



2016 Minerals Yearbook

VENEZUELA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF VENEZUELA

By Philip A. Szczesniak

Venezuela accounted for about 3% of the world's crude petroleum production in 2016 and was the third-ranked producing country (following Brazil and Mexico) in the region of Latin America and the Caribbean. Proven crude petroleum reserves in Venezuela represented about 18% of the global total, which was the largest share in the world, followed by Saudi Arabia (16%), Canada (10%), and Iran and Iraq (9% each) based on data reported by BP p.l.c in 2017. About 74% of Venezuela's proven crude petroleum reserves consisted of extra-heavy crude petroleum in the Orinoco Belt, a region that covers more than 50,000 square kilometers (km²) in northeastern Venezuela that has been estimated to contain more than 1 trillion barrels of heavy oil-in-place. Natural gas production in 2016 accounted for about 1% of global natural gas production, and Venezuela held nearly 3% of the world's proven natural gas reserves. Mineral commodities produced in Venezuela included alumina, aluminum, bauxite, cement, clay, coal, feldspar, ferromanganese, ferrosilicon, gold, iron, refined lead, lime, limestone, natural gas liquids, nickel, nitrogen (N content of ammonia), petroleum refinery products, phosphate rock, quartz, salt, sand, silicomanganese, steel, stone, and sulfur. Venezuela accounted for 1.4% of the world's supply of direct-reduced iron in 2016 (Schenk and others, 2009; BP p.l.c., 2017, p. 12, 14, 26, 28; World Steel Association, 2017, p. 18).

Venezuela's debt was estimated to have increased to more than \$151 billion by the end of the year, up from \$139 billion in 2015; the Government's ability to finance that debt in the future was seen as a potential constraint on economic growth. The International Monetary Fund (IMF) reported that Venezuela's nominal gross domestic product (GDP) was estimated to be \$287 billion in 2016, which was nearly 15% below its recent peak of more than \$330 billion achieved in 2011. Venezuela accounted for about 6% of the nominal GDP of the Latin America and the Caribbean region, which was estimated to be slightly more than \$5 trillion. The GDPs of Argentina, Brazil, and Mexico have consistently outranked Venezuela's GDP since 2010. In recent years, Venezuela's economy has been subject to high rates of inflation; inflation reached about 255% in 2016, which was the highest in the Latin America and the Caribbean region and one of the highest in the world (Economic Commission for Latin America and the Caribbean, 2017b, p. 185; International Monetary Fund, 2017b).

Minerals in the National Economy

The mining and quarrying sector's contribution to real GDP decreased to about 25% in 2014 (the most recent year for which data were available) from a high of 42% in 2003. Continued declines in crude petroleum production since 2014 had driven the sector's contribution to real GDP down to an estimated 20% in 2016. The mineral sector was the only sector of the economy that saw a decline in the value of its real GDP between 2000 to 2014, falling by more than 12% to \$63.4 billion in 2014

from \$72.2 billion in 2000 (table 1; Economic Commission for Latin America and the Caribbean, 2017a).

The United Nations Conference on Trade and Development reported that Venezuela's foreign direct investment (FDI) increased for the second year in a row in 2016 to \$1.77 billion, up from \$1.59 billion in 2015 and \$320 million in 2014. The country's FDI continued to be far below the 5-year high of \$5.97 billion that was reached in 2012, however. The Economic Commission for Latin America and the Caribbean reported that, although Venezuela's uncertain political and economic situation had negatively affected the decisions of many countries to make future investments in the country, Venezuela was expected to continue to receive substantial FDI. China announced plans to invest up to \$20 billion in the coming years, especially targeting industries related to infrastructure (but not directly related to mining), supported by the Export Import Bank of China and the China Development Bank. It was reported that many manufacturing companies (such as Ford Motor Co. and General Motors Co. of the United States) were forced to halt production at the end of 2015. A lack of raw materials available in Venezuela from the state-owned mining companies, which were curtailing production most likely in response to the Government's financial problems, was seen as a primary cause for the manufacturing production stoppages (Economic Commission for Latin America and the Caribbean, 2016, p. 22, 47, 53–54; 2017c, p. 74; United Nations Conference on Trade and Development, 2017, p. 224).

Government Policies and Programs

The Ministerio del Poder Popular de Petróleo y Minería [Ministry of Popular Power of Petroleum and Mining], which was established by Decree No. 9.309 in 2012, had been the Government entity responsible for all legal matters related to mining and crude petroleum activities until June. By Decree No. 2.413 of June 2016, the ministry was split into two in order to create the Ministerio del Poder Popular de Desarrollo Minero Ecológico [Ministry of Popular Power of Ecological Mining Development (MPPDME)] and the Ministerio de Poder Popular de Petróleo [Ministry of Popular Power of Petroleum (MinPetróleo)]. The Ministerio del Poder Popular para Industrias [Ministry of Popular Power for Industries], established by Decree No. 8.609 in 2011, is the Government entity responsible for all legal matters related to industries. Decree No. 6.210 was passed in December 2015; this law requires that the Government have a 55% share in all mining projects, sets a period of no more than 20 years for mining operations, and entitles the Government to a minimum share of 3% and a maximum share of 13% as a royalty on the value of the annual production of gold and "other strategic minerals" (not specifically defined). According to the Venezuelan Constitution, all mineral and hydrocarbon resources belong to the state (Agencia Venezolana de Noticias, 2016a; Ministerio del Poder

Popular de Petróleo y Minería, 2016, p. 48–53; Ministerio del Poder Popular para Industrias, 2016, p. 58–61, 67–68; Thomson Reuters, 2016).

The Instituto Nacional de Geología y Minería [National Institute of Geology and Mining (INGEOMIN)], which was established by Decree No. 5.382 of 1999, is the Government entity responsible for all matters related to geology, including mineral resources. INGEOMIN advises both Government agencies and the private sector regarding the optimal use of mineral resources and water, prevention and mitigation of the effects of natural hazards, and sustainable development (Ministerio del Poder Popular de Petróleo y Minería, 2016, p. 5, 572).

