



2009 Minerals Yearbook

BAUXITE AND ALUMINA

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In 2009, almost all the 6.62 million metric tons (Mt) of bauxite consumed in the United States was imported. U.S. production and shipments of alumina (calcined equivalent) were 3.06 Mt. An estimated 87% of domestic shipments was used for metal production. World production of bauxite totaled 199 Mt; the leading producing countries, in descending order of production, were Australia, China, and Brazil. World production of alumina was estimated to be 76.4 Mt; China, Australia, and Brazil were 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 28% lower in 2009 than in 2008 (table 2). During the first quarter of the year, Gramercy Alumina LLC cut the production rate at its 1.25-million-metric-ton-per-year (Mt/yr) alumina refinery in Gramercy, LA, to 500,000 metric tons per year (t/yr) from 1 Mt/yr. However, as prices recovered, Gramercy increased production in September, and by yearend had returned to full production (Noranda Aluminum Holding Corp., 2009a, b). Citing low alumina and aluminum prices, Sherwin Alumina Co. cut production at the end of March at its 1.6-Mt/yr refinery in Corpus Christi, TX, to 960,000 t/yr (Sherwin Alumina Co., 2009).

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 declined by 31% compared with that of 2008 as a result of cutbacks at alumina refineries late in 2008 and in the first quarter of 2009. In 2009, 98% of the bauxite consumed in the United States was refined to alumina [an estimated 2.11 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 87% of the net alumina imports and alumina shipped by U.S. alumina refineries went to primary aluminum smelters for metal production. In 2009, 14 domestic primary aluminum smelters consumed 3.45 Mt of alumina, a decrease of 35% compared with the amount of alumina

consumed in 2008. 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 2009 annual average values of U.S. imports of metallurgical-grade bauxite are listed in table 5. Alumina prices generally followed the trend in aluminum prices. Spot prices for metallurgical-grade alumina in international markets published by Metal Bulletin are listed in table 6. The 2009 average value of U.S. imports of calcined alumina was \$330 per metric ton, cost, insurance, and freight at U.S. ports. Yearend price ranges for refractory-grade bauxite in China, 87% Al₂O₃ free on board (f.o.b.) ports, as quoted in Industrial Minerals (2009b), are listed in table 7.

World Industry Structure

Production.—In 2009, world production of bauxite decreased by 6% compared with that of 2008 (table 11). Mine production of 199 Mt was reported from 25 countries. The leading producers of bauxite, in decreasing order of tonnage mined, were Australia, China, Brazil, India, and Guinea. These countries accounted for 83% of total world production; Australia, China, and Brazil together accounted for more than two-thirds of the world’s production.

World output of alumina decreased by 7% in 2009 compared with that of 2008 (table 12). The five leading producing countries, in descending order of quantity of alumina produced, were 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 more than 57%.

Mergers, Acquisitions, and Restructuring.—Noranda Aluminum Holding Corp. (Franklin, TN) became the sole owner of Gramercy Alumina when it purchased Century Aluminum Co.’s (Monterey, CA) 50% share in the company. Renamed Noranda Alumina LLC, the company’s assets include a 1.25-Mt/yr alumina refinery in Gramercy and a 4.8-Mt/yr bauxite mine in St. Ann, Jamaica (Noranda Aluminum Holding Corp., 2009b).

At the end of July, Alcoa completed the sale of its interest in Rio Tinto plc to Aluminum Corp. of China (Chinalco). In February 2008, Alcoa and Chinalco had jointly acquired 12% of the stock in Rio Tinto. A change in strategy in light of the

economic conditions was cited by Alcoa as the reason for the sale (Alcoa Inc., 2009f).

Suriname Aluminum Co. (Suralco) (a subsidiary of Alcoa World Alumina and Chemicals Ltd.) purchased BHP Billiton Ltd.'s 45% share of the Suralco-BHP Billiton joint venture in Suriname, which included a 2.2-Mt/yr refinery at Paranam and associated bauxite mines (Alcoa Inc., 2009b).

As part of a financial restructuring deal, the Government of Montenegro received ownership of 29.4% of Kombinat Aluminijuma Podgorica and Bauxite Mines (KAP). Central European Aluminum Co. remained the managing partner with 29.4% ownership, with the remainder owned by other investors. Assets owned by KAP included a 120,000-t/yr smelter and a 280,000-t/yr alumina refinery in Podgorica and a 700,000-t/yr bauxite mine in Kutsko Brdo (Central European Aluminum Co., 2009, 2010).

World Review

Australia.—The Government of Australia was moving forward with a proposed cap-and-trade plan in an effort to reduce emissions of carbon dioxide and other greenhouse gases. The proposal included provisions for the aluminum and other emission-intensive industries to lower rates of carbon emissions during the first several years after enactment (Australian Department of Climate Change, 2009).

Work on the expansion project at the Worsley refinery continued on schedule despite the drop in alumina prices and the financial downturn. BHP Billiton was increasing capacity of the refinery to 4.6 Mt/yr from 3.5 Mt/yr, with completion projected in early 2011 (BHP Billiton Ltd., 2009b).

