



# 2010 Minerals Yearbook

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## BAUXITE AND ALUMINA [ADVANCE RELEASE]

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# BAUXITE AND ALUMINA

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In 2010, almost all of the 9.24 million metric tons (Mt) of bauxite consumed in the United States was imported. U.S. production and shipments of alumina (calcined equivalent) were 3.91 Mt and 3.93 Mt, respectively. An estimated 91% of domestic shipments was used for metal production. World production of bauxite totaled 209 Mt; the leading producing countries were, in descending order of production, Australia, China, and Brazil. World production of alumina was estimated to be 85.3 Mt; 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 65% higher in 2010 than in 2009 (table 2) owing to the restart of idled capacity in the fourth quarter of 2009 at a refinery in Gramercy, LA, and increased production at other refineries. Alumina production increased to satisfy domestic consumption, as net imports declined from those of the prior year. In October, a 5-year labor contract with Noranda Aluminum Holding Corp. was ratified by employees represented by the United Steelworkers union. The contract covered approximately 350 employees at the 1.2-million-metric-ton-per-year (Mt/yr) alumina refinery in Gramercy (Noranda Aluminum Holding Corp., 2010).

## 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 68% compared with that of 2009 as a result of the production restart at an alumina refinery late in 2009 and increased production at other refineries. In 2010, 99% of the bauxite consumed in the United States was refined to alumina [an estimated 2.33 metric tons (t) of dried bauxite was required to produce 1 t of alumina]; the remaining 1% was consumed in nonmetallurgical applications (table 4).

**Alumina.**—An estimated 92% of the net alumina imports and alumina shipped by U.S. alumina refineries went to primary aluminum smelters for metal production. In 2010, nine domestic primary aluminum smelters consumed 3.45 Mt of alumina,

the same amount of alumina consumed in 2009. 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 were 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 2010 annual average values of U.S. imports of metallurgical-grade bauxite (table 5) were essentially unchanged compared with those of 2009. Alumina prices generally followed the trend in aluminum prices. The 2010 average value of U.S. imports of calcined alumina was \$407 per metric ton including cost, insurance, and freight at U.S. ports. The monthly average prices for metallurgical-grade alumina are listed in table 6. Yearend price ranges for refractory-grade bauxite in China, a leading supplier, as quoted in Industrial Minerals (2010b), are listed in table 7.

## World Industry Structure

**Production.**—In 2010, world production of bauxite increased by 7% compared with that of 2009 (table 11). Total mine production of 209 Mt was reported from 25 countries. The leading producers of bauxite were, in decreasing order of tonnage mined, Australia, China, Brazil, India, and Guinea. These countries accounted for 84% of total world production; Australia, China, and Brazil together accounted for two-thirds of the world’s production. World output of alumina increased by 11% in 2010 compared with that of 2009 (table 12). The five leading producing countries were, in descending order of quantity of alumina produced, China, Australia, Brazil, India, and the United States. These countries accounted for more than three-quarters of world production; China and Australia together accounted for 57%.

**Mergers, Acquisitions, and Restructuring.**—Norsk Hydro ASA (Oslo, Norway) and Vale SA (Rio de Janeiro, Brazil) announced a deal in May in which Norsk Hydro would purchase Vale’s bauxite, alumina, and aluminum assets in Brazil in exchange for \$1.1 billion in cash plus \$3.8 billion in Norsk Hydro stock. As a result of the transaction, Vale would own 22% of Norsk Hydro; Norsk Hydro would own 51% of the 460,000-metric-ton-per-year (t/yr) Albras smelter; and Norsk Hydro would increase its share of the 6.3-Mt/yr Alunorte refinery to 91% from 34% and of the 1.86-Mt/yr Companhia de Alumina do Para (CAP) refinery project to 81% from 20%. Norsk Hydro would also gain ownership of 60% of the Paragominas bauxite mine (9.9 Mt/yr capacity) with an option

to purchase the remaining 40% of the mine by yearend 2015 (Norsk Hydro ASA, 2010a; Platts Metals Week, 2010b). The companies had planned to complete the transaction by yearend but closing was delayed until early in 2011 awaiting regulatory approval (Norsk Hydro ASA, 2010b).

Rio Tinto plc sold its 80% share in the Ghana Bauxite Co. Ltd. to Bosai Minerals Group Co. Ltd. in February. The Government maintained its ownership of 20% of the 800,000-t/yr Awaso Mine (Rio Tinto Alcan Inc., 2010b).

## World Review

**Australia.**—The Australian Government announced that it was deferring implementation of a cap-and-trade program aimed at reducing greenhouse gas emissions. The proposal was withdrawn in April because of a lack of agreement in Parliament (Australian Department of Climate Change, 2010). The proposal would have included provisions for the aluminum industry and other emission-intensive industries to mitigate the costs during the first several years of implementation.

Work on expansion of BHP Billiton's Worsley refinery to 4.6 Mt/yr from 3.5 Mt/yr continued throughout the year. Completion was projected for early 2011 (BHP Billiton Ltd., 2010a).

