



2020–2021 Minerals Yearbook

ICELAND [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF ICELAND

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Note: In this chapter, information for 2020 is followed by information for 2021.

Iceland has an abundance of geothermal and hydropower energy sources but as of 2021, no proven mineral fuel or metallic mineral reserves. High-energy-consuming smelting of aluminum metal, ferrosilicon, and silicon metal were economically advantageous endeavors in Iceland owing to the country's inexpensive and accessible renewable energy. Iceland was the 8th-ranked silicon metal producer in the world and the 10th-ranked aluminum producer, accounting for 1.3% of the world's production of each (Naess-Schmidt and others, 2017, p. 7, 13; Bray, 2022; Schnebele, 2022).

Minerals in the National Economy

In 2020, Iceland's real gross domestic product (GDP) decreased by 6.5%. The nominal GDP was \$21.72 billion. Mining and quarrying accounted for 0.1% of the country's GDP, and the manufacture of metals, 1.1%. Approximately 100 people (or 0.05% of Iceland's employed population) worked in mining and quarrying, and approximately 1,800 people (or 0.9%) worked in the metal manufacturing industries (Statistics Iceland, 2021a, b; World Bank, The, 2022a, b).

In 2020, the total value of exports of goods decreased to \$4.63 billion,¹ or by 2.4% compared with that in 2019. The export value of aluminum and aluminum products decreased by 2.0% and accounted for 33.2% of the total value of exported goods compared with 33.0% in 2019; the export quantity decreased by 0.8% to 825,082 metric tons (t). The export value of ferrosilicon increased by 2.4% and accounted for 2.6% of the total value of exported goods compared with 2.5% in 2019; the export quantity increased by 7.3% to 107,227 t. The total value of goods imports decreased by 7.0% to \$5.70 billion owing mainly to a decrease in the value of mineral fuel imports (Statistics Iceland, 2022a–c).

Production

In 2020, the production of silicon metal decreased by 2%. Production of ferrosilicon and aluminum (primary metal) increased by 7% and 6%, respectively. Data on mineral production are in table 1.

Structure of the Mineral Industry

The major mineral facilities, such as those for aluminum and ferrosilicon, were foreign-owned. Table 2 is a list of the major mineral industry facilities.

Commodity Review

Metals

Aluminum.—In 2020, three aluminum smelters were in operation in Iceland. Alcoa Corp. of the United States owned the Fjardaal aluminum smelter at Reydarfjörður, which had a production capacity of 344,000 metric tons per year (t/yr) of primary aluminum. Century Aluminum Co. of the United States owned an aluminum smelter in Grundartangi that had a production capacity of 350,000 t/yr of aluminum and aluminum alloys, including a primary aluminum capacity of 260,000 t/yr. Rio Tinto Alcan Ltd. of Canada owned the ISAL aluminum smelter in Hafnarfjörður, which had a production capacity of 210,000 t/yr (Alcoa Corp., 2021, p. 40; Century Aluminum Co., 2021; Nordural Grundartangi ehf, 2021, p. 9; Rio Tinto Iceland Ltd., 2021).

In 2020, the production of primary aluminum decreased to 728,104 t, or by 5.5% compared with that in 2019. The Fjardaal smelter produced 334,619 t of aluminum compared with 334,858 t in 2019. In 2020, 14 of the 336 aluminum-producing pots at the smelter were not in operation because of pot maintenance, which was conducted every 5 to 7 years. The maintenance process for the 14 pots was expected to be completed by the end of 2021. The Grundartangi smelter produced 312,629 t of aluminum and aluminum alloys compared with 315,867 t in 2019, and the ISAL smelter produced approximately 183,000 t of primary aluminum, which was about 1,000 t less than in 2019 (table 1; Alcoa Fjardaal sf., 2021; 2022a, p. 20; Nordural Grundartangi ehf, 2021, p. 9; Rio Tinto plc, 2021, p. 339).

Silicon.—PCC BakkiSilicon hf temporarily shut down its silicon metal production in 2020 owing to a significant decline in silicon metal prices caused by the coronavirus disease 2019 (COVID-19) pandemic. The company stopped production from one electric arc furnace in the second quarter of 2020 and from the other furnace in July. PCC BakkiSilicon's silicon metal plant in Bakki near Husavík was owned by PCC SE of Germany (86.5% of the shares) and a local company Bakkastakkur slhf (13.5%); it had a production capacity of 32,000 t/yr of silicon metal. The plant received a final acceptance certificate on October 30, 2019, and started regular silicon metal production in November 2019. In 2020, Stakksberg ehf planned a renovation of its 23,000-t/yr-capacity silicon metal plant in Helgúvík; the renovation project was to begin in the first quarter of 2021 and to take 14 months to complete (PCC SE, 2021a; 2021b, p. 19, 35; Stakksberg ehf, 2021).

