



2011 Minerals Yearbook

BAUXITE AND ALUMINA

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In 2011, almost all the 8.41 million metric tons (Mt) of bauxite consumed in the United States was imported. U.S. production and shipments of alumina (calcined equivalent) were 3.57 Mt and 3.56 Mt, respectively. An estimated 98% of domestic shipments was used for metal production. World production of bauxite was 259 Mt (tables 1 and 11); the leading producing countries were, in descending order of production, Australia, China, Indonesia, and Brazil. World production of alumina was estimated to be 91.6 Mt (tables 2 and 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 3% higher in 2011 than that in 2010 (table 2) owing to increased capacity utilization at refineries.

Sherwin Alumina Co. [a subsidiary of Glencore International plc, (Baar, Switzerland)] restarted a digester at its Corpus Christi, TX, alumina refinery during the first quarter of 2011. The digester had been shut down in March 2009 when alumina prices declined. With the restart, the 1.6-million-metric-ton-per-year (Mt/yr) alumina refinery was operating at capacity (Glencore International plc, 2012, p. 57).

In November, Ormet Corp. (Hannibal, OH) restarted its 540,000-metric-ton-per-year (t/yr) alumina refinery in Burnside, LA. The refinery was expected to be producing at full capacity in early 2012. The refinery had been closed in the fourth quarter of 2006 because of low alumina prices and high natural gas prices (Ormet Corp., 2011a, b).

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 3% compared with that of 2010. In 2011, 98% of the bauxite consumed in the United States was refined to alumina [an estimated 2.31 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 98% of the net alumina imports and domestic alumina shipments by U.S. alumina refineries went to primary aluminum smelters for metal production. In 2011, 10 domestic primary aluminum smelters consumed 3.97 Mt of alumina, 15% more than the amount of alumina consumed in 2010. 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) increased by about 6% in 2011 compared with that of 2010. Alumina prices generally followed the trend in aluminum prices. In 2011, the average value of U.S. imports of calcined alumina, (table 6) including cost, insurance, and freight at U.S. ports, increased by 14% to \$463 per metric ton. Yearend price ranges for refractory-grade bauxite in China and Guyana (table 7), the leading suppliers, as quoted in Industrial Minerals (2011), were unchanged from those in 2010.

World Industry Structure

Production.—In 2011, world production of bauxite increased by 10% compared with that of 2010 (table 11). Total mine production of 259 Mt was reported from 25 countries. The leading producers of bauxite were, in decreasing order of tonnage mined, Australia, China, Indonesia, Brazil, India, and Guinea. These countries accounted for 85% of total world production; Australia, China, and Indonesia together accounted for 59% of the world’s production. World output of alumina increased by 8% in 2011 compared with that of 2010 (table 12). Total alumina production of 91.6 Mt was reported from 25 countries. 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 58%.

Mergers, Acquisitions, and Restructuring.—In February, Vale S.A. (Rio de Janeiro, Brazil) completed the sale of bauxite, alumina, and aluminum assets in Brazil to Norsk Hydro ASA (Oslo, Norway) in exchange for \$1.1 billion in cash plus \$3.8 billion in Norsk Hydro stock. As a result of the transaction, Vale received 22% of Norsk Hydro’s stock; Norsk Hydro received 51% of the 460,000-t/yr Albras smelter; and Norsk Hydro

increased its share of the 6.3-Mt/yr Alunorte alumina refinery to 91% from 34% and of the 1.86-Mt/yr Companhia de Alumina do Para (CAP) alumina refinery project to 81% from 20%. Norsk Hydro also gained 60% ownership of the 9.9-Mt/yr Paragominas bauxite mine and would purchase the remaining 40% of the mine by yearend 2015 (Vale S.A., 2011).

After completing the acquisition of assets in Brazil from Vale, Norsk Hydro sold its 35% share of the shuttered 1.65-Mt/yr Alpart alumina refinery and the adjacent 4.9-Mt/yr bauxite mine in Jamaica to United Company RUSAL (Moscow, Russia); Rusal became the sole owner of the Alpart assets. The mine and refinery closed in May 2009 and remained so throughout 2011 (Norsk Hydro ASA, 2011; 2012b; United Company RUSAL, 2012b).