Rio Tinto announced that construction on the expansion project at the Yarwun refinery was delayed 2 years in response to the global financial downturn. The capacity of the refinery would increase to 3.4 Mt/yr from 1.4 Mt/yr when completed in the second half of 2012. Rio Tinto also reduced production of bauxite from the Weipa Mine to 15 Mt/yr from 19.4 Mt/yr at the start of 2010 (Rio Tinto plc, 2009b, c, p. 15).

In August, Bauxite Resources Ltd. (BRL) (Osborne Park, Western Australia) started production at its 3-Mt/yr bauxite mine in the Darling Range near Bindoon, Western Australia. Bauxite would be shipped by BRL to refineries in China and other customers in Asia through the ports at Kwinana and Bunbury. The company exported its first shipment of bauxite to China in November (Bauxite Resources Ltd., 2009a, b).

Chinalco continued a feasibility study of the Aurukun bauxite mine and refinery project, but by mid-2010 decided not to proceed with construction 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 said it was considering developing the project in the future if a deal with the Queensland government could be negotiated (Aluminum Corp. of China Ltd., 2009b; Wilson, 2010).

Azerbaijan.—OJSC Azerbaijan Aluminum shut down production from its Ghandja refinery during the second quarter in response to low alumina prices and high costs. The refinery had a capacity of 400,000 t/yr (CRU Alumina Monitor, 2009a).

Bosnia and Herzegovina.—Birac AD reduced the alumina production rate at its refinery to approximately 110,000 t/yr

during the second quarter in response to low alumina prices and high costs. The refinery had a capacity of 600,000 t/yr (CRU Alumina Monitor, 2009a).

Brazil.—Alcoa World Alumina and Chemicals [a joint venture between Alcoa (60%) and Alumina Ltd. (40%)] opened the Juruti bauxite mine in September. At capacity, the mine was expected to produce 2.6 Mt/yr of bauxite. Bauxite from the mine would be sent to the Alumar refinery in São Luís, where an expansion project completed in July increased capacity to 3.6 Mt/yr from 1.5 Mt/yr. The refinery was expected to operate at full capacity during the first quarter of 2010. The refinery was a joint venture between Alcoa (38.4%), BHP Billiton (36%), Alumina (15.6%), and Rio Tinto (10%), with Alcoa being the refinery's operator (Alcoa, 2009c, d; BHP Billiton Ltd., 2009a).

Work continued on the construction of the Companhia de Alumina do Pará (CAP) alumina refinery in Barcarena. The refinery, expected to begin production by yearend 2012, would have an initial production capacity of 930,000 t/yr. An expansion to increase the refinery's capacity to 1.86 Mt/yr was also planned, although a construction schedule was not announced. The project was a joint venture among Vale SA (61%), Norsk Hydro ASA (Hydro) (20%), and Dubai Aluminium Co. Ltd. (Dubal) (19%). Vale also continued work on the Paragominas III mine. When completed in the second half of 2012, the mine would produce 4.95 Mt/yr of bauxite (Vale SA, 2009d, e).

Mineração Rio do Norte S.A. (MRN) cut the bauxite production rate from its mines at Oriximina, Papagalo, and Trombetas to 15 Mt/yr from 19.8 Mt/yr in January in response to decreasing demand and lower prices for bauxite and alumina. The production rate decreased further in the second quarter, to 14.2 Mt/yr, before being increased to 16 Mt/yr during the third quarter as prices and demand stabilized and recovered slightly. MRN had a capacity to produce 19.8 Mt/yr of bauxite and was a joint venture among Vale (40%), BHP Billiton (14.8%), Alcoa (13.2%), Rio Tinto (12%), Companhia Brasileira de Alumínio (CBA) (10%), Hydro (5%), and Reynolds Alumínio do Brasil (5%) (Vale SA 2009a–c).

Novelis Inc. shut down production of alumina from its Ouro Preto refinery at the end of March. The refinery, which had supplied the adjacent Novelis smelter, was shut down because alumina could be purchased from other suppliers at less than the refinery's cost of production. The refinery had a production capacity of 150,000 t/yr (Novelis Inc., 2009).

Cameroon.—Cameroon Alumina Ltd. announced the discovery of a bauxite deposit with 550 Mt of reserves, located in the Adamawa region. The company was a joint venture between Dubal and Hindalco Industries Ltd. The company planned to open a mine in 2014 that would produce 4.5 to 9 Mt/yr and with an associated alumina refinery with a capacity of 1.4 to 3.0 Mt/yr. Rail infrastructure upgrades would be required to transport the bauxite or alumina 860 kilometers (534 miles) to the nearest port. Cameroon Alumina was applying for mining permits and negotiating with the Government about railroad upgrades. A feasibility study to be completed in 2012 was underway (Musa, 2009).

