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BAUXITE AND ALUMINA [ADVANCE RELEASE]

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Bauxite and Alumina

By E. Lee Bray

Domestic survey data and tables were prepared by Susan M. Weaver, statistical assistant.

In 2020, almost all of the 3.33 million metric tons (Mt) of bauxite consumed in the United States was imported. World production of bauxite was approximately 391 Mt (tables 1, 11); the leading producing countries were, in descending order of production, Australia, China, Guinea, Brazil, Indonesia, and India, which accounted for 91% of world bauxite production.

U.S. production and shipments of alumina (calcined equivalent) were 1.34 Mt and 1.36 Mt, respectively (table 2). Alumina production and shipments (calcined equivalent) decreased by 5% and 4%, respectively, compared with those in 2019. An estimated 75% of alumina shipments from domestic refineries was to domestic smelters for metal production; 13% of shipments was used for abrasives, chemicals, ceramics, and refractories; and 11% of shipments was exported. World production of alumina (calcined equivalent) was approximately 136 Mt (tables 2, 12); the leading producing countries were, in descending order of production, China, Australia, Brazil, and India, which accounted for 81% of world alumina production.

Production

Bauxite.—The United States was reliant on imports for 100% of the metallurgical-grade bauxite consumed. Small amounts of bauxite and bauxitic clays were produced in Alabama, Arkansas, and Georgia for nonmetallurgical uses, such as abrasives, cement, chemicals, proppants, and refractories. Domestic mines operated by five companies supplied less than 5% of the U.S. requirement for bauxite, and all of the bauxite that the United States required for alumina production was imported.

Alumina.—U.S. production of alumina (calcined equivalent), which was derived exclusively from imported metallurgical-grade bauxite, decreased by 5% in 2020 from that in 2019 to 1.34 Mt (table 2). Domestic production and consumption data for alumina were obtained by the U.S. Geological Survey (USGS) from three separate voluntary surveys. The "Alumina Production" survey was sent to the two operating domestic alumina refineries, neither of which responded, and alumina production was estimated based on bauxite imports.

Noranda Alumina LLC (a subsidiary of New Day Aluminum LLC) produced alumina at its 1.2-million-metric-ton-per-year (Mt/yr) refinery in Gramercy, LA. Approximately 800,000 metric tons per year (t/yr) of its capacity was used to produce chemical-grade alumina.

A 500,000-t/yr refinery in Burnside, LA, owned by LAlumina LLC, a subsidiary of Arthur Metals LLC, was used to produce alumina for nonmetallurgical uses. The Burnside refinery was temporarily shut down in August. Decreased consumption of specialty grade alumina associated with economic constraints caused by the global coronavirus disease 2019 (COVID-19) pandemic was cited for the shutdown. Approximately 300 employees were laid off (Mosbrucker, 2020).

Consumption

Bauxite.—The USGS "Bauxite Consumption" survey was sent to 27 operations, 15 of which responded, representing approximately 10% of the bauxite consumed for uses other than cement listed in table 4. The two refineries producing alumina in 2020 did not respond, and bauxite consumption was estimated based on import data.

Total domestic consumption of bauxite decreased by 10% in 2020 compared with the revised amount in 2019. In 2020, 94% of the bauxite consumed in the United States was refined to alumina; the remaining 6% was consumed in nonmetallurgical applications. An estimated 2.32 metric tons (t) of dried bauxite was required to produce 1 t of alumina (table 4).

Alumina.—Alumina consumption by domestic primary aluminum smelters was estimated from the responses to the USGS "Aluminum Production" survey, which was received from all three companies that operated seven primary aluminum smelters. An estimated 79% of apparent consumption of alumina was for metal production at primary aluminum smelters. In 2020, seven domestic primary aluminum smelters consumed 2.02 Mt of alumina, 7% less than the amount of alumina consumed in 2019. In July, Alcoa Corp. temporarily shut down the 236,000-t/yr Intalco smelter in Ferndale, WA, citing low aluminum prices and high power prices (Alcoa Corp., 2020, p. 1, 3). The remainder of U.S. consumption of various forms of alumina was used for abrasives, chemicals, refractories, and other specialty industries.

Prices

Most metallurgical-grade bauxite was produced by companies that owned both bauxite mines and alumina refineries or was purchased under long-term contracts, and contract terms normally were not made public. However, spot prices for metallurgical-grade alumina and specialty forms of bauxite and alumina for nonmetallurgical applications were published in trade journals.

The annual average delivered price of U.S. imports of crude and dried bauxite (metallurgical-grade bauxite) decreased by 17% in 2020 compared with the revised price in 2019 (table 5). In 2020, the average unit value of U.S. imports of calcined alumina, including cost, insurance, and freight at U.S. ports, was 14% less than that in 2019 at $412 per metric ton (table 6). However, U.S. import values for alumina and bauxite often reflect prices established under long-term contracts or are for alumina and bauxite produced by the same company as the importing smelter or refinery, so they are not necessarily reflective of global prices. Yearend price ranges, as quoted by Industrial Minerals, for refractory-grade bauxite exported from China were higher than those at yearend 2019 (table 7) (Ghilotti and Pan, 2020; Industrial Minerals, 2020).

