

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 20-F

**ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d)
OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended: December 31, 2019
Commission file number: 001-38256

NEXA RESOURCES S.A.

(Exact name of Registrant as specified in its charter)

Grand Duchy of Luxembourg

(Jurisdiction of incorporation or organization)

Rodrigo Menck

Senior Vice President Finance and Group Chief Financial Officer

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37A, Avenue J.F. Kennedy

L-1855, Luxembourg

Grand Duchy of Luxembourg

(Address of principal executive offices)

Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common shares, each with par value of US\$1.00	NEXA	New York Stock Exchange

Securities registered or to be registered pursuant to Section 12(g) of the Act: None

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act: None

The number of outstanding shares of each class of stock of Nexa Resources S.A. as of March 20, 2020 was:

133,320,513 common shares, each with par value of US\$1.00

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes ☐ No ☒

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.

Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports) and (2) has been subject to such filing requirements for the past 90 days.

Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or an emerging growth company. See definition of “accelerated filer,” “large accelerated filer” and “emerging growth company” in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☐

Accelerated filer ☒

Non-accelerated filer ☐

Emerging growth company ☐

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP ☐

International Financial Reporting Standards as issued by the International Accounting Standards Board ☐

If “Other” has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow.

Item 17 ☐ Item 18 ☐

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes ☐ No ☒

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**Change in registrant's certifying
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FORWARD-LOOKING STATEMENTS

This annual report includes statements that constitute estimates and forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or Securities Act, and Section 21E of the Securities Exchange Act, as amended, or Exchange Act. The words “believe,” “will,” “may,” “may have,” “would,” “estimate,” “continues,” “anticipates,” “intends,” “plans,” “expects,” “budget,” “scheduled,” “forecasts” and similar words are intended to identify estimates and forward-looking statements. Estimates and forward-looking statements refer only to the date when they were made, and we do not undertake any obligation to update or revise any estimate or forward-looking statement due to new information, future events or otherwise, except as required by law. Estimates and forward-looking statements involve risks and uncertainties and do not guarantee future performance, as actual results or developments may be substantially different from the expectations described in the forward-looking statements.

These statements appear in a number of places in this report and include statements regarding our intent, belief or current expectations, and those of our officers and employees, with respect to, among other things: (i) our future financial or operating performance; (ii) our growth strategy; (iii) future trends that may affect our business and results of operations; (iv) the impact of competition and applicable laws and regulations on our results; (v) planned capital investments; (vi) future of zinc or other metal prices; (vii) estimation of mineral reserves; (viii) mine life; and (ix) our financial liquidity.

Forward-looking statements are not guarantees of future performance and involve risks and uncertainties. Actual results and developments may be substantially different from the expectations described in the forward-looking statements for a number of reasons, many of which are not under our control, among them the activities of our competition, the future global economic situation, weather conditions, market conditions, exchange rates, and operational and financial risks. The unexpected occurrence of one or more of the abovementioned events may significantly change the results of our operations on which we have based our estimates and forward-looking statements. Our estimates and forward-looking statements may be influenced by the following factors, including, among others:

- the cyclical and volatile prices of commodities;
 - the changes in the expected level of supply and demand for commodities;
 - the risks and uncertainties relating to economic and political conditions in the countries in which we operate;
 - changes in global market conditions;
 - outbreaks of contagious diseases or health crises impacting overall economic activity regionally or globally;
 - severe natural disasters, such as, storms and earthquakes, disrupting our operations;
 - operational risks, such as operator errors, mechanical failures and other accidents;
 - the availability of materials, supplies, insurance coverage, equipment, required permits or approvals and financing;
 - the implementation of our growth strategy, the availability of capital and the risks associated with related capital expenditures;
 - failure to obtain financial assurance to meet closure and remediation obligations;
 - the possible material differences between our estimates of mineral reserves and the mineral quantities we actually recover;
 - the possibility that our concessions may be terminated or not renewed by governmental authorities in the countries in which we operate;
-

- labor disputes or disagreements with local communities;
- loss of reputation due to unanticipated operational failures or significant occupational incidents;
- the future impact of competition and changes in domestic and international governmental and regulatory policies that apply to our operations; and
- other factors discussed under “Risk Factors.”

In light of the risks and uncertainties described above, the events referred to in the estimates and forward-looking statements included in this report may or may not occur, and our business performance and results of operation may differ materially from those expressed in our estimates and forward-looking statements, due to factors that include but are not limited to those mentioned above.

These forward-looking statements are made as of the date of this report, and we assume no obligation to update them or revise them to reflect new events or circumstances. There can be no assurance that the forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements.

ABOUT THE COMPANY

We are a large-scale, low-cost, integrated zinc producer with over 60 years of experience developing and operating mining and smelting assets in Latin America. We currently own and operate five long-life underground polymetallic mines—three located in the Central Andes of Peru and two located in the state of Minas Gerais in Brazil—and are developing the Aripuanã Project as our sixth underground mine in Mato Grosso, Brazil.

Nexa Resources S.A. is a public limited liability company (*société anonyme*) incorporated under the laws of Luxembourg on February 26, 2014. Our registered office is located at 37A, Avenue J.F. Kennedy, L-1855, Luxembourg, Grand Duchy of Luxembourg, and we are registered with the Luxembourg Trade and Companies Register under number B185489. Our telephone number at this address is +352 28 26 37 27. Our main office outside of Luxembourg is located at Avenida Engenheiro Luís Carlos Berrini, n° 105, 6th floor, São Paulo, State of São Paulo, Brazil. Our website is www.nexaresources.com. None of the information available on our website is incorporated in this annual report and it should not be relied upon in deciding to invest in our common shares.

PRESENTATION OF FINANCIAL AND OTHER INFORMATION

Certain definitions

Unless otherwise indicated or the context otherwise requires, the terms below are defined in the following manner.

- “Nexa,” “we,” “us” and “our” or similar terms refer to Nexa Resources and, unless the context otherwise requires, its consolidated subsidiaries;
- “Nexa Resources” refers to Nexa Resources S.A., a Luxembourg public limited liability company (*société anonyme*);
- “Nexa CJM” refers to our subsidiary Nexa Resources Cajamarquilla S.A. (previously known as Votorantim Metais—Cajamarquilla S.A.), a corporation organized as a *sociedad anónima* under the laws of Peru;
- “Nexa Brazil” refers to our subsidiary Nexa Recursos Minerais S.A. (previously known as Votorantim Metais Zinco S.A.), a corporation organized as a *sociedade anônima* under the laws of Brazil;
- “Nexa Peru” refers to our subsidiary Nexa Resources Peru S.A.A. (previously known as Compañía Minera Milpo S.A.A.), a corporation organized as a *sociedad anónima abierta* under the laws of Peru and publicly traded on the Lima Stock Exchange;
- “Enercan” refers to our subsidiary Campos Novos Energia S.A., a corporation organized as a *sociedade anônima* under the laws of Brazil;
- “VSA” refers to our controlling shareholder Votorantim S.A., a corporation organized as a *sociedade anônima* under the laws of Brazil;
- the “Votorantim Group” refers to our controlling shareholder VSA and, unless the context otherwise requires, its consolidated subsidiaries;
- the “*real*,” “*reais*” or “R\$” refers to the Brazilian *real*, the official currency of Brazil;
- “*sol*,” “*soles*” or “S/.” refers to the Peruvian *sol*, the official currency of Peru; and

In addition, the meaning of other defined terms used in this report are set out in “Glossary.”

Financial information

Our consolidated financial statements as of December 31, 2019 and 2018 and for each of the years ended December 31, 2019, 2018 and 2017 are included in this annual report. Our consolidated financial statements are prepared in accordance with International Financial Reporting Standards as issued by the International Accounting Standards Board, or IFRS. References in this report to “our consolidated financial statements” are to our consolidated financial statements as of December 31, 2019 and 2018 and for each of the years ended December 31, 2019, 2018 and 2017, and the related notes thereto included elsewhere in this report.

The financial information presented in this report should be read in conjunction with our consolidated financial statements, including the related notes, and the section of this report titled “Operating and financial review and prospects.”

The main consolidated companies included in our consolidated financial statements are:

- **Nexa CJM** – a Peruvian company that is 99.92% directly and directly owned by Nexa Resources and is mainly engaged in smelting zinc contained in concentrate. Nexa CJM’s functional currency is the U.S. dollar.

- **Nexa Peru** – a Peruvian company that is 80.23% directly and indirectly owned by Nexa Resources and is mainly engaged in exploring, extracting, producing and trading zinc, copper and lead concentrates, extracted from its own three mining sites. Nexa Peru’s functional currency is the U.S. dollar. Nexa Peru is a public company with its shares listed on the Lima Stock Exchange.
- **Nexa Brazil** – a Brazilian company that is 100% owned by Nexa Resources and is mainly engaged in exploring, extracting and producing zinc, copper and lead concentrates, and smelting zinc contained in concentrate with operations in the state of Minas Gerais. Nexa Brazil’s functional currency is the *real*.

Non-IFRS measures

Our management uses non-IFRS measures such as Adjusted EBITDA and cash cost, among other measures, for internal planning and performance measurement purposes. We believe these measures provide useful information about the financial performance of our operations that facilitates period-to-period comparisons on a consistent basis. Management uses Adjusted EBITDA internally to evaluate our underlying operating performance for the reporting periods presented and to assist with the planning and forecasting of future operating results. Management believes that Adjusted EBITDA is a useful measure of our performance because it reflects our cash generation potential from our operational activities excluding exceptional items of the period. These measures should not be considered individually or as a substitute for net income or operating income, as indicators of operating performance, or as alternatives to cash flow as measures of liquidity. Additionally, our calculation of Adjusted EBITDA and other non-IFRS measures may be different from the calculation used by other companies, including our competitors in the mining industry, so our measures may not be comparable to those of other companies. See “Selected financial data” for a discussion of our use of non-IFRS measures in this report, including the reasons why we believe this information is useful to management and to investors, and a reconciliation to the comparable IFRS measures.