Canada.—Rio Tinto reduced the production rate of alumina from the Vaudreuil refinery to approximately 1 Mt/yr from 1.4 Mt/yr in the first quarter. In September, as prices for alumina

increased, the production rate was increased to approximately 1.15 Mt/yr. The refinery in Jonquiere, Quebec, had a capacity of 1.4 Mt/yr (Rio Tinto plc, 2009a, c, p. 4, 15).

Exploration Orbite V.S.P.A. Inc. planned a pilot plant to test the recovery of alumina from aluminous clays near Grande-Vallee, Quebec. The clay contains approximately 23% alumina, and laboratory experiments have produced 99.8%-pure alumina. Preliminary exploration work of the deposit had been conducted but further exploration was planned to determine the size of the resource. Aluminerie Aloutte invested in the project and had tested samples of the alumina produced in the laboratory from the clay for use in its smelter (Exploration Orbite V.S.P.A. Inc., 2008a, b; Platts Metals Week, 2009a).

China.—In January, Henan Wanji Aluminum Co. Ltd. cut the production rate at its 800,000-t/yr refinery in Wanji, Henan Province, to approximately 400,000 t/yr. In April, the company increased the production rate to 640,000 t/yr. The shutdown and restart were in response to market conditions and prices for alumina (CRU Alumina Monitor, 2009e).

In February, Yangquan Coalmine Aluminium Co. Ltd. shut down 400,000 t/yr of capacity at its 1.6-Mt/yr refinery in Sanmenxia, Henan Province, as a result of decreasing prices and demand (Platts Metals Week, 2009b).

In August, Guangxi Huayin Aluminum Co. Ltd. restarted capacity that had been shut down in late 2008 at its refinery in Huayin, Guangxi Province. The restart of 1.6 Mt/yr of capacity as enabled by higher alumina prices (CRU Alumina Monitor, 2009g).

In January, Datung International Power Generation Co. completed construction of a refinery to produce alumina from coal ash. The refinery in Datong, Shanxi Province, had a capacity of 3,000 t/yr and would use coal ash from Nei Mongol Province, which had an alumina content of nearly 50% (Hornby, 2009).

East Hope Group Ltd. delayed startup of the expansion of its refinery in Sanmenxia. The project increased capacity of the refinery to 2.0 Mt/yr from 1.5 Mt/yr. Market conditions were cited as a reason for the delayed startup. A decision on constructing an additional expansion to 2.5 Mt/yr was postponed until market conditions improved (Platts Metals Week, 2009e).

Chinalco was progressing with construction of a refinery in Nanchuan, Chongqing Province, that would have a capacity of 800,000 t/yr when completed in 2010. Chinalco was also progressing on an 800,000-t/yr refinery in Zunyi, Guizhou Province, that was expected to be completed in 2010 (Aluminum Corp. of China Ltd., 2009a, p. 81–83).

Henan Yima Group Ltd. was constructing a 400,000-t/yr alumina refinery in Yima, Henan Province, and planned to start production early 2010 (CRU Alumina Monitor, 2009j).

Louyang Xiangjiang Wanji Aluminium Ltd. started work on an expansion project at its alumina refinery in Louyang, Henan Province. Capacity would increase to 1.4 Mt/yr from 800,000 t/yr when completed at the end of 2011. Further expansion to increase capacity to 2.0 Mt/yr was proposed, although a schedule was not available (Platts Metals Week, 2009f).

Guizhou Guanglu Aluminium Co. started construction of an 800,000-t/yr alumina refinery in Qingzhen, Guizhou Province. The project was scheduled for completion by 2012 with

production at full capacity expected by mid-2012. The company also started construction of a nearby mine to supply bauxite to the refinery. The mine would have a capacity of 1.6 Mt/yr when completed at the beginning of 2012 (Platts Metals Week, 2009c).

Melicsea Erdos Alumina Co. Ltd. started construction of a refinery that would produce alumina from coal ash. The 400,000-t/yr refinery located in Ordos, Nei Mongol Autonomous Region, was expected to begin production by early 2010 (CRU Alumina Monitor, 2009e).

Zhengzhou Coal Group Co. announced plans to construct an 800,000-t/yr alumina refinery in Yuncheng, Shanxi Province, although a schedule was not announced. Bauxite mined from areas adjacent to the refinery would be processed at the refinery (CRU Alumina Monitor, 2009f).

Bosai Minerals Group Co. Ltd. announced that it would expand capacity of its alumina refinery in Sichuan Province to 500,000 t/yr from 200,000 t/yr by mid-2010 (CRU Alumina Monitor, 2009g).

A reported 80-Mt bauxite deposit was discovered near the city of Zunyi, Guizhou Province, and construction of an 800,000-t/yr refinery was to start at yearend 2010, although a completion date was not available (CRU Alumina Monitor, 2009e).

France.—In January, Rio Tinto announced that the production rate of specialty alumina from the Gardanne refinery would be reduced to approximately 300,000 t/yr from 550,000 t/yr in response to declining demand and lower prices for alumina. Production of smelter-grade alumina had been shut down during the fourth quarter of 2008 (Rio Tinto plc, 2009a, c, p. 4, 15).

