



2012 Minerals Yearbook

BAUXITE AND ALUMINA

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In 2012, almost all the 9.56 million metric tons (Mt) of bauxite consumed in the United States was imported. U.S. production and shipments of alumina (calcined equivalent) were 4.39 Mt and 4.41 Mt, respectively. An estimated 90% of domestic shipments was used for metal production. World production of bauxite was 258 Mt (tables 1, 11); the leading producing countries were, in descending order of production, Australia, China, Brazil, Indonesia, India, and Guinea. World production of alumina was estimated to be 96.4 Mt (tables 2, 12); China, Australia, and Brazil were, in descending order, the leading producing countries.

Production

Bauxite.—For many years, domestic mines have supplied less than 1% of the U.S. requirement for bauxite, all of which was used in nonmetallurgical products, such as abrasives, chemicals, proppants, and refractories. Thus, the United States imported almost all the bauxite that it required.

Alumina.—U.S. production of alumina, which was derived exclusively from imported metallurgical-grade bauxite, was 16% higher in 2012 than that in 2011 (table 2) owing to increased production at refineries that restarted capacity in 2011.

Ormet Corp. (Hannibal, OH) completed the rampup to full capacity of its 540,000-metric-ton-per-year (t/yr) alumina refinery in Burnside, LA, at midyear (Ormet Corp., 2012). The refinery had reopened in November 2011 after having closed at yearend 2006 because of the prevailing low alumina price and high natural gas price.

In April, Almatix GmbH (Frankfurt, Germany) sold an alumina trihydrate plant in Bauxite, AR, which produced fire retardant products to JM Huber Corp. (Edison, NJ). Almatix continued to own and operate adjacent facilities which produced calcined and tabular alumina used in abrasives, ceramics, and refractories (Almatix GmbH, 2012).

Consumption

Bauxite.—Domestic production and consumption data for bauxite and alumina were obtained by the U.S. Geological Survey from three voluntary surveys. The “Bauxite Consumption” survey was sent to 31 operations, 24 of which responded, representing approximately 89% of the bauxite consumed for uses other than cement listed in table 4.

Total domestic consumption of bauxite increased by 8% compared with that of 2011. In 2012, 98% of the bauxite consumed in the United States was refined to alumina [an estimated 2.13 metric tons (t) of dried bauxite was required to produce 1 t of alumina]; the remaining 2% was consumed in nonmetallurgical applications (table 4).

Alumina.—An estimated 90% of the net alumina imports and domestic alumina shipments by U.S. alumina refineries went to primary aluminum smelters for metal production. In 2012, 10 domestic primary aluminum smelters consumed 4.14 Mt of alumina, 4% more than the amount of alumina consumed in 2011. Consumption of various forms of alumina by the abrasives, chemicals, refractories, and other specialty industries accounted for the remainder of U.S. alumina use.

Prices

Most metallurgical-grade bauxite and alumina was purchased under long-term contracts, and contract terms normally were not made public. Spot prices for metallurgical-grade alumina and specialty forms of bauxite and alumina for nonmetallurgical applications, however, were published in trade journals.

The annual average delivered value of U.S. imports of metallurgical-grade bauxite (table 5) decreased slightly in 2012 compared with that of 2011. Alumina prices generally followed the trend in aluminum prices. In 2012, the average value of U.S. imports of calcined alumina, (table 6) including cost, insurance, and freight at U.S. ports, decreased by 10% to \$416 per metric ton. Yearend price ranges for refractory-grade bauxite in China and Guyana (table 7), the leading suppliers, as quoted in Industrial Minerals (2013), were generally unchanged from those in 2011.

Research and Development

The Central Glass and Ceramic Research Institute (CGCRI) (Kolkata, India) was developing a process to convert metallurgical grade bauxite into refractory-grade bauxite. The process removes calcium, iron, and titanium oxides from bauxite. The bauxite processed in a laboratory-scale plant had a melting point of about 1,600 °C, suitable for refractory products. CGCRI was scaling up production and planned to build a commercial-scale plant if the process proved to be economically feasible (Syrett, 2012b).

Foreign Trade

In 2011, the European Union, Mexico, and the United States filed a complaint with the World Trade Organization (WTO) concerning Chinese export taxes on several mineral products, including refractory-grade bauxite. The WTO ruled that the export taxes violated international trade agreements, and China appealed the ruling. The Appellate Body of the WTO rejected most of China’s claims in the appeal, determining that China’s export restraints on several raw materials, including refractory-grade bauxite, were inconsistent with China’s WTO obligations. In December, the Government of China announced that it would remove the 15% export tax on refractory-grade

bauxite beginning January 1, 2013 (American Metal Market, 2012; World Trade Organization, 2012; China Metal Market—Alumina and Aluminum, 2013f).