In February, the Zona de Desarrollo Estratégico Nacional Arco Minero del Orinoco [Strategic Mine Development Zone of the Orinoco Mining Arc], was established by Decree No. 2.248. According to the decree, a previous protected area of nearly 112,000 km² would be opened up for mining. The area, which accounts for 12% of the country's territory, is located south of the Orinoco River in the State of Bolívar. The Government reported that the intent of the decree was especially aimed at the development of reserves of bauxite, columbite-tantalite (coltan), diamond, gold, and iron ore (Agencia Venezolana de Noticias, 2016b; Ministerio del Poder Popular de Desarrollo Minero Ecológico, 2016).

Production

Production of most mineral commodities decreased owing to the negative effects of the Venezuelan Government's heavy debt burden, which had caused cutbacks at state-run mining companies and weakened the domestic economy. The production levels of many mineral commodities decreased and remained at multi-year lows. Coal production decreased by about 66% to 270,000 metric tons (t). Other significant decreases were for raw steel, by 55%; alumina, by an estimated 35%; iron ore (gross weight), by an estimated 32%; direct-reduced iron, by 31%; gold, by an estimated 28%; and lead, by 20%. One notable exception to these declines was aluminum, for which production increased by 18% to an estimated 140,000 t. Data on mineral production are in table 1.

Structure of the Mineral Industry

Government-owned Petróleos de Venezuela S.A. (PDVSA) had majority control of Venezuela's crude petroleum sector. Government-owned Corporación Socialista del Cemento S.A. controlled the cement sector through its subsidiaries C.A. Fábrica Nacional de Cementos S.A.C.A. (FNC), Corporación de Cemento Andino C.A. (Cemento Andino), Empresa de Cemento Cerro Azul C.A. (Cemento Cerro Azul), Industria Venezolana de Cementos S.A. (INVECEM), and Venezolana de Cementos S.A.C.A. (VENCEMOS). Cement production capacity in 2016 exceeded 13 million metric tons per year (Mt/yr). Table 2 is a list of major mineral industry facilities.

The Government-owned Corporación Venezolana de Guayana (CVG) was composed of four companies—the aluminum smelters CVG Alumino del Caroni S.A. (CVG Alcasa) and CVG Venezolana de Aluminio C.A. (CVG Venalum), the

carbon anode producer CVG Carbones del Orinoco, C.A. (CVG Carbonorca), and the bauxite and alumina production facility CVG Bauxilum C.A. (CVG Bauxilum). The Corporación Venezolana de Minería S.A. (CVM) owned 100% of the Mina Norte and 51.53% of the Paso Diablo Mines, both of which are located in the State of Zulia; these mines had a combined capacity to produce about 8.3 Mt/yr of coal. CVM Loma Niquel had the capacity to produce about 14,400 metric tons per year (t/yr) of nickel and 72,000 t/yr of ferronickel.

Mineral Trade

Venezuela's leading trade partner in 2016 was the United States. The total value of exported goods from Venezuela in 2016 was about \$27 billion,¹ which was a decrease of 27.5% from about \$37 billion exported in 2015. In terms of value, the United States received 35% of Venezuela's exported goods and supplied 21% (by value) of the imported goods received by Venezuela. Mineral exports to the United States from Venezuela were dominated by crude petroleum, which was valued at \$9.3 billion. Other noteworthy mineral exports were other crude petroleum products valued at \$754 million; bauxite and alumina, \$110 million; other nonferrous metals, \$11 million; nonmonetary gold, \$5 million; and copper, \$4 million. India and China were the second- and third-ranked destinations for exported goods from Venezuela, in terms of value, accounting for 17% and 14%, respectively. Venezuela was a member of the Asociación Latinoamericana de Integración [Latin American Integration Association (ALADI)], the Comunidad de Estados Latinoamericanos y Caribeños [Community of Latin American and Caribbean States (CELAC)], the Mercado Común del Sur [Southern Common Market (MERCOSUR)]; the Organization of the Petroleum Exporting Countries (OPEC), and the World Trade Organization (WTO), and it was the controlling member of PetroCaribe (European Commission, 2017, p. 8; U.S. Census Bureau, 2017).

Commodity Review

Metals

Aluminum and Bauxite and Alumina.—CVG Bauxilum C.A. operated the Los Pijiguas bauxite mine located in the State of Bolívar; the mine accounted for all Venezuela's bauxite production in 2016. Production at the mine decreased by 9% to an estimated 900,000 t from 992,000 t in 2015; production was down by more than 60% since 2014. The mine had achieved record production of 5.9 million metric tons (Mt) in 2006. The decreased production was attributed to several factors, such as low availability of equipment and reduced aluminum demand. CVG Bauxilum also operated Venezuela's only alumina refinery, which was also located in Bolívar State. Similar to bauxite, alumina production decreased in 2016—down by 35% to an estimated 300,000 t from 465,000 t in 2015; this decrease was also owing mainly to the reduced demand for aluminum (Ministerio del Poder Popular de Petróleo y Minería, 2016,

¹Where necessary values have been converted from euro area euros (EUR) to U.S. dollars (US\$) at the annual average exchange rate of EUR0.937=US\$1.00 for 2015 and EUR0.940=\$1.00 for 2016.

p. 845; Ministerio del Poder Popular para Industrias, 2016, p. 268, 271; Agencia Venezolana de Noticias, 2017).