All forward-looking non-IFRS financial measures in this document, including cash cost guidance, are provided only on a non-IFRS basis. This is due to the inherent difficulty of forecasting the timing or number of items that would be included in the most directly comparable forward-looking IFRS financial measures. As a result, reconciliation of the forward-looking non-IFRS financial measures to IFRS financial measures is not available without unreasonable effort and we are unable to assess the probable significance of the unavailable information.

Country, market and industry information

This report contains and refers to information and statistics regarding the countries in which we operate and the markets for the metals we produce. This data is obtained from independent public sources, including publications and materials from participants in the industry, such as Wood Mackenzie and from governmental entities such as the Brazilian Central Bank, Bloomberg Finance L.P., London Metal Exchange (or LME), London Bullion Market Association (or LBMA), Brazilian Ministry of Treasury (*Ministério da Fazenda*), Brazilian Ministry of Mines and Energy (*Ministério de Minas e Energia*) or MME, National Mining Agency (*Agência Nacional de Mineração*), B3 S.A. – Brasil, Bolsa, Balcão, Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*) or IBGE, the Getulio Vargas Foundation (*Fundação Getúlio Vargas*) or FGV, the Peruvian Stock Market Superintendency (*Superintendencia del Mercado de Valores*), the Peruvian Central Bank, the Peruvian Ministry of Economy and Finance (*Ministerio de Economía y Finanzas*) and the Peruvian National Institute of Statistics and Informatics (*Instituto Nacional de Estadística e Informática*). Some data is also based on our estimates, which are derived from our review of internal reports, as well as independent sources.

Volume information

All tonnage information in this report is expressed in metric tonnes, unless stated otherwise, and all references to ounces are to troy ounces, in each case, unless otherwise specified.

RISK FACTORS

Nexa and its operations are exposed to a number of inherent risks and uncertainties, including those described below.

Business risks

Our business is highly dependent on the international market prices of the metals we produce, which are both cyclical and volatile.

Our business and financial performance is significantly affected by the market prices of the metals we produce, particularly the market prices of zinc, copper, silver, lead and, to a lesser extent, gold. Historically, prices of such metals have been subject to wide fluctuations and are affected by numerous factors beyond our control, including international economic and political conditions, the cyclical nature of consumption, actual or perceived changes in levels of supply and demand, the availability and costs of substitutes, inventory levels maintained by users, actions of participants in the commodities markets and currency exchange rates. We cannot predict whether, and to what extent, metal prices will rise or fall in the future.

Future declines in metal prices, and especially zinc, copper, silver and lead prices, could have an adverse impact on our results of operations and financial position, and we might consider curtailing or modifying certain operations or not proceeding with our sustaining and/or growth strategy. In addition, we may not be able to adjust production volume in a timely or cost-efficient manner in response to changes in metal prices. Lower utilization of capacity during periods of weak prices may expose us to higher unit production costs since a significant portion of our cost structure is fixed in the short-term due to the high capital intensity of mining operations. Conversely, during periods of high prices, our ability to rapidly increase production capacity may be limited, which could prevent us from selling more products. Moreover, we may be unable to complete expansions and greenfield projects in time to take advantage of rising prices for zinc, copper, lead or other products.

Changes in the demand for the metals we produce could adversely affect our sales volume and revenues.

Our revenues depend on the volume of metals we sell (and, to a lesser extent, the volume of metals produced by others that are smelted in our facilities), which in turn depend on the level of industrial and consumer demand for these metals. An increase in the production of zinc, copper, silver and lead worldwide or changes in technology, industrial processes or consumer habits, including increased demand for substitute materials, may decrease the demand for these metals. A fall in demand, resulting from economic slow-downs or other factors, could also decrease the volume of metals we sell and therefore materially adversely impact our results of operations and financial position.

Our results and financial position are affected by the cyclical nature of global economic activity.

The mining industry has historically been highly volatile largely due to the cyclical nature of industrial production, which affects the demand for minerals and metals. Demand for minerals and metals thus generally correlates to macroeconomic fluctuations in the global economy.

Adverse economic developments in China could have a negative impact on our revenues, cash flow and profitability.

China has been the main source of global demand for commodities over the last few years. According to Wood Mackenzie, in 2019, Chinese demand represented 49.9% of global demand for zinc and 50.7% of global demand for copper. Any slowdown in China's economic growth that is not offset by increased demand or reduced supply from other regions could have an adverse effect on demand for our products or commodity prices and result in lower revenues, cash flow and profitability.

The mining industry is highly competitive.

We face competition from other mining, processing, trading and industrial companies in Brazil, Peru and around the world. Competition principally involves the following factors: sales, supply and labor prices; contractual terms and conditions; attracting and retaining qualified personnel; and securing the services, supplies and technologies we need for our operations. Slower development in technology and innovation could impact costs, productivity and competitiveness. In addition, mines have limited lives and, as a result, we must seek to replace and expand our mineral reserves by acquiring new properties. Significant competition exists to acquire mining concessions, land and related assets. We cannot assure shareholders that competition will not adversely affect us in the future.

The international trade environment faces increasing uncertainty. Potential changes to international trade regulations and agreements, as well as other political and economic arrangements (including direct or indirect subsidies), may benefit competitors operating in countries other than where our mining operations are currently located. These changes could also adversely affect the prices we pay for the supplies we need and our export costs when we engage in international transactions. We cannot assure shareholders that we will be able to compete based on price or other factors with companies that in the future may benefit from favorable regulations, lower cost of capital, trading or other arrangements or that we will be able to maintain the cost of the supplies that we require as well as our export costs.

Operational risks

The mining business is subject to inherent risks, some of which are not insurable.

The business of mining zinc, copper, silver, lead and other minerals is generally subject to numerous risks and hazards. Hazards associated with underground mining operations include underground fires and explosions, including those caused by flammable gas, gas and coal outbursts, cave-ins or falls of ground, rock falls, openings collapse, lack of oxygen, air pollution, tailings dam failures or other discharges of tailings, hazardous substances and materials, gases and toxic chemicals, water ingress and flooding, sinkhole formation, ground subsidence, and other accidents and conditions resulting from underground mining activities, such as drilling, blasting, removing and processing material. In addition, we may encounter geotechnical challenges as we continue with and expand our mining activities, including the possibility of failure of underground openings. We could incur additional expenses in connection with preventive and remediating measures related to underground openings, which could materially adversely affect results of our operations and financial position.

Such occurrences could result in damage to, or destruction of, our properties or production facilities, third-party property, human exposure to pollution, personal injury or death, environmental and natural resource damage or contamination, delays in mining, monetary losses and legal liability. In addition, any such occurrences could adversely affect our reputation. Damages to our reputation could result in additional environmental and health and safety legal oversight, and authorities could impose more stringent conditions in connection with the licensing process of our projects and operations. In addition, our customers may be less willing to buy metals from us if we have been subject to significant adverse publicity. We maintain insurance typical in the mining industry, and in amounts that we believe to be adequate, but which may not provide complete coverage in certain circumstances. Insurance against certain risks (including certain liabilities for environmental contamination, tailings dam failures and other hazards as a result of exploration and production) may not be generally available or is uneconomical to afford. We could also incur additional expenses due to failures in our industrial drainage system or other environmental control equipment.

We may be materially adversely affected by challenges relating to slope and stability of underground openings.

Our underground mines get deeper and our waste and tailings deposits increase in size as we continue with and expand our mining activities. This presents certain geotechnical challenges, including the possibility of failure of underground openings. If we are required to reinforce such openings or take additional actions to prevent such a failure, we could incur additional expenses, and our operations and stated mineral reserves could be negatively affected. We have taken actions we consider appropriate to maintain the stability of underground openings, but additional actions may be required in the future. Unexpected failures or additional requirements to prevent such failures may materially adversely affect our costs and expose us to health, safety and other liabilities in the event of an accident. These developments may in turn materially adversely affect the results of our operations and financial position, as well as potentially diminish our stated mineral reserves.

Our projects are subject to operational risks that may result in increased costs or delays that prevent their successful implementation.

We invest in sustaining and increasing our mine and metal production capacity and developing new operations. Our projects are subject to several risks that may materially adversely affect our growth prospects and profitability, including the following:

- we may encounter delays or higher than expected costs in obtaining the necessary equipment, machinery, materials, supplies, labor or services, in project execution by third-party contractors and in implementing new technologies to develop and operate a project;
- we may experience delays in commencing the operations of a new project or the expansion of an existing operation;
- our efforts to develop projects according to schedule may be hampered by a lack of infrastructure, including a reliable power supply;
- we may fail to obtain, or experience delays or higher than expected costs in obtaining, the required agreements, authorizations, licenses, approvals and permits to develop a project, including the prior consultation procedure and agreements with local communities;
- changes in market conditions or regulations may make a project less profitable than expected at the time we initiated work on it;
- accidents, natural disasters, labor disputes and equipment failures;
- adverse mining conditions may delay and hamper our ability to produce the expected quantities and qualities of minerals upon which the project was budgeted;
- mineral reserves are estimates based on the interpretation of limited sampling data and testwork that may not be representative of the deposits as a whole, or the technical and economic assumptions used in the estimates may prove to be materially different when the deposits are mined, that could result in materially different economic outcomes, and
- conflicts with local communities and/or strikes or other labor disputes may delay the implementation or the development of projects.

We may be adversely affected by the failure or unavailability of adequate infrastructure and skilled labor.

Our mining, smelting, processing, development and exploration activities depend to a large degree on adequate infrastructure. The regions where certain of our current operations, projects and prospects are located are sparsely populated and difficult to access. We require reliable roads, bridges, power sources and water supplies to access and properly conduct our operations. As a result, the availability and cost of this infrastructure affects capital and operating costs and our ability to maintain expected levels of production and sales. We could also experience an increase in transit-related accidents due to the need to transport employees to remote areas. Unusual weather, such as excessive rains and flooding, or other natural phenomena, sabotage, government or external interference in the maintenance or provision of such infrastructure could impact the development of a project, reduce mining volumes, increase mining or exploration costs or delay the transportation of raw materials to the mines and projects or concentrates to the customers. See “Risk factors—Health, safety and environmental risks—Natural disasters, climate change, and disease outbreak could affect our business.”

