

2019 Minerals Yearbook

**DENMARK, THE FAROE ISLANDS, AND GREENLAND
[ADVANCE RELEASE]**

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

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DENMARK

Denmark, the Faroe Islands, and Greenland make up the Kingdom of Denmark. In 2019, Denmark's real gross domestic product (GDP) increased by 2.4%; the nominal GDP was \$348.1 billion. Although metallic mineral resources were limited, Denmark had several industrial mineral mines in operation and produced petroleum and natural gas offshore in the Danish area of the North Sea. In 2019, Denmark accounted for 15.2% of the world's diatomite (moler) production and was the world's second-ranked diatomite producer (table 1; Crangle, 2020; World Bank, The, 2020).

Minerals in the National Economy

In 2019, 4,482 people were employed in the mining and quarrying sector compared with 4,640 in 2018; the number of people employed in the sector represented 0.16% of the country's total employment. The value of production in the mining and quarrying sector decreased to \$4.44 billion¹ and accounted for 0.73% of the value of the country's total production. The gross value added of the mining and quarrying sector decreased to \$3.25 billion and accounted for 1.1% of the country's gross value added. The value of sales in the mining and quarrying sector decreased to \$4.0 billion, of which extraction of oil and gas accounted for 75.9%, and extraction of gravel and stone accounted for 12.9% (Statistics Denmark, 2020a–c).

Production

In 2019, the most significant decreases in mineral commodity production were reported for lime and peat, by 52% each; clay (excluding bentonite and plastic clay), 25%; natural gas, 24%; sulfur, 15%; and crude petroleum, 12%. 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

Cement.—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. Aalborg Portland A/S was part of Aalborg Portland Holding A/S, which was owned

by Cementir Holding N.V. In 2019, Aalborg Portland Holding produced cement in seven countries and employed 2,969 people, of which 727 people were employed in Denmark (Aalborg Portland Holding A/S, 2020a; 2020b, p. i).

Mineral Fuels and Other Sources of Energy

Crude Petroleum and Natural Gas.—In September 2019, the Tyra Field in the northern part of the Danish area of the North Sea was temporarily shut down for redevelopment. The operations were expected to recommence in July 2022. Peak production prior to the redevelopment was estimated to be 60,000 barrels of oil equivalent per day; after the redevelopment was completed, this amount was expected to be more than 200 million barrels of oil equivalent, of which approximately two-thirds would be natural gas and one-third would be petroleum. The Tyra Field started production in 1984 and accounted for 90% of Denmark's natural gas production. 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. In 2018, Total E&P had acquired the shares in the Tyra Field that were held by Maersk Oil (which had been serving as the operator) and Chevron Corp., and Noreco ASA had purchased Royal Dutch Shell plc's shares. In 2019, the Tyra Field was operated by Total E&P Denmark A/S (a subsidiary of Total S.A. of France) and owned by the Danish Underground Consortium (DUC), which comprised Total E&P Denmark, 43.2%; Noreco, 36.8%; and Nordsofonden, 20% (table 1; Total S.A., 2018; Danish Energy Agency, 2020a; Offshore Technology, 2020).

Renewable Energy.—In 2019, Denmark produced 50% of its electricity from renewable energy, of which 47% was produced from wind turbines, and 3%, from solar. Compared with the amounts in 2010, Denmark's production of renewable energy increased by 37% and its consumption increased by 51%. Domestic wind turbines provided 46% of all Denmark's electricity consumption (Hinrichsen, 2019; Danish Energy Agency, 2020b; Hill, 2020).

Outlook

The GDP is projected to decrease by 4.5% in 2020 and to increase by 6.0% in 2021. Crude petroleum and natural gas production in Denmark are expected to decrease in the short term owing to the planned redevelopment of the Tyra gas and oil field; however, in 2022, after the redevelopment is completed, production is expected to increase significantly. In the years ahead, Denmark is expected to rely increasingly on renewable sources for its energy supply rather than on fossil fuels. Danish production of renewable energy is projected to

¹Where necessary, values have been converted from Denmark kroner (DDK) to U.S. dollars (US\$) at an annual average exchange rate of DKK 6.670=US\$1.00 for 2019.

surpass the country's own total electricity consumption by 2028 (Hinrichsen, 2019; International Monetary Fund, 2020).