Foreign Trade

Imports of crude dry bauxite decreased by 18% from the revised amount in 2019. Imports of alumina decreased by 30%, and exports of alumina decreased by 24% compared with those in 2019. Jamaica (84%), Sierra Leone (9%), Guinea (3%), and Turkey (3%) were the leading sources of crude dry bauxite imports. Brazil, Jamaica, Australia, and Canada were the leading sources of alumina imports, accounting for 67%, 13%, 7%, and 4%, respectively. Mexico and Canada were the leading destinations for alumina exports in 2020, receiving 39% and 16%, respectively (tables 8, 10).

World Industry Structure

Bauxite.—In 2020, world production of bauxite was slightly more than the revised amount in 2019. Significant increases in production in Guinea (by 19 Mt) and Indonesia (4.21 Mt) were partially offset by decreased production in China (by 12.3 Mt), India (2.12 Mt), Jamaica (1.48 Mt), Australia (1.22 Mt), and Guyana (1 Mt). Total mine production of 391 Mt was from 25 countries, not including production from the United States, which was withheld to avoid disclosing company proprietary data. The leading producers of bauxite were, in descending order of tonnage mined, Australia, China, Guinea, Brazil, Indonesia, India, and Jamaica. These countries accounted for 93% of total world production; Australia and China together accounted for 50% of the world's production (table 11).

Alumina.—World output of alumina increased slightly to 136 Mt in 2020 compared with that in 2019 (table 12). Increased production in Brazil (by 1.13 Mt), the United Arab Emirates (820,000 t), China (658,000 t), and Australia (551,000 t), was partially offset by decreased production in Jamaica (by 552,000 t) and India (127,000 t). Although there was production in 27 countries, the 4 leading producing countries, in descending order of quantity of alumina produced—China, Australia, Brazil, and India—accounted for 81% of world production; China and Australia accounted for 54% and 15%, respectively.

World Review

Australia.—Bauxite production decreased slightly to 104,328 Mt, but alumina production increased by 3% to 20,790 t compared with the revised amounts in 2019 (tables 11, 12). A power outage on January 31 was cited for a temporary shutdown at the Kwinana alumina refinery in the State of Western Australia. Power was restored and production resumed by February 5. The refinery was a joint venture between Alcoa (60%) and Alumina Ltd. (40%) and had 2.2 Mt/yr of capacity (Lim, 2020).

Australian Bauxite Ltd. continued planning a mine to produce bauxite from the Binjour deposit in central Queensland State. In November, a mining lease application was submitted for the Sunrise project. The deposit had 37 Mt of reserves of gibbsite bauxite with 44% to 45% alumina and 5% silica. The proposed mine capacity was 500,000 t/yr. A construction schedule was pending regulatory approval (Australian Bauxite Ltd., 2020).

Brazil.—Bauxite production decreased by 3% to 31 Mt, but alumina production increased by 12% to 10.3 Mt compared with the revised amounts in 2019 (tables 11, 12). On August 18, Hydro ASA shut down production from the Paragominas Mine, citing damage to the pipeline used to transport bauxite to the Alumina do Norte do Brasil S.A. (Alunorte) alumina refinery in Barcarena. In a routine inspection of the pipeline, it was discovered that it had deteriorated more than expected and it was shut down immediately for repair. Production at the 9.9-Mt/yr bauxite mine did not resume until the repairs were completed in October. Production from the 6.3-Mt/yr Alunorte alumina refinery was decreased to 35% to 40% of its capacity, a rate of 2.2 to 2.5 Mt/yr, until the pipeline was repaired. The pipeline was restarted on October 8, and production from the mine resumed, and production from the Alunorte alumina refinery that was shut down was restarted. Output from the mine and alumina refinery still increased compared with that in 2019 because each had produced at about one-half of its capacity until May 2019 because of regulatory orders related to suspected leaks from waste-storage facilities in February 2018. The mine and alumina refinery also had brief shutdowns in December 2019 attributed to a power failure (Hydro ASA, 2019a, b, 2020a, b, c; Lazzaro and Ribeiro, 2020).

China.—Bauxite production was estimated to have decreased by 12% to 92.7 Mt from that in 2019 (table 11). Bauxite imports equaled 112 Mt, 11% more than the 101 Mt imported in 2019. The leading sources of bauxite imports were Guinea (47%), Australia (33%), and Indonesia (17%). Imports from Australia, Guinea, and Indonesia increased by 967,000 t (3%), 8.22 Mt (19%), and 4.21 Mt (29%), respectively, compared with those in 2019, accounting for the increased imports. These increases were partially offset by decreased imports from India (by 328,000 t), Jamaica (36,000 t), Malaysia (486,000 t), the Solomon Islands (319,000 t), and Vietnam (138,000 t). Strict enforcement of environmental and safety regulations and shutdowns of mines in response to the COVID-19 pandemic were cited for decreased alumina production in the first quarter of the year, but production resumed later in the year at a higher rate. Decreasing quality of domestic bauxite was cited for decreased bauxite production from mines in China (Everiss, 2020c; Latham, 2020; Lazzaro, 2020).

Alumina production in 2020 increased slightly to 73.1 Mt compared with that in 2019 (table 12). Alumina capacity at yearend 2020 was estimated to be 89.2 Mt/yr, a slight increase from 87.2 Mt/yr at yearend 2019. Approximately 73.0 Mt/yr of capacity was in use at yearend. Alumina imports were 3.8 Mt, 133% more than the 1.63 Mt imported in 2019. The leading sources of alumina imports were Australia (67%), Vietnam (14%), Kazakhstan (7%), and Indonesia (5%). China exported 155,000 t of alumina in 2020 compared with 279,000 t of alumina in 2019 (China Metal Market—Alumina and Aluminum, 2020g, 2021d).