World Industry Structure

Production.—In 2012, world production of bauxite was essentially unchanged compared with that of 2011 (table 11). Total mine production of 258 Mt was reported from 26 countries. The leading producers of bauxite were, in decreasing order of tonnage mined, Australia, China, Brazil, Indonesia, India, and Guinea. These countries accounted for 86% of total world production; Australia, China, and Brazil together accounted for 61% of the world's production. World output of alumina increased by 5% in 2012 compared with that of 2011 (table 12). Total alumina production of 96.4 Mt was reported from 25 countries. The five leading producing countries were, in descending order of quantity of alumina produced, China, Australia, Brazil, the United States, and India. These countries accounted for 80% of world production; China and Australia together accounted for 61%.

Mergers, Acquisitions, and Restructuring.—In August, H.I.G. European Capital Partners SAS (Paris, France) purchased the specialty alumina refineries at Beyre de Gardanne, and La Bathie, France, and Teutschenthal, Germany, from Rio Tinto plc and organized them into a company named ALTEO. Rio Tinto sold the refineries as part of its restructuring plan started in 2011 (H.I.G. Capital, LLC, 2012; Rio Tinto plc, 2012a).

World Review

Australia.—Alumina and bauxite production in 2012 increased 8% and 9%, respectively, compared with production in 2011 owing to production restarting after disruptions caused by flooding in 2011 and completion of expansions at two refineries. In March, expansion of the Worsley alumina refinery near Boddington, Western Australia, to 4.6 million metric tons per year (Mt/yr) of alumina from 3.5 Mt/yr was completed. Rampup of the refinery was expected to be completed in mid-2013. The refinery was a joint venture between BHP Billiton Ltd. (86%), Japan Alumina Associates Pty. Ltd. (10%), and Sojitz Alumina Pty. Ltd. (4%) (BHP Billiton Ltd., 2012, p. 24).

In June, Rio Tinto completed an expansion of the Yarwun alumina refinery in Queensland, increasing capacity of the refinery to 3.4 Mt/yr of alumina from 1.4 Mt/yr. In July, production began, and by September, the expansion was producing near full capacity, with the rampup expected to be completed in mid-2013 (Rio Tinto plc, 2012b, p. 4).

Brazil.—Norsk Hydro ASA (Oslo, Norway) and Dubai Aluminium Co. Ltd. (Dubai) postponed construction of the proposed 1.86-Mt/yr Companhia de Alumina do Para (CAP) refinery in Barcarena, citing uncertainty of alumina and aluminum markets during the next few years. Declining aluminum demand in Europe and other markets served by Norsk Hydro were specifically noted. The CAP refinery, a joint venture between Norsk Hydro (81%) and Dubai (19%), was to have been completed by yearend 2015 (Norsk Hydro ASA, 2012).

Bauxite production from the 9.9-Mt/yr Paragominas Mine increased to 9.2 Mt, 13% more than that in 2011, and a record

amount owing to ramping up expansions completed previously (Norsk Hydro ASA, 2013, p. 106).

Canada.—In December, Orbite Aluminae Inc. (Montreal, Quebec) started producing high-purity alumina at its refinery at Cap-Chat, Quebec. The refinery planned to rampup to a rate of 1,800 t/yr by yearend 2013. A 540,000-t/yr refinery being constructed at Cap-Chat to produce smelter-grade alumina was scheduled to be completed by yearend 2013. The process developed by Orbite recovers alumina from high-alumina clay and can also recover other products such as gallium, iron oxide, rare-earth elements, and high-purity silica. Orbite's process can also use low-grade bauxite and red mud (Orbite Aluminae Inc., 2013).

China.—China's production of alumina and bauxite increased by 11% and 4%, respectively, compared with those of 2011 as new capacity was opened during the year. Capacity expansions under construction were expected to further increase production in future years.

Chongqing Province.—In March, Nanchuan Xianfeng Alumina (a subsidiary of Bosai Mining Co. Ltd.) completed expansion of its alumina refinery in Nanchuan to 800,000 t/yr from 500,000 t/yr (China Metal Market—Alumina and Aluminum, 2012b). In September, Aluminum Corp. of China (Chinalco) completed expansion of its alumina refinery in Nanchuan to 800,000 t/yr from 400,000 t/yr (China Metal Market—Alumina and Aluminum, 2012i).

Guangxi Province.—In September, Tiandong Jinxin Chemical Engineering Co. Ltd. completed a 1-Mt/yr refinery in Tiandong to produce aluminum hydroxide for aluminum-based chemicals (China Metal Market—Alumina and Aluminum, 2012g). In October, Chinalco started expanding the bauxite mine which supplied its alumina refinery in Pingguoto to 1 Mt/yr from 600,000 t/yr. Chinalco also was installing capacity to recover 40 t/yr of gallium from the refinery (China Metal Market—Alumina and Aluminum, 2012j). In May, Guangxi Baiyi Mining Co. Ltd. started construction of a bauxite mine in Longhe. Capacity of the mine and the construction schedule were not available (China Metal Market—Alumina and Aluminum, 2012d).

