



2019 Minerals Yearbook

NORWAY [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF NORWAY

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The geologic diversity among Norway's terranes offers a wide variety of mineral occurrences for exploration and development. In 2019, Norway was the leading olivine producer in the world, accounting for approximately 50% of the world's production, and the third-ranked silicon producer, accounting for 4% of the world's production. Norway was also the third-ranked exporter of natural gas in the world. Norwegian petroleum production supplied approximately 2% of the global consumption of petroleum (Geological Survey of Norway, 2020; Norwegian Directorate of Mining, 2020, p. 20; Norwegian Petroleum, 2020c; Schnebele, 2021).

Minerals in the National Economy

In 2019, Norway's real gross domestic product (GDP) increased by 1.2%, and the nominal GDP was \$403.3 billion. The mining and quarrying sector played an insignificant role in Norway's economy, whereas the petroleum sector was the major industry for the Norwegian economy in terms of its share of value added, state revenue, export value, and investment. Crude petroleum and natural gas accounted for approximately 20% and 27%, respectively, of the total value of the country's exports in 2019 (Government of Norway, 2020a; Norwegian Directorate of Mining, 2020, p. 20; Norwegian Petroleum, 2020c; World Bank, The, 2020a, b).

The mining and quarrying sector employed 4,558 people in 2019 compared with 4,537 in 2018. Total sales of mineral raw materials, excluding those from the extraction of crude petroleum and natural gas, increased by 6.7% to approximately \$1.3 billion.¹ Sales of construction raw materials (excluding natural stone) increased in tonnage by 5% to 98 million metric tons (Mt) and in value by 3.6% to \$818.0 million. In terms of tonnage, sales of metallic ores totaled 2.2 Mt, which was approximately the same as in 2018; however, in terms of value, sales of metallic ores increased by 27% to \$210.3 million. Sales of natural stone increased in tonnage by 31% to 990,551 metric tons (t), and in value by 2.5% to \$107.5 million (a greater amount of the less expensive natural stone types were sold during the year). Sales of energy minerals (which in Norway is synonymous with coal production) decreased in tonnage by 24% to 107,900 t and was valued at \$10.9 million. In the mining and quarrying sector, in terms of value, 60% of the companies accounted for only 1.3% of the sales in the industry, and 10% of the companies accounted for 85% of the sales (Norwegian Directorate of Mining, 2020, p. 4, 14, 24, 28, 31, 34, 41, 42).

In 2019, investments in the mining and quarrying sector, which did not include investments in the extraction of crude petroleum and natural gas, increased for the second year in a row and totaled approximately \$227 million, which was an

increase of 54% compared with investments in 2018 and an increase of 245% compared with investments in 2017. As of December 31, 2019, a reported total of 626 exploration licenses and 169 recovery licenses for state-owned minerals were issued, which covered approximately 0.5% of Norway's mainland area. The real number of licenses was presumably slightly higher, as the results of privately funded surveys in areas with no ongoing operations were not required to be reported, and reporting on these types of surveys was done on a voluntary basis (Norwegian Directorate of Mining, 2019, p. 44; 2020, p. 4, 6, 44, 47).

Government Policies and Programs

Act No. 101 of June 19, 2009 (The Minerals Act), which entered into force on January 1, 2010, regulates the exploration and extraction of mineral resources and the acquisition of mining rights. The act differentiates between government-owned and privately owned minerals. Metals with a specific gravity of 5 grams per cubic centimeter and above, and the ores of these metals, are owned by the state. These include arsenic, cadmium, chromium, cobalt, copper, gold, iron, lead, manganese, molybdenum, nickel, niobium, platinum, silver, thorium, tin, titanium, tungsten, uranium, vanadium, and zinc. All other minerals are owned by the landowner. The Directorate of Mining, which is under the Ministry of Trade and Industry, is responsible for administering the extraction of mineral resources (Norwegian Ministry of Trade and Industry, 2013, p. 57, 59; Government of Norway, 2020b; Food and Agricultural Organization of the United Nations, 2021).