Many alumina refineries decreased production in January and February in response to the COVID-19 pandemic. Health officials in China imposed travel and work restrictions in some parts of the country most affected by the virus to contain it. In some regions, high rates of absenteeism were attributed to concerns about the virus. Shortages of raw materials such as bauxite and caustic soda at inland refineries were reported as transportation was interrupted when health officials in China imposed travel and work restrictions. Bauxite shipments from

ports to inland alumina refineries were delayed in January and February because of limited rail and truck service, but deliveries of imports at ports were not interrupted. Temporary shutdowns of alumina refineries in Guizhou, Henan, and Shanxi Provinces totaled 2.55 Mt/yr of capacity by mid-February. As travel and work restrictions were lifted in March, production from many of the affected alumina refineries increased. Alumina production increased in March by 16% compared with the amount produced in February. Prices and demand for alumina in China were volatile in the first quarter of the year as production decreased in some areas, but aluminum smelters also decreased production as demand for aluminum declined. Shortages of anodes at smelters and coal shortages, affecting electricity production from powerplants, were cited as the reasons for some smelting capacity being shut down, decreasing alumina demand in the first quarter of the year (Everiss, 2020c; Goh, 2020; Latham, 2020; Lazzaro, 2020; Liu, 2020; Tang, 2020a, b).

In October, Government authorities modified winter shutdown orders affecting alumina refineries in several locations. The shutdown orders were expected to have only a limited effect on alumina refineries in the regions around Beijing, Hebei, and Tianjin for the 2020–21 winter season. Refineries in Shandong Province were exempt from shutdown orders for the 2020–21 winter. Since 2017, the Government of China had ordered alumina refineries in 30 cities to decrease production by 30% during the winter months, citing pollution control efforts. In September 2019, an updated policy was announced covering alumina refineries in the same areas that would order shutdowns based on specific pollution emissions criteria. Pollution control efforts would be based on local conditions, with shutdowns only under specified conditions (Hotter, 2017; Mok, 2017a; CRU Bauxite and Alumina Monitor, 2019a; Tang, 2020c).

Chongqing Municipality.—In April, Bosai Minerals Group Ltd. temporarily shut down its 800,000-t/yr alumina refinery and an adjacent 1.65-Mt/yr bauxite mine in Shuijiang, citing the COVID-19 pandemic. Production resumed in June, and production reached full capacity a few months later. The refinery and mine were owned by Aluminum Corp. of China (Chalco), but the companies entered an operation and development agreement in January 2019 (China Metal Market—Alumina and Aluminum, 2020e).

Bosai was building an alumina refinery at the Chongqing Jiulong Wanbo plant in Wanzhou. Completion was expected by yearend 2021. The refinery would have 3.6 Mt/yr of capacity and use bauxite imported from Australia and Guinea. The refinery would sell alumina to smelters in the southwest of China as the industry was expected to migrate to that region where hydropower resources are abundant (Ling, 2020).

Guangxi Zhuang Autonomous Region.—Alumina and aluminum capacity was being expanded to use hydropower resources in southwestern China. Guangxi Huasheng New Material Co. Ltd. completed construction of a 2-Mt/yr alumina refinery in Fangchenggang, and production reached full capacity in November. Construction of the refinery started in September 2018. Expansion of the alumina refinery to 4 Mt/yr would start in 2022. Guangxi Longzhou Xinxiang Aluminum Co. Ltd. was constructing a 1-Mt/yr alumina refinery in Longzhou County. Construction started in November 2017, and the refinery would be completed in May 2021. Guangxi Tiangui Aluminum Co. Ltd. was expanding its alumina refinery from 800,000 t/yr to 2.5 Mt/yr. Construction would be completed by yearend 2021 (China Metal Market—Alumina and Aluminum, 2020f, 2021a; Ling, 2020).

Guizhou Province.—In April, Guizhou Zunyi Industrial Development Co. Ltd. (owned by State Power Investment Corp.) completed construction of a 1-Mt/yr alumina refinery in Wuchuan County. Commercial production began in June. The refinery used bauxite from two underground mines near the refinery. Guizhou Qiya Aluminum Co. Ltd. was expanding the capacity of its alumina refinery in Qiya. Capacity would be increased to 1.3 Mt/yr from 800,000 t/yr. A construction schedule was not available. In February, East Hope Group Ltd. obtained a permit to construct an alumina refinery in Zunyi. The refinery would have 3.2 Mt/yr of capacity when completed. A construction schedule was not announced (China Metal Market—Alumina and Aluminum, 2020b, c, d).

Inner Mongolia Autonomous Region.—Chifeng Qihui Aluminum Development Co. Ltd. was planning to construct an alumina refinery in Chifeng. The refinery would be built in five stages, with each stage having 1.3 Mt/yr of capacity. The refinery would use imported bauxite that would be transported by rail from the port at Jinzhou. A construction schedule was not available (China Metal Market—Alumina and Aluminum, 2020b).

Shandong Province.—Shandong Weiqiao Zhanhua Co. Ltd. completed a new alumina refinery with 1 Mt/yr of capacity. The refinery started production in October and was producing at full capacity in November (China Metal Market—Alumina and Aluminum, 2021c).