Guizhou Province.—Guizhou Qiya Aluminum Co. Ltd. completed an 800,000-t/yr alumina refinery in Kaili and started ramping up production during the first half of the year (China Metal Market—Alumina and Aluminum, 2012d). In September, China Power Investment Corp. started construction of an 800,000-t/yr alumina refinery in Wuzhengdo. An adjacent 2-Mt/yr bauxite mine was also under construction (China Metal Market—Alumina and Aluminum, 2012h).

Henan Province.—In May, Henan Huiyuan Chemical Engineering Co. Ltd. completed expanding its alumina refinery in Pingdingshan to 800,000 t/yr from 650,000 t/yr (China Metal Market—Alumina and Aluminum, 2012f).

Inner Mongolia Province.—In August, Chinalco started construction of a 1.2-Mt/yr refinery in Jungar to recover alumina from coal ash from a nearby powerplant (China Metal Market—Alumina and Aluminum, 2012g).

Shandong Province.—In March, Shandong Lubei Chemical Engineering Co. Ltd. completed expansion of its alumina refinery in Lubei to 1 Mt/yr from 800,000 t/yr. Longkou

Donghai Alumina Co. Ltd. also completed expansion of its alumina refinery in Longkou to 1.6 Mt/yr from 1.2 Mt/yr during the year (China Metal Market—Alumina and Aluminum, 2012b).

Shanxi Province.—During the third quarter of the year, Chinalco completed construction of a 1.6-Mt/yr bauxite mine in Huaxing, which would supply an 800,000-t/yr alumina refinery, also under construction adjacent to the mine. The refinery was scheduled for completion in 2013 (China Metal Market—Alumina and Aluminum, 2012g). Chinalco also completed expanding its alumina refinery in Hejin to 2.7 Mt/yr from 2.2 Mt/yr in April and started ramping up production in May (China Metal Market—Alumina and Aluminum, 2012d). Zhaofeng Aluminum Co. Ltd. completed an alumina refinery in Yangquan with a capacity of 700,000 t/yr (China Metal Market—Alumina and Aluminum, 2012a).

During the first quarter of the year, China Coal Corp. started construction of a 90,000-t/yr alumina refinery in Shouzhou (China Metal Market—Alumina and Aluminum, 2012b). East Hope Group Ltd. started construction of a 3-Mt/yr refinery in Lingshi to produce aluminum hydroxide for aluminum-based chemicals, which would also recover 40 t/yr of gallium when completed (China Metal Market—Alumina and Aluminum, 2012c). Shanxi Wusheng Aluminum Co. Ltd. started construction of a 500,000-t/yr alumina refinery in Yuncheng (China Metal Market—Alumina and Aluminum, 2012a). In December, Zhengzhou Coal Corp. started construction of an 800,000-t/yr alumina refinery in Wushengto (China Metal Market—Alumina and Aluminum, 2013a).

Yunnan Province.—In July, Yunnan Aluminum Co. Ltd. started production at its 800,000-t/yr alumina refinery in Wenshan. Rampup to full capacity was expected to be completed by yearend. The refinery was completed in 2011, but production was delayed owing to technical issues (Platts Metals Week, 2012a).

Fiji.—Shandong Chipping Xinfa ramped up its new bauxite mine at Nawailevu during the first half of the year and started shipping bauxite in July. During the second half of the year, the company exported 286,000 t of bauxite to its alumina refinery in Jiaokou, Shanxi Province, China (China Metal Market—Alumina and Aluminum, 2012n; 2013c, e; CRU Alumina Monitor, 2012a).

Ghana.—Bauxite production increased by 94% compared with that of 2011; increased production was attributed to the reopening of a mine by Bosai, which acquired Ghana Bauxite Co. from the Government. Bosai started exporting bauxite to China in November and planned to export 1 Mt in 2013 and 1.5 to 2 Mt in 2014 (China Metal Market—Alumina and Aluminum, 2013b).

Guinea.—Alumina production decreased by 74% from that of 2011 owing to a strike that shut down production at United Company RUSAL plc's 618,000-t/yr Friguia alumina refinery and adjacent bauxite mine. Workers seized the refinery on April 4 and held it until June 4, but production did not resume before yearend. Although bauxite production at the Friguia Mine decreased 74% compared with that of 2011, bauxite production in Guinea increased 16% compared with that of 2011 owing to increased production at two other mines. Production from the

14-Mt/yr Sangaredi Mine was at full capacity, producing 12% more bauxite compared with that in 2011. The mine was a joint venture among the Government (49%), Alcoa Inc. (22.95%), Rio Tinto (22.95%), and Dadco Group (5.1%). Production from RUSAL's Kindia Mine increased 11% compared with that of 2011 owing to an expansion to 3.8 Mt/yr from 3.2 Mt/yr (Platts Metals Week, 2012b; United Company RUSAL plc, 2012, 2013; Rio Tinto plc, 2013, p. 17).