Rio Tinto plc restructured 12 assets in its aluminum product group prior to selling them at an appropriate time in the future. Rio Tinto's interests in six Australian and New Zealand assets were transferred into a new business unit called Pacific Aluminium that was managed and reported separately from the Rio Tinto Alcan product group prior to divestment. The Pacific Aluminium group included the 8-Mt/yr bauxite mine and 3.8-Mt/yr alumina refinery at Gove, Australia; a powerplant at Gladstone, Australia; the Bell Bay (160,000 t/yr), Boyne (550,000 t/yr), and Tomago (525,000 t/yr) smelters in Australia; and the 350,000-t/yr Tiwai Point, New Zealand, smelter. A second group of six noncore assets, including the 196,000-t/yr smelter at Seabee, KY, continued to be managed by Rio Tinto Alcan while it investigated additional divestment options. Other assets for sale that continued to be managed by Rio Tinto Alcan were a 700,000-t/yr alumina refinery at Gardanne, France; specialty alumina refineries at Beyre de and La Bathie, France, and Teutschenthal, Germany; and a powerplant associated with a 169,000-t/yr smelter at Lynemouth, United Kingdom, which was scheduled to be permanently shut down in 2012 (Rio Tinto plc, 2011a).

In November, Mytilineos Holdings SA (Athens, Greece) agreed to purchase the bauxite assets of S&B Industrial Minerals SA by mid-2014. Mytilineos owned the 800,000-t/yr alumina refinery at Aspra Spitia Voiotias, Greece, and purchased approximately 60% of the bauxite produced by S&B Industrial Minerals. S&B Industrial Minerals sold 40% of its production as cement-grade nonrefractory bauxite (O'Driscoll, 2011b).

Trade.—The World Trade Organization (WTO) found that export quotas for refractory-grade bauxite and several other mineral commodities violated WTO rules. Complaints against China's export policies had been filed with the WTO by the European Union, Mexico, and the United States in 2009. China claimed that the export restrictions were permitted in order to conserve resources. However, the WTO found that Chinese businesses were favored by the policy and restrictions on consumption had not been placed on businesses in China (O'Driscoll, 2011a).

World Review

Australia.—Heavy rains that started in December 2010 and continued through April 2011 caused flooding that reduced production of alumina at Rio Tinto's 3.85-Mt/yr alumina refinery and bauxite from the adjacent mine at Gladstone,

Queensland. Rio Tinto reported that production was 20% lower in the first quarter compared with production in the fourth quarter of 2010, but gradually recovered to normal levels by yearend. Total 2011 production was 12% lower than production in 2010 (Rio Tinto plc, 2011b, p. 1, 4, 15; 2012a, p. 4, 15).

A power outage that caused a shutdown of the Gove alumina refinery during August delayed ramp up to full capacity following an expansion in mid-2008 that increased capacity to 3.8 Mt/yr from 2 Mt/yr. Total alumina production in 2011 was 2.55 Mt, 3% more than the 2.47 Mt produced in 2010 (Rio Tinto plc, 2011c, p. 4; 2012a, p. 17). Rio Tinto continued to expand the Yarwun alumina refinery to 3.4 Mt/yr from 1.4 Mt/yr with completion projected for mid-2012 (Rio Tinto plc, 2012b, p. 9, 20).

Alumina production at BHP Billiton Ltd.'s Worsley refinery for 2011 was 4% lower than that of 2010. The reduced production mainly resulted from low production in the first quarter because of planned maintenance. Work to expand alumina capacity to 4.6 Mt/yr from 3.5 Mt/yr continued throughout the year at a slower pace than planned, with scheduled completion revised to early 2012 from early 2011. Issues with construction were cited for the revised schedule, and higher costs for materials and equipment, as well as the strength of the Australian currency, were cited for increased costs of the project. The Worsley 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., 2011; 2012, p. 2, 6).

Azerbaijan.—Det. AL Group (Detal) (Baku) restarted its 450,000-t/yr Sumgait alumina refinery during the fourth quarter of 2011. Alumina from the refinery was to supply Detal's new 100,000-t/yr aluminum smelter in Ganga that opened during 2011, the 60,000-t/yr Sumgait smelter should it reopen, and other customers. The Sumgait refinery and smelter had been shut down in 2009 because of declining prices for aluminum (Platts Metals Week, 2011a; CRU Alumina Monitor, 2012a).

Brazil.—Ramp up of production from the expansion of the Alumar alumina refinery continued throughout 2011, and the refinery reached a production rate of 3.45 Mt/yr during the fourth quarter. Production at full capacity was expected to be reached in the first quarter of 2012. The expansion to 3.6 Mt/yr from 1.5 Mt/yr had been completed in July 2009. The refinery was a joint venture between Alcoa Inc. (38.4%), BHP Billiton (36%), Alumina Ltd. (15.6%), and Rio Tinto (10%); Alcoa was the refinery's operator (Rio Tinto plc, 2012a, p. 15).