¹Where necessary, values have been converted from Icelandic krona (ISK) to U.S. dollars (US\$) at the annual average exchange rates of ISK126.986=US\$1.00 for 2021 and ISK135.354=US\$1.00 for 2020.

Renewable Energy.—In 2020, Iceland produced 99.98% of its electricity from renewable energy sources. The mix of energy sources for electricity included hydroelectric (68.79%), geothermal (31.16%), wind (0.03%), and mineral fuels (0.02%). The country's power production decreased by 1.9% to 19,127 gigawatt-hours (GWh) in 2020 from 19,489 GWh in 2019. In 2020, the country had 63 hydroelectric powerplants that had a total installed capacity of 2,107 megawatts (MW) and 9 geothermal powerplants that had a total capacity of 755 MW. Three of the hydroelectric powerplants began operating in 2020 (Orkustofnun, 2021, 2022).

MINERAL INDUSTRY HIGHLIGHTS IN 2021

In 2021, Iceland's real GDP increased by 3.7%. The nominal GDP was \$25.46 billion. The economic growth was driven mainly by private consumption and investment. The total value of exports of goods was \$6.00 billion in 2021. Exports of aluminum and aluminum products were valued at \$2.24 billion and amounted to 830,761 t. Exports of ferrosilicon were valued at \$189 million and amounted to 105,762 t. The total value of goods imports was \$7.83 billion in 2021 (Statistics Iceland, 2022a–c; Trading Economics, 2022; World Bank, The, 2022a, b).

In 2021, Iceland's production of primary aluminum amounted to 729,813 t, which was approximately the same amount as in 2020. The Fjarðaal smelter produced 317,869 t of aluminum, which was a 5% decrease from that in 2020; 32 of the 336 pots at the smelter were not in operation owing to pot maintenance. The pot maintenance process for the 32 pots was expected to be finished by the end of 2022. The Grundartangi smelter produced 315,182 t of aluminum and aluminum alloys in 2021, and the ISAL smelter produced approximately 203,000 t of primary aluminum (table 1; Alcoa Fjarðaal sf., 2022a, p. 20; 2022b; Nordural Grundartangi ehf, 2022, p. 11; Rio Tinto plc, 2022, p. 351).

The production of ferrosilicon in Iceland decreased by 3.4% to 123,800 t in 2021. Elkem Iceland ehf, which was owned by Elkem AS of Norway, operated a ferrosilicon plant in Akranes, 40 kilometers north of the capital Reykjavik, and produced 28,007 t of silicon metal. In 2021, PCC BakkiSilicon resumed production at its Husavik silicon metal plant. One furnace was restarted in April, and the other furnace, in July. Since then, both furnaces had operated stably at almost full capacity (table 1; Elkem Iceland ehf, 2022; PCC SE, 2022, p. 34).

Outlook

Silicon metal production is anticipated to increase owing to the ramping up to full-capacity production at the Husavik plant in the coming years. As the country continues to develop renewable energy sources for its power supply, energy-intensive mineral-processing activities, such as smelting of aluminum, ferrosilicon, and silicon metal, are expected to remain the major components of the mineral industry. The output of these commodities may increase in the future as the country's carbon-free electricity becomes increasingly attractive for mineral commodity production (Statistics Iceland, 2022a).