In February, Henan International Mining Co. Ltd. started construction of a bauxite mine to supply an alumina refinery to be built in Boke. A construction schedule and expected capacity information for the project were not available (China Metal Market—Alumina and Aluminum, 2012a).

Guyana.—Bauxite production increased by 22% compared with that in 2011. Production at RUSAL's 2.2-Mt/yr Kwakwani Mine increased by 18% compared with that in 2011 as the rampup of plant upgrades continued, accounting for most of Guyana's increase in bauxite production (United Company RUSAL plc, 2013).

Bosai shut down production at its Linden Mine on July 18 owing to violent protests by local residents over an electricity price increase. The protests ended after a month and production resumed. The mine had a capacity to produce 250,000 t/yr of bauxite and the processing plant had a capacity of 150,000 t/yr of calcined refractory-grade bauxite. The Linden Mine was the main source of refractory-grade bauxite outside of China (Syrett, 2012a).

India.—Alumina production increased 12% compared with production in 2011 owing to expansions, which were completed during 2011. Bauxite production from the Panchpatmali Mine decreased by 3% compared with production in 2011 as National Aluminium Co. Ltd. (Nalco) (Bhubaneswar) shut down production for 4 weeks in November and December, citing expiration of its mining permit. A new permit was issued and mining at the 6.3-Mt/yr mine resumed in mid-December. Alumina production at Nalco's alumina refinery in Damanjodi, in the State of Odisha (formerly Orissa), continued uninterrupted using stockpiled bauxite, and production for the year increased by 6% as capacity from an expansion completed in 2011 was ramped up. Nalco completed expansion of the refinery to 2.28 Mt/yr from 2.1 Mt/yr in December and was increasing capacity of the mine to 6.8 Mt/yr by yearend 2013 (National Aluminium Co. Ltd., 2012a, b; 2013, p. 6, 10).

Hindalco Industries Ltd. (Mumbai) continued construction of its 1.5-Mt/yr Utkal alumina refinery and an adjacent 3-Mt/yr bauxite mine, with production scheduled to start in 2013. Hindalco continued construction of the Aditya aluminum project, which included a 1.5-Mt/yr alumina refinery with an adjacent 4.2-Mt/yr bauxite mine in Koraput, Odisha, and a 359,000-t/yr aluminum smelter with a 900-megawatt captive powerplant in Lapanga, Odisha. The smelter and powerplant were expected to be completed in the second half of 2013, and completion of the alumina refinery was expected by yearend 2014 (Hindalco Industries Ltd., 2012; 2013, p. 28).

In December, Vedanta Resources plc (London, United Kingdom) shut down its alumina refinery in Lanjigarh, Odisha. Permits to mine the nearby Niyamgiri Hills bauxite deposit had not been issued, and the refinery was unable to purchase bauxite

from other sources. During the first 9 months of the year, the 1.4-Mt/yr refinery produced at approximately 70% of its capacity, and during October and November, production was at about 40% of capacity because of the bauxite shortage. Vedanta was delaying plans to expand the refinery until mining permits were obtained (Vedanta Resources plc, 2012, p. 7, 28, 29; 2013).

Anrak Aluminium Ltd. (Visakhapatnam) completed a 1.5-Mt/yr alumina refinery in Rachapalle, in the State of Andhra Pradesh, during the year. Anrak planned to purchase bauxite for the refinery from suppliers in Gujarat (CRU Alumina Monitor, 2012b, c).

Indonesia.—Bauxite production decreased by 28% compared with that in 2011, attributed to a new export tax. In May, the Government of Indonesia instituted a 20% tax on the export of unprocessed mineral ores, including bauxite, as part of a new law aimed at reducing unprocessed ore exports. The Government also planned to prohibit the export of unprocessed ores starting in 2014. Implementation of the export tax affected bauxite exports during the year. Bauxite exports to China, the leading destination for bauxite exports, decreased by 22% compared with those in 2011, to 27.9 Mt. Bauxite imports from Indonesia received at alumina refineries in China reportedly increased from 2.41 Mt in January to 5.56 Mt in May, then decreased to only 187,000 t in June. In October, exports to China increased to 1.05 Mt, and were 2.27 Mt and 2.25 Mt in November and December, respectively. PT Antam Tbk (Antam) received permits to export bauxite after implementation of the new ore export law took effect (China Metal Market—Alumina and Aluminum, 2012k, l, m; 2013d, e; PT Antam Tbk, 2012a; Yamada, 2012).

Construction of a 300,000-t/yr alumina refinery at Tayan continued with completion expected by yearend 2013. The project was a joint venture between Antam (80%) and Japan-based Showa Denko K.K. (20%). Bauxite for the refinery was to come from a nearby deposit that was being developed (PT Antam Tbk, 2012b).