Côte d'Ivoire.—In February, Lagune Exploitation Afrique Ltd. completed an expansion of its bauxite mine near Benene. The project increased mine capacity to 1.2 Mt/yr from 750,000 t/yr from a deposit with 35 Mt of reserves. Further development to construct an alumina refinery was being considered (China Metal Market—Alumina and Aluminum, 2020h).

Guinea.—Alumina production increased by 19% to 439,000 t (table 12) as rampup continued at the 650,000-t/yr alumina refinery in Friguia, which was restarted in May 2018. Bauxite production in 2020 was 86 Mt, 28% more than that in 2019 (table 11) as new mines ramped up production. Bauxite production from the Dian-Dian Mine reached its capacity of 3 Mt/yr in the fourth quarter of 2019. Further expansion of the mine that started production in 2018 to 9 Mt/yr was planned for completion in 2021 (United Company RUSAL Plc, 2020a, 2021).

Bauxite production from the Neiyabokai Mine increased to an estimated 8.9 Mt compared with 1.4 Mt in 2019. The mine was commissioned in 2019 by Henan International Mining Ltd. and had 8.9 Mt/yr of capacity (Everiss, 2020a, b).

Alliance Guinéenne de Bauxite, d'Alumine et d'Aluminium Ltd. (AGB2A) started production of bauxite from the GBT Mine. The first cargo was exported in May. The initial mine capacity was 2.4 Mt/yr but was increased to 4.8 Mt/yr in October as new equipment was installed. AGB2A used a dry beneficiation process to upgrade bauxite by removing silica-rich fines; the salable bauxite contained between 1.2% and 1.4%

reactive silica, significantly less than most metallurgical-grade bauxite, which commonly contains 3% to 5% reactive silica, enabling a higher alumina recovery rate and less caustic soda consumption at refineries. AGB2A also was developing the AXIS Mine, which would have 4.8 Mt/yr of capacity when completed in 2021 (Alliance Guinéenne de Bauxite d'Alumine et d'Aluminium Ltd., 2020).

Guyana.—Bauxite production decreased by 53% compared with that in 2019 (table 11). On February 3, United Company RUSAL Plc temporarily shut down production from the Bauxite Company of Guyana Mine, citing civil unrest that interfered with mining operations and damaged mine property. The 1.7-Mt/yr mine near Georgetown was a joint venture between RUSAL (90%) and the Government of Guyana (10%). All expatriate employees were relocated, and production had not resumed by yearend (United Company RUSAL Plc, 2020b, 2021, undated).

First Bauxite LLC completed construction of the Bonasika Mine near Sand Hills and started commercial production in February. The mine had 360,000 t/yr of capacity and produced refractory-grade bauxite. A plant at the mine would wash bauxite, but calcining would be done at other locations until a kiln was installed and a natural gas pipeline built to the mine. The bauxite would be used mainly in refractory products but also to produce proppants used in the petroleum drilling industry. Other markets for the high-purity bauxite would include abrasives, chemicals, slag conditioning in steelmaking, and welding rods. The calcined bauxite would contain more than 93% alumina with less than 3% silica and less than 1% iron oxide (First Bauxite LLC, 2019a, b; Papannah, 2020).

India.—Bauxite production decreased by 10% to 20.2 Mt, and alumina production decreased slightly to 6.56 Mt compared with that in 2019 (tables 11, 12). Decreased bauxite production was attributed to decreased exports; bauxite was not imported in 2020 by China, a country that had been an important destination for bauxite exports from India (China Metal Market—Alumina and Aluminum, 2021b). Vedanta Resources Ltd. (United Kingdom) was increasing capacity at the Lanjigarh alumina refinery to 5.0 Mt/yr from 2.0 Mt/yr. Completion was expected by April 2022 (Vedanta Resources Ltd., 2020, p. 23; 2021, p. 13, 32).

Hindalco Industries Ltd. continued a project at the Utkal refinery to increase capacity to 2 Mt/yr from 1.5 Mt/yr. Completion of the expansion project was expected by midyear 2021 (Hindalco Industries Ltd., 2021, p. 5, 36).

National Aluminium Co. Ltd. of India (Nalco) continued expanding the capacity of its alumina refinery in Damanjodi to 3.28 Mt/yr from 2.28 Mt/yr. Preliminary site work started in December 2017, and completion was expected in 2021. Nalco continued planning a mine to develop the Pottangi bauxite deposit after being granted mining rights by the Odisha State government in 2016. Completion of the mine was expected in 2022 (National Aluminium Co. Ltd., 2018, p. 4; 2019; 2020; 2021, p. 12–14, 54).

Anrak Aluminium Ltd. continued to delay the start of its 1.5-Mt/yr alumina refinery in Rachapalle, Andhra Pradesh State, which had been completed in 2013. Government officials in Andhra Pradesh State were planning to permit the alumina refinery to start production but stated that bauxite deposits near the refinery may not be mined. The refinery had a captive 225-megawatt powerplant. When the refinery was built, it was intended to consume bauxite from Andhra Pradesh Mineral Development Corporation Ltd.'s (APMDC's) Jerella deposit in Andhra Pradesh State, but APMDC had not received the necessary permit to start mining. In April 2017, the government of Andhra Pradesh State canceled the bauxite supply agreement between APMDC and Anrak. In June 2019, the government of Andhra Pradesh State ended permission to mine in the tribal areas of Eastern Ghats. Bauxite reserves in Andhra Pradesh State were estimated to be 600 Mt, and the Eastern Ghats region had some of the biggest deposits. Anrak was reported to be seeking bauxite supplies from mines in other parts of India, but concerns about the company's finances also were preventing the refinery from being commissioned, and a commissioning schedule was not available (Sukumar, 2017; Sarma, 2018; CRU Bauxite and Alumina Weekly, 2019a; Patnaik, 2019; Newsmeter Network, 2020).