Ghana.—In April, Rio Tinto temporarily cut the production rate at the Awaso bauxite mine to 110,000 t/yr from 870,000 t/yr as a result of lower prices and reduced demand for bauxite and alumina. The mine, with a capacity of 1.0 Mt/yr, was a joint venture between Rio Tinto (80%) and the Government of Ghana (20%) (Rio Tinto plc, 2009c, p. 4, 15).

Guinea.—The Government was taking action to nullify the sale of the Friguia refinery to United Company RUSAL (Rusal) that was negotiated by the prior regime in 2006. The Government was also demanding that Rusal and other mining companies employ fewer expatriot professionals and hire qualified Guinean citizens at mines throughout the country (Mukumbira, 2009).

In October, workers at mines across Guinea called a general strike to protest violence by the military that killed more than 150 people who had been protesting against the Government. The strike lasted 2 days and was organized by groups opposed to the military-led Government (Samb, 2009).

Rusal cut alumina production from the 640,000-t/yr alumina refinery at Friguia by 11% compared with production in 2008 as a result of declining demand and lower prices. Bauxite production from the Friguia and Kinda mines also declined by 15% compared with production in 2008 (United Company RUSAL, 2010).

In March, the bauxite production rate was cut at the Sangaredi mine to 8.3 Mt/yr from 13.5 Mt/yr as a result of lower prices and declining demand for bauxite and alumina. The mine, with a capacity of 14 Mt/yr, was a joint venture among the Government

(49%), Rio Tinto (22.95%), Alcoa (22.95%), and Dadco Group (5.1%) (Rio Tinto plc, 2009c, p. 4, 15).

Global Alumina Corp. was reviewing the construction schedule of its bauxite mine and alumina refinery project. The project was still in the feasibility stage, and construction was delayed at least until the end of 2010, with completion not expected until 2014. The refinery would have a capacity of 3.3 Mt/yr and would use bauxite from deposits for which Global Alumina had mining concessions. The project was a joint venture with BHP Billiton, Dubal, and Mubadala Development Co. (Global Alumina Corp., 2009).

Navasota Resources Ltd.'s exploration project on its concession in the Boke Bauxite Belt reported bauxite reserves of 343 Mt and an additional 63 Mt of inferred resources (Navasota Resources Ltd., 2009).

Guyana.—Bosai informed the Government that construction of a 1-Mt/yr alumina refinery, scheduled to begin in 2009, would be delayed as a result of the credit crisis and depressed alumina prices. The refinery would probably be built in two stages after construction is rescheduled and would be a joint venture between Bosai (70%) and the Government (30%) (Media Corp. Pte. Ltd., 2009).

In May, Bosai cut production of refractory-grade bauxite by 30% at its Linden Mine as a result of reduced demand and lower prices, but restored production in September when demand increased. Bosai owned 70% of the mine, with the Government owning 30% (Habibullah, 2009; Industrial Minerals, 2009a).

Rusal reduced production at the Kwakwani bauxite mine by 23% compared with production in 2008 as a result of reduced demand and lower prices for bauxite and alumina (United Company RUSAL, 2010). In addition, Rusal placed on hold construction scheduled to start in 2011 on an alumina refinery and an aluminum smelter powered by a hydroelectric plant (Media Corp. Pte. Ltd., 2009).

India.—National Aluminum Co. of India Ltd. (Nalco) completed the expansion project at its refinery in Damanjodi, which increased capacity to 2.1 Mt/yr from 1.6 Mt/yr (National Aluminum Co. Ltd., 2009, p. 14). Commissioning of the new line had been scheduled for July but was delayed as a result of attacks in the area by Maoist insurgents. Nalco planned to start production by early 2010, depending on the security situation in the region (Platts Metals Week, 2009d).

Hindalco 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. Funding for about one-half of the cost for the smelter and powerplant was committed. Completion of the construction of the smelter was planned for October 2011, although completion of the construction of the refinery was revised to June 2013 from January 2013 (Hindalco Industries Ltd., 2009).

Vedanta Resources plc ramped up the first phase of its 1.4-Mt/yr Lanjigarh refinery to full capacity at the beginning of 2009. The second phase of the refinery was completed and

production was initiated during the first quarter of 2009. Work was progressing to increase capacity to 2.0 Mt/yr by March 2010, and Vedanta planned to expand capacity further to 5.0 Mt/yr by mid-2011. Construction was progressing on the Niyamgiri bauxite mine, expected to be the main source of bauxite for the Lanjigarh refinery, with completion projected by mid-2010 (Vedanta Resources plc, 2009, p. 13).

Anrak Aluminium Ltd. was progressing with plans to construct a 1.5-Mt/yr alumina refinery, a 250,000-t/yr aluminum smelter, and a 900-MW powerplant in Vishakhapatnam, Andhra Pradesh. A construction schedule was not available (CRU Alumina Monitor, 2009c, i).