In addition, the mining industry is labor-intensive, and our success depends to a significant extent on our ability and our contractors’ ability to attract, hire, train and retain qualified employees, including our ability and our contractors’ ability to attract employees with the necessary skills in the regions in which we operate. We could experience increases in our recruiting and training costs and decreases in our operating efficiency, productivity and profit margins if we are unable to attract, hire and retain a sufficient number of skilled employees to support our operations.

The failure of a tailings dam could negatively impact our business, reputation and results of operations, and the implementation of associated regulations and decommissioning processes may be expensive.

Mining companies face inherent risks in their operations of tailings dams—structures built for the containment of the mining waste, known as tailings—that exposes us to certain risks. Our tailings dams include, in some cases, materials that could increase the hazard potential in the event of unexpected failure. If any such risks were to occur, this could materially adversely affect our reputation and our ability to conduct our operations and could make us subject to liability and, as a result, have a material adverse effect on our business, financial position and results of operations.

In addition, the changes in regulation that may occur as a result of recent dam failures, like those that have occurred in Brazil, could increase the time and costs to build, operate, inspect, maintain and decommission tailings dams, obtain new licenses or renew existing licenses to build or expand tailings dams, or require the use of new technologies. New regulations may also impose more restrictive requirements that may exceed our current standards, including mandated compliance with emergency plans and increased insurance requirements, or require us to pay additional fees or royalties to operate tailings dams. We may also be required to provide for and facilitate the relocation of communities and facilities impacted by tailings dam failures. Moreover, insurance coverage for damages resulting from tailings dams' failure may not be available. For more information see "Information on the Company—Mining operations—Tailings disposal."

A disruption in zinc concentrate supply could have a material adverse effect on our production levels and financial results.

A portion of the zinc concentrate used by our smelters is obtained from third parties, and we may be adversely affected if we are not able to source adequate supplies of zinc for such operations. In 2019, 47.6% of the zinc concentrate used by our smelters was obtained from third parties, with the remainder supplied by our own mining operations. The availability and price of zinc concentrate used by our smelters may be negatively affected by several factors largely beyond our control, including interruptions in production in our mines or by our suppliers, decisions by suppliers to allocate supplies of concentrate to other purchasers, price fluctuations and increasing transport cost. In addition, the efficiency of a smelter's production over time is affected by the mix of the zinc concentrate qualities it processes. In circumstances where we cannot source adequate supplies of the zinc concentrate qualities that comprise the most efficient mix for our smelters, alternative types of concentrate may be available, but the use thereof may increase our costs of production or reduce the productivity of our smelters and adversely affect our business, results of operations and financial position.

Inadequate supply of zinc secondary feed materials and zinc calcine could affect the results of our smelters.

Zinc sourced from suppliers of secondary feed materials represented approximately 17.6% of the zinc content used by our Juiz de Fora smelter in 2019. The use of zinc secondary feed material is a competitive advantage in relation to the use of zinc concentrate, mainly due to lower acquisition costs and, to a lesser extent, operational gains. In addition, we have recently incorporated zinc calcine processed by third parties into our operations to increase the production in our smelters. Our smelters then use this zinc calcine processed by third parties to produce additional refined zinc products that they would not produce were they to rely solely on other inputs. To the extent we are unable to obtain adequate supplies of zinc secondary feeds or zinc calcine, or if we must pay higher than anticipated prices of these inputs, our business, results of operations and financial position may be adversely affected.

Interruptions of energy supply or increases in energy costs may materially adversely affect our operations.

Energy is an important component of our production costs. In Peru, we obtain electric power for our operations from third parties through electricity supply contracts. Although we have recently entered into a long-term power purchase agreement with Electroperú S.A., we cannot assure you that we will have secure access to energy sources in Peru at the same prices and conditions in the event of any interruption or failure of our sources of electricity, failures or congestion in any part of the SEIN (*Sistema Eléctrico Interconectado Nacional*) or any failure to renew or extend our other existing electricity supply contracts.

In Brazil, we obtain electric power for our operations from hydroelectric plants grouped into several legal entities—which are directly or indirectly jointly owned by us, our controlling shareholder and its affiliates—pursuant to long-term power purchase agreements. Although these hydroelectric plants currently provide 96.9% of our estimated consumption of electricity, any unavailability or shortages of electrical power or other energy sources and interruptions of energy supply may have a material adverse impact on our results of operations. Furthermore, our energy costs under these agreements could increase in the event of differences in the hydrology forecast due to these hydroelectric plants paying additional levies. For more information, see “Information on the Company—Other operations—Power and energy supply.”

The prices for and availability of energy resources for our operations may be subject to change or curtailment due to, among other things, new laws or regulations, the imposition of new taxes or tariffs, supply interruptions, equipment damage, worldwide price levels, market conditions and any inability to renew our existing supply contracts. Disruptions in energy supply or increases in costs of energy resources could have a material adverse effect on our financial position and results of operations.

Shortages of water supply, explosives, critical spare parts, maintenance service and new equipment and machinery may materially adversely affect our operations and development projects.

Our mining operations require the use of significant quantities of water for extraction activities, processing and related auxiliary facilities. Water usage, including extraction, containment, and recycling requires appropriate permits, which are granted by regulatory authorities in Brazil and Peru. The available water supply may be adversely affected by shortages or changes in governmental regulations. We cannot assure that water will be available in sufficient quantities to meet our future production needs or will prove sufficient to meet our water supply needs. In addition, we cannot assure shareholders that we will maintain our existing licenses related to water rights. A reduction in our water supply could materially adversely affect our business, results of operations and financial position. In addition, we have not yet obtained the water rights to support some of our expansion projects, and our inability to obtain those rights could prevent us from pursuing those expansions.

In addition to water, our mining operations require intensive use of equipment and machinery as well as explosives. To be able to acquire and use explosives, we must first obtain the corresponding authorizations, which are granted by the relevant regulatory authorities in Brazil and Peru. A shortage in the supply of key spare parts, adequate maintenance service, new equipment and machinery to replace old ones and cover expansion requirements, or explosives, including due to the inability to deliver such water, energy, supplies, critical spare parts, explosives, or equipment and machinery to our operations, could materially adversely affect our operations and development projects.

We may be adversely affected by labor disputes.

Mining is a labor-intensive industry. We depend on more than 12,000 workers, including employees and contractors, to carry out our operations. A portion of our employees are unionized. We cannot assure that we will not experience work slowdowns, work stoppages, strikes or other labor disputes in the future, particularly in the context of the annual renegotiation of our collective bargaining agreements.

We may also be affected by labor-related disputes that broadly develop in the countries in which we operate. Strikes and other labor disruptions at any of our operations could have a material adverse effect on our business, financial position and results of operations.

We may be liable for certain payments to individuals employed by third-party contractors.

Under Peruvian law, outsourcing of employees from third-party contractors is permitted if certain requirements are met. To the extent that such requirements are not met, we may be jointly liable for all mandatory employment benefits and may be required to pay workers used under an outsourcing scheme with profit-sharing benefits as if they were employed directly by us. Moreover, we may be required to consider such persons employed by third-party contractors as our employees. Although we believe that we are in material compliance with Peruvian labor laws, we cannot assure shareholders that any proceedings initiated by outsourced employees will be resolved in our favor and that we will not be liable for any mandatory employment benefits or for profit-sharing benefits. See “Information on the Company—Regulatory matters—Peruvian regulatory framework.”

Under Brazilian law, outsourcing is also permitted if certain requirements are met. In addition, Brazilian law provides that the contractor will be held liable on a secondary basis if the outsourced or subcontracted companies do not fulfill their labor obligations. In cases where the outsourced or subcontracted companies do not pay the workers the labor sums they are entitled to, the contractor is responsible for those payments. These payments may have an adverse effect on our results of operation and financial position. Recent changes to Brazilian labor laws have affected outsourcing, and we cannot predict how these changes will be further regulated and applied by local authorities and interpreted by Brazilian labor courts. If outsourcing becomes more restrictive or costly because of these new laws, our cash flow may be reduced, affecting our financial position and results of operations. See “Information on the Company—Regulatory matters—Brazilian regulatory framework.”

We may be subject to misconduct by our employees or third-party contractors.

We may be subject to misconduct by our employees or third-party contractors, such as theft, bribery, sabotage, fraud, insider trading, violation of laws, slander or other illegal actions. Any such misconduct may lead to fines or other penalties, slow-downs in production, increased costs, lost revenues, increased liabilities to third parties, impairment of assets or harmed reputation, any of which may have a material adverse effect on our business, results of operations or financial position.

The nature of our business includes risks related to litigation and administrative proceedings that could materially adversely affect our business and financial performance in the event of unfavorable rulings.

The nature of our business exposes us to various litigation matters, including civil liability claims, environmental matters, health and safety matters, regulatory and administrative proceedings, governmental investigations, tort claims, contract disputes, labor matters and tax matters, among others. We cannot assure shareholders that these or other legal proceedings will not have a material adverse effect on our ability to conduct our business or on our financial position and results of operations, through distraction of our management team, diversion of resources or otherwise. In addition, although we establish provisions as we deem necessary in accordance with IFRS as issued by the IASB, the amount of provisions that we record could vary significantly from any amounts we actually pay, due to the inherent uncertainties in the estimation process.

We could be harmed by a failure or interruption of our information technology systems or automated machinery, including system security breaches or other cybersecurity attacks.

We rely on our information technology systems and automated machinery to effectively manage our production processes and operate our business. Any failure of our information technology systems and automated machinery to perform as we anticipate could disrupt our business and result in production errors, processing inefficiencies and the loss of sales and customers, which in turn could result in decreased revenue, increased overhead costs and excess or out-of-stock inventory levels resulting in a material adverse effect on our business results.