References Cited

- Alcoa Corp., 2021, June 2021 investor presentation: Pittsburgh, Pennsylvania, Alcoa Corp., June 9, 51 p. (Accessed July 12, 2021, at <https://investors.alcoa.com/events-and-presentations/presentations/2021/default.aspx>.)
- Alcoa Fjarðaal sf., 2021, Efnahagur og virðiskeðja [Economy and value chain]: Reyðarfjörður, Iceland, Alcoa Fjarðaal sf. (Accessed July 12, 2021, at <https://alcoa.samfelagsskyrsla.is/efnahagur/>.) [In Icelandic.]
- Alcoa Fjarðaal sf., 2022a, 2021 samfelagsskýrsla [2021 CSR report]: Reyðarfjörður, Iceland, Alcoa Fjarðaal sf., 62 p. (Accessed July 5, 2022, at https://uploads-ssl.webflow.com/60b8ac59d1cc976af2c4d382/626fa9d0e9c90514256dedf2_ALC_2021_samfelagssk.pdf.) [In Icelandic.]
- Alcoa Fjarðaal sf., 2022b, Efnahagur og virðiskeðja [Economy and value chain]: Reyðarfjörður, Iceland, Alcoa Fjarðaal sf. (Accessed July 5, 2022, at <https://alcoa.samfelagsskyrsla.is/efnahagur/>.) [In Icelandic.]
- Bray, E.L., 2022, Aluminum: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 22–23.
- Century Aluminum Co., 2021, Grundartangi, Iceland: Chicago, Illinois, Century Aluminum Co. (Accessed July 12, 2021, at <http://centuryaluminum.com/plants-products/grundartangi-iceland/index.html>.)
- Elkem Iceland ehf, 2022, Elkem Iceland: Akranes, Iceland, Elkem Iceland ehf. (Accessed July 5, 2022, at <https://www.elkem.com/about-elkem/our-plants-and-locations/worldwide-presence/elkem-iceland/>.)
- Naess-Schmidt, H.S., Hansen, M.B.W., and von Below, D., 2017, Energy market reform options in Iceland: Copenhagen, Denmark, Copenhagen Economics, February 20, 32 p. (Accessed July 12, 2021, at <https://www.copenhageneconomics.com/dyn/resources/Publication/publicationPDF/2/392/1488986369/copenhagen-economics-2017-energy-market-reform-options-promoting-security-of-supply-and-natural-resource-value.pdf>.)
- Nordural Grundartangi ehf, 2021, Nordural Grundartangi ehf.—Financial statements 2020: Akranes, Iceland, Nordural Grundartangi ehf, 25 p. (Accessed July 12, 2021, via <https://nordural.is/en/financialstatements/>.)
- Nordural Grundartangi ehf, 2022, Nordural Grundartangi ehf.—Financial statements 2021: Akranes, Iceland, Nordural Grundartangi ehf, 30 p. (Accessed July 5, 2022, via <https://nordural.is/en/financialstatements/>.)
- Orkustofnun, 2021, OS-2021-T009-01, development of electricity production in Iceland (2020): Reykjavik, Iceland, Orkustofnun [National Energy Authority], Ministry of Industries and Innovation, June 30. (Accessed July 12, 2021, via <https://nea.is/the-national-energy-authority/energy-data/data-repository/>.)
- Orkustofnun, 2022, OS-2021-T014-01, installed electrical capacity and electricity production in Icelandic power stations 2020: Reykjavik, Iceland, Orkustofnun [National Energy Authority], Ministry of Industries and Innovation, February 28. (Accessed July 5, 2022, via <https://nea.is/the-national-energy-authority/energy-data/data-repository/>.)
- PCC SE, 2021a, Advanced silicon metal production plant in Iceland: Duisburg, Germany, PCC SE. (Accessed July 12, 2021, at <https://www.pcc.eu/en/silicon-project-iceland/>.)
- PCC SE, 2021b, PCC Group annual report 2020: Duisburg, Germany, PCC SE, July, 140 p. (Accessed July 29, 2021, at <https://www.pcc.eu/wp-content/uploads/2021/07/PCC-Group-Annual-Report-2020.pdf>.)
- PCC SE, 2022, PCC Group annual report 2021—Delivering success: Duisburg, Germany, PCC SE, July, 142 p. (Accessed July 5, 2022, at <https://www.pcc.eu/wp-content/uploads/2022/07/PCC-Group-Annual-Report-2021.pdf>.)
- Rio Tinto Iceland Ltd., 2021, Welcome to the Rio Tinto Iceland Ltd. website: Hafnarfjörður, Iceland, Rio Tinto Iceland Ltd. (Accessed July 12, 2021, at <https://riotinto.is/?pageid=95>.)
- Rio Tinto plc, 2021, Annual report 2020: Melbourne, Victoria, Australia, Rio Tinto plc, February 22, 384 p. (Accessed July 12, 2021, via <https://www.riotinto.com/invest/reports/annual-report>.)
- Rio Tinto plc, 2022, Annual report 2021: Melbourne, Victoria, Australia, Rio Tinto plc, February 23, 420 p. (Accessed July 5, 2022, via <https://www.riotinto.com/invest/reports/annual-report>.)
- Schnebele, E.K., 2022, Silicon: U.S. Geological Survey Mineral Commodity Summaries 2022, p. 150–151.
- Stakksberg ehf, 2021, Producing silicon based materials with clean Icelandic energy: Helguvík, Iceland, Stakksberg ehf. (Accessed July 12, 2021, at <https://stakksberg.com/en/stakksberg/>.)
- Statistics Iceland, 2021a, Gross domestic product by industries, percentage breakdown, 1997–2020: Reykjavik, Iceland, Statistics Iceland. (Accessed July 12, 2021, at https://px.hagstofa.is/pxen/pxweb/en/Efnahagur/Efnahagur_thjodhagsreikningar_framluppgr_ISAT2008/THJ08401.px/?rxid=c0a5a86e-c0d3-4990-9626-498d87b00252.)