In response to the bauxite export restrictions, several companies were making plans to build alumina refineries in Indonesia. Bosai planned to build a 2-Mt/yr refinery. China Hongqiao Group Co. Ltd. signed an agreement with Winning Investment, PT Cita, and PT Danpac to build a refinery; Hainan Joint Enterprise Business Service Co. Ltd. and PT Inopura were planning to construct a 1-Mt/yr refinery on Batam Island; and Gaungxi Investment Group Co. Ltd. and Wijaya Group signed an agreement to develop bauxite resources in Indonesia and built a 2-Mt/yr refinery (China Metal Market—Alumina and Aluminum, 2012e, g, o; 2013f).

Kazakhstan.—Production of alumina and bauxite declined by 10% and 6%, respectively, compared with that of 2011. Eurasian Natural Resources Corp. cited technical issues at its 1.7-Mt/yr alumina refinery during the first half of the year as the reason for the production declines (Eurasian Natural Resources Corp., 2012, p. 1; 2013, p. 7).

Romania.—Alumina production decreased by 14% compared with that of 2011. Vimetco N.V. cited decreased demand from its smelter, which experienced power shortages during most of the year (Vimetco N.V., 2013, p. 6, 7, 13).

Saudi Arabia.—Saudi Arabian Mining Co. (Ma'aden) and Alcoa continued construction of the 4-Mt/yr Al Ba'itha bauxite mine and a 1.8-Mt/yr alumina refinery in Ras al Khair that were expected to be completed in 2014. In February, the first concrete was poured at the alumina refinery. The mine and refinery were part of an aluminum complex that included a 740,000-t/yr smelter and a 380,000-t/yr rolling mill in Ras al Khair that were expected to be completed in 2013. Ma'aden owned 74.9% of the joint venture, and Alcoa owned 25.1% (Alcoa Inc., 2012).

Sierra Leone.—Bauxite production decreased by 40% compared with that of 2011. Vimetco cited weather conditions and equipment failures for the decline of production at its mine. Demand for bauxite at Vimetco's refinery in Romania also declined (Vimetco N.V., 2013, p. 6, 13).

Venezuela.—Production of alumina and bauxite in Venezuela decreased by 38% and 19%, respectively, compared with production in 2011. Decreased alumina sales to the two primary smelters in Venezuela were cited for the lower production of alumina and bauxite. Primary aluminum production decreased by 47% compared with that of 2011 owing to financial issues at the smelters hindering purchases of raw materials (Soules, 2012).

Vietnam.—State-owned Vietnam National Coal and Mineral Industries Group (Vinacomin) reported technical issues delayed the startup of the 600,000-t/yr alumina refinery in Tan Rai, Lam Dong Province, which was completed in December 2011. A mine adjacent to the refinery started production in 2011 and was stockpiling bauxite. In the fourth quarter of the year, Vinacomin commissioned the refinery with rampup expected to be completed in early 2013 (China Metal Market—Alumina and Aluminum, 2012i; CRU Alumina Monitor, 2012d; Mok, 2012).

Outlook

Consumption of bauxite and alumina were expected to closely follow the trend of aluminum production. Aluminum prices, which had increased during the second half of 2012, declined during the first half of 2013. World demand for aluminum in 2013 was not expected to change significantly from that in 2012 because the rate of economic expansion in China had declined and aluminum consumption in Europe continued to stagnate in the first half of the year. In the second half of 2013, signs of economic recovery in Europe were beginning to be observed and China's economic growth rate also appeared to be increasing, both of which could lead to increased consumption of bauxite and alumina starting in the last quarter of 2013. World consumption of bauxite and alumina for nonmetallurgical uses was expected to increase slightly, attributed to growth in consumption of aluminum hydroxide-based fire retardant materials.

A modest economic recovery in the United States and Western Europe in the second half of 2013 was expected to lead to an easing of availability of credit to consumers, resulting in increased consumption of products derived from bauxite and alumina. Lingering effects of the sovereign debt issues in Europe raised concerns about economic growth and consumer demand, and automobile sales declined during the early part of 2013 compared with sales in the same period of 2012. However, in the second half of 2013, the impact of sovereign debt issues in Europe appeared to be receding.

The impact of Indonesia's restrictions of exports of mineral resources was expected to have an impact on the flow of bauxite and the construction of new alumina refineries in the future. China's policies were also expected to have an impact on the location of new alumina refineries, because the Government was encouraging companies to make investments in power-intensive industries in other countries. Several new alumina refineries were expected to be constructed in Indonesia in coming years if financing is available, while fewer expansions of alumina refineries in China were expected.