In recent years, cyberattacks and other tactics designed to gain access to and exploit sensitive information by breaching mission critical systems of large organizations have increased in volume and sophistication. We are dependent on internal information, and we are vulnerable to failure of these systems, including through system security breaches, data protection breaches or other cybersecurity attacks. We could be exposed to a cyberattack through an internal breach from servers connected to our internal network or an external breach due to disruptions from unauthorized access to our systems, which could impact our ability to operate our existing systems. If these events occur, including a cyberattack causing critical data loss or the disclosure or use of confidential information, the exposure of such information could have a material adverse effect on our reputation and market value, which could adversely impact our results of operations.

In addition, data privacy is subject to frequently changing rules and regulations. The European Union’s General Data Protection Regulation, or GDPR, took effect in 2018 and introduced increased regulations relating to personal data security. The GDPR requires companies to satisfy new requirements regarding the handling of personal and sensitive data, including its use, protection and the ability of persons whose data is stored to correct or delete such data about themselves. In 2018, the Brazilian president signed Law No. 13,709 (*Lei Geral de Proteção de Dados*), or LGPD, a comprehensive data protection law. The LGPD establishes detailed rules for the collection, use, processing and storage of personal data and is expected to affect all economic sectors, including the relationship between customers and suppliers of goods and services, employees and employers and other relationships in which personal data is collected, whether in a digital or physical environment. The LGPD is scheduled to take effect in August 2020. Any noncompliance with the GDPR, the LGPD or any other cybersecurity and data privacy regulations could result in proceedings or actions against us by governmental entities, the imposition of fines or penalties and damage to our reputation, which could have an adverse effect on us and our business, reputation and results of operations.

Financial risks

Our financial position and results of operations may be materially adversely affected by currency exchange rate fluctuations.

Our revenues are primarily denominated in U.S. dollars, and certain portions of our operating costs, principally labor costs, are denominated in *reais* and *soles*. Accordingly, when inflation in Brazil and Peru increases without a corresponding devaluation of the *real* or *sol*, our financial position, results of operations and cash flows could be materially adversely affected.

Given the structure of our operations, a decrease in the value of the U.S. dollar relative to the foreign currencies in which we incur costs generally could have a negative impact on our results of operations or financial position. Our foreign currency exposures increase the risk of volatility in our financial position, results of operations and cash flows. We cannot assure shareholders that currency fluctuations, or costs associated with our hedging activities (including fluctuations in exchange rates contrary to our expectations), will not have an impact on our financial position and results of operations.

Fluctuations in interest rates could increase the cost of servicing our debt and negatively affect our overall financial performance.

Some of our indebtedness bears interest based on variable interest rates, including the London Interbank Offered Rate, or LIBOR. Such variable rates have fluctuated in response to changes in economic growth, monetary policy and governmental regulation. A significant increase in underlying interest rates, particularly in LIBOR, could have a material adverse effect on our financial expenses and materially adversely affect our overall financial performance. In July 2017, the Financial Conduct Authority announced its intention to phase out LIBOR by the end of 2021. It is not possible to predict the effect of any changes in the methods by which LIBOR is determined or regulatory activity related to LIBOR's phase out. Any of these developments could cause LIBOR to perform differently than in the past or cease to exist. There is a possibility that the Secured Overnight Financing Rate, or SOFR, could replace LIBOR. SOFR, which is based on transactions in the U.S. treasury repurchase market, may deviate significantly from LIBOR, and could have a material adverse effect on our financial investments and LIBOR-linked indebtedness. We may also have to amend our debt instruments to reflect the change from LIBOR to SOFR.

In addition, some of our financial investments bear interest based on variable interest rates, including LIBOR; the Interbank Deposit Certificate (*Certificado de Depósito Interbancário*), or CDI rate; and the Brazilian Central Bank's System for Settlement and Custody (*Sistema Especial de Liquidação e Custódia*) rate, or the SELIC rate. A significant reduction in any of these rates could materially adversely impact the financial income that we derive from our interest-earning assets and therefore our business, financial position and results of operations.

We engage in hedging activity which may not be successful and may result in losses to us.

We may use foreign exchange and metal commodity non-deliverable forwards to reduce the risk associated with currency and metal price volatility. However, our hedging activities could cause us to lose the benefit of an increase in the prices of the metals we produce if they increase over the price level of hedge positions, or the benefit of an increase in the currency price. The cash flows and the mark-to-market values of our production hedges can be affected by factors such as the volatility of currency and the market price of metals, which are not under our control.

Our hedging agreements contain events of default and termination events that could lead to early close-outs of our hedges such as failure to pay, breach of the agreement, misrepresentation, default under our loans or other hedging agreements and bankruptcy. In the event of an early termination of our hedging agreements, the relevant hedge positions would be required to be settled at that time. In that event, there could be a lump sum payment to be made either to or by us. The magnitude and direction of such a payment would depend upon, among other things, the characteristics of the particular hedge instruments that were terminated and the relevant market prices at the time of termination. Any of the factors described above could have a material adverse effect on our financial position, results of operations or cash flows. See “Operating and financial review and prospects—Risk management—Financial risk—Metal price sensitivity.”

Our business requires substantial capital expenditures and is subject to financing risks.

Our business is capital intensive. Exploration for and exploitation of mineral deposits, maintenance of machinery and equipment and compliance with applicable laws and regulations require substantial capital expenditures. We must continue to invest capital to maintain and potentially expand our existing brownfield operations, develop our greenfield projects pipeline in order to sustain and grow production, in addition to carrying out investments in sustaining, health, safety, and environment. In 2019, we invested US\$410.3 million in capital expenditures. We depend partially on our cash flows for maintenance of capital expenditures. See “Information on the Company—Capital expenditures.”

No assurance can be given that we will be able to maintain our production levels or generate sufficient cash flow, capitalize on a sufficient amount of our net income or have access to sufficient investments, loans or other financing alternatives to finance our capital expenditure program at a level necessary to sustain and grow our current exploration and exploitation activities. Any equity or debt financing, if available, may not be on terms that are favorable to us. If our access to external financing is limited, we may not be able to execute our strategy, which could adversely affect our business, financial position and results of operations.

We are exposed to credit risk in relation to our contractual and trading counterparties as well as to hedging and derivative counterparty risk.

We are subject to the risk that the counterparties with whom we conduct our business (in particular our customers) and who are required to make payments to us are unable to make such payment in a timely manner or at all. Credit risk is present in our hedging operations, customer operations and cash management operations. If amounts that are due to us are not paid or not paid in a timely manner, this may impact not only our current trading and cash-flow position but also our financial and business position. In addition, our derivatives, metals hedging, and foreign currency and energy risk management activities expose us to the risk of default by the counterparties to such arrangements. Any such default could have a material adverse effect on our business, financial position and results of operations.

Any acquisitions we make may not be successful or achieve the expected benefits.

We regularly consider and evaluate opportunities to acquire assets, companies and operations. There can be no assurance that we will be able to successfully integrate any acquired assets, companies or operations. In addition, any additional debt we incur to finance an acquisition may materially adversely affect our financial position and results of operations. If future acquisitions are significant, they could change the scale of our business and expose us to new geographic, political, operating and financial risks.

Changes in the assumptions underlying the carrying amount of certain assets could result in impairment charges.

We periodically test whether our tangible and intangible assets have suffered any impairment, in accordance with the accounting policy stated in our consolidated financial statements. If our estimates of the recoverable amount of an asset change or are inaccurate, we may determine that impairment charges are necessary. While impairment does not affect reported cash flows, the decrease in the recoverable amount determined could have a material adverse effect on our results of operations. Assurances cannot be given as to the absence of significant impairment charges in future periods, particularly if market conditions deteriorate.

Risks related to our mineral reserves

Our estimates of mineral reserves may be materially different from mineral quantities we actually recover, and commodity-price fluctuations and changes in operating and capital costs may render certain mineral reserves uneconomical to mine.

There is a degree of uncertainty attributable to the estimation of mineral reserves. Until reserves are actually mined and processed, the quantity and grades must be considered as estimates only. The mineral reserves described in this report are estimated tonnages and grades that we have determined can be economically mined and processed under present and assumed future conditions. We may be required in the future to revise our mineral reserves estimates based on actual production experience, projects, updated exploration drilling data and other factors, and we cannot assure that the indicated amount and grade of mined and processed material will be recovered or that it will be recovered at the rates we anticipate. Market prices of our metals, increased production costs, increased required capital costs, reduced recovery rates, short-term operating factors, royalties, taxes, fees and other factors may render some or all proven and probable mineral reserves uneconomic to exploit and may ultimately result in a reduction of mineral reserves. Our Morro Agudo mine, as well as our greenfield projects, do not have estimated mineral reserves under Industry Guide 7.

We depend on our ability to replenish our mineral reserves for our long-term viability.

Mineral reserves data are only indicative of future results of operations at the time the estimates are prepared and are depleted as we mine. We use several strategies to replenish and increase our mineral reserves, including exploration activities and the acquisition of mining concessions. We cannot assure that we will be able to continue with our strategy to replenish mineral reserves indefinitely. If we are unable to replenish our mineral reserves, our business, results of operations and prospects would be materially adversely affected.

Our mineral exploration efforts are highly speculative in nature and may be unsuccessful.

Mineral exploration is highly speculative in nature, involves many uncertainties and risks and is frequently unsuccessful. It is performed to demonstrate the dimensions, position and mineral characteristics of mineral deposits, estimate mineral reserves, assess amenability of the deposit to mining and processing scenarios and estimate potential deposit value. Substantial expenditures are required to establish proven and probable mineral reserves to determine processes to extract the metals and, if required, to construct mining and processing facilities and obtain the rights on the land and resources required to develop the mining activities. Therefore, once mineralization is discovered, it may take several years from the initial exploration phases before production is possible, during which time the potential feasibility of the project may change adversely.

Health, safety and environmental risks

Health, safety, and environmental laws and regulations, including regulations pertaining to climate change, may increase our costs of doing business, restrict our operations or result in the imposition of fines or revocation of permits.