JSW Steel Ltd. was progressing with plans to construct a 1.4-Mt/yr alumina refinery in Andhra Pradesh. The project was delayed during the first quarter of 2009 until a new source of financing was obtained later in the year. A revised construction schedule was not available (CRU Alumina Monitor, 2009c, i).

Ashapura Minechem Group Ltd. was planning to construct an aluminum complex in Rataigiri, Maharashtra. The complex would include a 500,000-t/yr alumina refinery, a 150,000-t/yr aluminum smelter, and a 330-MW captive powerplant. A construction schedule was not available (CRU Alumina Monitor, 2009c).

Indonesia.—PT Aneka Tambang (Antam) deferred plans to construct a 300,000-t/yr refinery in Tayan indefinitely as a result of market conditions and rising costs of construction. Antam was proceeding with the development of a 400,000-t/yr bauxite mine in Tayan. A completion date was not available (CRU Alumina Monitor, 2009h).

Iran.—Construction of a 200,000-t/yr alumina refinery in Sarab continued on schedule for completion by the end of 2010. Nepheline syenite would be the raw material used by the refinery that would also produce potassium carbonate and sodium carbonate as byproducts. Deposits in the two provinces near the refinery have been estimated to contain 4 to 6 billion metric tons of nepheline syenite (Mehrabian, 2009).

Ireland.—Rusal reduced the production rate at the Aughinish alumina refinery in the first quarter to 1.13 Mt/yr in response to low alumina prices. The refinery had a capacity of 1.5 Mt/yr (United Company RUSAL, 2009b, c).

Italy.—Rusal shut down the Eurallumina alumina refinery on the island of Sardinia in the first quarter of the year. Low alumina prices were cited for the closure of the 1.1-Mt/yr refinery (United Company RUSAL, 2009b, c).

Jamaica.—In February, bauxite production at Century's St. Ann Mine was cut to approximately 1.25 Mt/yr from 4.5 Mt/yr. Alumina production was reduced at the mine's exclusive customer, the refinery at Gramercy, LA, because the New Madrid, MO, aluminum smelter, which was one of Gramercy's main customers, shut down 75% of its production in January as a result of a power loss. Price declines for alumina were also cited for the production cut. After Century sold its share of the St. Ann Mine to Noranda in September, Noranda announced that it would increase production at the mine to full capacity by yearend, as output from the Gramercy refinery and the New Madrid smelter returned to full capacity (Noranda Aluminum Holding Corp., 2009a, b).

In January, Rusal and Hydro temporarily reduced the production rate by 825,000 t/yr from 1.65-Mt/yr at the Alpart alumina refinery in Nain and the nearby bauxite mine. In May, all production from the refinery and mine was closed. Rusal stated that the closure was expected to last for at least 1 year, citing the decline in prices for alumina and aluminum (Norsk Hydro ASA, 2009; United Company RUSAL, 2009a). Rusal also shut down the 3.9-Mt/yr Windalco Mine and the 650,000-t/yr Ewarton and 560,000-t/yr Kirkvine refineries in the first quarter (United Company RUSAL, 2009b).

Montenegro.—After financial restructuring, Central European Aluminum continued modernizing the Podgorica alumina refinery and aluminum smelter. The capacity of the alumina refinery would increase to 400,000 t/yr from 280,000 t/yr, and the capacity of the smelter would increase to 156,000 t/yr from 120,000 t/yr. Completion of the modernization projects was expected by yearend 2010 (Central European Aluminum Co., 2009, 2010).

Romania.—Vimetco NV restarted production from the Alum alumina refinery at Tulcea in October. The refinery had been closed since February 2007 for an expansion and modernization project to increase capacity to 600,000 t/yr from 500,000 t/yr and to upgrade emissions control systems to be compliant with environmental regulations (Vimetco NV, 2009).

Russia.—Rusal cut production from its alumina refineries in Russia by 10% compared with alumina production in 2008 as a result of lower prices. Most of the cuts were from the 1.1-Mt/yr Achinsk and 200,000-t/yr Boksitogorsk refineries, which were cited as having higher production costs than other refineries in Russia owned by Rusal. The production cuts were made during the first half of 2009. Bauxite production by Rusal in Russia was slightly higher than that of 2008 (United Company RUSAL, 2010).

As a result of financing constraints, Rusal announced plans to slow work on the Komi refinery project. The refinery would have a capacity of 1.4 Mt/yr and was previously planned to start production by the end of 2009. A revised construction schedule was not released (United Company RUSAL, 2009b).

Saudi Arabia.—Alcoa and Saudi Arabian Mining Co. (Ma'aden) formed a joint venture to construct an aluminum complex with a 4.0-Mt/yr bauxite mine, 1.8-Mt/yr alumina refinery, 740,000-t/yr smelter, and a rolling mill. The mine would be at Al Ba'itha, with bauxite transported by rail to Raz Az Zawr, where the refinery, smelter, and rolling mill would be built. Startup of the smelter and rolling mill using purchased alumina were expected in 2013, and production from the mine and refinery would begin in 2014. Alcoa would own 20% of the operation, with Ma'aden owning 60% and other partners owning the remaining 20% (Alcoa Inc., 2009a). Ma'aden had previously had a joint venture with Rio Tinto for the project, but Rio Tinto canceled its participation in the project amid financing constraints (Rio Tinto Alcan Inc., 2008).