Emerging technology to recover alumina from clay and coal ash might decrease demand for bauxite in the near future if these projects prove to be economically feasible. Exploration and development of bauxite deposits in China, as well as in many nations in Africa and Southeast Asia, was expected to increase supplies of bauxite and alumina, restraining prices in the long term. Limited access to bauxite deposits in India may restrain expansion of mines and alumina refineries.

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TABLE 1
SALIENT BAUXITE STATISTICS¹

(Thousand metric tons)

	2008	2009	2010	2011	2012
United States:					
Exports, as shipped:					
Crude and dried	14	9	21	22	11
Calcined	10	21	19	31	18
Imports for consumption, as shipped:					
Crude and dried	10,500	6,970	8,120	9,540	10,300
Calcined	1,110	461	690	353 ^r	405
Consumption, dry equivalent	9,550	4,960	8,180	8,820 ^r	9,560
World, production	227,000 ^r	210,000 ^r	238,000 ^r	259,000	258,000 ^e

^eEstimated. ^rRevised.

¹Data are rounded to no more than three significant digits.

TABLE 2
SALIENT ALUMINA STATISTICS¹

(Thousand metric tons)

	2008	2009	2010	2011 ^r	2012
United States:					
Production:					
Calcined alumina	3,900	2,130	3,420	3,740	3,980
Other alumina ²	610	370	483	543	645
Total:					
As produced or shipped ³	4,510	2,500	3,900	4,280	4,620
Calcined equivalent	4,300	2,370	3,470	3,790	4,390
Shipments:					
Calcined alumina	3,910	2,130	3,410	3,730	4,000
Other alumina ²	582	365	485	551	461
Total:					
As produced or shipped ³	4,490	2,500	3,900	4,280	4,640
Calcined equivalent	4,290	2,370	3,470	3,790	4,410
Stocks, yearend ^{4,5}	642	257	381	961	349
Imports for consumption ⁵	2,530	1,860	1,720 ^r	2,160	1,790
Exports ⁵	1,150	946	1,520	1,660	1,680
Consumption, apparent ^{5,6}	5,530	3,660	3,540 ^r	3,710	5,120
World, production ⁵	83,000 ^r	77,100 ^r	85,500 ^r	91,800 ^r	96,400

^rRevised.

¹Data are rounded to no more than three significant digits.

²Trihydrate, activated, tabular, and other aluminas. Excludes calcium and sodium aluminates.

³Includes only the end product if one type of alumina was produced and used to make another type of alumina.

⁴Excludes consumers stocks other than those at primary aluminum plants.

⁵Calcined equivalent.

⁶Defined as domestic production plus imports minus exports plus adjustments for industry stock changes.

TABLE 3
CAPACITIES OF DOMESTIC ALUMINA PLANTS, DECEMBER 31^{1,2}

(Thousand metric tons per year)

Company and plant	2011	2012
Alcoa Inc., Point Comfort, TX	2,300	2,300
Noranda Alumina LLC, Gramercy, LA	1,200	1,200
Ormet Corp., Burnside, LA	540	540
Sherwin Alumina Co., Corpus Christi, TX ³	1,600	1,600
Total	5,640	5,640

¹Capacity may vary depending on the bauxite used.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Owned by Glencore International AG.

TABLE 4
U.S. CONSUMPTION OF BAUXITE, BY INDUSTRY¹

(Thousand metric tons, dry equivalent)

Industry	2011	2012
Alumina	8,670 ^r	9,330
Other ²	152	227
Total	8,820 ^r	9,560

^rRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes abrasive, chemical, and refractory uses.

TABLE 5
AVERAGE VALUE OF U.S. IMPORTS OF CRUDE AND DRIED BAUXITE¹

(Dollars per metric ton)

Country	2011		2012	
	Port of shipment	Delivered to U.S. ports	Port of shipment	Delivered to U.S. ports
	f.a.s. ²	c.i.f. ³	f.a.s. ²	c.i.f. ³
Brazil	31.98	48.56	35.95	53.91
Guinea	29.77	47.01	33.79	48.72
Jamaica	30.30	43.22	21.29	36.79
Weighted average ⁴	30.49 ^r	45.20 ^r	28.46	44.43

^rRevised.

¹Computed from quantity and value data reported to U.S. Customs Service and compiled by the U.S. Census Bureau. Not adjusted for moisture content of bauxite or differences in methods used by importers to determine value of individual shipments.

²Free alongside ship valuation.

³Cost, insurance, and freight valuation.

⁴Weighted average of major suppliers.

TABLE 6
AVERAGE VALUE OF
U.S. IMPORTS OF ALUMINA¹

(Dollars per metric ton)

	2011	2012
January	415	418
February	444	471
March	422	432
April	512	396
May	454	389
June	474	512
July	480	408
August	460	360
September	434	381
October	446	417
November	623	418
December	397	388
Average	463	416

¹Metallurgical grade; cost, insurance, and freight valuation. Computed from quantity and value data reported to U.S. Customs Service and compiled by the U.S. Census Bureau.