Statistics Iceland, 2021b, Number of employed persons, jobs and hours worked by economic activity 2008–2020: Reykjavik, Iceland, Statistics Iceland. (Accessed July 12, 2021, at https://px.hagstofa.is/pxen/pxweb/en/Efnahagur/Efnahagur_vinumagnogframleidni_vinumagn/THJ11002.px/?rxid=c0a5a86e-c0d3-4990-9626-498d87b00252.)

Statistics Iceland, 2022a, Economic forecast, March 2022: Reykjavik, Iceland, Statistics Iceland, March 22. (Accessed July 5, 2022, at <https://statice.is/publications/publication/economic-forecast/economic-forecast-march-2022/>.)

Statistics Iceland, 2022b, Exports by commodities (SI classification) and countries 2012–2022: Reykjavik, Iceland, Statistics Iceland. (Accessed July 5, 2022, at https://px.hagstofa.is/pxen/pxweb/en/Efnahagur/Efnahagur_utanrikisverslun_1_voruvidskipti_01_voruskipti/UTA06101.px/table/tableViewLayout1/?rxid=cca94b94-9509-4f57-955c-365195293459/.)

Statistics Iceland, 2022c, The value of exports and imports by month (FOB/CIF) 2011–2022: Reykjavik, Iceland, Statistics Iceland. (Accessed July 5, 2022, at https://px.hagstofa.is/pxen/pxweb/en/Efnahagur/Efnahagur_utanrikisverslun_1_voruvidskipti_01_voruskipti/UTA06001.px/table/tableViewLayout1/?rxid=45035be1-baea-47d9-920d-e182896d292c.)

Trading Economics, 2022, Iceland GDP: Trading Economics. (Accessed July 5, 2022, at <https://tradingeconomics.com/iceland/gdp#:~:text=Iceland%20GDP%20The%20Gross%20Domestic%20Product%20%28GDP%29%20in,percent%20of%20the%20world%20economy.%20source%3A%20World%20Bank.>)

World Bank, The, 2022a, GDP (current US\$)—Iceland: Washington, DC, The World Bank. (Accessed July 12, 2022, at <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=IS>.)

World Bank, The, 2022b, GDP growth (annual %)—Iceland: Washington, DC, The World Bank. (Accessed July 12, 2022, at <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=IS>.)

TABLE 1
ICELAND: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight)

Commodity ²	2017	2018	2019	2020	2021
METALS					
Aluminum, metal, primary	763,618 ^r	733,523 ^r	689,995 ^r	728,104	729,813
Ferroalloys, ferrosilicon	116,811	116,889	120,255	128,187	123,800
Silicon, metal	7,160	7,036	28,396	27,903	28,007

^rRevised.

¹Table includes data available through July 22, 2022. All data are reported unless otherwise noted.

²In addition to the commodities listed, pumice, salt, sand and gravel, scoria, and crushed stone may have been produced, but available information was inadequate to make reliable estimates of output.

TABLE 2
ICELAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facility	Annual capacity
Aluminum, primary	Alcoa Fjarðal sf (Alcoa Corp., 100%)	Fjarðal smelter at Reyðarfjörður	344
Do.	Nordural Grundartangi ehf (Century Aluminum Co., 100%)	Smelter in Grundartangi	260
Do.	Rio Tinto Iceland Ltd. (Rio Tinto Alcan Ltd., 100%)	ISAL smelter in Hafnarfjörður	210
Ferrosilicon	Elkem Iceland ehf (Elkem AS, 100%)	Plant in Akranes	120
Pumice	BM Valla Ltd.	Mine in Mount Hekla	32
Do.	Jarðefnaíðnadur ehf	do.	210
Silicon, metal	PCC BakkiSilicon hf (PCC SE, 86.5%, and Bakkastakkur slhf, 13.5%)	Smelter in Bakki near Husavík	32
Do.	Stakksberg ehf (Arion Bank, 100%) ¹	Smelter in Helgúvík, Reykjanesbaer	23

Do., do. Ditto.

¹Operations suspended since September 2017.