Rio Tinto announced in November that expansion of the Yarwun refinery to 3.4 Mt/yr from 1.4 Mt/yr was being accelerated and was expected to be completed in August 2012. Work had been slowed during 2009 in response to the global financial downturn (Rio Tinto Alcan Inc., 2010c). Production at the Gove refinery was slightly lower than that of 2009 owing to unplanned maintenance in the first quarter. Production from the 3.85-Mt/yr Queensland refinery was 3% lower than that of 2009 owing to bad weather in the first quarter. Rio Tinto increased production of bauxite from the Weipa Mine by 15% to 18.6 Mt in 2010 from 16.2 Mt during 2009 to meet global demand for alumina production as prices increased (Rio Tinto plc, 2010a, p. 4; 2011, p. 15).

Aluminum Corp. of China Ltd. (Chinalco) decided not to proceed with construction of the Aurukun project in Queensland because of high costs and market conditions. The project would have included a 10-Mt/yr bauxite mine and a 2.1-Mt/yr alumina refinery. Chinalco was discussing future development of the project under new terms with the Queensland government (Aluminum Corp. of China Ltd., 2011, p. 98).

**Brazil.**—Alcoa World Alumina and Chemicals [a joint venture between Alcoa (60%) and Alumina Ltd. (40%)] continued to ramp-up production at the Juruti Mine, which opened in September 2009. At capacity, the mine was expected to produce 2.6 Mt/yr of bauxite that would be sent to the Alumar refinery in São Luís (Matthews, 2010).

Expansion of the Alumar refinery to 3.6 Mt/yr from 1.5 Mt/yr was completed in July 2009, and production ramp up continued throughout 2010. Production at full capacity was expected to be reached in mid-2011 instead of during the first quarter of 2010 because of issues with the ship-loading facilities. The refinery was a joint venture between Alcoa (38.4%), BHP Billiton (36%), Alumina (15.6%), and Rio Tinto (10%); Alcoa was the refinery's operator (BHP Billiton Ltd., 2010b, p. 2).

Vale continued work on the Paragominas III Mine, which, at capacity, would produce 5 Mt/yr of bauxite when completed in 2012 to be supplied to the CAP alumina refinery in Barcarena.

Work also continued on the CAP refinery, which was expected to be completed and begin production by yearend 2012, with an initial production capacity of 1.9 Mt/yr. The refinery was a joint venture among Vale (61%), Norsk Hydro (20%), and Dubai Aluminium Co. Ltd. (Dubai) (19%) (Norsk Hydro ASA, 2011, p. 50–52; Vale SA, 2011).

Bauxite production by Mineração Rio do Norte SA (MRN) increased to 17 Mt, 15% higher than the amount produced in 2009, as its mines at Oriximina, Papagalo, and Trombetas restarted idle capacity (Vale SA, 2011). MRN had a capacity to produce 19.8 Mt/yr of bauxite and was a joint venture among Vale (40%), BHP Billiton (14.8%), Rio Tinto (12%), Companhia Brasileira de Alumina (10%), Alcoa (8.6%), Alcoa World Alumina (5%), Norsk Hydro (5%), and Abalco (4.6%).

**Canada.**—Production from the 1.5-Mt/yr Vaudreuil refinery in Jonquiere, Quebec, increased during 2010 after a restart of idled capacity in September 2009 as prices for alumina and aluminum increased. During the third quarter of 2010, the refinery was producing near its capacity (Rio Tinto plc, 2010b, p. 4, 15). An expansion project for the refinery's waste disposal facility was started in November and was expected to be completed in approximately 3 years (Rio Tinto Alcan Inc., 2010a).

Exploration Orbite V.S.P.A. Inc. continued construction of a pilot plant to test the recovery of alumina from aluminous clays near Grande-Vallee, Quebec. The pilot plant at Cap-Chat, Quebec, was to be operational early in 2011 (Exploration Orbite V.S.P.A. Inc., 2010).

**China.**—In June, Chinalco announced plans to permanently close 1 Mt/yr of obsolete alumina refining capacity by 2011 in order to comply with energy conservation and emission control directives (China Metal Market—Alumina & Aluminum, 2010b). In July, Chiping Xinfu Aluminum Co. Ltd. was ordered to shut down approximately 200,000 t/yr of aluminum capacity and 320,000 t/yr of alumina capacity at its smelter and refinery, respectively, in Liaochen, Shandong Province. The closures were implemented during the third quarter (China Metal Market—Alumina & Aluminum, 2010c).

In June, Chinalco completed an 800,000-t/yr refinery in Zunyi, Guizhou Province. An adjacent 1.7-Mt/yr bauxite mine was also completed (CRU Alumina Monitor, 2010b; Aluminum Corp. of China Ltd., 2011, p. 60). In September, Chinalco commissioned an 800,000-t/yr refinery in Nanchuan, Chongqing. The refinery would use bauxite from local sources, which reportedly contain 100 Mt of reserves. Further expansion to 1.6 Mt/yr was being planned, with a 400,000-t/yr smelter and fabrication facilities also proposed in Chongqing (American Metal Market, 2010b; Aluminum Corp. of China Ltd., 2011, p. 60).