TABLE 7
REFRACTORY GRADE BAUXITE PRICES

(Dollars per metric ton)

Material	2011 ¹	2012 ¹
China:		
Guizhou Province, round kiln, lump	470–525	470–525
Shanxi Province, rotary kiln, lump	495–535	NA
Shanxi Province, round kiln, lump	510–535 ^r	405–440
Guyana, rotary kiln, lump	460–510	460–510

^rRevised. NA Not available.

¹Port of shipment, 87% Al₂O₃, free-on-board ship valuation, yearend.

Source: Industrial Minerals.

TABLE 8
U.S. EXPORTS AND IMPORTS FOR CONSUMPTION
OF BAUXITE, CRUDE AND DRIED, BY COUNTRY¹

(Thousand metric tons)

Country	2011	2012
Exports:		
Canada	13	9
Germany	(2)	(2)
Venezuela	(2)	--
Other	9 ^r	2
Total	22	11
Imports:		
Brazil	1,760	2,590
Guinea	2,340	2,760
Jamaica ³	5,140	4,720
Other	300	256
Total	9,540	10,300

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

³Data from the Jamaica Bauxite Institute.

Note: Total U.S. imports of crude and dried bauxite as reported by the U.S. Census Bureau were as follows: 2011—4.57 million metric tons (Mt) and 2012—5.63 Mt.

Source: U.S. Census Bureau.

TABLE 9
U.S. EXPORTS AND IMPORTS FOR CONSUMPTION OF CALCINED BAUXITE, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2011				2012			
	Refractory grade		Other grade		Refractory grade		Other grade	
	Quantity	Value ²	Quantity	Value ²	Quantity	Value ²	Quantity	Value ²
Exports:								
Canada	9	1,100	1	61	4	538	--	--
Mexico	1	315	4	2,410	1	533	12	2,130
Other	10	1,210	6	4,810	1	438	(3)	103
Total	20	2,630	11	7,280	6	1,510	12	2,240
Imports:								
Australia	--	--	87	1,870	--	--	93	2,920
Brazil	1	687	6	2,030	--	--	2	1,560
China	41	17,300	17	7,000	38	16,800	11	2,970
Greece	--	--	26	1,410	--	--	81	4,440
Guyana	49	20,200	121	6,620	46	19,400	102	5,830
Singapore	--	--	--	--	--	--	25	579
Other	(3)	128 ^r	4	494 ^r	(3)	205	7	1,240
Total	91	38,300	262	19,400^r	84	36,300	321	19,500

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Value at foreign port of shipment as reported to U.S. Customs Service.

³Less than ½ unit.

Source: U.S. Census Bureau; data adjusted by U.S. Geological Survey.

TABLE 10
U.S. EXPORTS AND IMPORTS FOR CONSUMPTION OF ALUMINA,
BY COUNTRY¹

(Thousand metric tons, calcined equivalent, and thousand dollars)

Country	2011		2012	
	Quantity	Value ²	Quantity	Value ²
Exports:				
Canada	841 ^r	321,000 ^r	774	268,000
China	9	20,100	57	49,200
Egypt	(3)	63	82	26,400
Georgia	57	18,100	228	73,300
Iceland	500	174,000	246	74,200
Mexico	33 ^r	24,100 ^r	33	28,200
Netherlands	75 ^r	34,600 ^r	32	21,900
Russia	1	2,270	120	35,600
Other	146 ^r	230,000 ^r	106	180,000
Total	1,660^r	824,000^r	1,680	756,000
Imports:				
Australia	662	226,000	632	191,000
Brazil	268	97,300	241	79,800
Canada	9 ^r	4,600 ^r	15	3,950
China	11	13,400	45	24,100
France	20	31,500 ^r	19	29,700
Germany	16 ^r	44,200 ^r	13	41,800
Jamaica ⁴	418	170,000	51	19,000
Suriname	736	259,000	754	229,000
Other	22 ^r	45,900 ^r	24	48,900
Total	2,160^r	892,000^r	1,790	667,000

^rRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Value at foreign port of shipment as reported to U.S. Customs Service.

³Less than ½ unit.

⁴Data from the Jamaica Bauxite Institute.

Source: U.S. Census Bureau.

