969	3,348 ^r	3,500 ^e
Copper, metal, refined, primary and secondary	do.	32,000 ^e	32,000 ^e	36,000	37,461 ^r	39,000 ^e
Iron and steel:						
Iron ore and concentrate, Fe content		3,105	2,532	3,421	3,409 ^r	3,854
Metal:						
Ferrous alloys:						
Ferromanganese		297	338	326	320	320
Ferrosilicomanganese		249	266	271	270	270
Ferrosilicon, 75% basis ^e		230	230	250	285	285
Silicon, metal ^e		175	175	150	180 ^r	180
Steel, crude		514	620	600	605 ^r	595
Mercury ^e	metric tons	25	25	25	25	25
Nickel:						
Mine output, concentrate, Ni content	do.	351	339	351 ²	350	350 ^e
Metal, primary	do.	92,100	92,427	91,687	91,017 ^r	92,000
Titanium:						
Ilmenite concentrate		864	870	831	826 ^r	864
TiO ₂ content		371	400 ^e	400	400	400 ^e
Zinc, metal, primary	metric tons	147,775	153,200	152,647	143,000	165,000
INDUSTRIAL MINERALS						
Cement, hydraulic ^e		1,298	1,387	1,500	1,700 ^{r,2}	1,700 ²
Clays		230 ^e	230 ^e	225	225	225
Feldspar		56	25	--	--	154
Graphite, flake	metric tons	6,270	7,789	6,992	6,207 ^r	8,308
Lime, hydrated, quicklime ^e		100	100	125	125	125
Nepheline syenite		327	330	320	320 ^r	331
Nitrogen, N content of ammonia		300	300	300	300	300
Olivine sand		2,560	2,237	1,650	1,702 ^r	1,394
Sand and gravel		13,011	13,215	14,260 ^r	13,984 ^r	14,110
Stone, crushed:						
Dolomite		604	682	643	661 ^r	714
Limestone		6,129	5,956	5,856	5,703 ^r	5,839
Quartz and quartzite		1,055	1,162 ^e	1,083	1,451 ^r	1,095
Sulfur, byproduct:^e						
Metallurgical		80	90	90	90	90
Petroleum		20	19	20	20	20
Total		100	109	110	110	110
Talc, soapstone, steatite	metric tons	6,400	8,191	7,983	-- ^r	--
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades		1,685	1,640	1,583	1,855 ^r	1,701
Gas, natural, marketed	million cubic meters	105,280	101,376	106,710	113,116 ^r	112,796
Peat, for agricultural use ^e	do.	490	500	500	500	500
Petroleum:						
Crude	thousand 42-gallon barrels	777,450	732,555	694,230	558,450 ^r	572,320
Refinery products:						
Gasoline	do.	28,142	32,303	30,920	32,850 ^r	32,800 ^e
Jet fuel	do.	3,942	4,380	4,636	3,650 ^r	3,600 ^e
Kerosene	do.	1,971	511	1,351	2,555 ^r	2,550 ^e
Distillate fuel oil	do.	43,545	49,567	46,866	51,100 ^r	51,100 ^e
Residual fuel oil	do.	12,301	11,425	10,366	10,950 ^r	11,000 ^e
Other products	do.	17,776	17,447	20,805	21,170 ^r	21,200 ^e
Total ^e	do.	107,700	115,600	114,900	122,275 ^r	122,250 ^e

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through August 17, 2015.

²Reported figure.

TABLE 2
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2014

(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, Sunndal, and Husnes	1,020
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	Mines at Longyearbyen and Svea	2,000
Cobalt, metal		Nikkelverk A/S (Glencore plc, 100%)	Refinery at Kristiansand	3
Copper, metal		do.	do.	40
Dolomite		Franzefoss Miljøkalk A/S	Mine at Ballangen	350
Do.		Omya Hustadmarmor A/S	Mines at Hammerfall and Seljeli	900
Ferroalloys		Elkem Bjølvefossen (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 AS	Ferromanganese plant at Porsgrunn	115
Do.		do.	Ferromanganese plant at Sauda	170
Do.		Glencore Manganese (Glencore 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 Ltd. (Eramet Group, 50%)	Tysedal (pig iron)	110
Iron ore		Rana Gruber A/S (LNS Group)	Mine at Mo i Rana	4,600
Do.		Northern Iron Ltd.	Mine at Bjørnevatn	6,000
Lime		Hylla Kalkverk (Franzefoss Minerals, 100%)	Verdal plant	200
Limestone		Norcem A/S (HeidelbergCement Group)	Dalen, Bjørntvedt, 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.		Lynges Kalk AS	Lyngstad quarry	600
Do.		Franzefoss Minerals	Hamar and Hole quarries	50
Manganese, alloys		Eramet Norway AS	Silicomanganese plant at Kvinesdal	160
Do.		do.	Silicomanganese plant at Porsgrunn	65
Natural gas	million cubic meters	Statoil ASA	Grane, 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, 30%; Marathon Petroleum Norge AS, 20%	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		Sibelco Nordic	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 plc., 100%)	Refinery at Kristiansand	85
Olivine		Sibelco Nordic AS	Mines and plant at Aheim	2,000
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	11,000
Do.	do.	Statoil Mongstad A/S (Statoil ASA, 100%)	Mongstad Refinery	84,000
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 AS, 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 minerals, 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. NA Not available.