Nanshan Longkou Donghai Alumina Co. Ltd. completed a 400,000-t/yr expansion in May and was continuing work on another expansion at its Shandong refinery. Alumina capacity at the refinery would increase to 1.6 Mt/yr from 1.2 Mt/yr when the expansion is completed in early 2011 (Platts Metals Week, 2010a). In September, Guangxi Huayin Aluminum Co. Ltd. started production from an expansion at its refinery in Huayin, Guangxi Province. The project increased capacity to 2 Mt/yr from 1.6 Mt/yr (CRU Alumina Monitor, 2010d).

In July, Shanxi Luneng Jinbei Aluminum Co. Ltd. completed the first phase of an expansion project at its alumina refinery. A second phase expansion was underway, which was to be completed in May 2011 and would increase capacity to 2 Mt/yr from 1 Mt/yr (China Metal Market—Alumina & Aluminum, 2010e). Also in July, Bosai Minerals completed an expansion of its alumina refinery in Nanchuan, Xianfeng Province, to 600,000 t/yr from 300,000 t/yr. An additional expansion was expected to be completed in 2011 and would increase capacity to 800,000 t/yr (CRU Alumina Monitor, 2010c). Yunnan Aluminum Co. Ltd. completed construction of a 400,000-t/yr alumina refinery in Wenshan, and production started during the fourth quarter. The capacity of the refinery was to be expanded to 800,000 t/yr by 2012. Bauxite was being supplied from a mine owned by Yunnan near the refinery (China Metal Market—Alumina & Aluminum, 2010h).

Guizhou Guanglu Aluminium Co. Ltd. continued construction of an 800,000-t/yr alumina refinery and powerplant in Qingzhen, Guizhou Province (Jiangsu New Century Jiangnan Environmental Protection Co., Ltd., 2010). The project was scheduled for completion by 2012, with production at full capacity expected by mid-2012.

Guangdong Galuminium Group Ltd. continued construction of an 800,000-t/yr alumina refinery in Qingzhen, Guizhou Province. The project was scheduled to be completed in mid-2011. The company was also developing a mine to supply to the refinery at a nearby bauxite deposit with 360 Mt of reserves. The mine would have a capacity of 1.6 Mt/yr when completed at the beginning of 2012 (China Metal Market—Alumina & Aluminum, 2010d).

Louyang Xiangjiang Wanji Aluminium Ltd. started work on an expansion of its alumina refinery in Louyang, Henan Province, during the second quarter of 2010. Capacity would increase to 1.4 Mt/yr from 800,000 t/yr when completed at yearend 2011 (CRU Alumina Monitor, 2010a). Shanxi Zhaofeng Aluminium Co. Ltd. started expansion of its alumina refinery in Shanxi Province to 1 Mt/yr from 400,000 t/yr. The project was expected to be completed in late 2012 (Platts Metals Week, 2010c). In September, Shandong Chiping Xinfu started construction of an alumina refinery in Jiaokou, Shanxi Province. The refinery would have a production capacity of 2.4 Mt/yr and was expected to be completed by yearend 2011 (China Metal Market—Alumina & Aluminum, 2010f). In November, Chinalco started construction on an expansion of the Guangxi alumina refinery in Pingguo, Guangxi Province, which would increase capacity to 2.5 Mt/yr from 2 Mt/yr. The refinery would also attempt to recover iron oxide from the red mud, with an expected 220,000 t/yr of iron oxide to be recovered. Expansion of the adjacent aluminum smelter would increase capacity to 550,000 t/yr from 150,000 t/yr (China Metal Market—Alumina & Aluminum, 2010a).

**Guinea.**—An appellate court ruling upheld the 2006 sale of the Friguia refinery and adjacent mine to United Company RUSAL (Rusal). The new Government had filed suit alleging that the sale of the 640,000-t/yr refinery by the prior regime was not legal. A lower court had ruled in favor of the Government in September 2009 (United Company RUSAL, 2010b).

Rusal increased alumina production from the Friguia alumina refinery by 13% compared with production in 2009 as a result of increasing demand and prices. Bauxite production from the

Friguia and Kinda Mines also increased by 14% each (United Company RUSAL, 2011, p. 33–35).

The Sangaredi Mine produced 12.4 Mt of bauxite during the year, 11% more than the 11.2 Mt produced in 2009. Production at the mine increased during the fourth quarter of 2009 as prices and demand increased. The mine, with a capacity of 14 Mt/yr, was producing at a rate of 12.6 Mt/yr at yearend. The mine was a joint venture among the Government (49%), Alcoa (22.95%), Rio Tinto (22.95%), and Dadco Group (5.1%) (Rio Tinto plc, 2011, p. 15).

