



2022 Minerals Yearbook

**DENMARK, THE FAROE ISLANDS, AND GREENLAND
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THE MINERAL INDUSTRIES OF DENMARK, THE FAROE ISLANDS, AND GREENLAND

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DENMARK

The Kingdom of Denmark is made up of Denmark and the self-governing territories of the Faroe Islands and Greenland. Denmark had several industrial mineral mines in operation and produced petroleum and natural gas offshore in the Danish area of the North Sea; however, metallic mineral resources were limited. In 2022, Denmark was estimated to be the world's second-ranked diatomite (moler) producer, accounting for 17% of the world's production, and the sixth-ranked bentonite producer, accounting for 4% of the world's production (table 1; Crangle, 2024; Simmons, 2024).

Minerals in the National Economy

In 2022, Denmark's real gross domestic product (GDP) increased by 3.8%; the nominal GDP was \$395.4 billion. In Denmark, 4,017 people were employed in the mining and quarrying sector, which accounted for 0.13% of the total employment, compared with 3,918 people in 2021. The production value in the mining and quarrying sector increased to \$6.09 billion¹ (DKK43.13 billion) and accounted for 0.8% of Denmark's total production value. The gross value added of the mining and quarrying sector increased to \$4.40 billion (DKK31.17 billion) and accounted for 1.2% of Denmark's total gross value added. The value of sales in the mining and quarrying sector increased by 73% to \$4.62 billion (DKK32.68 billion) compared with that in 2021; of this value, production of crude petroleum and natural gas accounted for 76.6%, and production of gravel and stone accounted for 14.4% (Statistics Denmark, 2023a–c; World Bank, The, 2023a, b).

Production

In 2022, significant increases in mineral commodity production were reported for chalk, which increased by 53%; and diatomite, 19%. Significant decreases were reported in the production of clay (excluding bentonite and plastic clay), which decreased by 25%; and peat (including sphagnum), 20%. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Danish mineral industry was mostly privately owned. One of the principal exceptions was Nordsøfonden, which was a crude petroleum and natural gas company owned by the Danish state. Within the state, ownership was placed with the Ministry of Industry, Business and Financial Affairs, which

was officially the sole owner of the business. Nordsøfonden managed the participation of the Danish state in licenses for the exploration and production of crude petroleum and natural gas. The company could enter into license partnerships with the same rights as the other companies; however, it could not be the operator of a license. Table 2 is a list of major mineral industry facilities (Nordsøfonden, 2023).

Commodity Review

Industrial Minerals

Cement.—Cement production decreased by 6% to 2.51 million metric tons (Mt) in 2022 from 2.67 Mt in 2021. The decrease was owing to a reduction in the construction of residential and industrial buildings in 2022. Aalborg Portland A/S was the sole producer of cement in Denmark; the cement factory was located in Rørdal, 4 kilometers (km) northeast of Aalborg, and had the capacity to produce 2.1 million metric tons per year of gray (portland) cement and 850,000 metric tons per year of white cement. Aalborg Portland A/S was part of Aalborg Portland Holding A/S, which was owned by Cementir Holding N.V. In 2022, Aalborg Portland Holding employed 3,046 people, of which 783 people were employed in Denmark (Aalborg Portland Holding A/S, 2023, p. 11, 14; Cementir Holding N.V., 2023a, p. 14, 275; 2023b).

Mineral Fuels and Other Sources of Energy

Petroleum and Natural Gas.—In 2022, Denmark produced 23.6 million barrels (Mbbl) of crude petroleum and 1.3 billion cubic meters of natural gas, which were 2.0% and 0.7% decreases, respectively, compared with 2021 production. In 2022, the largest amount of crude petroleum and natural gas production came from the Halfdan Field, which produced 10.91 Mbbl of crude petroleum and 808.4 million cubic meters of natural gas, followed by production from the Dan Field, 5.66 Mbbl of crude petroleum and 272.1 million cubic meters of natural gas. Both fields were owned by the Dansk Undergrunds Consortium (DUC), which was composed of TotalEnergies SE of France, 43.2%; Norwegian Energy Company (Noreco) ASA, 36.8%; and Nordsoefonden, 20%. The DUC was operated by TotalEnergies SE (table 2; Danish Energy Agency, 2023b, c; TotalEnergies SE, 2023c, p. 87).