Our mining activities are subject to Brazilian and Peruvian laws and regulations, including health and safety and environmental matters. Additional matters subject to legislation include, but are not limited to, transportation, mineral storage, water use and discharge, use of explosives, hazardous and other non-hazardous waste, and reclamation and remediation measures. Our operations are subject to periodic inspections and special inspections in certain circumstances by governmental authorities and consultation with local communities. Compliance with these laws and regulations and new or existing regulations that may be applicable to us in the future could increase our operating costs and adversely affect our financial results of operations and cash flows.

Regulatory and industry response to climate change or other controls on greenhouse gas emissions, including limits on emissions from the combustion of carbon-based fuels, controls on effluents and restrictions on the use of certain materials, could significantly increase our operating costs and affect our customers. Ongoing international efforts to address greenhouse gas emissions consist of controlling activities that may increase the atmospheric concentration of greenhouse gases. International agreements, like the Paris Agreement and Kyoto Protocol, are in different stages of negotiation and implementation. The measures included in such agreements may result in an increase of costs related to the installation of new controls aimed at reducing greenhouse gas emissions, the purchase of credits or licenses for atmospheric emissions and the monitoring and registration of greenhouse gas emissions generated by our operations. These measures could adversely affect our business, financial position and results of operations. The potential impact of climate change on our operations is highly uncertain and would be particular to the geographic circumstances of our facilities and operations. It may include changes in rainfall patterns, water shortages, rising sea levels, changing storm patterns and intensities and changing temperatures. These effects may materially adversely impact the cost, production and financial performance of our operations.

Pursuant to applicable environmental regulations and laws, we could be found liable for all or substantially all the damages caused by mining activities at our current or former facilities or those of our predecessors at disposal sites. We could also be found liable for all incidental damages due to the exposure of individuals to hazardous substances or other environmental damage. We cannot assure shareholders that our costs of complying with current and future environmental and health and safety laws and regulations, including decommissioning and remediation requirements, and any liabilities arising from past or future releases of, or exposure to, hazardous substances will not materially adversely affect our business, financial position and results of operations.

Natural disasters, climate change, and disease outbreaks could affect our business.

Natural disasters could significantly damage our mining and production facilities and infrastructure and may cause a contraction in sales to countries adversely affected due to, among other factors, power outages and the destruction of industrial facilities and infrastructure. In particular, the Central Andean region, where two of our mines are located, is prone to mudslides and earthquakes of varying magnitudes. Due to the El Niño weather phenomenon, Peru recently experienced extreme weather conditions that led to flooding and mudslides and which adversely affected our operations. In the past, extreme flooding and mudslides in Peru have interrupted the supply of metal concentrates from our mines and the supply of zinc products to our plants. The physical impact of climate change on our business remains uncertain, but we are likely to experience changes in rainfall patterns, increased temperatures, water shortages, rising sea levels, lower water levels in rivers due to natural or operational conditions, increased storm frequency and intensity as a result of climate change, which may adversely affect our operations. Although we have insurance covering damages caused by natural disasters, extensive damage to our facilities and staff casualties due to natural disasters could materially adversely affect our ability to conduct our operations and, as a result, reduce our future operating results.

Epidemic or pandemic outbreaks could affect our workforce health and safety, reducing our operational capacity or productivity, disrupting transportation networks and supply chains, or reducing customer demand. It remains unclear how and to what extent the recent coronavirus COVID-19 global outbreak will impact our business and the global economy in general. Authorities in the countries in which we operate have implemented policies in response to the outbreak, such as the state of emergency recently declared by the Peruvian government. However, as of the date of this report, we cannot predict the range of policies that will be pursued or the impact these will have on our business and operations. We continue to monitor developments related to this outbreak as of the day of this report.

Political, economic, social and regulatory risks

Political, economic and social conditions in the countries in which we have operations or projects could adversely impact our business, financial condition results of operations and the trading price of our securities.

Political, economic and social conditions in the countries in which we have operations or projects may negatively affect our financial performance. Our business, financial position and results of operations may be affected by the general conditions of the Peruvian, Brazilian and other national political conditions, economies, economic recessions, price instability, exchange rate volatility, inflation, interest rates, and domestic regulatory and taxation policies. There can be no assurance that the countries in which we operate will not face political, economic or social problems in the future or that these problems will not increase the volatility of the price of securities of issuers with operations in those countries, like us, or interfere with our ability to service our indebtedness.

In all these countries, we are exposed to various additional risks over which we have no control, such as social unrest, bribery, cyberattacks, extortion, corruption, robbery, sabotage, kidnapping, civil strife, terrorism, acts of war and guerilla activities. These issues may adversely affect the economic and other conditions under which we operate in ways that could have a materially negative effect on our business.

Recent and potential changes in commercial and mining laws may significantly impact our mining operations.

In 2017, the Brazilian federal government enacted, and the Brazilian congress approved, provisional measures that provided for significant changes to the regulatory framework of the Brazilian mining industry. Two of the measures were subsequently converted into law: a measure amending the terms of the mining royalty known as CFEM (*Compensação Financeira pela Exploração de Recursos Minerais*) and a measure creating a new mining agency, the ANM (*Agência Nacional de Mineração*). These and other changes to the Brazilian regulatory framework that could be enacted in the future may result in an increase in our expenses, particularly mining royalties. In addition, any changes in the interpretation of any Brazilian mining laws and regulations, including changes to our concession agreement and changes in commercial rules and protections, may increase our compliance, operational or other costs. For additional information, see “Information on the Company—Regulatory matters—Brazilian regulatory framework—Mining rights and regulation of mining activities.”

Our mineral rights may be terminated or not renewed by governmental authorities.

Our business is subject to extensive regulation in Brazil and Peru, including with respect to acquiring and renewing the required authorizations, permits, concessions and/or licenses from the relevant governmental regulatory bodies. We have obtained, or are in the process of obtaining, all material authorizations, permits, concessions and licenses required to conduct our mining and mining-related operations.

In Brazil, we may need to renew exploration authorizations related to our Brazilian mining operations 60 days prior to their expiration date if we determine that we continue to have an economic or business interest in the area. If we fail to demonstrate the existence of technical and economically viable mineral deposits in an area covered by an exploration authorization, we may be required to return it to the federal government. The federal government may then grant exploration authorizations to other parties that may conduct other mineral prospecting activities at said area. With respect to mining concessions, there is no renewal requirement once we have obtained such concession. However, we must continue to assess the mineral potential of each mining concession to determine if the costs of maintaining the related exploration authorizations and mining concessions are justified by the results of operations to date. If such costs are not justified and we abandon the mine or suspend the mining activities without the formal consent of the regulatory authority for a period more than six months, we may lose the respective mining concessions. Alternatively, we may elect to withdraw or assign some of our exploration authorizations or mining concessions.

In Peru, once mineral concessions are granted they may not be revoked as long as the titleholder complies with two obligations, including payment of an annual fee and either achievement of the minimum annual production target or expenditure of the equivalent amount in exploration or investments before the statutory deadline. If the production, expenditure or investment targets are not met, a statutory penalty must be paid. Accordingly, mineral concessions will lapse automatically if any of these obligations are not met within the statutory terms given to do so. Mining concessions in Peru may be terminated if the concessionaire does not comply with its obligations.

These authorizations, permits, concessions and environmental licenses are subject to our compliance with conditions imposed and regulations promulgated by the relevant governmental authorities. While we anticipate that all required authorizations, permits, concessions and environmental licenses or their renewals will be granted as and when sought, there is no assurance that these items will be granted as a matter of course, and there is no assurance that new conditions will not be imposed in connection with such renewals. If we were to violate any of the foregoing laws and regulations or the conditions of our concessions, authorizations and environmental licenses, we may be subjected to substantial fines or criminal sanctions, revocations of operating permits or licenses and possible closings of certain of our facilities.

Our operations depend on our relations and agreements with local communities, and new projects require carrying out a prior consultation procedure.

There are several local communities that surround our operations in Brazil and Peru, most of which we have entered into agreements with that provide for the use of their land for our operations. We also interact with regional and local governments and depend on our close relations with local communities and such governments to carry out our operations. If our relations with the local communities and such governments were to deteriorate in the future, or the local communities do not comply with the existing agreements or renew them upon expiration, it could have a material adverse effect on our business, properties, operating results, financial position or prospects. In addition, a disruption in the relations between the local communities, governments and other parties may affect us indirectly.

Furthermore, to develop new projects in the countries in which we operate on land owned by, or in the possession of, third parties, we need to reach an agreement with such third parties to use that land. Any delay or failure to reach such agreements or obtain governmental approvals for our new projects could result in a material adverse effect on our business, properties, operating results, financial position or prospects.

Changes in tax laws may increase our tax burden and, as a result, could adversely affect our business, financial position and results of operations.

The Brazilian, Peruvian and Luxembourg governments from time to time implement changes to tax laws and regulations. Any such changes, as well as changes in the interpretation of such laws and regulations, may result in increases to our overall tax burden, which would negatively affect our profitability. Moreover, some tax laws may be subject to controversial interpretation by tax authorities, including, but not limited to, the regulation applicable to corporate restructurings. In the event an interpretation different than the one on which we based our transactions prevails, we may be adversely affected. We cannot assure shareholders that the Brazilian, Peruvian or Luxembourg governments will not implement additional changes to tax regulations in the future, which could adversely affect our business, financial position and results of operations.

Our business, financial position and results of operations may be adversely affected by inflation.

Certain of the countries in which we operate have in the past experienced high levels of inflation and may experience high levels of inflation in the future, which may impact domestic demand for our products. Inflationary pressures may curtail our ability to access international financial markets and may lead to further government intervention in the economy, including the introduction of government policies that may materially adversely affect the overall performance of the national economy of the countries in which we operate, which in turn may materially adversely affect us. We may not be able to adjust the prices we charge our customers to offset the effects of inflation on our cost structure. In addition, although the functional currency for our Peruvian operations is the U.S. dollar, high rates of inflation could increase our operating costs and adversely impact our operating margins if we are not able to pass the increased costs on to consumers.