References Cited

- Aalborg Portland Holding A/S, 2020a, Aalborg Portland Holding financial statements 2019: Aalborg, Denmark, Aalborg Portland Holding S/A, April 27. (Accessed July 14, 2020, at <https://aalborgportlandholding.com/en/media/press-releases/aalborg-portland-holding-financial-statements-2019>.)
- Aalborg Portland Holding A/S, 2020b, Environmental report 2019: Aalborg, Denmark, Aalborg Portland Holding S/A, October 21, 73 p. (Accessed October 26, 2020, at https://aalborgportlandholding.com/sites/default/files/documenti/2020-09/Aalborg_Portland_Environmental_Report_2019.pdf.)
- Crangle, R.D., Jr., 2020, *Diatomite*: U.S. Geological Survey Mineral Commodity Summaries 2020, p. 56–57.
- Danish Energy Agency, 2020a, Monthly and yearly production, December 2019: Copenhagen, Denmark, Danish Energy Agency. (Accessed June 27, 2020, at https://ens.dk/sites/ens.dk/files/OlieGas/HTM_GIF/mp201912si.htm.)
- Danish Energy Agency, 2020b, Preliminary energy statistics 2019: Copenhagen, Denmark, Danish Energy Agency. (Accessed June 27, 2020, via <https://ens.dk/en/our-services/statistics-data-key-figures-and-energy-maps/annual-and-monthly-statistics>.)
- Hill, J.S., 2020, Denmark secured 50% of its power supply from wind and solar in 2019: Mullumbimby, New South Wales, Australia, *RenewEconomy*, January 13. (Accessed July 20, 2020, at <https://reneweconomy.com.au/denmark-secured-50-of-its-power-supply-from-wind-and-solar-in-2019/>.)
- Hinrichsen, M.B., 2019, Vindrekord giver grønneste strøm nogensinde [Wind provided record high of green power]: Frederiksberg, Denmark, *Dansk Energi*, December 19. (Accessed July 20, 2020, at <https://www.danskeenergi.dk/nyheder/vindrekord-giver-grønneste-strøm-nogensinde>.)
- International Monetary Fund, 2020, Denmark: International Monetary Fund, April. (Accessed July 20, 2020, at <https://www.imf.org/en/Countries/DNK>.)
- Offshore Technology, 2020, Tyra gas field redevelopment: London, United Kingdom, Offshore Technology. (Accessed August 23, 2020, at <https://www.offshore-technology.com/projects/tyra-gas-field-redevelopment/>.)
- Statistics Denmark, 2020a, Employment (36a2-grouping) by industry, socioeconomic status and time: Copenhagen, Denmark, Statistics Denmark. (Accessed November 26, 2020, at <https://www.statbank.dk/NABB36>.)
- Statistics Denmark, 2020b, Manufacturers' sales (annual) by type of turnover, industry (DB07) and time: Copenhagen, Denmark, Statistics Denmark. (Accessed September 9, 2020, at <https://www.statbank.dk/oms6>.)
- Statistics Denmark, 2020c, NABP10–1-2.1.1 Production and generation of income (10a3-grouping) by transaction, industry and price unit: Copenhagen, Denmark, Statistics Denmark. (Accessed September 9, 2020, at <https://www.statbank.dk/statbank5a/default.asp?w=1536>.)
- Total S.A., 2018, Total closes the Maersk Oil acquisition and becomes the second-largest operator in the North Sea: Paris, France, Total S.A., March 8. (Accessed August 14, 2019, at <https://www.total.com/en/media/news/press-releases/total-closes-maersk-oil-acquisition-and-becomes-second-largest-operator-north-sea>.)
- World Bank, The, 2020, Denmark: Washington, DC, The World Bank. (Accessed September 9, 2020, at <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2019&locations=DK&start=1966>.)

FAROE ISLANDS

The Faroe Islands are a self-governing overseas administrative division of the Kingdom of Denmark. The Islands had no significant identified mineral resources, and no commercially viable petroleum reservoirs had been discovered. In 2019, 93.7% of the country's exports was attributed to the fisheries sector (Faroese Geological Survey, 2020a, b; Hagstova, 2020).

Before the fifth oil 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 the United Kingdom licensing round. The fifth oil exploration licensing round opened in July 2019 and was run in conjunction with the 32nd United Kingdom licensing round. Both rounds

closed in November 2019. 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, and the possibility of prospects crossing the border could occur. The fourth oil exploration licensing round opened in May 2017 and closed in February 2018 with only one application received. The application was later withdrawn, and no license was issued. As of yearend 2019, the outcome of the fifth oil exploration licensing round was not revealed yet (Faroese Geological Survey, 2020a, b).