Aluminum production at the Venalum smelter increased by 18% in 2016 to about 125,000 t; the increase was owing to a recovery in the number of electrolytic cells operating. Venalum was a joint venture between the Government of Venezuela and a consortium from Japan, including Kobe Steel Ltd., Marubeni Corp., Mitsubishi Aluminum Co., Mitsubishi Materials Corp., Showa Denko K.K., and Sumitomo Chemical Co. Ltd. Production at Venezuela's other aluminum smelter, Alcasa, was estimated to be about 25,000 t in 2016, which was down by nearly 30% from that of 2015. Both aluminum smelters were located in Bolivar State (Americaeconomia.com, 2016; Ministerio del Poder Popular para Industrias, 2016, p. 250, 312).

Gold.—During the year, several mining companies, including Canadian companies Crystallex International Corp., Gold Reserve Inc., and Rusoro Mining Ltd., were involved in legal suits with Venezuela's Government concerning the Government's seizure of gold mines and projects during the past decade. Some of the more notable gold mines and projects involved in these suits included El Choco, Isidura, Las Brisas, and Las Cristinas. These mines and projects had significant gold reserves; for example, Las Cristinas Mine was estimated to have proven reserves of gold in excess of 500,000 kilograms (kg). CVG operated most of the gold mines, which were located in the State of Bolivar. Within a decade, annual production of gold in Venezuela decreased by more than 96%—that is, to an estimated 400 kg in 2016 from more than 12,000 kg in 2009; the decrease has been attributed to such factors as a lack of equipment and supplies, power failures, transportation problems, and protests over water quality (Gurmendi, 2015, p. 15.3; Els, 2016; Toro, 2016; Finanzasdigital.com, 2017).

In February, a memorandum of understanding was signed between the Government and Gold Reserve to set up a joint venture to explore for and produce gold (and other minerals). A plan for the development of the Brisas and the Las Cristinas properties was expected by 2017. Empresa Mixta Ecosocialista Siembra Minera, S.A. would hold the majority ownership of 55%, and the remaining 45% would be owned by Gold Reserve (Agencia Venezolana de Noticias, 2016b; Cuentasclarasdigital.org, 2016).

Iron and Steel.—State-owned steel company Siderúrgica del Orinoco "Alfredo Maneiro" C.A. (SIDOR) was the largest steelmaking company in Venezuela in terms of output. In 2016, SIDOR's steel production fell sharply to 310,000 t, which was a decrease of 72% compared with the 1.1 Mt produced in 2015; the decrease was attributed to multiple factors, including financial constraints, power outages, lack of machinery and equipment, and a fire. SIDOR had the capacity to produce just over 5 Mt/yr of steel. SIDOR's integrated steel complex is located in Bolivar State (Ministerio del Poder Popular para Industrias, 2016, p. 707; Díaz, 2017; Siderúrgica del Orinoco "Alfredo Maneiro" C.A., undated).

Industrial Minerals

Cement.—During the year, Venezuela made progress on a number of projects to add additional cement production capacity. A second production line at the San Sebastian plant

(operated by INVECEM) with a cement production capacity of 1.0 Mt/yr was inaugurated in March 2016; the second line required a \$168 million investment. The construction of a new production line at the Llanadas de Monay plant (operated by Cemento Andino), which would have a capacity to produce 1.36 Mt/yr of cement and 1.12 Mt/yr of clinker, was 70% complete by the end of 2016; the new line was expected to cost \$103 million to build (Global Cement, 2016a, b; CemNet.com, 2017).

Mineral Fuels

Coal.—Coal production in Venezuela continued to decline in 2016, decreasing to 270,000 t; the decline was owing largely to weak international coal prices. Venezuela was the third-ranked coal-producing country in the Latin America and the Caribbean region in 2016 after Colombia and Brazil. Total proven coal reserves in Venezuela at the end of 2016 were 731 Mt of anthracite and bituminous-quality coal; Brazil and Colombia had proven coal reserves estimated to be 6.6 billion metric tons (Gt) and 4.9 Gt, respectively. In 2015, the Government took measures to try to expand the country's coal production by signing an agreement with the Chinese state company Sinohydro Corp. for the development of coal mining in the Guasare and Socuy basins of Guajira Peninsula. The agreement granted the company the authority to develop and mine coal in a 242-km² (about 24,000 hectares) area in Guajira and to export up to 36 Mt/yr of coal for 30 years. The \$2 billion agreement allowed for engineering, procurement, and construction of a 1,000-megawatt coal-powered thermoelectric plant in the State of Zulia, completion of which would require rerouting the Socuy River (Argus Media Ltd., 2015; Dukta, 2015; BP p.l.c., 2017, p. 36, 38).

Crude Petroleum and Natural Gas.—Crude petroleum production decreased in 2016 compared with that of 2015 by 9.1%, but natural gas (marketed) production increased by 5.6%. The natural gas and petroleum industries in Venezuela, which are largely run by PDVSA, had been subject to a lack of investment and profitability since 2006 when the Government increased its share of ownership in oilfields that were managed by foreign companies. At yearend 2016, PDVSA's total debt, including that of its subsidiaries, was \$41.1 billion; this was a decrease of 6.0% compared with the \$43.7 billion owed at yearend 2015. China and Russia were the two main creditors of Venezuela, which owed them an estimated \$28 billion and \$8 billion respectively. PDVSA partnered with many leading international crude petroleum and natural gas companies in Venezuela in 2016, including BP p.l.c. of the United Kingdom, Chevron Corp. of the United States, China National Petroleum Corp., Eni S.p.A. of Italy, Total S.A. of France, and Vietnam Oil and Gas Group (Argus Media Ltd., 2017; Petróleos de Venezuela S.A., 2017a, p. 4).

