



# 2011 Minerals Yearbook

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## ICELAND

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# THE MINERAL INDUSTRY OF ICELAND

By Harold R. Newman

Iceland, which is the third largest island in Europe after Great Britain and Greenland, is a volcanic island consisting predominately of Quaternary and Tertiary basaltic rocks. It lies astride the Mid-Atlantic Ridge, which is part of an undersea mountain system, and is one of the most active volcanic regions on Earth (Iceland on the Web, 2011).

The mineral industry of Iceland consisted largely of metal production. Iceland had few proven mineral resources and was dependent on imports to meet domestic demand for mineral commodities. The country accounted for about 2% of global production of primary aluminum and about 1% of ferrosilicon production (Bray, 2012, Corathers, 2012). Most of the production of aluminum and ferrosilicon was exported. Because of the country's geographic proximity to the European Union (EU) and membership in the European Free Trade Association, most of Iceland's trade was with Europe.

In 2011, Iceland was an open economy. U.S. exports to Iceland included petroleum products valued at \$93.7 million; fuel oil, \$41.3 million; metallurgical-grade coal, \$9.1 million; and iron and steel products, \$386,000 (U.S. Census Bureau, 2011a). U.S. imports from Iceland included steelmaking and ferroalloying materials, \$7.9 million; industrial chemicals, \$2.7 million; and natural rubber that was reexported, \$2.5 million (U.S. Census Bureau, 2011b).

## Production

Iceland has few proven mineral resources; metallic minerals were not available in sufficient quantities to make mining feasible with existing technology. Consequently, the country's aluminum and ferrosilicon industries relied on imported materials as well as the country's abundant and inexpensive geothermal and hydroelectric energy. Aluminum was Iceland's leading mineral commodity, followed by ferrosilicon. In 2011, production of aluminum decreased whereas production of ferrosilicon increased. Production of industrial minerals included cement, crushed stone, pumice, salt, sand and gravel, and scoria, which were used by the local industries (table 1).

## Structure of the Mineral Industry

The major mineral enterprises, except for aluminum producers, were controlled by the Government through the ownership of majority shares in the enterprises. The remaining mineral enterprises were foreign owned and locally operated, or, in the case of small mineral-related businesses, locally owned and operated (table 2).

## Commodity Review

### Metals

**Aluminum.**—Alcoa Inc. of the United States announced that it had decided to discontinue the development of a proposed

smelter in Bakki near Husavik in northern Iceland. Alcoa concluded that it would not be able to acquire a long-term competitively priced power supply that would justify Alcoa's investment in the smelter. Alcoa stated that it had been offered by the power utility only one-half of the power originally envisioned for the project and that the timeframe for delivery of the power had been extended significantly. Alcoa had joined the Bakki project and had signed a memorandum of understanding with the Government and the municipality of Nordurthing in early 2006 (Alcoa Inc., 2011).

Rio Tinto Alcan of Canada announced that it would be updating equipment, increasing the production capability, and subsequently increasing the production at its Straumsvik smelter after the signing of a long-term energy agreement with Landsvirkjun (National Power Co.), which was the state-owned power utility. The smelter was expected to begin increasing its production starting in April 2012 to a total of 230,000 metric tons per year (t/yr) by July 2014. The upgrade included an amperes increase in two potlines, a bath recycling plant, and a rodding shop. The smelter's output would be changed from rolling slabs to extrusion billets (Rio Tinto Alcan, 2011).

**Silicon.**—Icelandic Silicon Corp. (ISC) announced that it had signed an investment agreement with the Government and the City of Reykjanes for the construction of a 40,000-t/yr metallurgical-grade silicon facility to be located in Helgukvík. ISC and Landsvirkjun signed an agreement on the supply of energy for the project. Construction was expected to start in 2012 and to be completed by midyear 2013. Globe Specialty Metals Inc. of the United States, which was one of the leading producers of silicon metal and silicon-based specialty alloys in the world, would own about 85% of ISC and be responsible for the operations and marketing (Invest in Iceland, 2011).