We are subject to anti-corruption, anti-bribery and anti-money laundering laws and regulations in various jurisdictions. Any violations of any such laws or regulations could have a material adverse impact on our reputation and results of operations and financial position.

We are subject to anti-corruption, anti-bribery, anti-money laundering and other international laws and regulations and are required to comply with the applicable laws and regulations of Brazil, Peru, Luxembourg, Canada and the United States, among others. In addition, we are subject to economic sanctions regulations that restrict our dealings with certain sanctioned countries, individuals and entities. Our governance and compliance processes may not timely identify or prevent future breaches of legal, accounting or governance standards. We may be subject to instances of fraudulent behavior, corrupt practices and dishonesty by our affiliates, employees, directors, officers, partners, agents and service providers. Any violations by us of anti-bribery and anti-corruption laws, sanctions regulations or other standards could have a material adverse effect on our business, reputation, results of operations and financial position.

Political and social opposition to mining activities generally in the regions where we operate could adversely impact our business and reputation.

Disputes with communities where we operate may arise from time to time. In some instances, our operations and mineral reserves are located on or near lands owned or used by indigenous people or other groups of stakeholders. Some of our mining and other operations are in territories where title may be subject to disputes or uncertainties, or in areas claimed for agriculture or land reform purposes, which may lead to disagreements with organized social movements, local communities and the government. We may be required to consult and negotiate with these groups as part of the process to obtain licenses required to operate, to mitigate impact on our operations or to obtain access to their lands. Disagreements or disputes with local groups, including indigenous groups, organized social movements and local communities, could cause delays or interruptions to our operations, adversely affect our reputation or otherwise hamper our ability to develop our reserves and conduct our operations. Protesters have taken actions to disrupt our operations and projects, and they may continue to do so in the future, which may harm our operations and could adversely affect our business. In recent years, Peru has experienced protests against mining projects in several regions. On several occasions, local communities have opposed these operations and accused them of polluting the environment and hurting agricultural and other traditional economic activities. Social demands and conflicts could have a material adverse effect on our business and results of operations and the economy in general of the countries in which we operate.

Uncertainty in governmental agency interpretation or court interpretation and the application of such laws and regulations could result in unintended non-compliance.

The courts in some of the jurisdictions in which we operate may offer less certainty as to the judicial outcome of legal proceedings or a more protracted judicial process than is the case in more established economies. Businesses can become involved in lengthy court cases over simple issues when rulings are not clearly defined, and the poor drafting of laws and excessive delays in the legal process for resolving issues or disputes compound such problems. In addition, there may be limited or no relevant case law providing guidance on how courts would interpret such laws and the application of such laws to our contracts, joint ventures, licenses, license applications or other legal arrangements. Accordingly, there can be no assurance that contracts, joint ventures, licenses, license applications or other legal arrangements will not be adversely affected by the actions of government authorities and the effectiveness of and enforcement of such arrangements in these jurisdictions. Moreover, the commitment of local businesses, government officials and agencies and the judicial system in these jurisdictions to abide by legal requirements and negotiated agreements may be more uncertain and may be susceptible to revision or cancellation, and legal redress may be uncertain or delayed. These uncertainties and delays could have a material adverse effect on our business and results of operations.

Risks relating to our corporate structure

VSA has substantial control over us, which could limit our shareholders' ability to influence the outcome of important corporate decisions.

As of March 16, 2020, VSA owns 64.25% of our issued and outstanding common shares. As a result, VSA can influence or control matters requiring approval by our shareholders, including the election of directors, the allocation of profits, the appointment of external auditors and the approval of mergers, acquisitions or other extraordinary transactions. VSA may also have interests that differ from our other investors and may vote in a way with which our other shareholders disagree, and which may be adverse to the interests of our other investors.

In addition, we have entered into several shared services contracts and similar agreements with other entities in the Votorantim Group in order to achieve operational economies of scale. Since we rely on the Votorantim Group for negotiation, renewal and extension of these agreements, there can be no assurances that we will always have access to the services procured pursuant to these agreements at the same prices and conditions. See “Share ownership and trading—Related Party Transactions.”

Dividends or other distributions paid by us on our common shares will generally be subject to Luxembourg withholding tax.

Any dividends or other distributions paid by us on our common shares will be subject to a Luxembourg withholding tax at a rate of 15.0% unless an exemption or reduction in rate applies. The withholding tax must be withheld from the gross distribution and paid to the Luxembourg tax authorities. Under certain circumstances, distributions as share capital reductions or share premium reimbursements may not be subject to withholding tax, but there are no assurances that we will be able to make such distributions in the future. See “Additional Information—Taxation—Luxembourg tax considerations—Shareholders.”

The rights of our shareholders, and the responsibilities of VSA as our controlling shareholder, are governed by Luxembourg law and differ in some respects from the rights and responsibilities of shareholders under the laws of other jurisdictions, including the United States and Canada, and shareholders may have more difficulty protecting their interests than they would as shareholders of a U.S. or Canadian corporation.

Our corporate affairs are governed by our articles of association and by the laws governing limited liability companies organized under the laws of Luxembourg, as well as such other applicable local law, rules and regulations. The rights of our shareholders and the responsibilities of VSA as our controlling shareholder and of our directors and officers under Luxembourg law are different from those applicable to a corporation incorporated in the United States. There may be less publicly available information about us than is regularly published by or about U.S. or Canadian issuers. Also, Luxembourg regulations governing the securities of Luxembourg companies may not be as extensive as those in effect in the United States or Canada, and Luxembourg law and regulations in respect of corporate governance matters may not be as protective of non-controlling shareholders as corporation laws in the United States or Canada. Therefore, shareholders may have more difficulty protecting their interests in connection with actions taken by us, our directors and officers or our principal shareholders than they would as shareholders of a corporation incorporated in the United States or Canada.

Our ability to make distributions on our common shares is subject to a number of factors and conditions.

The determination to pay dividends and the payment of dividends or other distributions (including reimbursements of share premium) will be subject to the approval of our board of directors and/or our shareholders, as applicable, and will depend on a number of factors, including, but not limited to, our cash balance, cash flow, earnings, capital investment plans, expected future cash flows from operations, our strategic plans and cash dividend distributions from our subsidiaries, as well as restrictions imposed by applicable law and contractual restrictions (although as of the date of this report there are no contractual restrictions on our ability to pay dividends or other distributions to our shareholders), and other factors our board of directors may deem relevant at the time. Luxembourg law also imposes certain requirements regarding distributions. For additional information, see “Share ownership and trading—Distributions.”

We are a holding company and have no material assets other than our ownership of shares in our subsidiaries. When we pay a dividend or other distribution on our common shares in the future, we generally cause our operating subsidiaries to make distributions to us in an amount sufficient to fund any such dividends or distributions. Although as of December 31, 2019, there are no material contractual restrictions on our subsidiaries’ ability to make distributions to us, their ability to do so is subject to their capacity to generate sufficient earnings and cash flow and may also be affected by statutory accounting and tax rules in Brazil and Peru.

It could be difficult for investors to enforce any judgment obtained outside Luxembourg against us or any of our associates.

We are organized under the laws of Luxembourg. Furthermore, certain of our directors and officers reside outside the United States and Canada and most of their assets are located outside the United States and Canada. Most of our assets are located outside the United States. As a result, it may not be possible for investors to effect service of process upon us or our directors and officers within the United States, Canada or other jurisdictions outside Luxembourg or to enforce against us or our directors and officers judgments obtained in the United States, Canada or other jurisdictions outside Luxembourg. Because judgments of U.S. or Canadian courts for civil liabilities based upon the U.S. federal securities laws or Canadian securities laws may only be enforced in Luxembourg if certain requirements are met, investors may face greater difficulties in protecting their interest in actions against us or our directors and officers than would investors in a corporation incorporated in a state or other jurisdiction of the United States or Canada.

SELECTED FINANCIAL DATA

The following tables present our selected consolidated financial data for each of the periods and the dates indicated below.

The selected consolidated financial data should be read in conjunction with the consolidated financial statements included elsewhere in this report. Our consolidated financial statements have been prepared in accordance with IFRS.

	For the Year Ended December 31,				
	2019	2018	2017	2016	2015
	(in millions of US\$, unless otherwise indicated)				
Consolidated income statement information:					
Continuing operations					
Net revenues	2,332.3	2,491.2	2,449.5	1,964.8	1,865.2
Cost of sales	(1,944.7)	(1,888.9)	(1,752.8)	(1,504.2)	(1,533.3)
Gross profit	387.6	602.3	696.7	460.6	331.9
Operating expenses:					
Selling, general and administrative	(216.5)	(159.6)	(154.5)	(144.2)	(89.5)
Mineral exploration and project development	(113.0)	(126.3)	(92.7)	(46.7)	(34.6)
Impairment loss	(142.1)	(3.3)	—	—	—
Other income and expenses, net	(27.0)	21.5	(47.9)	(139.7)	(43.9)
Total operating expenses	(498.6)	(267.7)	(295.1)	(330.6)	(168.0)
Operating income (loss)	(111.0)	334.6	401.6	130.0	163.9
Financial income	37.6	67.5	29.9	25.0	19.3
Financial expenses	(129.6)	(121.7)	(106.2)	(70.4)	(61.6)
Foreign exchange (loss) gain, net	(12.9)	(148.5)	(53.9)	124.5	(299.6)
Net financial results	(104.9)	(202.7)	(130.2)	79.1	(341.9)
Share in the results of associates	—	—	0.1	(0.2)	(0.3)
(Loss) Income before income tax	(215.9)	131.9	271.5	208.9	(178.3)
Current income tax	(46.4)	(71.8)	(125.7)	(75.3)	(62.8)
Deferred income tax	103.3	30.9	19.5	(23.1)	101.5
Net income (loss) for the year from continuing operations	(159.0)	91.0	165.3	110.5	(139.6)
Discontinued operations	—	—	—	—	(0.3)
Net income (loss) for the year	(159.0)	91.0	165.3	110.5	(139.9)
Net income (loss) attributable to:					
Nexa Resources' shareholders	(146.6)	74.9	126.9	93.2	(129.5)
Non-controlling interests	(12.4)	16.1	38.4	17.3	(10.3)
Weighted average number of outstanding shares (in millions)	132.6	133.3	116.5	80.7	1.9
Basic and diluted earnings (loss) per share (in US\$)	(1.1)	0.6	1.1	1.2	(69.1)