After acquiring the bauxite and alumina assets of Vale in Brazil, Norsk Hydro placed previously announced plans to expand the Paragominas Mine and construct the CAP alumina refinery in Barcarena under review. The proposed expansion would increase the capacity of the Paragominas Mine to 15 Mt/yr from 9.9 Mt/yr. The CAP refinery would have an initial production capacity of 1.9 Mt/yr. The refinery was a joint venture between Norsk Hydro (81%), and Dubai Aluminium Co. Ltd. (Dubal) (19%) (Norsk Hydro ASA, 2012a, p. 25–27).

Canada.—Orbite Aluminae Inc. (Montreal, Quebec) (formerly known as Exploration Orbite V.S.P.A. Inc.) completed construction of a pilot plant to recover alumina from aluminous clays near Grande-Vallee, Quebec, and successfully tested

the alumina as smelter feedstock. Orbite planned to construct a refinery to produce 540,000 t/yr of smelter-grade alumina that would be commissioned by yearend 2013. In addition to alumina, the refinery would also recover gallium, iron ore, manganese oxide, rare-earth elements, and high-purity silica. After refinery construction, the pilot plant was expected to continue to be used to produce high-purity alumina (Exploration Orbite V.S.P.A. Inc., 2011; Orbite Aluminae Inc., 2011).

China.—Aluminum Corp. of China (Chinalco) expanded the capacity of its alumina refinery in Zibo, Shandong Province, to 2.3 Mt/yr from 2 Mt/yr. The project was started during 2011 and was completed in September. Production was expected to be at full capacity by early 2012. Chinalco expanded the capacity of its alumina refinery in Zhongzhou, Hunan Province, to 3 Mt/yr from 2 Mt/yr. The project was started in May 2010, completed in the third quarter of 2011, and also was expected to be operating at full capacity early in 2012 (China Metal Market—Alumina and Aluminum, 2011b; CRU Alumina Monitor, 2011e). Chinalco completed an expansion of the Guangxi alumina refinery in Pingguo, Guangxi Province, which increased capacity to 2.5 Mt/yr from 2 Mt/yr. The expansion was started in November 2010 and was producing alumina by December 2011 (CRU Alumina Monitor, 2011g). In June, Chinalco started an expansion of its alumina refinery in Hejin, Shanxi Province, to 2.5 Mt/yr from 2 Mt/yr, which it expected to complete in September 2012 (China Metal Market—Alumina and Aluminum, 2011a).

Guangdong Galuminium Group Ltd. completed an 800,000-t/yr alumina refinery in Qingzhen, Guizhou Province, which started production in December. The company was also developing a mine at a nearby bauxite deposit to supply the refinery. The mine would have a capacity of 1.6 Mt/yr when completed at the beginning of 2012 (China Metal Market—Alumina & Aluminum, 2011g; 2012b). In September, China Power Investment Corp. (CPI) started construction of a bauxite mine in Wanchangping, Guizhou Province. The mine would produce 1 Mt/yr of bauxite that would supply a 1-Mt/yr alumina refinery being constructed in Wuchuan, Guizhou Province. In December, CPI started construction of a 1-Mt/yr bauxite mine at Dazhuyuan, Guizhou Province, also to supply the Wuchuan alumina refinery (China Metal Market—Alumina and Aluminum, 2011d; 2012a; CRU Alumina Monitor, 2011b).

In July, Henan Hongran Aluminum Co. Ltd. started production from a 200,000-t/yr alumina refinery in Sanmenxia, Henan Province (CRU Alumina Monitor, 2011c). Henan Huiyuan Chemical Engineering Co. Ltd. completed an expansion of its alumina refinery in Pingdingshan, Henan Province, to 625,000 t/yr from 525,000 t/yr in the first quarter of 2011 (CRU Alumina Monitor, 2011a).

During the first quarter, Nanshan Longkou Donghai Alumina Co. Ltd. completed expanding its alumina refinery in Longkou, Shandong Province, to 1.4 Mt/yr of alumina from 1.2 Mt/yr (CRU Alumina Monitor, 2011b).