TABLE 11
BAUXITE: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2008	2009	2010	2011	2012 ^c
Australia	64,038 ^r	65,231	68,414	69,976	76,282 ³
Bosnia and Herzegovina	1,018	556	844 ^r	708 ^r	700
Brazil	28,098	26,074 ^r	32,028 ^r	33,695 ^r	34,000
China ^c	35,000	40,000	44,000	45,000	47,000
Dominican Republic ^c	400	--	--	--	--
Fiji	--	--	--	50	500
Ghana	796	490	595 ^r	408 ^r	790 ⁴
Greece	2,176	1,935 ^r	1,902 ^r	1,900 ^{r,e}	2,100
Guinea ⁵	16,000 ^r	13,600 ^r	15,300 ^r	15,300 ^r	17,823 ³
Guyana ⁵	2,109	1,485	1,083	1,818	2,214 ³
Hungary	511	267 ^r	307 ^r	278 ^r	250
India	21,210	16,000	18,000	19,000 ^e	19,000
Indonesia ^c	17,000 ^r	15,000 ^r	27,000 ^r	40,000 ^r	29,000
Iran	715 ^r	522 ^r	681 ^r	600 ^{r,e}	600
Jamaica ^{5,6}	14,636 ^r	7,817	8,540	10,189	9,339 ³
Kazakhstan	5,160	5,130	5,310	5,495	5,170 ³
Malaysia	295	263	124	188	200
Montenegro	672	46	61	60 ^e	60
Mozambique	5	4	9	10 ^r	13
Pakistan	25	11 ^r	10 ^r	10 ^{r,e}	12
Russia	5,675	5,775	5,690 ^r	5,943 ^r	5,700
Sierra Leone	954	757	1,089	1,300 ^r	776 ³
Suriname	5,333 ^r	3,388 ^r	3,104	3,236 ^r	3,400
Tanzania	21	123	30 ^{r,7}	29 ^{r,7}	20 ⁷
Turkey	820 ^r	1,473 ^r	1,311 ^r	1,025 ^r	1,100
United States	NA	NA	NA	NA	NA
Venezuela	4,192	4,267	2,500	2,455 ^r	2,000
Vietnam ^c	80	80	80	100 ^r	100
Total	227,000 ^r	210,000 ^r	238,000 ^r	259,000	258,000

^cEstimated. ^rRevised. NA Not available. -- Zero.

¹World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through November 18, 2013.

³Reported figure.

⁴Estimate based on Ghana's bauxite exports to the world in 2012 and on the release of the Half-Year Performance of the Mining Industry report.

⁵Dry bauxite equivalent of crude ore.

⁶Bauxite processed for conversion to alumina in Jamaica plus kiln-dried ore prepared for export.

⁷Reported exports.

TABLE 12
ALUMINA: WORLD PRODUCTION, BY COUNTRY^{1, 2, 3}

(Thousand metric tons)

Country	2008	2009	2010	2011	2012
Australia	19,321	19,948	19,956	19,399	20,914
Azerbaijan ^c	165 ⁴	80	-- ⁴	5	220
Bosnia and Herzegovina	294	192	269	262 ^r	260 ^e
Brazil	7,822	8,618	9,433	10,182 ^r	10,000 ^e
Canada	1,370	1,125	1,301	1,363	1,397
China ^c	22,800	23,800	29,000	34,100 ^e	37,700 ^e
France	630	348	481	524	540 ^e
Germany	1,395	1,154	1,485	1,405	1,364
Greece	772 ^r	719 ^r	725 ^r	725 ^{r,e}	800 ^e
Guinea	593	530	597	574	150 ^e
Hungary	299	185	214	200 ^{r,e}	200 ^e
India	3,820	3,900	3,640	3,880	4,347
Iran ^e	200	210 ^r	250 ^r	225 ^r	225
Ireland	1,890	1,245	1,850	1,927	1,926
Italy	1,045	92	--	--	-- ^e
Jamaica	3,996	1,774	1,591	1,960	1,758
Japan ^{e,5}	320	310	300	280	250
Kazakhstan	1,600	1,608	1,639	1,670	1,510
Montenegro	220	59	--	--	--
Romania	--	44	414	484	414
Russia	3,112	2,794	2,930 ^r	2,825	2,719
Spain ^e	1,500 ^r	1,500 ^r	1,500 ^r	1,500 ^r	1,500
Suriname	2,154 ^r	1,536 ^r	1,486 ^r	1,421 ^r	1,420 ^e
Turkey ^c	160	80 ^r	160	160	200
Ukraine	1,670	1,520	1,530	1,600	1,430
United States	4,300	2,369	3,468	3,792 ^r	4,387
Venezuela ^c	1,591 ^{r,4}	1,400 ^r	1,250	1,300	800
Total	83,000 ^r	77,100 ^r	85,500 ^r	91,800 ^r	96,400

^cEstimated. ^rRevised. -- Zero.

¹Figures represent calcined alumina or the total of calcined alumina plus the calcined equivalent of hydrate when available; exceptions, if known, are noted.

²World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

³Table includes data available through November 18, 2013.

⁴Reported figure.

⁵Data presented are for alumina used principally for specialty applications. Information on aluminum hydrate for all uses is not adequate to formulate estimates of production levels. Production of aluminum hydroxide, in metric tons: 2008—700,000; 2009—710,000; 2010—700,000; 2011—690,000; and 2012—650,000.