The Petroleum Act No. 72 of November 29, 1996, regulates exploration, the awarding of licenses, field development, infrastructure, and activities involving the cessation and decommissioning of operations for the petroleum sector. The act also includes provisions on insurance requirements and liabilities regarding pollution. The Norwegian Petroleum Directorate, which is under the Ministry of Petroleum and Energy, regulates the use of petroleum resources. In 1990, the Government Pension Fund Global (formerly the Government Petroleum Fund) was established for the management of Government petroleum revenues. In 2019, the fund had a 19.9% return on investment and a market value of \$192.23 billion (Norwegian Petroleum Directorate, 2018, 2020a; McKay, 2019; Norges Bank Investment Management, 2020, p. 4).

In July 2019, the Seabed Minerals Act entered into force. The act applies to exploration and recovery of all subsea mineral deposits within Norway's internal waters, its territorial waters, and on the Norwegian Continental Shelf (NCS). The act does not apply to exploration and production of petroleum and research of minerals offshore (Arntzen de Besche, 2019; Norwegian Petroleum Directorate, 2020b).

¹Where necessary, values have been converted from Norwegian kroner (NOK) to U.S. dollars (US\$) at the annual average exchange rate of NOK8.802=US\$1.00 for 2019.

Production

In 2019, the most significant mineral commodity production decreases included those of feldspar, which decreased by 48% (estimated); bituminous coal, 24%; and quartz and quartzite, 15%. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Norwegian mineral industry was composed of Government and privately owned operations, and most of the companies were small businesses. Table 2 is a list of major mineral industry facilities.

Mineral Trade

Norway was not a member of the European Union, but it was a member of the European Free Trade Association and participated in the euro area single market through the European Economic Area Agreement. In 2019, Norway's exports were valued at \$82.43 billion, and its imports, \$81.32 billion. Norway's leading export partners were the United Kingdom (which received 20.1% of the country's total exports), Germany (14.3%), and the Netherlands (11.1%). Its leading import partners were Sweden (which supplied 11.8% of Norway's total imports), Germany (10.8%), and China (10.2%) (Norwegian Ministry of Foreign Affairs, 2020; Trademap.org, 2020a, b).

In 2019, the value of Norway's exports of nonfuel mineral commodities increased by 12.1% to approximately \$563 million compared with that in 2018 and accounted for 43% of the country's total sales of nonfuel mineral commodities. Of this export value, exports of industrial and metallic mineral ores increased by 18% to \$291.8 million; construction raw material exports increased by 17.5% to \$200.5 million; natural stone exports decreased by 1.5% to \$61.8 million; and energy minerals (coal) exports decreased by 24% to \$8.9 million. Norway exported almost all the metallic ores sold, 71% of the coal sold, 57% of the natural stone sold, 31% of the industrial minerals sold (excluding construction raw materials and nature stone), and 29% of the construction raw materials sold. Of the industrial minerals, almost all production of graphite, nepheline syenite, and olivine was exported, whereas limestone, quartz, and quartzite were sold mainly on the domestic market (Norwegian Directorate of Mining, 2019, p. 34; 2020, p. 10, 20, 34, 36, 37).

Most of the Norway's petroleum and natural gas production was exported. Norway was a significant supplier of petroleum and natural gas to the global market, producing approximately 2% of the global crude petroleum supply and 3% of the global gas supply. In 2019, European countries received 1.1 million barrels per day (Mbb/d) of Norway's crude petroleum production (the remaining 0.2 Mbb/d production was used domestically). Norway ranked third in exports of natural gas in the world (after Russia and Qatar) and exported more than 95% of its natural gas production. The value of exports of natural gas and crude petroleum (including condensates) accounted for approximately \$48.2 billion, or 46.9% of the total value of Norway's exports (Government of Norway, 2019; Norwegian Petroleum, 2020c).