Global Alumina Corp. delayed construction of its planned bauxite mine and alumina refinery until further notice. Construction of the refinery, which would have a capacity of 3.3 Mt/yr and would use bauxite from deposits for which Global Alumina had mining concessions, had been delayed since 2009 because of the global financial downturn. The project was a joint venture with BHP Billiton, Dubal, and Mubadala Development Co. (Global Alumina Corp., 2010).

**Hungary.**—A spill of red mud occurred on October 4 at the Magyar Aluminium Ltd. alumina refinery in Ajka. The 400,000-t/yr refinery shut down when the impoundment dam failed. The flood of red mud flowing through nearby villages killed 10 people and injured more than 100 others. Production was restarted on October 17 (Earth Times News, 2010; Gulyas, 2010; Magyar Aluminium Ltd., 2010).

**India.**—National Aluminium Co. Ltd. was working to complete expansion of its refinery in Damanjodi by early 2011. The project would increase production capacity to 2.1 Mt/yr from 1.6 Mt/yr (National Aluminium Co. Ltd., 2010, p. 8).

Hindalco Industries Ltd. continued progress on several major expansion projects. The Belgam refinery was ramping up production to 316,000 t/yr from 138,000 t/yr. Construction of the 1.5-Mt/yr Utkal alumina refinery was continuing, with production scheduled to start in July 2011. Planning continued for the Aditya aluminum complex in Orissa, which would have a 359,000-t/yr smelter, a 1.5-Mt/yr alumina refinery, and a 900-megawatt (MW) captive powerplant. Completion of the smelter was planned for October 2011, and completion of the refinery was expected in 2013 (Hindalco Industries Ltd., 2010).

Vedanta Resources plc was awaiting mining permits for the Niyamgiri Mine, expected to be the main source of bauxite for the Lanjigarh refinery. As a result, expansion of the Lanjigarh refinery to 2 Mt/yr from 1.4 Mt/yr was put on hold, and work on the 325,000-t/yr Korba III smelter and the 125,000-t/yr Jharsuguda II smelter was also suspended temporarily (Vedanta Resources plc, 2010).

**Indonesia.**—PT Aneka Tambang (Antam) ended production from the Kijang Mine in late 2009 and began reclamation work on the site, although sales of stockpiled bauxite continued throughout 2010. Construction of a 300,000-t/yr chemical-grade alumina refinery at Tayan was expected to begin in April 2011, and the refinery was expected to begin production in early 2014. Bauxite for the refinery would come from a nearby deposit that was being developed. In addition to the Tayan prospect, Antam continued exploration for bauxite in several other prospects in West Kalimantan (PT Aneka Tambang, 2011, p. 6, 14).

**Ireland.**—Rusal increased the production rate at the Aughinish alumina refinery to its full capacity of 1.5 Mt/yr as prices rose during the year. Production in 2010 was 1.85 Mt,

49% higher than the 1.25 Mt produced during 2009 (United Company RUSAL, 2011, p. 33–34).

**Jamaica.**—Rusal restarted production at the Ewarton alumina refinery in June, as prices rose during the year. Alumina production for the year was 238,000 t, 56% higher than the 153,000 t produced during 2009. Bauxite production was 900,000 t in 2010, compared with the 100,000 t produced in 2009. Production at the refinery and nearby mine had been shut down in the first quarter of 2009 in response to falling prices and demand (United Company RUSAL, 2010a; 2011, p. 33–35).

**Kazakhstan.**—Eurasian Natural Resources Corp. (ENRC) was expanding the capacity of its alumina refinery to 1.7 Mt/yr from 1.25 Mt/yr. Completion of the project was scheduled for mid-2011 and would supply ENRC's nearby smelter, where an expansion project was completed in May 2010, in addition to supplying other customers (Eurasian Natural Resources Corp., 2010, p. 17).

**Montenegro.**—Central European Aluminum Co. continued to modernize its Podgorica smelter and alumina refinery. Although originally planned for completion by yearend, some work was delayed until early 2011. Capacity of the smelter would increase to 156,000 t/yr from 120,000 t/yr, and capacity of the alumina refinery would increase to 400,000 t/yr from 280,000 t/yr (Central European Aluminum Co., 2010).

**Russia.**—Production of alumina in Russia was slightly higher in 2010 than that in 2009. Bauxite production was 5% less than that in 2009 owing to lower output at the North Urals Mine. Reserves near the surface were nearing depletion in two areas of the deposit. Rusal was developing an underground expansion of the mine that would extend the life of the mine, although a completion date was not announced (United Company RUSAL, 2011, p. 33–35).

**Saudi Arabia.**—In October, Saudi Arabian Mining Co. (Ma'aden) and Alcoa began construction of the 740,000-t/yr Raz as Zawr smelter and 380,000-t/yr rolling mill. The project, expected to be completed in 2013, also included a 4-Mt/yr bauxite mine at Al Ba'itha and a 1.8-Mt/yr alumina refinery in Raz as Zawr that were expected to be completed in 2014. The smelter would use imported alumina until the mine and refinery are completed. Ma'aden owned 74.9% of the joint venture, and Alcoa owned 25.1% (Alcoa Inc., 2010).