Outlook

Mineral commodities are not expected to play a role in the Faroese economy unless significant resources are identified. It is unclear if Government's efforts in exploration licensing can lead to exploration activities in the near future.

References Cited

- Faroese Geological Survey, 2020a, 4th licensing round: Torshavn, Faroe Islands, Faroese Geological Survey. (Accessed June 9, 2020, at <http://jf.fo/en/olju-og-gassleit/undanfarnu-utbjodingarumfor/4-utbjodingarumfar/>.)
- Faroese Geological Survey, 2020b, 5th licensing round: Torshavn, Faroe Islands, Faroese Geological Survey. (Accessed June 9, 2020, at <http://jf.fo/en/olju-og-gassleit/undanfarnu-utbjodingarumfor/5-utbjodingarumfar/>.)
- Hagstova, 2020, Export of goods by main groups and months (1993M01–2020M04): Argir, Faroe Islands, Hagstova. (Accessed June 9, 2020, at https://statbank.hagstova.fo/pxweb/en/H2/H2_UH_UH01/uh_uthbolkt_px/table/tableViewLayout2/?rxid=fcd6be02-ab3a-45fa-978d-53993f5f36ff.)

GREENLAND

Greenland, officially known as Kalaallit Nunaat, is a self-governing part of the Kingdom of Denmark. It's the biggest island in the world, with 81% of its land covered by ice. In 2018, the latest year for which data were available, Greenland's real GDP increased by 3.2%; the nominal GDP was \$3.05 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 oil and gas resources. As of October 2019, there were 5 exploitation licenses, 63 exploration licenses, 13 prospecting licenses, and 62 small-scale licenses granted for a wide variety of minerals compared with 6, 61, 8, and 58 licenses, respectively, in October 2018. Between October 2018 and October 2019, 18 licenses were issued, 11 relinquished, and 5 renewed. In 2019, Greenland had two active mines: the White Mountain anorthosite mine, and the Aappaluttoq corundum mine (tables 1, 2; Government of Greenland, 2018a; 2018b, p. 11; 2019b, p. 15–17; Statistics Greenland, 2020, p. 5, 37; World Bank, The, 2020).

In October 2019, the Ministry of Mineral Resources and Labor issued a draft (public consultation) of “Greenland's Mineral Strategy 2019–2023.” The document focused on five areas: improved sharing of geological knowledge; efficient, predictable and transparent administration; simplified transition from exploration to mining; sustainable development of the mineral resources industry; and 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 sector in Greenland to become a more competitive mining country and attract foreign investors (Government of Greenland, 2019a, p. 5, 8).

Production

In 2019, the production of corundum ore increased by 477%, and that of corundum (sorted, untreated) by 25%. In April, Hudson Greenland A/S began production at its White Mountain anorthosite mine. Data on mineral production are in table 1 (Hudson Resources Inc., 2020c).

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Industrial Minerals

Feldspar.—In April 2019, Hudson Greenland A/S (a subsidiary of Hudson Resources Inc. of Canada) commenced production in the White Mountain anorthosite (calcium feldspar) mine. In 2019, 17,000 metric tons of refined product trademarked as GreenSpar (the White Mountain anorthosite) were produced from April through October. During the summer, the company installed new components for the crusher, and it planned to install a rotary drum heater in January 2020, which would ensure better magnetic separation of the fine particles in the freezing temperatures during the winter. Production was expected to restart in 2020 once the rotary drum heater is commissioned. 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 substitute for kaolin and nepheline syenite, and is primarily composed of silicon (50%), aluminum (31%), and calcium (15%). According to the company, the White Mountain deposit is the largest anorthosite occurrence yet discovered. In Greenland, alumina was not produced from anorthosite owing to energy costs and chemical requirements. The mine was expected to produce 200,000 metric tons per year (t/yr) initially, and to increase to 500,000 t/yr in the future. Hudson Greenland was granted a 30-year mining permit in 2015 with a possibility of a 20-year extension (table 1; Government of Greenland, 2019b, p. 1, 2; 2020; Hudson Resources Inc., 2020a–c; Mining Technology, 2020).

Gemstones.—Greenland Ruby A/S, which was the owner of the Aappaluttoq corundum mine near Qeqertarsuaq, began extracting hard rock and separating out rubies and pink sapphires on site in May 2017. In 2019, the company started to release its gemstone to the market. The mine had an estimated life of at least 10 years (Greenland Ruby A/S, 2018, 2020; Government of Greenland, 2019b, p. 2).