The majority of the crude petroleum and natural gas production by PDVSA took place in the Orinoco oil belt. This area accounted for 50% of the country's production of mineral fuels in 2016. PDVSA's Eastern Division accounted for about 28% of crude petroleum and natural gas production followed by their Western Division at 22%. The IMF reported that, in 2016, Venezuela's production of unconventional oil (mostly oil sands,

heavy oil, and extra heavy oil) was 1.18 million barrels per day (Mbbl/d), which represented nearly one-half of Venezuela's total crude petroleum production (estimated to be about 2.50 Mbbl/d). During the year, PDVSA reduced its average production cost per barrel of crude petroleum to \$7.65, which was a decrease of \$3.03 compared with \$10.68-per-barrel cost in 2015. PDVSA's average sales price of crude petroleum in 2016 decreased by even more than its cost reduction, however; the average sales price in 2016 was \$35.15, which was a decrease of \$11.50 compared with the \$44.65 price in 2015. In 2014, PDVSA's average sales price for crude petroleum had been \$88.42 per barrel (International Monetary Fund, 2017a, p. 57; Petróleos de Venezuela S.A., 2017b, p. 67, 102).

Venezuela's proven reserves of crude petroleum continued to increase in 2016, rising slightly to 302 billion barrels (Gbbl) from 301 Gbbl in 2015. As recently as 2005, Venezuela's crude petroleum reserves stood at less than 100 Gbbl. This growth in crude petroleum reserves of more than 200 Gbbl took place primarily in the Orinoco oil belt's four main large areas: Ayacucho, Boyaca, Carabobo, and Junin. Venezuela accounted for 89% of the proven crude petroleum reserves of the Latin America region, nearly 25% of the total proven crude petroleum reserves of OPEC, and 18% of the world's reserves. Crude petroleum exploration decreased in 2016 (for the second consecutive year) as the number of active rigs in Venezuela decreased to 138 from 182 in 2015 (and 221 rigs in 2014). Venezuela had the most active rigs in the Latin America and the Caribbean region in 2016, accounting for 51% of the region's total, 19% of the total for OPEC (738 rigs), and 4% of the world total (3,365 rigs). Venezuela's daily rate of crude petroleum production in 2016 was estimated to be about 2.5 million barrels, which was the sixth highest production rate in OPEC after Saudi Arabia, Iraq, Iran, the United Arab Emirates, and Kuwait (BP p.l.c., 2017, p. 12; Organization of the Petroleum Exporting Countries, 2017, p. 27–28, 31; Petróleos de Venezuela S.A., 2017b, p. 100).

Venezuela's proven natural gas reserves in 2016 increased by 0.7% to 5.7 trillion cubic meters; these reserves accounted for 73% of the total for the Latin America and the Caribbean region and 6% of the total for OPEC (95,676 trillion cubic meters). Approximately 90% of the natural gas reserves were associated with the crude petroleum reserves that are located in the Orinoco Belt. Venezuela had between 4,500 and 5,000 kilometers of natural gas pipelines, including two cross-border systems that allowed for trade with Brazil and Colombia. Venezuela's crude petroleum industry consumed 35% of its domestic natural gas production. The crude petroleum industry used the natural gas for gas reinjection to bolster crude petroleum extraction (World Energy Council, 2016, p. 74; Organization of the Petroleum Exporting Countries, 2017, p. 120, 137).

Outlook

According to the IMF, the outlook for Venezuela's economy in the near term remained weak as the country faced continued economic uncertainty and hyperinflation. A rebound in crude petroleum prices in 2017 was expected to help the economy; however, the IMF still forecast a contraction in real GDP of 7.4% in 2017 and another decrease of 4.1% in 2018. The

IMF also forecast inflation rates of more than 720% in 2017 and even higher in 2018. Crude petroleum production may decrease during the next few years if PDVSA's high debt levels lead to financial difficulties that negatively affect operational performance (International Monetary Fund, 2017a, p. 18, 48; 2017b).

References Cited

- Agencia Venezolana de Noticias, 2016a, New Venezuelan laws will encourage strategic mining and petrochemical development: Agencia Venezolana de Noticias, January 8. (Accessed November 22, 2017, at http://eeuu.embajada.gob.ve/index.php?option=com_content&view=article&id=522:nuevas-leyes-venezolanas-fomentaran-desarrollo-estrategico-de-sectores-minero-y-petroquimico&catid=3:noticias-de-venezuela-en-el-mundo&Itemid=19&lang=en).
- Agencia Venezolana de Noticias, 2016b, Venezuela signed four agreements to boost development of Mining Arch: Agencia Venezolana de Noticias, February 25. (Accessed November 15, 2017, at <http://www.avn.info.ve/contenido/venezuela-signed-four-agreements-boost-development-mining-arch>.)
- Agencia Venezolana de Noticias, 2017, A 23 años de fundada Bauxilum se consolida como pilar de la industria del aluminio en Venezuela [At 23 years, Bauxilum is a pillar of the aluminum industry in Venezuela]: Agencia Venezolana de Noticias, March 23. (Accessed November 16, 2017, at <http://avn.info.ve/contenido/23-a%C3%B1os-fundada-bauxilum-se-consolida-como-pilar-industria-del-aluminio-venezuela>.)
- Americaeconomia.com, 2016, Sector de aluminio en Venezuela culmina el año con perspectiva de crecimiento [Aluminum sector in Venezuela end the year with growth perspective]: Americaeconomia.com, December 27. (Accessed November 17, 2017, at <https://www.americaeconomia.com/negocios-industrias/sector-de-aluminio-en-venezuela-culmina-el-ano-con-perspectiva-de-crecimiento>.)
- Argus Media Ltd., 2015, Sinohydro to tap Venezuela coal—Build power plant: Argus Media Ltd., March 4. (Accessed November 20, 2017, at <http://www.argusmedia.com/pages/NewsBody.aspx?id=1002290&menu=yes>.)
- Argus Media Ltd., 2017, PdV oil joint ventures in regime crosshairs: Argus Media Ltd., July 4. (Accessed November 21, 2017, at <http://www.argusmedia.com/news/article/?id=1491107>.)
- BP p.l.c., 2017, BP statistical review of world energy: London, United Kingdom, BP p.l.c., June, 52 p. (Accessed November 13, 2017, at <https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf>.)
- CemNet.com, 2017, Venezuela can't hide shortages and black market: CemNet.com, October 20. (Accessed November 17, 2017, at <https://www.cemnet.com/News/story/162682/venezuela-can-t-hide-shortages-and-black-market.html>.)
- Cuentasclarasdigital.org, 2016, Arco minero—El negocio redondo de Gold Reserve Inc. [Mining arc—The business of Gold Reserve Inc.]: Cuentasclarasdigital.org, November 5. (Accessed May 22, 2018, at <https://www.cuentasclarasdigital.org/2016/11/arco-minero-el-negocio-redondo-de-gold-reserve-inc/>.)
- Díaz, Anna, 2017, Producción de acero cayó de 4,3 millones de toneladas a 260.000 [Steel production fell from 4.3 million tons to 260,000]: El-nacional.com, July 10. (Accessed November 17, 2017, at http://www.el-nacional.com/noticias/economia/produccion-acero-cayo-millones-toneladas-260000_192174.)
- Dukta, Z.C., 2015, Maduro signs decree to reopen controversial coal mines for Chinese development: Venezuelanalysis.com, April 7. (Accessed November 20, 2017, at <http://venezuelanalysis.com/news/11319>.)
- Economic Commission for Latin America and the Caribbean, 2016, Foreign direct investment in Latin America and the Caribbean: Economic Commission for Latin America and the Caribbean, 164 p. (Accessed November 14, 2017, at <https://www.cepal.org/en/node/37450>.)
- Economic Commission for Latin America and the Caribbean, 2017a, Annual gross domestic product (GDP) by activity at constant prices: Economic Commission for Latin America and the Caribbean. (Accessed November 14, 2017, at <http://interwp.cepal.org/sisgen/ConsultaIntegrada.asp?idIndicador=2216&idioma=i>.)
- Economic Commission for Latin America and the Caribbean, 2017b, Economic survey of Latin America and the Caribbean: Economic Commission for Latin America and the Caribbean, 213 p. (Accessed November 21, 2017, at <https://www.cepal.org/en/publications/42002-economic-survey-latin-america-and-caribbean-2017-dynamics-current-economic-cycle>.)