Suriname.—Suralco announced that the alumina production rate at the 2.2-Mt/yr refinery in Paranam would be reduced by 40% to 1.3 Mt/yr. Reduced demand and lower prices for alumina and aluminum were cited as the reasons for the temporary production cut (Alcoa Inc., 2009e).

Ukraine.—Rusal shut down alumina production in the first quarter from the Zaporozhye refinery. The 227,000-t/yr refinery was cited as having higher costs than other refineries owned by Rusal (United Company RUSAL, 2010).

Venezuela.—The production rate from Corporacion Venezolana de Guayana Bauxilum C.A.'s (Bauxilum) Los Pijiguaos bauxite mine was cut to one-half of its 6-Mt/yr capacity early in the year as a result of shortages of fuel and replacement parts for equipment. In October, Bauxilum obtained funding for equipment repairs and other investments at the mine. Bauxilum reduced production of alumina from the Puerto Ordaz refinery as a result of the bauxite shortage and stopped exporting alumina in September, shipping alumina only to smelters in Venezuela (Beltran, 2009a, b).

Vietnam.—Vietnam Coal Industry Group and Shandong Aluminium Engineering Co. started construction of a 600,000-t/yr alumina refinery at the beginning of 2009. The refinery would be located in Hu Zhiming City, Lintong Province. A construction schedule was not available (CRU Alumina Monitor, 2009b).

Vietnam National Coal and Mineral Industries Group (Vinacomin) and Chinalco signed a contract for construction of a 600,000-t/yr alumina refinery in Nhan County, Dak Nong Province. The refinery was scheduled to be completed in 2011 (CRU Alumina Monitor, 2009d).

Alcoa and Vinacomin were conducting a feasibility study of a joint-venture 600,000-t/yr alumina refinery in Gia Nghia, Dak Nong (CRU Alumina Monitor, 2009e).

Atlantic Ltd. signed a memorandum of understanding with state-owned Vietnam Natural Resources and Environment Corp. to develop a bauxite mine and associated infrastructure. Atlantic would conduct exploration of bauxite deposits in Dak Nong and Lam Dong Provinces with the aim of developing a 25-Mt/yr mine. Studies for a refinery and smelter would also be conducted if a mine proved feasible (Atlantic Ltd., 2009).

Outlook

Consumption of bauxite and alumina was expected to closely follow the trends of the aluminum market. Although demand and prices for bauxite and alumina had stabilized after the global financial crisis during late 2008 and early 2009, consumption and prices were at a lower level than prior to the downturn. Consumption was expected to remain in a lower range until economic growth was reestablished. While some domestic alumina refinery capacity had been restarted during 2009, further restarts at domestic refineries were not projected until aluminum prices increase substantially. Globally, restarts at refineries and bauxite mines also were not anticipated until a sustained economic recovery was evident.

Although consumption was recovering from the low levels reached during the crisis, decreased demand for aluminum in developed economies still recovering from the economic events of 2008 could keep global aluminum production, and hence bauxite and alumina production, below the record-high 2008 production until at least 2012. Consumer credit issues in the United States and Western Europe were expected to continue through 2010. The uncertainty of the impact of sovereign debt issues in Europe also raised concerns about consumer demand.

Demand for aluminum in emerging economies was expected to increase as these economies continue to grow and recover from the effects of the global recession. However, policies aimed at restraining construction in China may slow the rate of growth of demand for aluminum in that nation. Lack of credit was expected to continue to cause delays in expansion projects at mines and refineries in many parts of the world, although projects in places with high-grade bauxite reserves were expected to move forward.

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TABLE 1
SALIENT BAUXITE STATISTICS¹

(Thousand metric tons)

	2005	2006	2007	2008	2009
United States:					
Exports, as shipped:					
Crude and dried	34	20	15	14	9
Calcined	18	14	8	10	8
Imports for consumption, as shipped:					
Crude and dried	11,800	11,600	9,840	10,500	6,970
Calcined	818	752	808	1,110	461
Consumption, dry equivalent	12,400	12,300	10,200	9,550	6,620
World, production	178,000 ^r	193,000 ^r	204,000 ^r	211,000 ^r	199,000 ^e

^eEstimated. ^rRevised.