Shanxi Luneng Jinbei Aluminum Co. Ltd. completed an expansion of its alumina refinery in Yuanping, Shanxi Province, to 2.6 Mt/yr from 1 Mt/yr and started production early in the year (China Metal Market—Alumina & Aluminum, 2011i). Shanxi Xiaoyi Xingan Chemical Engineering Co. Ltd.

completed expansion of its alumina refinery in Xiaoyi, Shanxi Province, to 2.2 Mt/yr from 1.2-Mt/yr and started production in June (China Metal Market—Alumina & Aluminum, 2011j). In January, Shandong Chiping Xinfu Group completed the first phase of an alumina refinery in Jiaokou, Shanxi Province. Production from the 1.2 Mt/yr refinery began in the fourth quarter of 2011. An additional 1.2 Mt/yr of alumina capacity was under construction and was scheduled to be completed early in 2012 (China Metal Market—Alumina and Aluminum, 2011k; Platts Metals Week, 2011f).

Shanxi Zhaofeng Aluminium Co. Ltd. continued work on expanding its alumina refinery in Shanxi Province to 1.1 Mt/yr from 400,000 t/yr. The project was expected to be completed in late 2012 (China Metal Market—Alumina and Aluminum, 2012c). During the fourth quarter of 2011, Shanxi Huaxing Aluminum Co. Ltd. started construction of a 900,000-t/yr bauxite mine in Xing County, Shanxi Province, to partially supply an 800,000-t/yr alumina refinery also being built by the company (CRU Alumina Monitor, 2011f). In August, Shanxi Tongde Aluminum Co. Ltd. started construction of a 1-Mt/yr alumina refinery in Yangjiawan, Shanxi Province. Further expansion of the refinery to 2.8 Mt/yr was planned, and a 6-Mt/yr bauxite mine and 1-Mt/yr aluminum smelter were planned as part of the project. A completion schedule was not available. Shanxi Tongde Aluminum was a joint venture between Shanxi Datong Coal Mine Group, Shanxi Huayu Group, and Shenzhen Vimetco Investment Co. Ltd. (China Metal Market—Alumina and Aluminum, 2011h).

Yunnan Aluminum Co. Ltd. completed its 800,000-t/yr alumina refinery in Wenshan, Yunnan Province, late in 2011 but delayed startup until 2012 owing to technical issues (Platts Metals Week, 2011c). Production of bauxite from the nearby mine started in August (CRU Alumina Monitor, 2011d).

Chongqing Bosai Mining Co. Ltd. delayed an expansion of its alumina refinery in Nanchuan, Hubei Province. The project, which was expected to increase capacity to 800,000 t/yr from 500,000 t/yr, had been expected to be constructed in 2011. The revised construction schedule was not available (CRU Alumina Monitor, 2011g).

The Chinese Government was funding research on recovering alumina from coal ash, citing limited, low-quality bauxite reserves in China for the need to research alternative sources of alumina (Platts Metals Week, 2011b). Two refineries were reportedly being constructed to recover alumina from coal ash as part of the program. Datang International Power Generation Co. Ltd. was constructing an alumina refinery in Qingshuihe, Inner Mongolia Autonomous Region. The project capacity and construction schedule were not available. China Coal Corp. was constructing a 100,000-t/yr alumina refinery in Pingsu, Shanxi Province, to be completed in the second half of 2012, with further expansions possible (China Metal Market—Alumina and Aluminum, 2011c, e). In addition to the projects which were part of the research program, in December, Shenhua Group Corp. Ltd. started construction of a refinery to recover alumina from coal ash in Jungar Banner, Inner Mongolia Autonomous Region. The refinery capacity was expected to be 1 Mt/yr and further expansions were proposed (CRU Alumina Monitor, 2012b). Also, Datang Inner Mongolia Recycling Resource Co.

Ltd. started production of alumina from coal fly ash during the first quarter of 2011 at a 240,000-t/yr refinery in Tuokeduo, Inner Mongolia Autonomous Region (China Metal Market—Alumina and Aluminum, 2011f).

Fiji.—Shandong Chipping Xinfa began construction of a bauxite mine at Nawailevu during the fourth quarter of 2011 and expected production to start in the first quarter of 2012. The company planned to export the bauxite to its alumina refinery in Jiaokou, Shanxi Province, China (CRU Alumina Monitor, 2011g).

Guyana.—Production at Rusal's 2.2-Mt/yr Kwakwani Mine increased by 61% compared with that in 2010 following completion of plant upgrades (United Company RUSAL, 2012a, p. 31).