Outlook

Greenland’s mineral reserves are well documented, and the implementation of “Greenland’s Mineral Strategy 2019–2023” is expected to continue to attract foreign investors. The Government of Greenland has carried out several resource assessments throughout the ice-free land mass of Greenland, recognizing the country’s potential to diversify the national economy through minerals extraction. The number of granted licenses continues to increase across Greenland, and the mineral industry may continue to develop and become a leading industrial sector in the country in the future.

References Cited

- Government of Greenland, 2018a, Greenland geology and selected mineral occurrences: Nuuk, Greenland, Government of Greenland. (Accessed June 29, 2020, via <http://www.greenmin.gl/>.)
- Government of Greenland, 2018b, Minex No. 51 mineral exploration newsletter: Nuuk, Greenland, Government of Greenland, October, 16 p. (Accessed June 29, 2020, at <https://govmin.gl/publications/minex-51/?ind=1568310278591&filename=Minex51.pdf&wpdmdl=2316&refresh=5f73939ac8ed11601409946>.)
- Government of Greenland, 2019a, Greenland’s Mineral Strategy 2019–2023: Nuuk, Greenland, Government of Greenland, October 29, 28 p. (Accessed June 29, 2020, at <https://naalakkersuisut.gl/~media/Nanoq/Files/Hearings/2019/Mineralstrategi/Documents/Mineralstrategi%2029OKT2019%20EN.pdf>.)
- Government of Greenland, 2019b, Minex No. 52 mineral exploration newsletter: Nuuk, Greenland, Government of Greenland, October, 20 p. (Accessed June 29, 2020, via <https://govmin.gl/publications/minex-52/?ind=1580239670590&filename=Minex52.pdf&wpdmdl=7645&refresh=5f73937acfd5e1601409914>.)
- Government of Greenland, 2020, Producing mines: Nuuk, Greenland, Government of Greenland. (Accessed June 21, 2020, at <https://govmin.gl/en/mining-and-exploration-projects/producing-mines>.)
- Greenland Ruby A/S, 2018, Break through for ruby miner: Nuuk, Greenland, Greenland Ruby A/S press release, May 23. (Accessed June 29, 2020, at https://www.greenlandruby.gl/press_releases/break-through-for-ruby-miner/.)
- Greenland Ruby A/S, 2020, About us: Nuuk, Greenland, Greenland Ruby A/S. (Accessed June 29, 2020, at <https://www.greenlandruby.gl/about-us/>.)
- Hudson Resources Inc., 2020a, Mining the way to green products: Vancouver, British Columbia, Canada, Hudson Resources Inc. (Accessed June 20, 2020, at <https://hudsonresourcesinc.com/>.)
- Hudson Resources Inc., 2020b, Products: Vancouver, British Columbia, Canada, Hudson Resources Inc. (Accessed June 20, 2020, at <https://hudsonresourcesinc.com/products/>.)
- Hudson Resources Inc., 2020c, White Mountain (Qaqortarsuaq) anorthosite project: Vancouver, British Columbia, Canada, Hudson Resources Inc. (Accessed June 20, 2020, at <https://hudsonresourcesinc.com/projects/white-mountain-anorthosite-project/>.)
- Mining Technology, 2020, White Mountain anorthosite project: London, United Kingdom, Mining Technology. (Accessed June 19, 2020, at <https://www.mining-technology.com/projects/white-mountain-anorthosite-project/>.)
- Statistics Greenland, 2020, Greenland in figures 2020: Nuuk, Greenland, Statistics Greenland, 40 p. (Accessed July 10, 2020, at <http://www.stat.gl/publ/en/GF/2020/pdf/Greenland%20in%20Figures%202020.pdf>.)
- World Bank, The, 2020, Greenland: Washington, DC, The World Bank. (Accessed July 10, 2020, at <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2018&locations=GL&start=2017&view=chart>.)