Commodity Review

Metals

Iron Ore and Other Metallic Ores.—In 2019, Rana Gruber AS was the sole iron-ore-producing company in Norway. Sydvaranger Industriområde, another iron-ore-mining company, received a mining permit in the spring of 2019 and was undertaking engineering works to reopen the mine at Bjornevatn, which had been closed in November 2015. A full-scale operation was expected to recommence in 2021 (Norwegian Directorate of Mining, 2020, p. 24, Sydvaranger Industriområde, 2020a, b).

In 2019, there were three new metallic ore mining projects with operating licenses; they were Nussir ASA's copper project, Engebo's rutile (a high-grade titanium feedstock) and garnet project, and the Sydvaranger iron mine project, which was in the process of being reopened. None of these projects was put into production in 2019 (Norwegian Directorate of Mining, 2020, p. 24).

Industrial Minerals

Cement.—Norcem AS, which was a subsidiary of HeidelbergCement Group, was Norway's sole producer of cement. Norcem had one plant located at Brevik in southern Norway and another plant at Kjopsvik in the northern part of the country. In Norway, HeidelbergCement also produced aggregates, alternative fuels, prefabricated concrete, and ready-mixed concrete. In 2019, cement consumption in Norway decreased by 9.8% compared with that in 2018. Cement consumption for infrastructure and nonresidential construction increased, whereas that for residential construction decreased slightly (European Cement Bureau, 2020, p. 21; HeidelbergCement AG, 2020; Norcem AS, 2020).

Graphite.—In October 2019, Mineral Commodities Ltd. of Australia completed the acquisition of Skaland Graphite AS (Skaland), which operated the Traelen graphite mine and the Skaland processing plant. The Taelen graphite mine was one of the world's highest-grade operating flake graphite mines and had an average mill feed grade of 25% carbon in 2019. Skaland was the leading flake graphite producer in Europe and the fourth-ranked producer outside of China. The company accounted for approximately 2% of the world's natural flake graphite production. The mineral resources at the Traelen Mine were estimated to be 1.78 Mt at a grade of 22% total graphitic carbon, resulting in about 397,000 t of contained graphite using a 10% cutoff grade. The total resources comprised indicated resources of approximately 0.41 Mt at a grade of 26% TGC and inferred resources of approximately 1.38 Mt at a grade of 21% TGC (Mineral Commodities Ltd., 2020; Skaland Graphite AS, 2020).

Mineral Fuels

Coal.—In 2019, coal was produced at only one mine, the Svalbard Grube 7 Mine (Mine 7) at Longyearbyen. The mine produced 107,900 t for the year, which was a decrease of 24% compared with that in 2018. In 2018, Store Norske Spitsbergen Kulkompani AS discontinued all coal mining operations at the Svea Nord and the Lunckefjellgruva Mines

in the Svea area, which were expected to be officially closed at the beginning of 2020 (Norwegian Directorate of Mining, 2019, p. 34; 2020, p. 34).

Natural Gas and Petroleum.—In 2019, 4 new fields started production—the Oda, followed by the Utgard, the Trestakk, and the Johan Sverdrup fields—and 13 fields were under development. At the end of the year, 87 fields were producing, which was a new record. Production from new fields that came onstream throughout the year did not compensate for the decline in production from existing mature fields (crude petroleum production and natural gas production decreased by 5% each). However, at the end of the year, there was a significant production increase owing to the startup of the Johan Sverdrup field (Norwegian Petroleum, 2020c, d, f).

In 2019, 57 exploration wells were drilled on the NCS, 83 production licenses were awarded (which was record high), and 17 discoveries were made. The new discoveries were relatively minor, with a preliminary estimate of 452.9 million barrels (Mbbbl) (reported as 72 million cubic meters) of crude petroleum equivalent. All the reserves were located offshore on the NCS. Since 2011, an average of 503.2 Mbbbl (reported as 80 million cubic meters) of petroleum equivalent had been proven each year, which was the equivalent of approximately one-third of the yearly production from the NCS. According to the Government of Norway, about 48% of the total petroleum resources on the NCS still were undiscovered (Norwegian Petroleum, 2020a, b; Norwegian Petroleum Directorate, 2020b).