Indonesia.—Bauxite production was estimated to be 20.8 Mt in 2020, an increase of 25% compared with 16.6 Mt in 2019 (table 11). Bauxite production had been steadily increasing since 2015—13.2 Mt in 2018, 2.9 Mt in 2017, 1.4 Mt in 2016, 472,000 t in 2015, 2.56 Mt in 2014, and 57 Mt in 2013—as the Government permitted more bauxite exports. A ban on exporting bauxite and other unprocessed mineral ores took effect on January 12, 2014. The export ban was part of the 2009 Mining Law intended to increase economic development in the country through investment in mineral-processing facilities (Yee, 2014). Exports of bauxite resumed in July 2017 for the first time since the ban started in 2014. The Government issued export licenses to PT Aneka Tambang Tbk (Antam) and PT Bintan Alumina Indonesia Ltd. (Bintan) so that they could use proceeds of bauxite sales to finance construction of alumina refineries. The permit system initially was scheduled to end in January 2022, but in December 2020 the permit system was extended to June 2023. Permits previously issued to companies that did not make significant progress on alumina refineries would be revoked. The Government also increased the tariff on bauxite exports to 7%, nearly double the previous rate. Alumina production was estimated to be 1.2 Mt in 2020, 5% more than the 1.15 Mt (revised) in 2019 (table 12). Previous production was 843,000 t in 2018, 917,000 t in 2017, 600,000 t in 2016, and 70,000 t in 2015 (Ghilotti, 2017; Lim, 2017; Mok, 2017b; CRU Bauxite and Alumina Monitor, 2019b, 2020; Everiss, 2020b).

Antam was constructing a 1-Mt/yr alumina refinery in Mempawah, West Kalimantan Province, with PT Indonesia Asahan Aluminium Tbk (Inalum). Work at the site started in April 2019, and completion of the refinery was scheduled for 2023. Expansion to 2 Mt/yr would begin after production of the first phase was ramped up. The refinery would supply Inalum's aluminum smelter in Asahan, North Sumatra Province, which Inalum planned to expand to 500,000 t/yr from 250,000 t/yr by yearend 2020 (PT Indonesia Asahan Aluminium Tbk, 2019; PT Aneka Tambang Tbk, 2020, p. 20, 132, 295; 2021, p. 171).

Bintan continued construction of a 1-Mt/yr alumina refinery in Galang Batang, Riau Islands Province. Construction started in December 2018, and completion was scheduled for early

2021. The refinery was a joint venture among Global Aluminum International Pte Ltd. (72%), Press Metal Berhad (25%), and PT Mahkota Karya Utama (3%). The alumina produced at the refinery would be exported. The refinery would use bauxite from Kalimantan Province and Riau Islands Province. Further expansion to 2 Mt/yr was planned (China Metal Market—Alumina and Aluminum, 2019a; Wong, 2019; Panama, 2020).

PT Well Harvest Winning Alumina Co. Ltd. was expanding capacity of its alumina refinery to 2 Mt/yr from 1 Mt/yr. A loan to finance construction of the project was obtained in November 2019, and construction was expected to be completed by yearend 2021. PT Well Harvest Winning Alumina was a joint venture of Hongqiao Group (60%) and Harita Jayaraya (40%). The first stage of the alumina refinery was completed in 2016 (PT Well Harvest Winning Alumina Co. Ltd., 2019; China Metal Market—Alumina and Aluminum, 2020a; S&P Global Platts Metals Daily, 2021).

Iran.—In the first quarter of 2020, production started from the Jajram alumina refinery in northern Iran. The 260,000-t/yr alumina refinery used bauxite from an adjacent bauxite mine and supplied an adjacent 130,000-t/yr aluminum smelter. The smelter was producing at a rate of 40,000 t/yr by the end of April (Eqbali, 2020).

Jamaica.—Alumina production was 1.62 Mt, 25% (552,000 t) less than that in 2019, and bauxite production decreased to 7.55 Mt, 16% (1.48 Mt) less than that in 2019 (tables 11, 12). Jiuquan Iron and Steel Co. (JISCO) continued a modernization project at the Alpart alumina refinery that had started in October 2019. The adjacent bauxite mine was shut down when the modernization project at the refinery started. The refinery's capacity was 1.65 Mt/yr, and the capacity of the bauxite mine was 4.9 Mt/yr, but the refinery only produced 800,000 to 900,000 t in 2018. JISCO cited high production costs, difficulty obtaining spare parts for its aging equipment, low alumina prices, and safety issues as reasons for the modernization project. The project was scheduled to be completed in 18 to 24 months and would increase the refinery capacity to 2 Mt/yr (Aluminium Insider, 2019; Lim, 2019; Mason, 2019; Mok, 2019).