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

TABLE 2
SALIENT ALUMINA STATISTICS¹

(Thousand metric tons)

	2005	2006	2007	2008	2009
United States:					
Production:					
Calcined alumina	4,750	4,610	3,770	3,900	2,760
Other alumina ²	708	618	717	610	471
Total:					
As produced or shipped ³	5,460	5,230	4,490	4,510	3,230
Calcined equivalent	5,220	5,010 ^r	4,240	4,300	3,060
Shipments:					
Calcined alumina	4,760	4,580	3,770	3,910	2,760
Other alumina ²	658	564	667	582	464
Total:					
As produced or shipped ³	5,420	5,150	4,440	4,490	3,230
Calcined equivalent	5,190	4,950 ^r	4,200 ^r	4,290 ^r	3,060
Stocks, yearend ^{4,5}	834	942	437	636	175
Imports for consumption ⁵	1,860	1,860	2,440	2,530	1,860
Exports ⁵	1,210	1,540	1,160	1,150	946
Consumption ^{5,6}	5,750	5,220	6,020	5,490	4,430
World, production ⁵	65,000 ^r	72,300 ^r	77,700 ^r	82,600 ^r	76,400 ^e

^eEstimated. ^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 changes.

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

(Thousand metric tons per year)

Company and plant	2008	2009
Alcoa Inc., Point Comfort, TX	2,300	2,300
Noranda Alumina LLC, Gramercy, LA ³	1,250	1,250
Ormet Corp., Burnside, LA	600	600
Sherwin Alumina Co., Corpus Christi, TX ⁴	1,600	1,600
Total	5,750	5,750

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 Noranda Aluminum Holding Corp., a subsidiary of Apollo Management LP.

⁴Owned by Glencore International AG.

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

(Thousand metric tons, dry equivalent)

Industry	2008	2009
Alumina	9,310	6,480
Other ²	234	142
Total	9,550	6,620

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	2008		2009	
	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	38.66	53.37	35.53	48.84
Guinea	35.04	47.50	32.69	46.86
Guyana	37.11	52.69	42.50	65.31
Jamaica	21.35	26.02	20.78	24.24
Sierra Leone	34.85	47.35	29.49	47.35
Weighted average	26.43	35.92	29.80	37.10

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.

TABLE 6
ALUMINA PRICES¹

(Dollars per metric ton)

	2008	2009
January	350–370	170–200 [°]
February	390–420	170–200
March	390–420	170–185
April	400–420	200–230
May	400–421	200–220
June	420–450	210–230
July	420–450	240–250
August	390–400	290–300
September	350–370	290–325
October	290–340	295–315
November	210–240	295–315
December	210–240	295–315

[°]Estimated.

¹Material: Metallurgical grade, free market, spot range, free on board ship valuation, month end.

Source: Metal Bulletin.

TABLE 7
REFRACTORY GRADE BAUXITE PRICES¹

(Dollars per metric ton)

Material	2008	2009
China:		
Guizhou Province, rotary kiln, lump	410–430	390–410
Shanxi Province, rotary kiln, lump	610–620	470–500
Shanxi Province, round kiln, lump	610–620	480–500
Guyana, rotary kiln, lump	540–570	450–510

¹Material, port, 88% 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	2008	2009
Exports:		
Canada	8	17
Germany	1	(2)
Ireland	3	--
Venezuela	1	(2)
Other	2	3
Total	14	20
Imports:		
Brazil	1,940	1,410
Guinea	2,350	1,910
Guyana	723	80
Jamaica ³	4,430	3,200
Sierra Leone	779	308
Other	260	72
Total	10,500	6,970

-- 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: 2008—9.94 million metric tons (Mt) and 2009—6.97 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	2008				2009			
	Refractory grade		Other grade		Refractory grade		Other grade	
	Quantity	Value ²	Quantity	Value ²	Quantity	Value ²	Quantity	Value ²
Exports:								
Canada	7	727	(3)	9	7	748	(3)	30
Korea, Republic of	--	--	--	--	11	8,800	--	--
Mexico	1	525	(3)	130	(3)	563	(3)	602
Other	1	84	(3)	123	1	126	(3)	17
Total	9	1,340	1	262	20	10,200	1	649
Imports:								
Australia	--	--	162	3,430	--	--	17	1,040
Brazil	125	58,500	27	2,590	114	54,300	46	1,700
China	177	63,100	66	14,300	12	--	11	5,980
Greece	28	1,610	--	--	74	3,850	--	--
Guyana	39	13,800	305	14,500	21	8,640	164	9,510
Other	1	100	178	6,490	(3)	6,390	1	344
Total	370	137,000	738	41,300	222	73,200	239	18,600

-- 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.

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

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

Country	2008		2009	
	Quantity	Value ²	Quantity	Value ²
Exports:				
Canada	629	244,000	332	109,000
France	--	--	125	37,800
Iceland	311	99,100	277	63,200
Mexico	54	39,100	57	38,000
Netherlands	28	17,300	2	7,750
Norway	34	13,300	79	17,100
Other	93	272,000	73	215,000
Total	1,150	684,000	946	488,000
Imports:				
Australia	930	307,000	703	159,000
Brazil	523	207,000	367	87,300
Jamaica	468	173,000	248	62,300
Suriname	264	86,500	381	90,300
Venezuela	154	66,300	--	--
Other	195	264,000	159	214,000
Total	2,530	1,100,000	1,860	613,000

-- 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.