On October 5, 2019, production was started at the Johan Sverdrup field. The field, which is located in the North Sea, was owned by Equinor Energy AS (42.63%, operator), Lundin Energy Norway AS (20.00%), Petoro AS (17.36%), Aker BP ASA (11.57%), and Total E&P Norge AS (8.44%). The production was expected to last more than 50 years. The Johan Sverdrup field was to be developed in two phases. Crude petroleum production capacity in phase 1 was expected to be 440,000 barrels per day (bbl/d), and this level of production was projected to be reached in the summer of 2020. The field's peak production was expected to be 660,000 bbl/d, or approximately one-third of Norway's total crude petroleum production. Phase 2 of the development was approved by the Norwegian authorities in May 2019, and production was expected to begin at the end of 2022 (Equinor ASA, 2020b, c; Norwegian Petroleum, 2020e, g).

On March 8, 2019, a new natural gas platform at the Aasta Hansteen field was commissioned. The platform came on stream in December 2018. The Snefrid North platform, which was tied to the Aasta Hansteen platform, came on stream at the end of 2019. At full capacity, the Aasta Hansteen and the Snefrid North fields were expected to produce approximately 23 million cubic meters per day of gas (144,000 bbl/d of oil equivalent); the combined reserves were estimated to be 55.6 billion cubic meters of gas and 0.6 million cubic meters of condensate (353 Mbbbl of oil equivalent). Aasta Hansteen, which was Norway's first spar platform and the deepest field developed to date, was also the first to be able to deliver gas to Norway from beyond the Arctic Circle (Government of Norway, 2019; Equinor ASA, 2020a).

Outlook

Increasing international demand for metals and minerals has resulted in increased interest in the mineral resources of Norway, as evidenced by the significant increases in mining investments during the past 2 years. The Sydvaranger iron ore mine and Nussir's copper mine in Kvalsund will continue with their construction projects and are expected to start operation in the short term future. Construction of the Engebo project to extract titanium-rich eclogite is expected to start at the end of 2020. The overall production of crude petroleum and natural gas is expected to increase in the next few years owing to the rampup of production at the Johan Sverdrup field and other new projects and discoveries. The level of exploration activity on the NCS is expected to remain high owing to the high probability of the occurrence of undiscovered resources (News.cision.com, 2020; Norwegian Directorate of Mining, 2020, p. 24; Norwegian Petroleum, 2020f; Norwegian Petroleum Directorate, 2020b).