Laos.—Sino Lao Aluminum Corp. Ltd. (Slaco) planned to develop a bauxite deposit in Attapu and Xekong Provinces. Chalco was a partner in the project with Slaco. An alumina refinery with 550,000 t/yr of capacity also was planned as part of the project. Slaco signed an agreement with a Chalco subsidiary for construction of the refinery in September 2018. Construction would take about 2 years, but the start of construction was not scheduled. Permits were not issued by yearend because residents of the area raised concerns about the effects of the mine and refinery (Leung, 2018; China Metal Market—Alumina and Aluminum, 2019b; Mekong Watch, 2020).

Malaysia.—Bauxite production was estimated to be 300,000 t, 67% less than 901,000 t in 2019 (table 11). Decreased production was attributed to environmental audits ordered by the Government. Bauxite mining was banned in January 2016 by the Government, citing pollution from unpermitted mines and uncovered storage facilities at ports. The Government ended the ban on bauxite mining effective March 31, 2019, and regulations on mining and storage of bauxite were enacted. Bauxite exports were limited to 600,000 metric tons per month, buffer zones were established between mines and residential areas, and mining licenses would be required as part of lifting the ban on mining (CRU Bauxite and Alumina Weekly, 2019b; Decena, 2019; Everiss, 2020b; China Metal Market—Alumina and Aluminum, 2021b).

Altech Chemicals Ltd. (Australia) suspended construction of its high-purity alumina refinery in Johor Bahru in March citing COVID-19 pandemic-related precautions. Construction restarted on June 3, and the second stage of construction was completed on July 9. Completion of the refinery was awaiting further financing. The 4,500-t/yr refinery would produce high-purity (99.99%) alumina for use in electronics and other high-technology products. Construction of the refinery started in January 2019. Feedstock would be sourced from a high-alumina clay deposit in the State of Western Australia, Australia (Altech Chemicals Ltd., 2020a, p. 2; 2020b, p. 2; 2020c, p. 2–3).

Ukraine.—A dispute with customs officials was cited for production temporarily decreasing at the alumina refinery in Nickoleav. Local customs officials detained approximately 100,000 t of bauxite in port claiming that RUSAL needed to pay an import duty on the bauxite. Additional ships off the coast were delayed for unloading bauxite. Production decreased by one-half of the 1.7-Mt/yr refinery's capacity on May 1. On May 5, the dispute was resolved, and production increased to full capacity once bauxite shipments arrived at the refinery. Despite the dispute, alumina production increased slightly compared with that in 2019 (Bouckley, 2020a, b).

United Arab Emirates.—Alumina production was 1.92 Mt, 75% (820,000 t) more than that in 2019 (table 12) as Emirates Global Aluminium PJSC (EGA) completed ramping up production from the Al Taweelah alumina refinery. In April 2019, EGA started alumina production at the 2-Mt/yr refinery (Emirates Global Aluminium PJSC, 2021).

Outlook

World consumption of bauxite and alumina in 2021 is expected to increase if economic activity recovers as the global COVID-19 pandemic is contained. World demand for aluminum is expected to increase as the global economy recovers and aluminum products become more accessible to consumers in developing economies, increasing demand for alumina and bauxite. World consumption of alumina for nonmetallurgical uses is expected to increase slightly, attributable to continued growth in consumption of aluminum-hydroxide-based fire-retardant materials and other alumina-based chemicals. Demand is expected to continue to increase for high-purity alumina used in devices such as smartphones, laptops, and tablets, although the effect on total consumption of bauxite and alumina will be nominal because of the limited volume of this market relative to aluminum smelting. Also, new entrants to the high-purity alumina market are expected to consume high-alumina clay instead of bauxite as the raw material for their processes, as higher purity levels can be obtained using high-alumina clay.

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TABLE 1
SALIENT BAUXITE STATISTICS[1]

(Thousand metric tons)

	2016	2017	2018	2019	2020
United States:					
Production	W	W	W	W	W
Exports, as shipped:					
Crude and dried	5	5	4	3	3
Calcined	20	14	7	7	7
Total	25	19	11	10	10
Imports for consumption, as shipped:					
Crude and dried	5,100	3,530	3,330	3,880 r	3,180
Calcined	548	478	376	430	335
Total	5,650	4,010	3,710	4,310 r	3,510
Consumption, dry equivalent	6,630	4,330	4,460	3,680 r	3,330
World, production[2]	286,000	307,000	340,000 r	387,000 r	391,000

rRevised. W Withheld to avoid disclosing company proprietary data.
[1]Table includes data available through August 16, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]May include estimated data.

TABLE 2
SALIENT ALUMINA STATISTICS[1]

(Thousand metric tons)

	2016	2017	2018	2019	2020
United States:					
Production:					
Calcined alumina	2,000	1,200	1,040	925	998
Other alumina[2]	570	770	810	750	532
Total:					
As produced or shipped[3]	2,570	1,970	1,850	1,680	1,530
Calcined equivalent	2,360	1,430	1,570	1,410 e	1,340 e
Shipments:					
Calcined alumina	2,050	1,220	1,080 r	925	1,020
Other alumina[2]	577	781	810	750	517
Total:					
As produced or shipped[3]	2,630	2,000	1,890 r	1,680	1,540
Calcined equivalent	2,410	1,450	1,610	1,410	1,360
Stocks, yearend[4, 5]	320	264	275	275	234
Imports for consumption[5]	1,140	1,330	1,530	1,930	1,340
Exports[5]	1,330	481	288	200	153
Consumption, apparent[5, 6]	2,130	2,340	2,800	3,140	2,580
World, production[5, 7]	121,000	129,000	131,000	133,000	136,000

eEstimated. rRevised.
[1]Table includes data available through August 16, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Trihydrate, activated, tabular, and other aluminas. Excludes calcium and sodium aluminates.
[3]Includes only the end product if one type of alumina was produced and used to make another type of alumina.
[4]Excludes consumers stocks other than those at primary aluminum plants.
[5]Calcined equivalent.
[6]Defined as domestic production plus imports minus exports plus adjustments for industry stock changes.
[7]May include estimated data.