TABLE 1
DENMARK AND GREENLAND: PRODUCTION OF MINERAL COMMODITIES¹

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

Country and commodity		2015	2016	2017	2018	2019
DENMARK ²						
Cement, hydraulic		3,047	3,404	3,554	3,343	3,354
Clay:						
Bentonite, including plastic clay		329	322	441	429	434
Other		627	837	816	1,060	790
Diatomite ³		469	421	406	366	400
Lime		60 ^e	64 ^e	69	69	33
Natural gas	million cubic meters	4,515	4,468	4,721	4,031	3,051
Peat, including sphagnum	metric tons	137,374	143,538	94,224	187,568	90,702
Petroleum, crude	thousand 42-gallon barrels	57,068	51,424	49,917	41,724 ^r	36,867
Sand and gravel, industrial, quartz		459	502	536	521	573
Stone, sand, and gravel, construction:						
Sand and gravel, unspecified		37,835	38,978	41,339	39,713	38,178
Stone, size and shape unspecified:						
Chalk		973 ^e	1,030 ^e	1,058	1,197	1,088
Granite		216	214	262	496	500 ^e
Limestone		2,900 ^e	3,080 ^e	3,316	3,311	3,248
Sulfur, byproduct, natural gas and petroleum, S content	metric tons	4,447	6,144	4,004	4,194	3,554
GREENLAND						
Feldspar, anorthosite	kilograms	--	--	--	--	17,000,000
Gemstones, corundum:						
Ore	do.	--	--	1,616,000	2,706,990	15,614,500
Sorted, untreated	do.	--	--	250 ^e	1,026	1,279

^eEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through July 22, 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, kaolin, refined petroleum products, salt, and semimanufactured steel may have been produced, but available information was inadequate to make reliable estimates of output.

³Data represent Danish extracted molar.

TABLE 2
DENMARK AND GREENLAND: STRUCTURE OF THE MINERAL INDUSTRIES IN 2019

(Thousand metric tons unless otherwise specified)

Country 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 Rordal	2,100
White		do.	do.	850
Chalk (calcium carbonate)		Dankalk A/S	Quarries at Aggersund, Batum, Mjels, and Poulstrup	750 ^e
Do.		Faxe Kalkbrud A/S (Lhuist Group S.A.)	Quarries at Stevns and Sigerslev	450
Diatomite (moler)		Imerys Industrial Minerals Denmark A/S ¹ (Imerys Group)	Quarries on Mors and Fur islands	580
Do.		Skamol Group	Plant at Fur island	NA
Lime		Faxe Kalkbrud A/S (Lhuist Group S.A.)	Plant at Stubberup, near Fakse, on Zealand Island	200
Natural gas	million cubic meters	Dansk Undergrunds Consortium ² (Total E&P Danmark, 43.2%; Noreco ASA 36.8%; Nordsofonden, 20.0%)	Tyra Field in the North Sea ³	5,000
Petroleum:				
Crude	barrels per day	do.	16 fields in the North Sea	97,000
Do.	do.	Hess Corp., 65.1%; INEOS Energy A/S, 36.8%; Danoil A/S, 1.7%	1 field (South Arne) in the North Sea	12,000
Do.	do.	INEOS Energy A/S	5 fields in the North Sea	6,000
Do.	do.	Wintershall Noordzee B.V., 63.6%, and Nordsofonden, 36.4%	1 field (Ravn) in the North Sea	2,000
Refined	do.	Dansk Shell A/S (Royal Dutch Shell plc., 100%)	Fredericia	63,000
Do.	do.	Equinor ASA ⁴	Kalundborg	110,000
Salt		Akzo Nobel A/S	Mine (brine) at Hvornum, plant at Mariager	1,000
Steel, semimanufactures		NLMK DanSteel A/S (NLMK International B.V., 100%)	Plant at Frederiksvaerk	500
GREENLAND				
Feldspar		Hudson Greenland A/S ⁵ (Hudson Resources Inc.)	Mine and plant at White Mountain (Qaqortorsuaq)	200
Gemstone:				
Pink sapphires		Greenland Ruby A/S ⁶ (Rana Mines, 92%, and Greenland Venture A/S, 8%)	Aappaluttoq Mine near Qeqertarsuaat	NA
Ruby		do.	do.	NA
Gold		AEX Gold Inc. ⁷	Nalunaq Mine at Nanortalik	NA

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

¹Formerly Damolin A/S.

²Total S.A. was the operator for all Dansk Undergrunds Consortium activities.

³The Tyra Field was temporarily shut down for redevelopment in November 2019. Production was expected to recommence in July 2022.

⁴Formerly Statoil A/S.

⁵Mine began production in April 2019. Production was temporarily stopped in October 2019, and was expected to recommence in 2020.

⁶Mine began production in May 2017.

⁷Mine was placed under administration, and operations have been suspended since 2013.