- Economic Commission for Latin America and the Caribbean, 2017c, Foreign direct investment in Latin America and the Caribbean: Economic Commission for Latin America and the Caribbean, 84 p. (Accessed November 14, 2017, at <https://www.cepal.org/en/publications/42024-foreign-direct-investment-latin-america-and-caribbean-2017>.)
- Els, Frik, 2016, Venezuela ordered to pay Vancouver miner \$1.6 billion: Mining.com, August 23. (Accessed November 22, 2017, at <http://www.mining.com/venezuela-ordered-pay-vancouver-miner-1-6-billion/>.)
- European Commission, 2017, European Union trade in goods with Venezuela: European Commission. (Accessed November 16, 2017, at http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_113462.pdf.)
- Finanzasdigital.com, 2017, Cámara Minera reporta cifras de producción más bajas de la historia [Mining Chamber reports lowest production figures in history]: Finanzasdigital.com, February 8. (Accessed November 17, 2017, at <http://www.finanzasdigital.com/2017/02/camara-minera-reporta-cifras-de-produccion-mas-bajas-de-la-historia/>.)
- Global Cement, 2016a, Cemento Andino reports second line 70% complete: Global Cement, May 27. (Accessed November 17, 2017, at <http://www.globalcement.com/news/item/4937-cemento-andino-reports-second-line-70-complete>.)
- Global Cement, 2016b, Production disrupted at Invecem: Global Cement, March 30. (Accessed November 17, 2017, at <http://www.globalcement.com/news/item/4750-production-disrupted-at-invecem>.)
- Gurmendi, A.C., 2015, The mineral industry of Venezuela, *in* Area reports—International—Latin America and Canada: U.S. Geological Survey Minerals Yearbook 2012, v. III, p. 15.1–15.9. (Accessed October 19, 2016, at <http://minerals.usgs.gov/minerals/pubs/country/2012/myb3-2012-ve.pdf>.)
- International Monetary Fund, 2017a, World economic outlook: International Monetary Fund, April, 258 p. (Accessed November 13, 2017, at <http://www.imf.org/en/Publications/WEO/Issues/2017/04/04/world-economic-outlook-april-2017>.)
- International Monetary Fund, 2017b, World economic outlook database: International Monetary Fund, April. (Accessed November 14, 2017, at <http://www.imf.org/external/pubs/ft/weo/2017/01/weodata/download.aspx>.)
- Ministerio del Poder Popular de Desarrollo Minero Ecológico, 2016, Zona de desarrollo estaregico nacional “Arco minero del Orinoco” [National development zone “Mining arc of the Orinoco”]: Caracas, Venezuela, Ministerio del Poder Popular de Desarrollo Minero Ecológico. (Accessed May 22, 2018, at <http://desarrollominero.gob.ve/zona-de-desarrollo-estrategico-nacional-arco-minero-del-orinoco/>.)
- Ministerio del Poder Popular de Petróleo y Minería, 2016, Memoria 2015 [2015 report]: Caracas, Venezuela, Ministerio del Poder Popular de Petróleo y Minería, 898 p. (Accessed November 22, 2017, at <https://transparencia.org.ve/wp-content/uploads/2016/07/Petroleo-y-Miner%C3%ADa-Memoria-2015.pdf>.)
- Ministerio del Poder Popular para Industrias, 2016, Memoria y cuenta 2015 [2015 report and account]: Caracas, Venezuela, Ministerio del Poder Popular para Industrias, 925 p. (Accessed November 22, 2017, at <https://transparencia.org.ve/wp-content/uploads/2016/07/MEMORIA-2015-MPPI.pdf>.)
- Organization of the Petroleum Exporting Countries, 2017, Annual statistical bulletin: Vienna, Austria, Organization of the Petroleum Exporting Countries, 148 p. (Accessed October 25, 2017, at http://www.opec.org/opec_web/static_files_project/media/downloads/publications/ASB2017_13062017.pdf.)
- Petróleos de Venezuela S.A., 2017a, Balance de la deuda financiera consolidada 2016 [Balance of the consolidated financial debt 2016]: Caracas, Venezuela, Petróleos de Venezuela S.A., 33 p. (Accessed November 20, 2017, at <http://www.pdvsa.com/images/pdf/balancededeuda2016.pdf>.)
- Petróleos de Venezuela S.A., 2017b, Consolidated financial statements 2016: Caracas, Venezuela, Petróleos de Venezuela S.A., 106 p. (Accessed October 25, 2017, at http://www.pdvsa.com/images/pdf/estado_financiero/pdvsa_ef_ingles_16.pdf.)
- Schenk C.J., Cook, T.A., Charpentier, R.R., Pollastro, R.M., Klett, T.R., Tennyson, M.E., Kirschbaum, M.A., Brownfield, M.E., and Pitman, J.K., 2009, An estimate of recoverable heavy oil resources of the Orinoco Oil Belt, Venezuela: U.S. Geological Survey Fact Sheet 2009–3028, 4 p. (Accessed March 23, 2017, at <https://pubs.usgs.gov/fs/2009/3028/pdf/FS09-3028.pdf>.)
- Siderúrgica del Orinoco “Alfredo Maneiro” C.A., [undated], La Empresa [the company]: Siderúrgica del Orinoco “Alfredo Maneiro” C.A. (Accessed November 17, 2017, at <http://www.sidor.com/index.php/la-nueva-sidor-54>.)
- Thomson Reuters, 2016, Venezuela’s Maduro creates mining ministry: Thomson Reuters, June 7. (Accessed November 14, 2017, at <http://www.reuters.com/article/us-venezuela-mining/venezuelas-maduro-creates-mining-ministry-idUSKCN0YU070>.)
- Toro, Francisco, 2016, Las Cristinas—A US\$1.386 billion tantrum: CaracasChronicles.com, April 6. (Accessed November 22, 2017, at <http://www.caracaschronicles.com/2016/04/06/las-cristinas-us-1-386-billion-tantrum/>.)
- United Nations Conference on Trade and Development, 2017, World investment report, 2017: United Nations Conference on Trade and Development, 252 p. (Accessed November 14, 2017, at http://unctad.org/en/PublicationsLibrary/wir2017_en.pdf.)
- U.S. Census Bureau, 2017, U.S. imports from Venezuela by 5-digit end-use code—2007–2016: U.S. Census Bureau. (Accessed November 16, 2017, at <https://www.census.gov/foreign-trade/statistics/product/enduse/imports/c3070.html>.)
- World Energy Council, 2016, World energy resources—Country notes 2016: World Energy Council, 75 p. (Accessed November 21, 2017, at https://www.worldenergy.org/wp-content/uploads/2017/03/WERResources_Country_Notes_2016.pdf.)
- World Steel Association, 2017, World steel in figures 2017: World Steel Association, 17 p. (Accessed November 13, 2017, at <https://www.worldsteel.org/en/dam/jcr:0474d208-9108-4927-ace8-4ac5445c5df8/World+Steel+in+Figures+2017.pdf>.)