**Turkey.**—Demireller Mining Co. was working to expand bauxite production to 750,000 t/yr from 400,000 t/yr by yearend 2011. Demireller mined bauxite from two sites in the Taurus Mountains near Mersin and planned to produce bauxite at other sites. The company has 10 Mt of bauxite reserves in the region (Industrial Minerals, 2010a).

**Venezuela.**—Production from Corporacion Venezolana de Guayana Bauxilum C.A.'s (Bauxilum) 6-Mt/yr Los Pijiguaos Mine was shut down from May through July as a result of low water levels in the Orinoco River. Mining and shipments resumed in July as river levels rose. The river was used to ship bauxite to Bauxilum's 1.8-Mt/yr Ciudad Guayana alumina refinery. Alumina production at Ciudad Guayana continued at a lower rate using bauxite imported from Brazil while shipments from Los Pijiguaos were suspended (American Metal Market, 2010a).

**Vietnam.**—In February, Vietnam National Coal and Mineral Industries Group (Vinacomin) and Chinalco started construction of a 600,000-t/yr alumina refinery and an adjacent bauxite

mine in Lam Dong. The refinery and mine were expected to be completed in 2012 (China Metal Market—Alumina & Aluminum, 2010g). Vinacomin and Chinalco were also constructing a 650,000-t/yr alumina refinery in Nhan Co, Dak Nong Province. The refinery and mine were expected to be completed in mid-2013 (ABN Business News, 2010).

Atlantic Ltd. continued studies on developing the Bao Loc bauxite deposit. Studies for a refinery and smelter would also be conducted if a bauxite mine proved feasible (Atlantic Ltd., 2010).

## Outlook

Consumption of bauxite and consumption of alumina were expected to closely follow the trend of aluminum consumption. Alumina prices generally continued their upward trend in the first quarter of 2011, exceeding the high price range of early 2008, but remained volatile. At yearend, one domestic alumina refinery that had been closed since 2006 was considering reopening to meet increasing demand, and in early 2011, the company announced that the refinery would reopen later in the year. Consumption of bauxite and consumption of alumina in emerging economies were expected to increase as these economies continue to recover from the effects of the global recession. However, policies aimed at slowing growth in China may slow the rate of growth of consumption of aluminum in that nation, affecting bauxite and alumina demand.

Consumer credit issues in the United States and Western Europe were expected to continue through 2011. The continuing uncertainty of the impact of sovereign debt issues in Europe also raised concerns about consumer demand. Although consumption was recovering, decreased demand for aluminum in developed economies still recovering from the economic events of 2008 could keep global bauxite and alumina production for 2011 through 2012 only slightly higher than 2008 production. Easing of credit to bauxite and alumina companies was expected to enable more expansion projects to resume progress in many parts of the world, especially in locations with substantial deposits of high-quality bauxite.

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TABLE 1  
SALIENT BAUXITE STATISTICS<sup>1</sup>

(Thousand metric tons)

	2006	2007	2008	2009	2010
United States:					
Exports, as shipped:					
Crude and dried	20	15	14	9	21
Calcined	14	8	10	21 <sup>r</sup>	19
Imports for consumption, as shipped:					
Crude and dried	11,600	9,840	10,500	6,970	8,120
Calcined	752	808	1,110	461	690
Consumption, dry equivalent	12,300	10,200	9,550	5,490 <sup>r</sup>	9,240
World, production	193,000	204,000	211,000	196,000 <sup>r</sup>	209,000 <sup>e</sup>

<sup>e</sup>Estimated. <sup>r</sup>Revised.

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

TABLE 2  
SALIENT ALUMINA STATISTICS<sup>1</sup>

(Thousand metric tons)

	2006	2007	2008	2009	2010
United States:					
Production:					
Calcined alumina	4,630 <sup>r</sup>	3,770	3,900	2,130 <sup>r</sup>	3,570
Other alumina <sup>2</sup>	619 <sup>r</sup>	717	610	370 <sup>r</sup>	522
Total:					
As produced or shipped <sup>3</sup>	5,250 <sup>r</sup>	4,490	4,510	2,500 <sup>r</sup>	4,100
Calcined equivalent	5,030 <sup>r</sup>	4,240	4,300	2,370 <sup>r</sup>	3,910
Shipments:					
Calcined alumina	4,580	3,770	3,910	2,130 <sup>r</sup>	3,580
Other alumina <sup>2</sup>	564	667	582	365 <sup>r</sup>	526
Total:					
As produced or shipped <sup>3</sup>	5,150	4,440	4,490	2,500 <sup>r</sup>	4,110
Calcined equivalent	4,950	4,200	4,290	2,370 <sup>r</sup>	3,930
Stocks, yearend <sup>4,5</sup>	948 <sup>r</sup>	446 <sup>r</sup>	642 <sup>r</sup>	257 <sup>r</sup>	250
Imports for consumption <sup>5</sup>	1,860	2,440	2,530	1,860	1,720
Exports <sup>5</sup>	1,540	1,160	1,150	946	1,520
Consumption, apparent <sup>5,6</sup>	5,240 <sup>r</sup>	6,010 <sup>r</sup>	5,490 <sup>r</sup>	3,660 <sup>r</sup>	4,120
World, production <sup>5</sup>	72,400 <sup>r</sup>	77,900 <sup>r</sup>	82,500 <sup>r</sup>	76,700 <sup>r</sup>	85,300 <sup>e</sup>