### Industrial Minerals

**Pumice and Pumicite.**—Jardefnaindnatur ehf (JEI) mined pumice in the Mount Hekla region about 100 kilometers (km) from Reykjavik. The pumice was mined by open pit, and the raw material was transported to the harbor area for processing. Processing consisted of grinding and screening of the pumice to various grain sizes and washing the material to remove any sludge particles. JEI's main export markets were Belgium, Denmark, the Netherlands, and the United States (Jardefnaindnatur ehf, 2011).

### Mineral Fuels and Other Sources of Energy

**Geothermal and Hydroelectric Energy.**—Iceland was a global leader in the use of renewable energy resources. The country has some of the largest potential sources of geothermal energy and hydropower in the world (Central Bank of Iceland, 2011, p. 17).

The Government was considering construction of the world's longest underwater electric cable to enable it to sell geothermal energy to the European market. Landsvirkjun was undertaking a study of building a subsea cable that could deliver as much as 5 terawatt-hours per year of electricity to Europe; this is enough electricity to power 1.25 million homes per year. The cable could be as long as 1,900 km, depending on its destination; the Government was considering Germany, the Netherlands, Norway, or the United Kingdom as location options. Based on 2011 energy prices, the cable could generate \$350 million to \$448 million in income each year for the Government and would help Europe achieve its target of meeting 20% of its energy requirements from renewable sources by 2020. In 2011, Landsvirkjun produced about 75% of Iceland's electricity by geothermal power (Thomson Reuters, 2011).

## Outlook

Aluminum and ferroalloy production are expected to continue to dominate the mineral resource sector. Petroleum exploration is expected to resume offshore Iceland in the near future. Entry into the EU will likely continue to be discussed by the Government and the EU. The issue has been on the agenda for discussion since the Government made application for membership in midyear 2009. Iceland's future development will continue to depend on the country's use of its abundant hydroelectric and geothermal power.

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TABLE 1  
ICELAND: ESTIMATED PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Commodity	2007	2008	2009	2010	2011
Aluminum, metal, primary <sup>3,4</sup>	446,297	761,204	804,605	825,803 <sup>f</sup>	780,853
Cement, hydraulic <sup>5</sup>	140,000	138,000 <sup>f</sup>	138,000	140,000	140,000
Ferrosilicon	114,000	107,882 <sup>4</sup>	112,983 <sup>4</sup>	114,231 <sup>4</sup>	120,076 <sup>4</sup>
Pumice and related volcanic material:					
Pumice	95,000	95,000	95,000	92,000	90,000
Scoria	1,000	1,000	1,000	1,000	1,000
Salt	4,500	4,500	4,500	4,500	4,500
Sand:					
Basaltic	1,200	1,000	1,000	1,000	1,000
Calcareous, shell	75,000	70,000	70,000	70,000	70,000
Sand and gravel	4,200	4,000	4,000	4,000	4,000
Silica dust <sup>6</sup>	25,000	24,000	24,000	24,000	24,000
Stone, crushed:					
Basaltic	95,000	95,000	90,000	90,000	90,000
Rhyolite	18,000	18,000	16,000	16,000	16,000

<sup>f</sup>Revised. do. Ditto.

<sup>1</sup>Estimated data are rounded to no more than three significant digits.

<sup>2</sup>Table includes data available through November 19, 2012.

<sup>3</sup>Ingot and rolling billet production.

<sup>4</sup>Reported figure.

<sup>5</sup>Sales.

<sup>6</sup>Byproduct of ferrosilicon.

TABLE 2  
ICELAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum	Alcoa Inc.	Fjaröaál smelter at Reydarfjörður	347
Do.	Reykjavik (ISAL) (Rio Tinto Alcan, 100%)	Straumsvik	190
Do.	Century Aluminum Co.	Grundartangi	260
Cement	Sementsverksmiðja Ríkisins (Government, 100%)	Akranes	115
Ferrosilicon	Elkem Iceland (Elkem A/S)	Plant at Grundartangi	100
Fertilizer	Aburðarverksmiðja Ríkisins (Government, 100%)	Gufunes	60
Pumice	Jarðefnaídnadur ehf (JEI)	Mount Hekla	210
Do.	Pumice Products Ltd. (BM Valla Ltd., 100%)	do.	32
Salt	Icelandic Salt Co. (Akzo Nobel NV, 58%)	Plant at Svartsengi	5

Do., do. Ditto.