TABLE 3
CAPACITIES OF DOMESTIC ALUMINA PLANTS, DECEMBER 31[1]

(Thousand metric tons per year)

Company and plant	2019	2020
LAlumina LLC, Burnside, LA[2]	500	500
Noranda Alumina LLC, Gramercy, LA	1,200	1,200
Total	1,200	1,200

[1]Table includes data available through August 16, 2021. Data are rounded to no more than three significant digits; may not add to totals shown. Capacity may vary depending on the bauxite used.
[2]Sold by Almatis Inc. in June 2019.

TABLE 4
U.S. CONSUMPTION OF BAUXITE, BY INDUSTRY[1]

(Thousand metric tons, dry equivalent)

Industry	2019	2020
Alumina	3,470	3,120
Other[2]	214 r	212
Total	3,680 r	3,330

rRevised.
[1]Table includes data available through August 16, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes abrasive, chemical, and refractory uses.

TABLE 5
AVERAGE VALUE OF U.S. IMPORTS OF CRUDE AND DRIED BAUXITE[1]

(Dollars per metric ton)

	2019		2020	
Country or locality	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	54.95	55.05	XX	XX
Guinea	36.50	36.69	25.70	26.08
Jamaica[4]	25.05	30.64	25.05	30.64
Sierra Leone	XX	XX	33.50	34.03
Turkey	33.72	49.10	35.80	46.77
Weighted average[5]	32.34 r	37.73 r	26.19	31.30

rRevised. XX Not applicable.
[1]Table includes data available through August 16, 2021. Computed from quantity and value data reported to U.S. Customs and Border Protection 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.
[2]Free alongside ship valuation.
[3]Cost, insurance, and freight valuation.
[4]Based on quantity reported by the Jamaica Bauxite Institute.
[5]Weighted average of major suppliers.

TABLE 6
AVERAGE VALUE OF U.S. IMPORTS OF ALUMINA[1]

(Dollars per metric ton)

	2019	2020
January	507	407
February	523	426
March	554	401
April	708	366
May	470	473
June	552 r	366
July	446	375
August	427	351
September	492	419
October	387	467
November	348	428
December	509 r	607
Weighted average[2]	480	412

rRevised.
[1]Table includes data available through August 16, 2021. Metallurgical grade; cost, insurance, and freight valuation. Computed from quantity and value data reported to U.S. Customs and Border Protection and compiled by the U.S. Census Bureau.
[2]Weighted average of major suppliers.

TABLE 7
REFRACTORY-GRADE BAUXITE PRICES[1]

(Dollars per metric ton)

Material	2019	2020
China:		
Xingang, rotary kiln, lump 86% Al_2O_3	390–410	440–460
Xingang, round kiln, lump 87% Al_2O_3	420–430	460–480

[1]Table includes data available through August 16, 2021. Port of shipment, 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 OR LOCALITY[1]

(Thousand metric tons)

Country or locality	2019	2020
Exports:		
Canada	2	2
Other	1	1
Total	3	3
Imports:		
Brazil	806	(2)
Guinea	53	104
Jamaica[3]	2,610	2,680
Sierra Leone	--	298
Turkey	402 r	96
Other	7	1
Total	3,880 r	3,180

rRevised. -- Zero.
[1]Table includes data available through May 11, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Less than ½ unit.
[3]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: 2019—0.96 million metric tons (Mt) and 2020—0.40 Mt.

Source: U.S. Census Bureau.

TABLE 9
U.S. EXPORTS AND IMPORTS FOR CONSUMPTION OF CALCINED BAUXITE, BY COUNTRY OR LOCALITY[1]

(Thousand metric tons and thousand dollars)

	2019				2020			
	Refractory grade		Other grade		Refractory grade		Other grade	
Country or locality	Quantity	Value[2]	Quantity	Value[2]	Quantity	Value[2]	Quantity	Value[2]
Exports:								
Canada	4	1,810	--	--	3	1,100	--	--
China	2	627	--	--	2	946	(3)	3
Mexico	1	527	(3)	5	2	917	(3)	3
Other	1 r	296 r	(3)	14	1	362	(3)	13
Total	7	3,260	(3)	19	7	3,320	(3)	19
Imports:								
Australia	--	--	213	7,510	--	--	149	5,060
China	17	7,490	12	5,360	34	13,900	5	2,380
Guyana	52	16,200	133	14,000	30	8,170	115	16,300
India	(3)	48	--	--	--	--	--	--
Other	1	401	4	386	1	661	(3)	71
Total	69	24,200	361	27,200	66	22,800	270	23,800

rRevised. -- Zero.
[1]Table includes data available through May 11, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Value at foreign port of shipment as reported to U.S. Customs Service.
[3]Less 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 COUNTRY OR LOCALITY[1]