TABLE 1
VENEZUELA: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons, gross weight, unless otherwise specified)

Commodity ^{2,3}		2012	2013	2014	2015	2016
METALS						
Aluminum:						
Bauxite		2,285 ^r	2,341	2,346	992	900 ^e
Alumina		808	580	660	465	300 ^e
Aluminum metal, primary, unalloyed		208	186	138	119	140 ^e
Gold, mine production, Au content	kilograms	1,981	1,675	1,056	558	400 ^e
Iron and steel:						
Direct-reduced iron		4,472	2,727	1,402	1,300 ^r	900
Raw steel ⁴		2,359	2,139	1,485	1,345 ^r	600
Iron ore, mine production:						
Gross weight		15,403 ^r	11,198 ^r	11,256 ^r	11,716	8,000 ^e
Fe content		9,627 ^r	6,999 ^r	7,035 ^r	7,323 ^r	5,000 ^e
Lead, refinery production, secondary		25	22	20	20	16
Manganese:						
Ferromanganese	metric tons	9,000	9,000	8,000	8,000	8,000 ^e
Silicomanganese	do.	58,000	63,000	39,000	35,000	35,000 ^e
Nickel:						
Mine production, Ni content, laterite ore ^e	do.	8,100	NA ^r	5,000 ^r	4,000 ^r	3,700
Ferronickel:						
Gross weight	do.	31,300 ^e	NA	16,000 ^e	16,000 ^e	15,000 ^e
Ni content	do.	8,100 ^e	NA	5,000 ^e	4,000 ^e	3,700
Silicon, ferrosilicon ^e	do.	72,300	74,300	74,300	74,600	74,600
INDUSTRIAL MINERALS						
Cement, hydraulic		8,440	8,846 ^r	7,942 ^r	8,210 ^r	8,000 ^e
Clay and shale:						
Kaolin	metric tons	2,447	2,793	2,500	2,400 ^e	2,300 ^e
Other		452	513	28	20 ^e	19 ^e
Feldspar, mine production	metric tons	85,115 ^r	91,100 ^r	93,900 ^r	75,500 ^r	80,000 ^e
Lime ^e	do.	400,000	400,000	360,000	350,000	350,000
Nitrogen, N content, ammonia ^e		1,200	1,200	1,100	1,000	950
Phosphate rock:						
Gross weight	metric tons	151,539	106,354	35,820	26,324	25,000 ^e
P ₂ O ₅ content	do.	41,000	29,000	9,500 ^r	7,100 ^r	6,750 ^e
Stone, sand, and gravel:						
Sand and gravel, construction, sand		3,621	1,537	729	700 ^e	700 ^e
Silica, mine production:						
Quartz	metric tons	11,803 ^r	8,475	--	--	--
Unspecified	do.	117,788	7,620	6,900	6,800 ^e	6,700 ^e
Stone, crushed, limestone		5,893	2,190	NA ^r	NA ^r	NA
Sulfur, S content, natural gas and petroleum, byproduct ^e		800	800	700	700	700
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous		1,911	1,229	801	802	270
Natural gas:						
Gross	million cubic meters	75,968	63,758	76,717	80,119	84,600 ^e
Marketable	do.	22,726	21,820	21,878	25,943	27,400 ^e
Natural gas liquids	thousand 42-gallon barrels	45,750	42,340	41,610	42,669	45,000 ^e
Petroleum:						
Crude	do.	1,063,000	1,056,000	1,014,000	1,001,000	910,000 ^e
Refinery production	do.	449,680	454,462	420,188	394,000 ^{r,e}	318,000 ^e