Selected Financial Data

	As of December 31,				
	2019	2018	2017	2016	2015
	(in millions of US\$)				
Consolidated Balance Sheet Information:					
Assets					
Cash and cash equivalents	698.6	1,032.9	1,019.0	915.6	621.4
Financial investments	58.4	91.9	206.2	117.0	57.9
Inventory	295.3	269.7	324.9	291.8	230.6
Total current assets ⁽¹⁾	1,375.4	1,698.0	1,838.9	1,591.8	1,143.8
Property, plant and equipment	2,122.7	1,968.5	1,996.5	1,978.5	1,883.4
Intangible assets ⁽¹⁾	1,538.5	1,742.5	1,822.7	1,903.1	1,969.0
Total non-current assets	4,114.2	4,037.4	4,122.6	4,568.5	4,488.0
Total assets	5,489.6	5,735.4	5,961.5	6,160.6	5,657.2
Liabilities					
Loans and financing (current)	33.1	32.5	40.8	62.6	41.4
Trade payables	414.1	387.2	329.8	282.2	259.7
Total current liabilities	699.0	651.8	768.2	875.9	532.0
Loans and financing (non-current)	1,475.4	1,392.4	1,406.5	1,081.8	1,014.8
Total non-current liabilities	2,270.5	2,181.7	2,284.4	1,960.4	1,578.1
Total liabilities	2,969.5	2,833.6	3,052.6	2,836.2	2,128.7
Shareholders' equity					
Total equity attributable to owners of the parent	2,147.5	2,476.6	2,486.8	2,848.0	2,585.4
Non-controlling interests	372.6	425.2	422.1	476.3	943.1
Total shareholders' equity	2,520.1	2,901.9	2,908.9	3,324.3	3,528.5
Total liabilities and shareholders' equity	5,489.6	5,735.4	5,961.5	6,160.6	5,657.2

Consolidated Statement of Cash Flows Information	For the Year Ended December 31,				
	2019	2018	2017	2016	2015
	(in millions of US\$)				
Net cash provided by (used in):					
Operating activities	122.8	347.6	378.9	585.1	414.6
Investing activities	(335.4)	(158.1)	(328.4)	(201.5)	(156.7)
Financing activities	(119.3)	(177.4)	52.9	(92.2)	(385.9)
Effects of exchange rates on cash and cash equivalents	(2.5)	1.8	0.1	2.8	(1.3)
Increase (decrease) in cash and cash equivalents	(334.3)	13.9	103.5	294.2	(129.3)
Cash and cash equivalents at the beginning of the year	1,032.9	1,019.0	915.6	621.4	750.7
Cash and cash equivalents at the end of the year	698.6	1,032.9	1,019.0	915.6	621.4

	As of and For the Year Ended December 31,		
	2019	2018	2017
	(in millions of US\$, except financial ratios)		
Other Financial Information			
Depreciation and amortization	317.9	267.2	270.5
Interest paid on loans and financing	(71.8)	(74.6)	(58.6)
Adjusted working capital ⁽¹⁾	134.6	93.1	71.2
Adjusted EBITDA ⁽¹⁾	349.0	604.8	667.5
Adjusted EBITDA by segment ⁽¹⁾ :			
Mining	172.6	430.4	521.5
Smelting	180.0	174.8	152.7
Other ⁽²⁾	(3.6)	(0.4)	(6.8)
Total	349.0	604.8	667.5
Net debt (period end) ⁽¹⁾	787.8	302.8	225.1
Net debt to Adjusted EBITDA ratio ⁽¹⁾	2.3	0.5	0.3

- (1) See discussion below.
- (2) The line item “Other” represents the residual component of Adjusted EBITDA either not pertaining to the mining or smelting segments, or, represents items that, because of their nature, are not being allocated to a specific segment.

Non-IFRS measures and reconciliation

Our management uses non-IFRS measures such as Adjusted EBITDA, among other measures, for internal planning and performance measurement purposes. We believe these measures provide useful information about the financial performance of our operations that facilitates period-to-period comparisons on a consistent basis. Management uses Adjusted EBITDA internally to evaluate our underlying operating performance for the reporting periods presented and to assist with the planning and forecasting of future operating results. Management believes that Adjusted EBITDA is a useful measure of our performance because it reflects our cash generation potential from our operational activities excluding exceptional items of the period. These measures should not be considered individually or as a substitute for net income or operating income, as indicators of operating performance, or as alternatives to cash flow as measures of liquidity. Additionally, our calculation of Adjusted EBITDA and other non-IFRS measures may be different from the calculation used by other companies, including our competitors in the mining industry, so our measures may not be comparable to those of other companies.

In this report, we present Adjusted EBITDA, which we define as (i) net income (loss) for the period, adjusted by (ii) share in the results of associates, (iii) depreciation and amortization, (iv) net financial results, (v) income tax, (vi) gain (loss) on sale of investments, and (vii) impairment and impairment reversals. In addition, management may adjust the effect of certain types of transactions that in management's judgment are not indicative of our normal operating activities or do not necessarily occur on a regular basis.

A reconciliation of Adjusted EBITDA to our net income for the years indicated is presented below.

	For the Year Ended December 31,		
	2019	2018	2017
	(in millions of US\$)		
Reconciliation of Adjusted EBITDA:			
Net (loss) income for the year	(159.0)	91.0	165.3
(+) Share in the results of associates	—	—	(0.1)
(+) Depreciation and amortization	317.9	267.2	270.5
(-/+) Net financial results	104.9	202.7	130.2
(-/+) Income tax	(56.9)	40.9	106.2
(-/+) Exceptional items ⁽¹⁾	142.1	3.1	(4.5)
Adjusted EBITDA	349.0	604.8	667.5

(1) Exceptional items in 2019 included the recognition of a US\$142.0 million non-cash impairment loss related to the Cerro Pasco cash-generating unit.

We define Adjusted EBITDA by segment as (i) net income for the year, *plus* (ii) share in the results of associates, *plus* (iii) depreciation and amortization, *plus/less* (iv) net financial results, *plus/less* (v) income tax, *plus/less* (vi) exceptional items, which are composed of impairment of property, plant and equipment and miscellaneous adjustments. See Note 12(d) to our consolidated financial statements.

A breakdown of the Adjusted EBITDA by segment indicated is presented below.

	For the Year Ended December 31,		
	2019	2018	2017
	(in millions of US\$)		
Breakdown of Adjusted EBITDA by segment:			
Mining	172.6	430.4	521.5
Smelting	180.0	174.8	152.7
Other ⁽¹⁾	(3.6)	(0.4)	(6.8)
Adjusted EBITDA	349.0	604.8	667.5

(1) Represents the residual component of Adjusted EBITDA either not pertaining to the mining or smelting segments, or, represents items that, because of their nature, are not being allocated to a specific segment.

Selected Financial Data

We also present herein our net debt, which we define as (i) loans and financing *less* (ii) cash and cash equivalents, *less* (iii) financial investments, *plus/less* (iv) the fair value of derivative financial liabilities or assets, respectively. Our management believes that net debt is an important figure because it indicates our ability to repay outstanding debts that become due simultaneously using available cash and highly liquid assets.

A reconciliation of net debt to loans and financing as of December 31, 2019, 2018, and 2017 is presented below.

	As of December 31,		
	2019	2018	2017
	(in millions of US\$)		
Calculation of Net Debt:			
Loans and financing	1,508.6	1,424.9	1,447.3
Cash and cash equivalents	(698.6)	(1,032.9)	(1,019.0)
Derivative financial instruments	2.3	3.0	3.3
Lease liabilities	34.4	—	—
Financial investments	(58.8)	(92.2)	(206.5)
Net Debt	787.8	302.8	225.1

We define net debt to Adjusted EBITDA ratio as net debt divided by Adjusted EBITDA.

The calculation of our net debt to Adjusted EBITDA ratio for the periods indicated is presented below.

	As of and For the Year Ended December 31,		
	2019	2018	2017
	(in millions of US\$)		
Calculation of Net Debt to Adjusted EBITDA Ratio:			
Net debt (period end)	787.8	302.8	225.1
Adjusted EBITDA	349.0	604.8	667.5
Net Debt to Adjusted EBITDA Ratio	2.3	0.5	0.3

We define Adjusted EBITDA margin as Adjusted EBITDA divided by net revenues. The calculation of our Adjusted EBITDA margin for the periods indicated is presented below.

	For the Year Ended December 31,		
	2019	2018	2017
	(in millions of US\$)		
Calculation of Adjusted EBITDA Margin:			
Adjusted EBITDA	349.0	604.8	667.5
Net revenue	2,332.3	2,491.2	2,449.5
Adjusted EBITDA Margin	15.0%	24.3%	27.3%

We calculate adjusted working capital as (i) trade accounts receivable, *plus* (ii) inventory, *plus* (iii) other assets, *less* (iv) trade payables, *less* (v) confirming payable, *less* (vi) salaries and payroll charges, *less* (vii) other liabilities. Our management believes that adjusted working capital is an important figure because it provides a relevant metric for the efficiency and liquidity of our operating activities.

The calculation of our adjusted working capital derived from our consolidated financial statements as of December 31, 2019, 2018, and 2017 is presented below.

	As of December 31,		
	2019	2018	2017
	(in millions of US\$)		
Calculation of Adjusted Working Capital:			
Trade accounts receivable	177.2	173.2	182.7
Inventory	295.3	269.7	324.9
Other assets	285.7	243.3	171.8
Trade payables	(414.1)	(387.2)	(329.8)
Confirming payable	(82.8)	(70.4)	(111.0)
Other liabilities	(126.7)	(135.5)	(167.4)
Adjusted working capital	134.6	93.1	71.2

- (1) This amount relates to Other assets as presented in our consolidated financial statements.
- (2) This amount relates to the Other liabilities as presented in our consolidated financial statements.