India.—In early 2011, National Aluminium Co. Ltd. (Nalco) completed an expansion of the alumina refinery in Damanjodi, Orissa, which increased the production capacity to 2.1 Mt/yr from 1.6 Mt/yr. Production from the expansion was near capacity by September. Nalco planned to increase the capacity of the refinery further to 2.28 Mt/yr by mid-2012. Capacity of Nalco's bauxite mines was being increased to 6.83 Mt/yr from 6.3 Mt/yr by yearend 2012 (National Aluminium Co. Ltd., 2011; Platts Metals Week, 2011d).

Hindalco Industries Ltd. continued construction of the 1.5-Mt/yr Utkal alumina refinery and an adjacent 3-Mt/yr bauxite mine, with production scheduled to start early in 2012. Hindalco planned to construct a 1.5-Mt/yr alumina refinery in Koraput, Orissa, by yearend 2014 to supply the 359,000-t/yr Aditya aluminum smelter that was being constructed in Lapanga, Orissa. The smelter and a 900-megawatt captive powerplant were expected to be completed in early 2013 (Hindalco Industries Ltd., 2011a, b).

Anrak Aluminium Ltd. was constructing a 1.5-Mt/yr alumina refinery in Rachapalle, Andhra Pradesh, to be completed by mid-2012. Bauxite for the refinery would be supplied from the Jerrela deposit, approximately 90 kilometers from the refinery (Anrak Aluminium Ltd., 2011).

Indonesia.—In April, PT Aneka Tambang (Antam) started construction of a 300,000-t/yr chemical-grade alumina refinery at Tayan, West Kalimantan. 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. The refinery was expected to begin production in early 2014. Antam also planned to construct a smelter-grade alumina refinery in Mempawah, West Kalimantan, and was exploring for bauxite in several prospects nearby (PT Aneka Tambang, 2011; 2012, p. 127).

Ireland.—Rusal planned to increase the capacity of the Aughinish alumina refinery to 2 Mt/yr from 1.89 Mt/yr by early 2013 (CRU Alumina Monitor, 2011d).

Jamaica.—Rusal restarted production at the 600,000-t/yr Kirkvine alumina refinery and the 2-Mt/yr Russell Place bauxite mine in July, as prices rose during the year. The 1.65-Mt/yr Alpart alumina refinery and 5-Mt/yr Nain bauxite mine remained closed owing to technical difficulties and high energy prices. Production at both refineries and nearby mines had been shut down in early 2009 in response to falling prices and demand (Riley, 2011a; United Company RUSAL, 2011b).

The Government of Jamaica permitted Noranda Aluminum Holding Corp. to increase bauxite exports from its St. Ann Mine to 5.4 Mt/yr from 4.5 Mt/yr for 2 years. To enable the increase in exports, port facilities were expanded to accommodate larger capacity ships (Riley, 2011b).

Kazakhstan.—Eurasian Natural Resources Corp. (ENRC) completed expanding the capacity of its alumina refinery to 1.7 Mt/yr from 1.25 Mt/yr in July. Production from the new capacity was to supply ENRC's nearby smelter, where an expansion had been completed in May 2010, in addition to other customers (Eurasian Natural Resources Corp., 2011).

Montenegro.—Central European Aluminum Co.'s 650,000-t/yr Niksic bauxite mine was shut down during the fourth quarter of 2011 owing to financial difficulties. The mine reportedly was unable to pay for fuel and also had not paid workers, leading to strikes (CRU Alumina Monitor, 2011g).

Russia.—Rusal shut down production of alumina at the 149,000-t/yr Bokitogorsk refinery in July owing to high operating costs (United Company RUSAL, 2012a, p. 31). Rusal continued to develop an underground extension of the North Urals Mine to replace two surface mines having a combined capacity of 3.4 Mt/yr that were nearing reserve depletion. A completion date and capacity for the expansion were not available (United Company RUSAL, 2012a, p. 15, 32). Rusal began constructing a mine to produce refractory-grade bauxite from the Middle Timan deposit. Production was scheduled to begin in 2012, and when the project is completed, the mine would have a capacity of 250,000 t/yr (United Company RUSAL, 2011a).

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 Raz as Zawr that were expected to be completed in 2014. 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 Raz as Zawr that were expected to be completed in 2013. Ma'aden owned 74.9% of the joint venture, and Alcoa owned 25.1% (Alcoa Inc., 2011).