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TABLE 1
NORWAY: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2015	2016	2017	2018	2019
METALS					
Aluminum, metal, primary	1,225,000	1,247,000	1,253,000	1,295,000 ^r	1,300,000 ^e
Cadmium, refinery, primary	310	335	416	380 ^r	400 ^e
Cobalt, refinery, metal	3,117 ^r	3,541 ^r	3,473 ^r	4,166 ^r	4,354
Copper, refinery, primary	35,500	28,100	22,700	20,600	22,000
Ferroalloys:					
Ferromanganese	309,200	329,100	400,800	327,600	328,000 ^e
Silicomanganese	309,900	306,100	284,500	330,000	330,000 ^e
Iron ore, mine:					
Gross weight	3,519,116	NA	NA	NA	NA
Fe content	2,182,000	NA	NA	NA	NA
Iron and steel:					
Pig iron	59,000 ^r	43,000 ^r	74,000 ^r	79,000 ^r	80,000 ^e
Steel, raw steel	590,000	620,000	603,000	575,000	621,000
Nickel:					
Mine, Ni content	285	220	206	210	200
Refinery, metal, electrolytic	91,220	92,700	86,500	90,800	92,100
Platinum-group metals, refinery:					
Palladium kilograms	7,527	7,900	6,563	6,843	7,092
Platinum do.	3,297	3,826	3,204	2,550	2,613
Titanium, mineral concentrates, ilmenite and leucoxene ^e	630,000	590,000	670,000	590,000	590,000
Zinc, smelter, primary	162,878	170,541	172,086	190,570	195,374
INDUSTRIAL MINERALS					
Cement, hydraulic thousand metric tons	1,640 ^r	1,660 ^r	1,880 ^r	1,770 ^{r,e}	1,760 ^e
Feldspar	76	70 ^{r,e}	63 ^{r,e}	103 ^{r,e}	54 ^e
Graphite, crystalline flake	9,185	9,600 ^r	9,600 ^r	10,000 ^r	9,500 ^e
Sand and gravel, industrial, quartz and quartzite thousand metric tons	1,112	1,174	1,066	1,358	1,152
Stone, sand, and gravel, construction:					
Sand and gravel, unspecified do.	14,295	14,959	14,696	13,478	13,863
Stone, crushed:					
Dolomite do.	472	730 ^e	730 ^e	730 ^e	730 ^e
Limestone do.	5,547	5,895	5,786	5,669	5,253
Olivine do.	1,672	1,400 ^e	1,400 ^e	1,400 ^e	1,400 ^e
Sulfur, byproduct, metallurgy, S content do.	76	74	64	70 ^r	70 ^e
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous thousand metric tons	1,203	960	134 ^r	142 ^r	108
Natural gas, marketable million cubic meters	117,000	116,800	124,200	121,600	115,200
Petroleum, crude thousand 42-gallon barrels	587,650	601,520	590,570	553,705	524,505

^eEstimated. ^rRevised. do. Ditto. NA Not available.

¹Table includes data available through November 4, 2020. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, clay, ferrosilicon, lime, nepheline syenite, nitrogen (in ammonia), mercury, peat, refined petroleum, silicon metal, and tin may have been produced, but available information was inadequate to make reliable estimates of output.