<sup>e</sup>Estimated. <sup>r</sup>Revised.

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

<sup>2</sup>Trihydrate, activated, tabular, and other aluminas. Excludes calcium and sodium aluminates.

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

<sup>4</sup>Excludes consumers stocks other than those at primary aluminum plants.

<sup>5</sup>Calcined equivalent.

<sup>6</sup>Defined as domestic production plus imports minus exports plus adjustments for industry stock changes.

TABLE 3  
CAPACITIES OF DOMESTIC ALUMINA PLANTS, DECEMBER 31<sup>1,2</sup>

(Thousand metric tons per year)

Company and plant	2009	2010
Alcoa Inc., Point Comfort, TX	2,300	2,300
Noranda Alumina LLC, Gramercy, LA	1,200 <sup>r</sup>	1,200
Ormet Corp., Burnside, LA	540 <sup>r</sup>	540
Sherwin Alumina Co., Corpus Christi, TX <sup>3</sup>	1,600	1,600
Total	5,640 <sup>r</sup>	5,640

<sup>r</sup>Revised.

<sup>1</sup>Capacity may vary depending on the bauxite used.

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

<sup>3</sup>Owned by Glencore International AG.

TABLE 4  
U.S. CONSUMPTION OF BAUXITE, BY INDUSTRY<sup>1</sup>

(Thousand metric tons, dry equivalent)

Industry	2009 <sup>r</sup>	2010
Alumina	5,330	9,110
Other <sup>2</sup>	153	137
Total	5,490	9,240

<sup>r</sup>Revised.

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

<sup>2</sup>Includes abrasive, chemical, and refractory uses.

TABLE 5  
AVERAGE VALUE OF U.S. IMPORTS OF CRUDE AND DRIED BAUXITE<sup>1</sup>

(Dollars per metric ton)

Country	2009		2010	
	Port of shipment f.a.s. <sup>2</sup>	Delivered to U.S. ports c.i.f. <sup>3</sup>	Port of shipment f.a.s. <sup>2</sup>	Delivered to U.S. ports c.i.f. <sup>3</sup>
Brazil	35.53	48.84	28.47	48.32
Guinea	32.69	46.86	27.78	47.92
Jamaica	20.78	24.24	25.88	34.03
Sierra Leone	29.50 <sup>r</sup>	42.00 <sup>r</sup>	--	--
Weighted average	29.80	50.97 <sup>r</sup>	29.41	50.60

<sup>r</sup>Revised. -- Zero.

<sup>1</sup>Computed 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.

<sup>2</sup>Free alongside ship valuation.

<sup>3</sup>Cost, insurance, and freight valuation.

TABLE 6  
AVERAGE VALUE OF  
U.S. IMPORTS OF ALUMINA<sup>1</sup>

(Dollars per metric ton)

	2009	2010
January	322	384
February	277	400
March	248	418
April	270	500
May	295	419
June	292	425
July	324	398
August	399	352
September	314	402
October	400	393
November	360	400
December	420	394
Average	327	407

<sup>1</sup>Metallurgical 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	2009 <sup>1</sup>	2010 <sup>2</sup>
China:		
Guizhou Province, rotary kiln, lump	390–410	470–525
Shanxi Province, rotary kiln, lump	470–500	495–535
Shanxi Province, round kiln, lump	480–500	500–535
Guyana, rotary kiln, lump	450–510	460–510

<sup>1</sup>Port of shipment, 88% Al<sub>2</sub>O<sub>3</sub>, free-on-board ship valuation, yearend.

<sup>2</sup>Port of shipment, 87% Al<sub>2</sub>O<sub>3</sub>, free-on-board ship valuation, yearend.

Source: Industrial Minerals.

TABLE 8  
U.S. EXPORTS AND IMPORTS FOR CONSUMPTION  
OF BAUXITE, CRUDE AND DRIED, BY COUNTRY<sup>1</sup>

(Thousand metric tons)

Country	2009	2010
<b>Exports:</b>		
Canada	6 <sup>r</sup>	15
Germany	(2)	(2)
Venezuela	(2)	1
Other	2 <sup>r</sup>	6
Total	9 <sup>r</sup>	21
<b>Imports:</b>		
Brazil	1,410	1,640
Guinea	1,910	2,130
Jamaica <sup>3</sup>	3,200	4,300
Sierra Leone	308	--
Other	152 <sup>r</sup>	45
Total	6,970	8,120

<sup>r</sup>Revised. -- Zero.