Turkey.—Demireller Mining Co. continued working to expand bauxite production to 750,000 t/yr from 400,000 t/yr by early 2012 from its mines near Mersin. Most of the bauxite Demireller mined was used for cement, with small quantities used for abrasives. Albuck Mining Ltd. was working to expand production of bauxite to 350,000 t/yr from 200,000 t/yr. Albuck produced bauxite for abrasives, cement, steelmaking, and other nonmetallurgical uses (Roberts, 2011).

Ukraine.—Rusal completed modernizing the Nikolaev alumina refinery, including building a fifth calcination kiln and reconstructing the lime kiln and captive powerplant. The project marginally increased capacity of the refinery. Further upgrades continued although details of proposed capacity and a completion schedule were not available (United Company RUSAL, 2011c).

Venezuela.—Production from Corporacion Venezolana de Guayana Bauxilum C.A.'s (Bauxilum) 6-Mt/yr Los Pijiguaos Mine was reduced by machinery and equipment problems during the first quarter of 2011. Bauxilum's 1.8-Mt/yr Ciudad Guayana alumina refinery imported 800,000 t of bauxite from

Guyana and Brazil to make up for the decreased shipments from the Los Pijiguaos Mine (Worldal, 2011).

Vietnam.—State-owned Vietnam National Coal and Mineral Industries Group (Vinacomin) (Ha Long) was progressing toward opening a 600,000-t/yr alumina refinery in Tan Rai, Lam Dong Province. Construction had been scheduled for completion in September, but heavy rainfall delayed completion until December. Commissioning of the refinery was completed in April 2012. Tan Rai would be Vietnam's first alumina refinery and would use bauxite from adjacent deposits. Alumina from the refinery was to be sold to customers in China, such as Chinalco, which was providing technical support in the construction of the refinery, and in other countries. Mining of bauxite from a deposit adjacent to the refinery started during 2011. Vinacomin was also building a 650,000-t/yr alumina refinery in Nhan Co, Dak Nong Province, which was to be completed in 2013 (Platts Metals Week, 2011e).

Outlook

Consumption of bauxite and alumina were expected to closely follow the trend of aluminum production. Demand for bauxite and alumina in emerging economies was expected to increase as these economies continue to expand, although at a slower pace than in prior years. World demand for aluminum in 2012 was expected to increase slightly compared with demand in 2011 as economic expansion in China was expected to offset declines of aluminum consumption in Europe. However, policies aimed at slowing growth in China may slow the rate of growth of demand for aluminum in that nation, affecting bauxite and alumina demand. World consumption of bauxite and alumina for nonmetallurgical uses was expected to remain stable, with growth in consumption in emerging economies expected to offset declines in consumption in Europe.

Consumer credit issues in the United States and Western Europe were expected to continue through 2012. The continuing uncertainty of the impact of sovereign debt issues in Europe also raised concerns about consumer demand. Although global alumina consumption was increasing during the first half of 2012, closures of aluminum smelters announced in Australia, Europe, and the United States at midyear would likely decrease demand for alumina and bauxite in the second half of 2012. Alumina prices stabilized in the first half of 2012, after their downward trend in the fourth quarter of 2011.

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 many nations in Africa and Southeast Asia was expected to increase supplies of bauxite and alumina, restraining prices in the long term.

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TABLE 1
 SALIENT BAUXITE STATISTICS¹

(Thousand metric tons)

	2007	2008	2009	2010	2011
United States:					
Exports, as shipped:					
Crude and dried	15	14	9	21	22
Calcined	8	10	21	19	31
Imports for consumption, as shipped:					
Crude and dried	9,840	10,500	6,970	8,120	9,540
Calcined	808	1,110	461	690	647
Consumption, dry equivalent	10,200	9,550	4,960 ^r	8,180 ^r	8,410
World, production	221,000 ^r	229,000 ^r	216,000 ^r	235,000 ^r	259,000 ^e

^eEstimated. ^rRevised.