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

	2019		2020	
Country or locality	Quantity	Value[2]	Quantity	Value[2]
Exports:				
Canada	30	37,300 r	24	51,900
China	5	43,500 r	7	56,600
India	7	11,000 r	4	6,080
Mexico	42	42,400	60	46,500
Netherlands	15	23,000	4	20,700
Norway	(3)	273	(3)	166
Russia	1	2,680	(3)	815
United Arab Emirates	1	1,160	1	1,480
Other	99 r	230,000 r	52	202,000
Total	200	391,000	153	386,000
Imports:				
Australia	459	171,000	98	27,900
Brazil	1,010	399,000	899	269,000
Canada	79	59,700	60	34,500
China	48	60,900 r	32	38,300
France	19	33,400 r	22	34,200
Germany	27	86,900 r	18	54,600
India	12	10,700	8	7,140
Jamaica[4]	217	80,500	181	67,300
Other	57	86,700	26	59,400
Total	1,930	988,000 r	1,340	592,000

rRevised.
[1]Table includes data available through May 11, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Value at foreign port of shipment as reported to U.S. Customs and Border Protection.
[3]Less than ½ unit.
[4]Data from the Jamaica Bauxite Institute.

Source: U.S. Census Bureau.

TABLE 11
BAUXITE: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1]

(Thousand metric tons)

Country or locality	2016	2017	2018	2019	2020
Australia	83,517	89,421	95,948	105,544 r	104,328
Bosnia and Herzegovina	641	700	803 r	934 r	900 e
Brazil[2]	39,244	38,072	32,377 r	31,938 r	31,000 e
China	68,620	68,390	77,170 r	105,000 r, e	92,700 e
Côte d'Ivoire	--	--	400 e	750 e	700 e
Dominican Republic	7	--	--	--	--
Fiji	117	60	60	--	--
Ghana	1,144	1,477	1,011	1,200 e	1,000 e
Greece[2]	1,880	1,927	1,559 r	1,492 r	1,500 e
Guinea[2]	31,500	46,160	57,000 e	67,000 e	86,000 e
Guyana[2]	1,480	1,482 r	1,924	1,900 e	900 e
Hungary	17	4	5	--	--
India	23,886	22,803	23,229	22,321 r	20,200 e
Indonesia	1,400	2,900 e	13,243 r	16,593 r	20,800 e
Iran[2]	860 r	1,047 r	805 r	780 r, e	800 e
Jamaica[2]	8,540	8,245	10,058	9,022	7,546
Kazakhstan	4,801	4,846	5,700	4,118 r	5,000 e
Malaysia	3,000 e	2,000 e	590	901	300 e
Montenegro	667	928	468	775	650 e
Mozambique	1	3	10	8 r	5 e
Pakistan	90	103	121	62 r, e	60 e
Russia	5,431	5,523	5,651	5,574	5,570
Saudi Arabia	3,843	3,708	3,885	4,050 e	4,305
Sierra Leone	1,369	1,788	1,938	1,884	1,342
Solomon Islands	238	1,503	1,609	1,161	842
Tanzania	73	12	7	--	--
Turkey	1,000	941	1,000 e	819 r	1,300 e
United States	W	W	W	W	W
Venezuela	909	550 e	--	--	250 e
Vietnam[e]	1,420	2,800	3,500	3,350 r	3,500 r
Total	286,000	307,000	340,000 r	387,000 r	391,000

[e]Estimated. [r]Revised. W Withheld to avoid disclosing company propriety data. -- Zero.
[1]Table includes data available through June 23, 2021. All data are reported unless otherwise noted; totals may include estimated data. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.
[2]Dry bauxite equivalent of crude ore.

TABLE 12
ALUMINA: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1, 2]

(Thousand metric tons)

Country or locality	2016	2017	2018	2019	2020
Australia	20,681	20,486	20,062	20,239 r	20,790
Bosnia and Herzegovina	188	238	262	214 r	200 e
Brazil	10,886	11,061	8,258	9,171 r	10,300
Canada	1,566	1,570	1,568	1,522	1,518
China	61,034	69,017	72,531	72,474	73,132
France[e]	300	300	300	300	300
Germany[e]	1,900	1,900	1,900	1,900	1,900
Greece	821	821	827	820 r	827
Guinea	--	--	182	368	439
Hungary	274	273	266 r	265 r	260 e
India	6,028	6,055	6,430	6,690	6,563
Indonesia	600 e	917	843	1,148 r	1,200 e
Iran	233 r	240 e	235 r	235 r	240 e
Ireland	1,967	1,937	1,874	1,893	1,883
Jamaica	1,865	1,782	2,484	2,173	1,621
Japan[e]	18	20	20	20	40
Kazakhstan	1,500	1,509	1,481	1,393 r	1,400 e
Romania	467	473	572	461	426
Russia	2,682	2,822	2,763	2,755	2,873
Saudi Arabia	1,429	1,484	1,774	1,839	1,810
Spain	1,579	1,588	1,589	1,595	1,552
Turkey[e]	305	300	300	300	300
Ukraine	1,510	1,676	1,715	1,690	1,725
United Arab Emirates	--	--	--	1,100	1,920
United States	2,360	1,430	1,570	1,410 e	1,340 e
Venezuela	301	240 e	--	--	110 e
Vietnam	602	1,062	1,329	1,365 r	1,400 e
Total	121,000	129,000	131,000	133,000	136,000

[e]Estimated. [r]Revised. -- Zero.

[1]Table includes data available through June 10, 2021. All data are reported unless otherwise noted; totals may include estimated data. Totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

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