Source: U.S. Census Bureau.

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

(Thousand metric tons)

Country	2005	2006	2007	2008	2009 ^e
Australia	59,959	61,780	62,398	61,389	65,231 ³
Bosnia and Herzegovina	1,032	854	867	1,018 ^r	850
Brazil	22,034	23,236 ^r	25,461 ^r	28,098 ^r	28,200 ^p
China ^c	22,000	27,000	30,000	35,000	40,000
Dominican Republic	535 ³	500	500	400	--
Ghana	607	842	748	796 ^r	440 ³
Greece	2,495	2,163	2,126 ^r	2,176 ^r	2,100
Guinea ⁴	16,817	18,784	18,519	18,400 ^r	15,600
Guyana ⁴	1,694 ^r	1,479 ^r	2,243 ^r	2,092 ^r	1,760 ³
Hungary	535 ^e	538	546	511 ^r	317
India	12,385	13,940	20,343	21,210	16,000
Indonesia	1,442	1,502	1,251	1,152 ^r	1,200
Iran	438 ³	500	500	500	500
Jamaica ^{4,5}	14,116	14,865	14,568	14,363 ^r	7,817 ³
Kazakhstan	4,815	4,884	4,943	5,160 ^r	5,130 ³
Malaysia	5	92	157	295 ^r	280
Montenegro	672 ⁶	659	667	672	46 ³
Mozambique	10	11	9	5 ^r	4 ³
Pakistan	7	7	8	8	7
Russia	5,000 ^{r,e}	6,300 ^r	5,775 ^r	5,675 ^r	5,775 ³
Sierra Leone	--	1,071	1,169	954	757 ³
Suriname	4,757	4,924	5,054 ^r	5,200 ^r	4,000 ³
Tanzania	2	5	5	5 ^e	5
Turkey ⁷	475	771	344	350 ^e	330
United States	NA	NA	NA	NA	NA
Venezuela	5,900	5,928	5,500 ^r	5,500 ^e	2,500
Vietnam ^c	26 ³	30	30	30	30
Total	178,000 ^r	193,000 ^r	204,000 ^r	211,000 ^r	199,000

^eEstimated. ^pPreliminary. ^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 July 29, 2010.

³Reported figure.

⁴Dry bauxite equivalent of crude ore.

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

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

⁷Public-sector production only.

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

(Thousand metric tons)

Country	2005	2006	2007	2008	2009
Australia	17,704	18,312	18,844	19,321	19,948
Azerbaijan	315	363	185	165 ^r	10
Bosnia and Herzegovina	450	390	304	294 ^r	120 ^e
Brazil	5,300	6,793	6,890	7,889 ^r	8,000 ^p
Canada	1,214	1,281	1,300 ^e	1,370 ^r	1,125
China ^e	8,610	13,700	19,500	22,800	23,800
France ^e	600 ^r	600 ^r	600 ^r	630 ^{r, 4}	348 ⁴
Germany	1,255	1,393	1,388	1,395	1,154
Greece ^e	750	750	750	750	780
Guinea	740	530 ^r	527 ^r	593 ^r	530
Hungary	305 ^r	301 ^r	301 ^r	299 ^r	185
India ^e	2,700	2,800	2,900	3,000	3,700
Iran ^e	200	250	250	200 ^r	250
Ireland	1,800 ^r	1,816 ^r	1,803 ^r	1,890 ^r	1,245
Italy	1,093	1,103 ^r	1,069 ^r	1,045 ^r	92
Jamaica	4,086	4,099	3,941	3,996 ^r	1,774
Japan ^{e, 5}	350	330	300	320	310
Kazakhstan	1,505	1,515	1,556	1,600 ^r	1,608
Montenegro	235 ⁶	237 ^r	240	220	59
Romania	689	622	23 ⁷	--	44
Russia	3,259	3,265	3,333 ^r	3,112 ^r	2,794
Slovakia	-- ^r	-- ^r	-- ^r	-- ^r	--
Slovenia	-- ^r	-- ^r	-- ^r	-- ^r	--
Spain ^{e, 8}	1,000 ^r	1,000 ^r	1,500 ^r	1,500 ^r	1,500
Suriname	1,944	2,153	2,270 ^r	2,156 ^r	1,178
Turkey ^e	113 ⁴	150 ⁴	160	160	150
Ukraine	1,632	1,672	1,656 ^r	1,673 ^r	1,524
United Kingdom	-- ^r	-- ^r	-- ^r	-- ^r	--
United States	5,220	5,010 ^r	4,240	4,300	3,060
Venezuela ^e	1,920 ⁴	1,892 ⁴	1,900	1,900	1,100
Total	65,000 ^r	72,300 ^r	77,700 ^r	82,600 ^r	76,400 ^e

^eEstimated. ^pPreliminary. ^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 July 29, 2010.

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: 2005—740,000; 2006—720,000; 2007—700,000; 2008—700,000; and 2009—710,000.

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

⁷Plant closed January 2007.

⁸Hydrate.