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

TABLE 2
 SALIENT ALUMINA STATISTICS¹

(Thousand metric tons)

	2007	2008	2009	2010	2011
United States:					
Production:					
Calcined alumina	3,940 ^r	3,900	2,130	3,420 ^r	3,520
Other alumina ²	665 ^r	610	370	483 ^r	529
Total:					
As produced or shipped ³	4,610 ^r	4,510	2,500	3,900 ^r	4,050
Calcined equivalent	4,370 ^r	4,300	2,370	3,470 ^r	3,570
Shipments:					
Calcined alumina	3,890 ^r	3,910	2,130	3,410 ^r	3,510
Other alumina ²	614 ^r	582	365	485 ^r	534
Total:					
As produced or shipped ³	4,510 ^r	4,490	2,500	3,900 ^r	4,050
Calcined equivalent	4,290 ^r	4,290	2,370	3,470 ^r	3,560
Stocks, yearend ^{4,5}	492 ^r	642	257	381 ^r	455
Imports for consumption ⁵	2,440	2,530	1,860	1,790 ^r	2,280
Exports ⁵	1,160	1,150	946	1,520	1,730
Consumption, apparent ^{5,6}	6,100 ^r	5,530 ^r	3,660	3,610 ^r	4,160
World, production ⁵	77,700 ^r	82,900 ^r	76,700	85,100 ^r	91,600 ^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 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	2010	2011
Alumina	8,050 ^r	8,260
Other ²	137	152
Total	8,180 ^r	8,410

^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	2010		2011	
	Port of shipment f.a.s. ²	Delivered to U.S. ports c.i.f. ³	Port of shipment f.a.s. ²	Delivered to U.S. ports c.i.f. ³
Brazil	28.47	48.32	31.98	48.56
Guinea	27.78	47.92	29.77	47.01
Jamaica	25.88	34.03	30.30	43.22
Weighted average	29.41	50.60	38.87	53.85

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
AVERAGE VALUE OF
U.S. IMPORTS OF ALUMINA¹

(Dollars per metric ton)

	2010	2011
January	384	415
February	400	444
March	418	422
April	500	512
May	419	454
June	425	474
July	398	480
August	352	460
September	402	434
October	393	446
November	400	623
December	394	397
Average	407	463

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	2010 ¹	2011 ¹
China:		
Guizhou Province, round kiln, lump	470–525	470–525
Shanxi Province, rotary kiln, lump	495–535	495–535
Shanxi Province, round kiln, lump	500–535	500–535
Guyana, rotary kiln, lump	460–510	460–510

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	2010	2011
Exports:		
Canada	15	13
Germany	(2)	(2)
Venezuela	1	(2)
Other	6	10
Total	21	22
Imports:		
Brazil	1,640	1,760
Guinea	2,130	2,340
Jamaica ³	4,300	5,140
Other	45	300
Total	8,120	9,540

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: 2010—5.19 million metric tons (Mt) and 2011—4.57 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	2010				2011			
	Refractory grade		Other grade		Refractory grade		Other grade	
	Quantity	Value ²	Quantity	Value ²	Quantity	Value ²	Quantity	Value ²
Exports:								
Canada	8	891	1	35	9	1,100	1	61
Mexico	1	265	8	5,740	1	315	4	2,410
Other	(3)	123 ^r	1	224	10	1,210	6	4,810
Total	9	1,280 ^r	10	6,000 ^r	20	2,630	11	7,280
Imports:								
Australia	--	--	85	1,910	--	--	87	1,870
Brazil	167	76,000	70	3,270	1	687	6	2,030
China	74	34,000	3	677	41	17,300	17	7,000
Greece	-- ^r	-- ^r	104 ^r	5,650 ^r	--	--	26	1,410
Guyana	37	14,200	148	9,980	49	20,200	121	6,620
Other	-- ^r	-- ^r	3 ^r	170 ^r	(3)	127	4	938
Total	278 ^r	124,000 ^r	412 ^r	21,700 ^r	91	38,300	262	19,900

^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	2010		2011	
	Quantity	Value ²	Quantity	Value ²
Exports:				
Canada	719	238,000	848	328,000
France	58	25,500	59	28,100
Iceland	217	63,300	500	174,000
Mexico	83	50,000	81	50,600
Netherlands	182	60,000	76	37,600
Norway	(3)	233	30	9,600
Other	265	287,000	139	277,000
Total	1,520	724,000	1,730	905,000
Imports:				
Australia	572	163,000	662	226,000
Brazil	233	72,400	268	97,300
Canada	62	41,600	44	36,800
France	23	30,600	20	31,600
Germany	81	109,000	75	109,000
Jamaica ⁴	151 ^r	53,300 ^r	418	170,000
Suriname	488	143,000	736	259,000
Venezuela	56	18,200	--	--
Other	120	103,000	57	91,400
Total	1,790^r	734,000^r	2,280	1,020,000

^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.

⁴Data from the Jamaica Bauxite Institute.