In 2022, the redevelopment of the Tyra Field continued. The field was owned by the DUC and located in the northern part of the Danish area of the North Sea. In September 2019, the Tyra Field was temporarily shut down for redevelopment. The field's operations were initially planned to recommence in July 2022; however, owing to the coronavirus 2019 (COVID-19) pandemic, the production was expected to restart in winter 2023–24.

¹Where necessary, values have been converted from Danish kroner (DKK) to U.S. dollars (US\$) at the annual average exchange rate of DKK7.077=US\$1.00 for 2022.

The objective of the redevelopment project was to extend the life of the Tyra Field and its satellite fields. The peak production after the redevelopment was estimated to be approximately 60,000 barrels per day of oil equivalent, of which approximately two-thirds would be natural gas and one-third petroleum. The redevelopment project would result in 2.8 billion cubic meters per year of natural gas production. The Tyra Field started production in 1984 and had accounted for 90% of all Denmark's natural gas production. In 1997, at its peak production, the field produced 4.2 billion cubic meters of natural gas; in 2009, production was approximately 2.0 billion cubic meters; and since 2010, production had been less than 2.0 billion cubic meters per year. The Tyra Field consisted of two main centers—Tyra East (containing six platforms) and Tyra West (containing five platforms)—which were linked to five unmanned satellite fields, including Harald, Roar, Svend, Tyra Southeast, and Valdemar (table 1; Offshore Technology, 2019; TotalEnergies SE, 2022, p. 84, 85; 2023a, p. 29; 2023b; 2023c, p. 24, 87; Danish Energy Agency, 2023b, c).

On January 1, 2022, Klesch Group acquired Equinor Refining Denmark A/S's (a subsidiary of Equinor ASA) refinery in Kalundborg and terminals in Hedehusene and changed their names to Kalundborg Refinery A/S. This was the largest refinery in Denmark in terms of production. In the previous year, on July 1, 2021, PL ESG Denmark Co APS (Postlane Partners) acquired Dansk Shell A/S's (a subsidiary of Royal Dutch Shell plc.) refinery in Fredericia. The refinery would continue to produce hydrocarbon fuels while being transformed into a carbon-neutral facility that would produce biofuels and green hydrogen (Royal Dutch Shell plc., 2021; Klesch Group, 2022).

Renewable Energy.—In 2022, Denmark produced 51.8% of its electricity from renewable energy (compared with 47.8% in 2021), of which 40% was produced from geothermal means, 33% from wind turbines, and 5% from solar means. Domestic renewable energy production increased by 15.8% compared with that in 2021 and by 68.1% compared with that in 2010 (Danish Energy Agency, 2023a).

Outlook

The GDP of Denmark is projected to increase by 1.7% in 2023, according to the International Monetary Fund. Crude petroleum and natural gas production in Denmark has decreased in the short term owing to the planned redevelopment of the Tyra gas and oil field. Postponing the date of the operation restart at the Tyra Field by a year is expected to result in a shortage of Denmark's natural gas production and temporary import of natural gas; however, in 2024, after completion of the redevelopment of the field, Denmark's production is expected to increase significantly. In the years ahead, Denmark is expected to increasingly rely on renewable sources for its energy supply rather than on fossil fuels. Danish production of renewable energy is projected to surpass Denmark's total electricity consumption by 2028 (Hinrichsen, 2019; Offshore Technology, 2022; International Monetary Fund, 2023).

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FAROE ISLANDS

The Faroe Islands are a self-governing division of the Kingdom of Denmark. The Faroe Islands had no significant identified mineral resources, and no commercially viable petroleum reservoirs had been discovered. The Faroe Islands' exports were attributed to the fisheries sector; in terms of value, fisheries exports accounted for 92.0% of the territory's total exports in 2022 (Faroese Geological Survey, 2023a, b; Hagstova, 2023).

Before the fifth petroleum exploration licensing round in 2019, the Parliament approved changes in the terms and conditions of licenses and licensing procedures to align them more closely to those of the United Kingdom. The fifth petroleum exploration licensing round opened in July 2019 and was run in conjunction with the 32d United Kingdom licensing round. Both countries' rounds closed in November 2019. These new changes could influence companies' investment decisions in those areas where the geology is similar on both sides of the maritime border between the Faroe Islands and the United Kingdom. Although there is the possibility of petroleum prospects crossing the border, there were no licenses issued in the fifth petroleum exploration licensing round. There was no petroleum exploration licensing round in 2020, 2021, or 2022 (Faroese Geological Survey, 2023a–c).