^eEstimated. ^rRevised. do. Ditto. NA Not available. -- Zero.

¹Table includes data available through December 11, 2017. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, carbon black, common clay, diamond, lead, salt, sand and gravel, and stone may have been produced in Venezuela, but available information was inadequate to make reliable estimates of output.

³Sources: Republica Bolivariana de Venezuela, Ministerio del Poder Popular de Petroleo y Minería, Memoria 2015, and Ministerio del Poder Popular Para Industrias, Memoria 2015.

⁴Source: World Steel Association.

TABLE 2
VENEZUELA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Alumina	CVG Bauxilum C.A. [Corporación Venezolana de Guayana (CVG)]		Puerto Ordaz, Bolivar State	2,000
Aluminum	CVG Aluminio del Caroní, S.A. (Alcasa) [Corporación Venezolana de Guayana (CVG)]		do.	170
Do.	CVG Venezolana de Aluminio C.A. (CVG Venalum) [Corporación Venezolana de Guayana (CVG), 80%, and Kobe Steel Ltd., Marubeni Corp., Mitsubishi Aluminum Co., Mitsubishi Materials Corp., Showa Denko K.K., and Sumitomo Chemical Co. Ltd., 20%]		do.	430
Bauxite	CVG Bauxilum C.A. [Corporación Venezolana de Guayana (CVG)]		Los Pijiguaos Mine, Cedeño, Bolivar State	6,000
Cement	C.A. Fabrica Nacional de Cementos S.A.C.A. (Corporación Socialista del Cemento, S.A.)		Ocumare plant, Ocumare del Tuy, Miranda State	1,210
Do.	do.		Tachira plant, Palmira, Tachira State	220
Do.	Corporación de Cemento Andino C.A. (Corporación Socialista del Cemento, S.A.)		Llanadas de Monay plant, Trujillo State	1,900
Do.	Corporación de Cemento Catatumbo C.A. (Corporación Socialista del Cemento, S.A.)		Villa Del Rosario plant, Zulia State	650
Do.	Empresa Cemento Cerro Azul C.A. (Corporación Socialista del Cemento, S.A.)		Cerro Azul plant, Monagas State	1,000
Do.	Industria Venezolana de Cementos S.A. (INVECEM) (Corporación Socialista del Cemento, S.A.)		Cumarebo plant, Falcon State	1,590
Do.	do.		San Sebastian plant, San Sebastian de los Reyes, Aragua, State	2,710
	Venezolana de Cementos S.A.C.A. (Corporación Socialista del Cemento, S.A.)		Guyana plant, Bolivar State	330
Do.	do.		Lara plant, Lara State	490
Do.	do.		Mara plant, Zulia State	730
Do.	do.		Pertigalete plant, Anzoategui	2,680
Coal	Carbones del Guasare S.A. [Corporación Venezolana de Minería S.A. (CVM), 51.63%]		Paso Diablo, Guajira, Zulia State	6,800
Do.	Carbones de la Guajira S.A. [Corporación Venezolana de Minería S.A. (CVM), 100%]		Mina Norte, Guajira, Zulia State	1,500
Ferronickel	CVM Loma Niquel [Corporación Venezolana de Minería S.A. (CVM), 100%]		Loma de Niquel, Aragua and Miranda States	72
Ferrosilicon	FerroAtlantica de Venezuela, S.A. [Ferrolobe PLC, 80%, and Corporación Venezolana de Guayana (CVG), 20%]		Puerto Ordaz, Bolivar State	96
Gold	kilograms	CVG Compañía General de Minería C.A. [Corporación Venezolana de Guayana (CVG)]	Capitan Eduardo Vera plant, Bolivar State	NA
Do.	do.	do.	Caratal plant, Bolivar State	NA
Do.	do.	do.	Colombia Mine, Bolivar State	2,000 ^c
Do.	do.	do.	El Peru plant, Bolivar State	NA
Do.	do.	do.	Hansa San Luis Mine, Bolivar State	NA
Do.	do.	do.	Isidora Mine, Bolivar State	2,500 ^c
Do.	do.	do.	San Rafael-El Placer Mine, Bolivar State	200 ^c
Do.	do.	do.	Sosa Mendez Mine, Bolivar State	1,700 ^c
Do.	do.	do.	Tomi Mine, El Callao, Bolivar State	2,000 ^c
Do.	do.	do.	Union Mine, Bolivar State	NA
Do.	do.	Promotora Minera de Venezuela (CVG Compañía General de Minería C.A.)	El Choco Mines and plant, El Callao, Bolivar State	NA
Iron and steel	Siderúrgica del Orinoco "Alfredo Maneiro" C.A. (SIDOR) [Corporación Venezolana de Guayana (CVG), 80%]		Steel plant in Puerto Ordaz, Bolivar State	5,100
Do.	Complejo Siderúrgico de Guayana C.A. [Corporación Venezolana de Guayana (CVG)]		Hot-briquetted iron in Puerto Ordaz, Bolivar State	1,000
Do.	Braquetera del Orinoco		do.	2,200
Do.	CVG Ferrominera Orinoco C.A. [Corporación Venezolana de Guayana (CVG)]		do.	1,000

See footnotes at end of table.