Source: U.S. Census Bureau.

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

(Thousand metric tons)

Country	2007	2008	2009	2010	2011 ^e
Australia	62,398	61,389	65,231	68,414	69,976 ³
Bosnia and Herzegovina	867	1,018	556	828 ^r	830
Brazil	25,461	28,098	28,060 ^r	31,700 ^r	31,800
China ^c	30,000	35,000	40,000	44,000	45,000
Dominican Republic	500	400	--	--	--
Ghana	748	796 ^r	490 ^r	512 ^r	400 ³
Greece	2,126	2,176	2,100	2,100	2,100
Guinea ⁴	18,519	18,400	15,600	17,400	17,593 ³
Guyana ⁴	2,239 ^r	2,109 ^r	1,485 ^r	1,083 ^r	1,818 ³
Hungary	546	511	317	365 ^r	400
India	20,343	21,210	16,000	18,000	19,000
Indonesia	18,700 ^r	20,800 ^r	16,000 ^r	23,500 ^r	37,100
Iran	500	500	500	500	500
Jamaica ^{4,5}	14,568	14,363	7,817	8,540	10,189 ³
Kazakhstan	4,963	5,160	5,130	5,310	5,495 ³
Malaysia	157	295	263	124 ^r	188 ³
Montenegro	667	672	46	61	60
Mozambique	9	5	4	9 ^r	13
Pakistan	27	25 ^r	12 ^r	32 ^r	28
Russia	5,775	5,675	5,775	5,520 ^r	5,890 ³
Sierra Leone	1,169	954	757	1,089	1,457 ³
Suriname	5,054	5,200	5,388 ^r	3,104 ^r	4,000
Tanzania	5	21	123	130	130
Turkey ⁶	344	350 ^e	200 ^e	350 ^e	300
United States	NA	NA	NA	NA	NA
Venezuela	5,323 ^r	4,192 ^r	4,267 ^r	2,500	4,500
Vietnam ^c	80	80	80	80	600
Total	221,000 ^r	229,000 ^r	216,000 ^r	235,000 ^r	259,000

^eEstimated. ^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 9, 2012.

³Reported figure.

⁴Dry bauxite equivalent of crude ore.

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

⁶Public-sector production only.

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

(Thousand metric tons)

Country	2007	2008	2009	2010	2011 ^c
Australia	18,844	19,321	19,948	19,956	19,399 ⁴
Azerbaijan	185	165	80 ^{r,c}	--	5
Bosnia and Herzegovina	304	294	192 ^r	269 ^r	270
Brazil	7,078	7,822	8,618 ^r	9,433 ^r	10,300
Canada	1,300	1,370	1,125	1,301	1,363 ⁴
China ^c	19,500	22,800	23,800	29,000	34,100
France ^c	600 ^c	630	348	481	524 ⁴
Germany	1,388	1,395	1,154	1,485	1,405 ⁴
Greece	750	750	780	760	800
Guinea	527	593	530	597	574 ⁴
Hungary ^c	301	299	185	214 ^r	250
India ^c	3,000 ^r	3,820 ^r	3,900 ^r	3,640 ^r	3,880
Iran ^c	250	200	250	270	270
Ireland	1,803	1,890	1,245	1,850	1,927 ⁴
Italy	1,069	1,045	92	--	-- ⁴
Jamaica	3,941	3,996	1,774	1,591	1,960 ⁴
Japan ^{e,5}	300	320	310	300	280
Kazakhstan	1,537	1,600	1,608	1,639 ^r	1,670 ⁴
Montenegro	240	220	59	--	--
Romania	23	--	44	414	484
Russia	3,333	3,112	2,794	2,857	2,825 ⁴
Spain ^c	1,200 ^r	1,200 ^r	1,000 ^r	1,100 ^r	1,200
Suriname	2,270	2,153 ^r	1,178	1,536 ^r	1,500
Turkey ^c	160	160	100 ^r	160	160
Ukraine	1,656	1,673	1,524	1,534	1,601 ⁴
United States	4,370 ^r	4,300	2,370	3,470 ^r	3,570 ⁴
Venezuela ^c	1,800 ^r	1,800 ^r	1,700 ^r	1,250 ^r	1,300
Total	77,700 ^r	82,900 ^r	76,700	85,100 ^r	91,600

^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 July 9, 2012.

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: 2007—700,000; 2008—700,000; 2009—710,000; 2010—700,000; and 2011—690,000.