Outlook

Mineral commodities are not expected to play a role in the Faroese economy unless significant mineral resources are identified.

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GREENLAND

Greenland is a self-governing division of the Kingdom of Denmark. Greenland is the biggest island in the world, with 81% of its land covered in ice. In 2022, Greenland's real GDP increased by 1.3%; the nominal GDP was \$2.9 billion (DKK20.3 billion). Greenland has a variety of mineral resources such as coal, copper, gold, graphite, ilmenite, molybdenum, iron ore, lead, nickel, precious stones, rare-earth elements, silver, titanium, uranium, and zinc. Greenland also has hydropower and possibly crude petroleum and natural gas resources. In 2022, there were 7 mining licenses, 84 exploration licenses, 16 prospecting licenses, and 34 small-scale mining licenses granted for a wide variety of minerals compared with 7, 72, 15, and 44 licenses, respectively, in 2021. Greenland had two active mines: the White Mountain anorthosite (feldspar) mine, and the Aappaluttoq corundum mine (Government of Greenland, 2022, p. 2; 2023a; 2023b, p. 2; 2023c; Statistics Greenland, 2023, p. 4, 32).

To develop the mineral industry in Greenland and attract foreign exploration companies, the Greenland Ministry of Mineral Resources approved “Greenland's Mineral Strategy 2020–2024.” The document focused on five areas: improved sharing of geologic knowledge; efficient, predictable, and transparent administration; simplified transition from exploration to mining; sustainable development of the mineral industry; and a competitive tax and royalty model. The strategy replaced the former “Oil and Mineral Strategy 2014–2018” and provided an updated framework for the development of the mineral resources industry in Greenland to become a more competitive mining territory and attract foreign investors. In 2022, the Government carried out several geoscientific projects that were aimed at promoting the economic potential of and increasing the knowledge of the geology of Greenland (Government of Greenland, 2020, p. 5, 8; 2023b, p. 3).

Production

Data on mineral production are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Industrial Minerals

Feldspar.—In January 2022, Hudson Greenland A/S's name was changed to Lumina Sustainable Materials A/S. The name change was associated with the company's transformation from a focus on the mining project to becoming a supplier of highly specialized anorthosite-based industrial products. Hudson Greenland A/S, a subsidiary of Hudson Resources Inc. of Canada, specialized in anorthosite (calcium feldspar) mining and began construction of the Qaqortorsuaq White Mountain anorthosite mine, which was started in 2016 and completed in November 2018. The first shipment of the refined product (the White Mountain anorthosite) was in 2019. The White Mountain anorthosite mine is located approximately

80 km southwest of Kangerlussuaq and was estimated to have a mine life of 100 years. The deposit is anorthosite that can be used as a substitute for kaolin and nepheline syenite and is primarily composed of silicon (47%), aluminum (32%), and calcium (15%). In Greenland, alumina was not produced from anorthosite owing to energy costs and chemical requirements (Mining Technology, 2021; Hudson Resources Inc., 2022, 2023a, b; Government of Greenland, 2023b, p. 9).

In 2021, Lumina Sustainable Materials A/S shipped production test materials to potential customers on three continents. In November 2022, 8,000 metric tons of anorthosite was shipped to a European customer, who had purchased several shipments of anorthosite in continuously increasing quantities. In 2023, feldspar production was expected to continue increasing (Government of Greenland, 2022, p. 4; 2023b, p. 9).

Outlook

The Government of Greenland has conducted several mineral resource assessments throughout the ice-free land mass of Greenland, recognizing the potential to diversify the national economy through mineral extraction. The implementation of “Greenland’s Mineral Strategy 2020–2024” is expected to continue to attract foreign investors. The number of granted licenses is expected to continue to increase throughout the ice-free parts of Greenland, and the mineral industry is likely to become one of the leading industrial sectors on the island in the future. Feldspar production is expected to undergo stable growth in 2023.