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

<sup>2</sup>Less than ½ unit.

<sup>3</sup>Data 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: 2009—6.77 million metric tons (Mt) and 2010—5.19 Mt.

Source: U.S. Census Bureau.

TABLE 9  
U.S. EXPORTS AND IMPORTS FOR CONSUMPTION OF CALCINED BAUXITE, BY COUNTRY<sup>1</sup>

(Thousand metric tons and thousand dollars)

Country	2009				2010			
	Refractory grade		Other grade		Refractory grade		Other grade	
	Quantity	Value <sup>2</sup>	Quantity	Value <sup>2</sup>	Quantity	Value <sup>2</sup>	Quantity	Value <sup>2</sup>
<b>Exports:</b>								
Canada	7	748	(3)	30	8	891	1	35
Korea, Republic of	11	8,800	--	--	--	--	--	--
Mexico	1 <sup>r</sup>	563	(3)	602	1	265	8	5,740
Other	1	125 <sup>r</sup>	(3)	17	(3)	228	1	242
Total	20	10,200	1	649	9	1,380	10	6,020
<b>Imports:</b>								
Australia	--	--	17	1,040	--	--	85	1,910
Brazil	114	54,300	46	1,680 <sup>r</sup>	167	76,000	70	3,270
China	12	6,190 <sup>r</sup>	11	6,240 <sup>r</sup>	74	34,000	3	677
Greece	74	3,880 <sup>r</sup>	--	--	104	5,650	--	--
Guyana	21	8,640	164	9,560 <sup>r</sup>	37	14,200	148	9,980
Other	(3)	29 <sup>r</sup>	1	50 <sup>r</sup>	1	45	2	126
Total	222	73,000 <sup>r</sup>	239	18,600	384	130,000	307	16,000

<sup>r</sup>Revised. -- Zero.

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

<sup>2</sup>Value at foreign port of shipment as reported to U.S. Customs Service.

<sup>3</sup>Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 10  
U.S. EXPORTS AND IMPORTS FOR CONSUMPTION OF ALUMINA,  
BY COUNTRY<sup>1</sup>

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

Country	2009		2010	
	Quantity	Value <sup>2</sup>	Quantity	Value <sup>2</sup>
<b>Exports:</b>				
Canada	332	109,000	719	238,000
France	125	37,800	58	25,500
Iceland	277	63,200	217	63,300
Mexico	57	38,000	83	50,000
Netherlands	2	7,750	182	60,000
Norway	79	17,100	( <sup>3</sup> )	233
Other	74 <sup>r</sup>	215,000	265	287,000
<b>Total</b>	<b>946</b>	<b>488,000</b>	<b>1,520</b>	<b>724,000</b>
<b>Imports:</b>				
Australia	700 <sup>r</sup>	159,000	572	163,000
Brazil	367	87,300	233	72,400
Canada	48	51,200	62	41,600
France	12	20,900	23	30,600
Germany	71	84,100	81	109,000
Jamaica	248	62,300	84	30,000
Suriname	381	90,300	488	143,000
Venezuela	--	--	56	18,200
Other	28 <sup>r</sup>	58,200	120	103,000
<b>Total</b>	<b>1,860</b>	<b>613,000</b>	<b>1,720</b>	<b>711,000</b>

<sup>r</sup>Revised. -- Zero.

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

<sup>2</sup>Value at foreign port of shipment as reported to U.S. Customs Service.

<sup>3</sup>Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 11  
BAUXITE: WORLD PRODUCTION, BY COUNTRY<sup>1,2</sup>

(Thousand metric tons)