TABLE 2
NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Alcoa Inc.	Smelters at Lista and Mosjoen	282
Do.		Hydro Aluminium AS (Norsk Hydro ASA, 70%)	Smelters at Ardal, Husnes, Hoyanger, Karmoy, and Sunndal	1,032
Do.		do.	Rolling mill at Holmestrand	90
Cadmium	metric tons	Boliden Odda AS (Boliden AB, 100%)	Smelter at Oda	NA
Cement		Norcem AS (HeidelbergCement Group)	Plants at Brevik and Kjopsvik	2,000 ^e
Coal		Store Norske Spitsbergen Kulkompani AS	Mine at Longyearbyen	200
Do.		do.	Mines at Svea ¹	NA
Cobalt		Nikkelverk AS (Glencore plc., 100%)	Refinery at Kristiansand	5
Copper, metal		do.	do.	40
Ferroalloys:				
Ferromanganese		Eramet Norway AS	Ferromanganese plant at Porsgrunn	105
Do.		do.	Ferromanganese plant at Sauda	170
Do.		Glencore Manganese (Glencore plc., 100%)	Ferromanganese plant at Mo i Rana	120
Ferrosilicon		Elkem Bjolvefossen (China Bluestar)	Ferrosilicon plant at Alvik	NA
Do.		Elkem Bremanger (China Bluestar)	Ferrosilicon plant at Svelgen	NA
Do.		FESIL Rana Metall ASA (MFC Group)	Ferrosilicon plant at Mo i Rana	90
Do.		Finnfjord Smelteverk AS	Ferrosilicon plant at Finnsnes	100
Do.		Hafsil AS	Ferrosilicon powder plant at Sarpsborg	5
Silicomanganese		Eramet Norway AS	Silicomanganese plant at Kvinesdal	160
Do.		do.	Silicomanganese plant at Porsgrunn	70
Graphite, flake		Skaland Graphite AS [Mineral Commodities Ltd. (MRC), 100%]	Traelen Mine and plant at Skaland	12
Iron ore, mine		Rana Gruber AS (LNS Group)	Mine at Mo i Rana	NA
Do.		Sydvaranger Industriomrade (Tschudi Group, 100%)	Mine at Bjernevatn ²	NA
Iron and steel:				
Pig iron		TiZir (Eramet Norway AS, 50%)	Plant at Tyssedal	110
Do.		Ulstein Jernstoperi AS (Bergen Engines AS)	Plant at Hordvikneset	10
Raw steel		Celsa Armeringsstal	Plant at Mo i Rana	600
Lime		Hylla Kalkverk (Franzefoss Minerals AS, 100%)	Verdal plant	200
Natural gas	million cubic meters	AS Norske Shell (operator)	Ormen Lange field	20,200 ^e
Do.	do.	ConocoPhillips Skandinavia AS (operator)	Ekofisk field	9,900 ^e
Do.	do.	Equinor Energy AS (operator)	Aasta Hansteen field	7,000 ^e
Do.	do.	do.	Asgard field	10,300 ^e
Do.	do.	do.	Kvitebjorn field	6,900 ^e
Do.	do.	do.	Troll field	38,600 ^e
Nepheline syenite		Sibelco Nordic AS	Mine at Stjernoy	350
Nickel:				
Ore, concentrate, Ni content	metric tons	Titania AS (Kronos Norge AS, 100%)	Mine at Tellnes	350
Metal		Nikkelverk AS (Glencore plc., 100%)	Refinery at Kristiansand	92
Petroleum:				
Crude	42-gallon barrels per day	ConocoPhillips Skandinavia AS (operator)	Ekofisk field	112,000 ^e
Do.	do.	Equinor Energy AS (operator)	Johan Sverdrup field	440,000
Do.	do.	do.	Oseberg field	57,200 ^e
Do.	do.	do.	Snorre field	110,000 ^e
Do.	do.	do.	Troll field	127,000 ^e
Refined	do.	Equinor Mongstad AS (Equinor ASA, 100%)	Mongstad refinery	164,000
Do.	do.	Esso Norge AS (Exxon Mobil Corp., 100%)	Slagen refinery at Slagentangen	123,000

See footnotes at end of table.

TABLE 2—Continued
 NORWAY: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
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 AS)	Plant at Holla	50
Stone:			
Dolomite	Franzefoss Miljokalk AS	Mine at Ballangen	350
Do.	Omya Hustadmarmor AS	Mines at Hammerfall and Seljeli	900
Limestone	Bronnoy Kalk	Akselberg Mine	2,200
Do.	Franzefoss Minerals	Hamar and Hole quarries	50
Do.	Norcem AS (HeidelbergCement Group)	Dalen, Bjorntvedt, and Kjøpsvik Mines	1,600
Do.	Vardelskalk AS (Franzefoss Burk AS, 100%)	Sandvika Mine	800
Do.	Visnes Kalk AS	Lyngstad quarry	600
Olivine	Sibelco Nordic AS	Mines and plant at Aheim	2,000
Quartzite	Elkem Marnes (China Bluestar)	Mine at Marnes	200
Do.	Elkem Tana (China Bluestar)	Mine at Tana	1,200
Do.	Georg Tveit AS (Eramet Norway AS, 75%)	Mine at Kragero	110
Titanium, mineral concentrate	Titania AS (Kronos Norge AS, 100%)	Mine at Tellnes	850
Zinc, metal	Boliden Odda AS (Boliden AB, 100%)	Smelter at Odda	200

^eEstimated. Do., do. Ditto. NA Not available.

¹In 2018, Store Norske Spitsbergen Kulkompani AS decided to discontinue all coal mining operations at the Svea Mines, which are planned to be closed in 2020.

²In 2015, Northern Iron Ltd. declared bankruptcy. In April 2016, the mine was sold to the Tschudi Group, which planned to restart production in 2021.