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TABLE 1
DENMARK AND GREENLAND: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons, gross weight, unless otherwise specified)

Locality and commodity		2018	2019	2020	2021	2022
DENMARK ²						
Cement, hydraulic		2,200	2,250	2,490	2,670	2,510
Clay:						
Bentonite, including plastic clay		429	434	433	1,008	908
Other		1,060	790	948	833	623
Diatomite ³		366	400	423	444	528
Natural gas	million cubic meters	4,031	3,045	1,396	1,322	1,313
Peat, including sphagnum	metric tons	187,568	90,702	145,299	145,274	116,371
Petroleum:						
Crude	thousand 42-gallon barrels	41,724	36,867	26,077	24,040	23,567
Refinery	do.	55,521	56,034	51,937	54,917	52,858
Sand and gravel, industrial, quartz		540 ^r	600 ^r	740 ^r	840 ^r	770
Stone, sand, and gravel, construction:						
Sand and gravel, unspecified		39,713	38,178	42,681	42,834	41,097
Stone, size and shape unspecified:						
Chalk		1,197	241	214	230	352
Granite		496	216	162	430	428
Limestone		3,311	4,003	4,427	4,632	4,176
Sulfur, byproduct, natural gas and petroleum, S content	metric tons	4,194	3,554	4,140	4,090	3,717
GREENLAND						
Feldspar, anorthosite	do.	--	17,000	20,000 ^e	30,000 ^e	NA
Gemstone, corundum:						
Ore	kilograms	2,706,990	15,614,500	NA ^r	NA ^r	NA
Sorted, untreated	do.	1,026	1,279	NA ^r	NA ^r	NA

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

¹Table includes data available through September 5, 2023. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, kaolin, lime, salt, and semimanufactured steel may have been produced, but available information was inadequate to make reliable estimates of output.

³Data represent Denmark's extracted moler.

TABLE 2
DENMARK AND GREENLAND: STRUCTURE OF THE MINERAL INDUSTRIES IN 2022

(Thousand metric tons unless otherwise specified)

Locality and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
DENMARK				
Cement:				
Gray		Aalborg Portland A/S [Aalborg Portland Holding A/S (Cementir Holding N.V.)]	Plant at Rørdal	2,100
White		do.	do.	850
Chalk (calcium carbonate)		Dankalk K/S [Dansk Landbrugs Grovvareselskab (DLG) A/S, 56%; Omya A/S, 44%]	Quarries at Aggersund and Mjels	450 ^c
Diatomite (moler)		Imerys Industrial Minerals Denmark A/S (Imerys Group)	Quarries on Fur and Mors Islands	580
Do.		Skamol Group	Plant at Fur Island	NA
Lime		Dankalk K/S [Dansk Landbrugs Grovvareselskab (DLG) A/S, 56%; Omya A/S, 44%]	Quarries at Aggersund and Mjels	NA
Natural gas	million cubic meters	Dansk Undergrunds Consortium (DUC) [TotalEnergies SE, 43.2% (operator); Norwegian Energy Company (Noreco) ASA, 36.8%; Nordsøfonden, 20.0%]	Dan Field	280 ^c
Do.		do.	Halfdan Field	810 ^c
Do.		do.	Tyra Field in the North Sea ¹	2,800
Petroleum:				
Crude	42-gallon barrels per day	do.	13 fields in the North Sea, including:	95,000 ^{c, 2}
Do.	do.	do.	Dan Field	1,700 ^c
Do.	do.	do.	Halfdan Field	2,600 ^c
Do.	do.	do.	Tyra Field ²	20,000
Do.	do.	INEOS Energy A/S	South Arne Field in the North Sea	1,100 ^c
Refined	do.	Kalundborg Refinery A/S (Klesch Group, 100%)	Refinery at Kalundborg	110,000
Do.	do.	PL ESG Denmark Co APS (Postlane Partners, 100%)	Refinery at Fredericia	63,000
Salt		Dansk Salt A/S	Plant at Mariager	600
Steel, semimanufactures		NLMK DanSteel A/S (NLMK International B.V., 100%)	Plant at Frederiksværk	550
GREENLAND				
Feldspar		Lumina Sustainable Materials A/S ³ (Hudson Resources Inc., 31%)	Mine and plant at White Mountain (Qaqortorsuaq)	200
Gemstone:				
Ruby		Greenland Ruby A/S (Rana Mines, 92%; Greenland Venture A/S, 8%)	Aappaluttoq Mine near Qeqertarsuaat	NA
Sapphire, pink		do.	do.	NA

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

¹The Tyra Field was temporarily shut down for redevelopment in November 2019. Production was expected to recommence in 2023.

²Annual capacity listed is the total for the DUC's fields in the North Sea that produce crude petroleum.

³Formerly Hudson Greenland A/S.