TABLE 2—Continued
 VENEZUELA: STRUCTURE OF THE MINERAL INDUSTRY IN 2016

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Iron and steel—Continued		Venezolana de Prereducidos de Caroní (International Briquettes Holding, 100%)	Hot-briquetted iron in Puerto Ordaz, Bolívar State	815
Do.		CVG Ferrominera Orinoco C.A. [Corporación Venezolana de Guayana (CVG)]	Altamira, Cerro Bolívar, Las Pallas, Los Barrancos, and San Isidro Mines, Bolívar State	25,000
Do.		do.	Iron ore pellets in Puerto Ordaz, Bolívar State	1,100
Do.		Siderúrgica del Orinoco "Alfredo Maneiro" C.A. (SIDOR) [Corporación Venezolana de Guayana (CVG), 80%]	do.	4,250
Lead, refined	metric tons	Funmetal C.A.	Mariara, Carabobo	NA
Natural gas	million cubic meters	Petroboscan S.A. [Petróleos de Venezuela S.A. (PDVSA), 60.8%, and Chevron Corp., 39.2%]	Boscan field in Zulia State	70 ^e
Do.	do.	Petroindependiente S.A. [Petróleos de Venezuela S.A. (PDVSA), 74.8%, and Chevron Corp., 25.2%]	LL-652 field in Lake Maracaibo	700 ^e
Do.	do.	Petropiar S.A. [Petróleos de Venezuela S.A. (PDVSA), 70%, and Chevron Corp., 30%]	Hamaca field in Orinoco Belt	146 ^e
Nickel, mine production, Ni content		CVM Loma Niquel [Corporación Venezolana de Minería S.A. (CVM), 100%]	Loma de Niquel Mine, Aragua and Miranda States	14
Nitrogen content of ammonia		Petroquímica de Venezuela S.A. (Government, 100%)	Jose Antonio Anzoategui Petrochemical complex, Anzoategui State	1,200
Do.		do.	Ana Maria Campos petrochemical complex, Zulia State	300
Do.		do.	Moron petrochemical complex, Carabobo State	200
Petroleum:				
Crude	thousand 42-gallon barrels	Petroanzoategui S.A. [Petróleos de Venezuela S.A. (PDVSA), 100%]	Junin area in Orinoco Belt	NA
Do.	do.	Petroboscan S.A. [Petróleos de Venezuela S.A. (PDVSA), 60.8%, and Chevron Corp., 39.2%]	Boscan field in Zulia State	10,000 ^e
Do.	do.	Petrocarabobo, S.A. [Petróleos de Venezuela S.A. (PDVSA), 60%; Repsol S.A. and PC Venezuela Ltd., 11%; Petrocarabobo Ganga B.V., 11%; Indoil Netherlands B.V., 7%]	Carabobo area in Orinoco Belt	11,000 ^e
Do.	do.	Petrocedeño S.A. [Petróleos de Venezuela S.A. (PDVSA), 60%; Total S.A., 30.3%; Statoil ASA, 9.7%]	Zuata Region, Junin area in Orinoco Belt	73,000 ^e
Do.	do.	Petroindependiente S.A. [Petróleos de Venezuela S.A. (PDVSA), 74.8%, and Chevron Corp., 25.2%]	LL-652 field in Lake Maracaibo	370 ^e
Do.	do.	Petrojunin S.A. [Petróleos de Venezuela S.A. (PDVSA), 60%, and Eni S.p.A., 40%]	Block 5, Junin area in Orinoco Belt	NA
Do.	do.	Petrolerasinovensa, S.A. [Petróleos de Venezuela S.A. (PDVSA), 64.25%, and China National Petroleum Corp., 35.75%]	Sinovensa, Carabobo in Orinoco Belt	NA
Do.	do.	Petromacareo S.A. [Petróleos de Venezuela S.A. (PDVSA), 60%, and PetroVietnam (Vietnam Oil and Gas Group), 40%]	Block 2 North, Junin area in Orinoco Belt	NA
Do.	do.	Petromiranda, S.A. [Petróleos de Venezuela S.A. (PDVSA), 60%, and Consorcio Nacional Petroleo SRL, 40%]	Block 6, Junin area in Orinoco Belt	NA
Do.	do.	Petromonagas S.A. [Petróleos de Venezuela S.A. (PDVSA), 83.33%, and BP p.l.c., 16.67%]	Carabobo area in Orinoco Belt	NA
Do.	do.	Petropiar S.A. [Petróleos de Venezuela S.A. (PDVSA), 70%, and Chevron Corp., 30%]	Hamaca field in Orinoco Belt	3,300 ^e
Do.	do.	Petrourica S.A. [Petróleos de Venezuela S.A. (PDVSA), 60%, and China National Petroleum Corp., 40%]	Block 4, Junin area in Orinoco Belt	NA
Refinery products	do.	Petróleos de Venezuela S.A. (PDVSA) (Government, 100%)	Bajo Grande, Zulia State	5,800 ^e
Do.	do.	do.	El Palito, Carabobo State	51,100 ^e
Do.	do.	do.	Paraguana, Falcon State	350,000 ^e
Do.	do.	do.	Puerto de la Cruz, Anzoategui State	68,300 ^e
Do.	do.	do.	San Roque, Anzoategui State	1,800 ^e
Phosphate rock		Petroquímica de Venezuela S.A. (Government, 100%)	Riccito Mine, Cerro Riccito, Falcon State	400

^eEstimated. Do., do. Ditto. NA Not available.