Country	2006	2007	2008	2009	2010 <sup>e</sup>
Australia	61,780	62,398	61,389	65,231	68,414 <sup>3</sup>
Bosnia and Herzegovina	854	867	1,018	556 <sup>f</sup>	650
Brazil	23,236	25,461	28,098	25,628 <sup>f</sup>	28,100 <sup>p</sup>
China <sup>c</sup>	27,000	30,000	35,000	40,000	44,000
Dominican Republic	500	500	400	--	--
Ghana	842	748	802 <sup>f</sup>	440	170
Greece	2,163	2,126	2,176	2,100	2,100
Guinea <sup>4</sup>	18,784	18,519	18,400	15,600	17,400
Guyana <sup>4</sup>	1,479	2,243	2,092	1,760	1,760
Hungary	538	546	511	317	350
India	13,940	20,343	21,210	16,000	18,000
Indonesia	1,502	1,251	1,152	811 <sup>f</sup>	105 <sup>3</sup>
Iran	500	500	500	500	500
Jamaica <sup>4,5</sup>	14,865	14,568	14,363	7,817	8,540 <sup>3</sup>
Kazakhstan	4,884	4,963 <sup>f</sup>	5,160	5,130	5,310 <sup>3</sup>
Malaysia	92	157	295	263 <sup>f</sup>	270
Montenegro	659	667	672	46	61 <sup>3</sup>
Mozambique	11	9	5	4	5
Pakistan	13 <sup>f</sup>	27 <sup>f</sup>	32 <sup>f</sup>	37 <sup>f</sup>	39
Russia	6,300	5,775	5,675	5,775	5,475 <sup>3</sup>
Sierra Leone	1,071	1,169	954	757	1,089 <sup>3</sup>
Suriname	4,924	5,054	5,200	4,000	4,000 <sup>p</sup>
Tanzania	5	5	21 <sup>f</sup>	123 <sup>f</sup>	130
Turkey <sup>7</sup>	771	344	350 <sup>e</sup>	200 <sup>f</sup>	350
United States	NA	NA	NA	NA	NA
Venezuela	5,928	5,500	5,500 <sup>e</sup>	2,500 <sup>e</sup>	2,500 <sup>p</sup>
Vietnam <sup>c</sup>	60 <sup>f</sup>	80 <sup>f</sup>	80 <sup>f</sup>	80 <sup>f</sup>	80
Total	193,000	204,000	211,000	196,000 <sup>f</sup>	209,000

<sup>c</sup>Estimated. <sup>p</sup>Preliminary. <sup>f</sup>Revised. NA Not available. -- Zero.

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

<sup>2</sup>Table includes data available through July 28, 2011.

<sup>3</sup>Reported figure.

<sup>4</sup>Dry bauxite equivalent of crude ore.

<sup>5</sup>Bauxite processed for conversion to alumina in Jamaica plus kiln-dried ore prepared for export.

<sup>6</sup>Montenegro and Serbia formally declared independence in June 2006 from each other and dissolved their union.

<sup>7</sup>Public-sector production only.

TABLE 12  
ALUMINA: WORLD PRODUCTION, BY COUNTRY<sup>1, 2, 3</sup>

(Thousand metric tons)

Country	2006	2007	2008	2009	2010 <sup>e</sup>
Australia	18,312	18,844	19,321	19,948	19,956 <sup>4</sup>
Azerbaijan	363	185	165	80 <sup>r, e</sup>	--
Bosnia and Herzegovina	394 <sup>r</sup>	304	294	192 <sup>r</sup>	230
Brazil	6,793	7,078 <sup>r</sup>	7,822 <sup>r</sup>	8,625 <sup>r, 4</sup>	9,000
Canada	1,281	1,300 <sup>e</sup>	1,370	1,125	1,301 <sup>4</sup>
China <sup>e</sup>	13,700	19,500	22,800	23,800	29,000
France <sup>e</sup>	600	600	630 <sup>4</sup>	348 <sup>4</sup>	481 <sup>4</sup>
Germany	1,393	1,388	1,395	1,154	1,485 <sup>4</sup>
Greece	750	750	750	780	760
Guinea	530	527	593	530	597
Hungary <sup>e</sup>	301	301	299	185	200
India <sup>e</sup>	2,800	2,900	3,000	3,700	4,000
Iran <sup>e</sup>	250	250	200	250	270
Ireland	1,816	1,803	1,890	1,245	1,850 <sup>4</sup>
Italy	1,103	1,069	1,045	92	-- <sup>4</sup>
Jamaica	4,099	3,941	3,996	1,774	1,591 <sup>4</sup>
Japan <sup>e, 5</sup>	330	300	320	310	300
Kazakhstan	1,515	1,556	1,600	1,608	1,640 <sup>4</sup>
Montenegro	237	240	220	59	-- <sup>4</sup>
Romania	622	23	--	44	414
Russia	3,265	3,333	3,112	2,794	2,857 <sup>4</sup>
Spain <sup>e, 6</sup>	1,000	1,500	1,500	1,500	1,500
Suriname	2,153	2,270	2,156	1,178	1,200
Turkey <sup>e</sup>	150 <sup>4</sup>	160	160	100 <sup>r</sup>	160
Ukraine	1,672	1,656	1,673	1,524	1,534 <sup>4</sup>
United States	5,030 <sup>r</sup>	4,240	4,300	2,370 <sup>r</sup>	3,910 <sup>4</sup>
Venezuela <sup>e</sup>	1,892 <sup>4</sup>	1,900	1,900	1,370 <sup>r</sup>	1,100
Total	72,400 <sup>r</sup>	77,900 <sup>r</sup>	82,500 <sup>r</sup>	76,700 <sup>r</sup>	85,300

<sup>e</sup>Estimated. <sup>r</sup>Revised. -- Zero.

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

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

<sup>3</sup>Table includes data available through July 28, 2011.

<sup>4</sup>Reported figure.

<sup>5</sup>Data 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: 2006—720,000; 2007—700,000; 2008—700,000; 2009—710,000; and 2010—700,000.

<sup>6</sup>Hydrate.