Cash cost, net of by-product credits and related measures

In this report, we also present measures of costs that are widely used by peer companies operating in the mining and smelting industries. These performance measures are not IFRS measures, and they do not have a standard meaning and therefore may not be comparable to similar data presented by other mining and smelting companies. They should not be considered as a substitute for costs of sales, costs of selling and administrative expenses, or as an indicator of costs. Similar measures are also calculated by Wood Mackenzie for many market participants, but Wood Mackenzie's methodology differs from the methodology we use below.

Our management uses cash cost, net of by-product credits and related measures, among other measures, for internal planning and performance measurement purposes. We believe these measures provide useful information about the operational performance of our operations that facilitates period-to-period comparisons on a consistent basis.

In calculating cash cost, net of by-product credits, we account for transactions between our mining operations and our smelting operations using the same methodology we use to evaluate the performance of our mining and smelting segments. See Note 2 to our consolidated financial statements. We prepare an internal calculation based on transfer-pricing adjustments made on an arm's length principle basis. All information disclosed for cash cost, net of by-product credits is consistent with this methodology.

Mining operations

Cash cost, net of by-product credits: For our mining operations, cash cost, net of by-product credits includes all direct costs associated with mining, concentrating, leaching, solvent extraction, on-site administration and general expenses, any off-site services essential to the operation, concentrate freight costs, marketing costs and property and severance taxes paid to state or federal agencies that are not profit-related. Treatment and refining charges on metal sales, which are typically recognized as a deduction component of sales revenues, are added to cash cost. Cash cost is calculated on a contained zinc sold basis, which indicates the percentage of zinc in metal sold, after the deduction of by-product credits attributable to mining operations, such as copper, silver, gold, and lead, which are deducted from total cash cost.

Sustaining cash cost, net of by-product credits: Sustaining cash cost, net of by-product credits is defined as the cash cost, net of by-product credits *plus* non-expansion capital expenditure, including sustaining health, safety and environment, modernization and other non-expansion-related capital expenditures.

All-in sustaining cost, net of by-product credits: All-in sustaining cost (or AISC) is defined as sustaining cash cost, net of by-product credits *plus* corporate general and administrative expenses, royalties and workers' participation.

Our cash cost and AISC net of by-products credits are measured with respect to zinc sold.

For mining operations, we present below cash cost, net of by-product credits, sustaining cash cost, net of by-product credits and all-in sustaining cost and a reconciliation to our consolidated financial statements.

For the year ended December 31, 2019

	<u>Vazante</u>	<u>Morro Agudo</u>	<u>Cerro Lindo</u>	<u>El Porvenir</u>	<u>Atacocha</u>	<u>Consolidation of Operations</u>	<u>Corporate and Others⁽¹⁾</u>	<u>Mining</u>
Operations (in millions of US\$, unless otherwise indicated)								
Sales Volume (Zinc Contained in Concentrate)								
Tonnes	139,041	24,354	125,153	54,725	16,360	359,633	—	359,633
Cost of goods sold	90.9	62.6	369.3	171.6	112.3	806.7	(4.8)	802.0
On-site G&A	8.6	7.3	0.0	0.0	0.0	15.9	0.0	15.9
By-product credits	(6.4)	(19.2)	(270.5)	(84.6)	(70.8)	(451.5)	(0.3)	(451.7)
Treatment and refining charges	93.7	12.9	60.5	31.7	9.4	208.2	0.0	208.2
Selling expenses	0.3	1.7	3.0	0.7	0.5	6.1	0.0	6.1
Depreciation and amortization	(22.6)	(11.7)	(107.7)	(43.9)	(30.4)	(216.4)	(1.4)	(217.9)
Royalties	(1.7)	(1.5)	0.0	0.0	0.0	(3.2)	0.0	(3.2)
Workers participation & bonus	(1.8)	(0.9)	(8.5)	(1.9)	(0.5)	(13.6)	—	(13.6)
Others	(2.6)	(0.7)	(1.5)	1.5	(3.2)	(6.5)	—	(6.5)
Cash cost net of by-product credits (sold)	158.3	50.6	44.6	75.1	17.2	345.8	(6.5)	339.3
Cash cost net of by-product credits (sold) (US\$/tonne)	1,138.5	2,076.7	356.0	1,372.9	1,052.0	961.5	0.0	943.5
Non-expansion capital expenditure	42.7	12.8	50.5	32.9	11.8	150.8	3.7	154.5
Sustaining cash cost net of by-product credits	201.0	63.4	95.1	108.1	29.0	496.5	(2.8)	493.8
Sustaining cash cost net of by-product credits (sold) (US\$/tonne)	1,445.7	2,604.1	759.5	1,975.0	1,770.3	1,380.7	0.0	1,373.0
Workers participation & bonus	1.8	0.9	8.5	1.9	0.5	13.6	—	13.6
Royalties	1.7	1.5	0.0	1.7	1.0	5.9	—	5.9
Corporate G&A	—	—	—	—	—	—	90.5	90.5
AISC net of by-product credits (sold) ⁽²⁾	—	—	—	—	—	—	—	603.8
(US\$/tonne)	—	—	—	—	—	—	—	1,678.8

For the year ended December 31, 2018

	<u>Vazante</u>	<u>Morro Agudo</u>	<u>Cerro Lindo</u>	<u>El Porvenir</u>	<u>Atacocha</u>	<u>Consolidation of Operations</u>	<u>Corporate and Others⁽¹⁾</u>	<u>Mining</u>
Operations (in millions of US\$, unless otherwise indicated)								
Sales Volume (Zinc Contained in Concentrate)								
Tonnes	140,776	26,408	129,656	59,510	17,066	373,416	—	373,416
Cost of goods sold	77.3	45.1	336.9	158.8	92.9	711.1	(3.4)	707.8
On-site G&A	5.9	5.7	—	—	0.4	12.0	—	12.0
By-product credits	(7.4)	(17.7)	(290.0)	(73.3)	(57.2)	(445.7)	0.7	(444.9)
Treatment and refining charges	62.1	9.9	47.0	25.4	7.2	151.6	—	151.6
Selling expenses	—	0.9	0.8	0.9	0.3	3.0	—	3.0
Depreciation and amortization	(17.6)	(5.6)	(87.5)	(36.5)	(24.3)	(171.5)	(0.9)	(172.4)
Royalties	(1.7)	(1.5)	—	—	—	(3.2)	—	(3.2)
Workers participation & Bonus	(1.2)	(0.7)	(8.4)	(4.0)	(0.4)	(14.7)	0.0	(14.7)
Others	—	—	(5.4)	(0.3)	—	(5.7)	—	(5.7)
Cash cost net of by-product credits (sold)	117.5	36.0	(6.5)	71.0	19.0	237.0	(3.5)	233.5
Cash cost net of by-product credits (sold) (US\$/tonne)	834.5	1,363.8	(50.4)	1,192.9	1,115.5	634.7	—	625.3
Non-expansion capital expenditure	42.4	12.3	25.3	25.6	16.9	122.4	1.3	123.7
Sustaining cash cost, after by-product credits	159.8	48.3	18.7	96.6	35.9	359.4	(2.2)	357.2
Sustaining cash cost net of by-product credits (sold) (US\$/tonne)	1,135.5	1,829.5	144.3	1,623.2	2,105.5	962.5	—	956.7
Workers participation & bonus	1.2	0.7	8.4	4.0	0.4	14.7	(0.1)	14.5
Royalties	1.7	1.5	—	1.9	0.9	6.0	0.0	6.1
Corporate G&A	—	—	—	—	—	—	31.4	31.4
AISC net of by-product credits (sold) ⁽²⁾	—	—	—	—	—	—	—	409.3
(US\$/tonne)	—	—	—	—	—	—	—	1,096.0

(1) "Others" includes Enercan, inactive operations and non-operational provisions and reversals.

(2) Starting in 2018, certain expenses that were previously presented as General and administrative expenses and Other income and expenses, net in our income statement were reclassified as Mineral exploration and project development expenses. As a result of this change, we have adjusted our calculations of AISC.

For the year ended December 31, 2017

	<u>Vazante</u>	<u>Morro Agudo</u>	<u>Cerro Lindo</u>	<u>El Porvenir</u>	<u>Atacocha</u>	<u>Consolidation of Operations</u>	<u>Corporate and Others⁽¹⁾</u>	<u>Mining</u>
Operations (in millions of US\$, unless otherwise indicated)								
Sales Volume (Zinc Contained in Concentrate)								
Tonnes	135,379	20,969	156,034	45,564	17,038	374,984	—	374,984
Cost of goods sold	70.8	46.8	322.8	133.0	94.2	667.6	13.3	680.8
On-site G&A	5.3	3.0	—	—	—	8.4	—	8.4
By-product credits	(7.2)	(18.6)	(320.4)	(70.6)	(77.4)	(494.2)	(5.6)	(499.8)
Treatment and refining charges	78.5	10.1	66.8	23.3	8.3	186.9	—	186.9
Selling expenses	—	0.9	(0.6)	1.4	(0.3)	1.5	—	1.5
Depreciation and amortization	(15.1)	(6.1)	(92.2)	(32.6)	(24.9)	(170.8)	(0.2)	(171.1)
Royalties	(1.7)	(1.6)	—	—	—	(3.3)	—	(3.3)
Others	—	—	(5.8)	0.6	(3.2)	(8.3)	—	(8.3)
Cash cost net of by-product credits (sold)	130.7	34.5	(29.4)	55.1	(3.3)	187.6	7.4	195.0
Cash cost net of by-product credits (sold) (US\$/tonne)	965.3	1,644.3	(188.6)	1,210.2	(191.1)	500.3	—	520.1
Non-expansion capital expenditure	21.3	7.9	7.5	19.8	5.6	62.0	0.5	62.6
Sustaining cash cost, after by-product credits	152.0	42.3	(22.0)	74.9	2.4	249.6	8.0	257.6
Sustaining cash cost, net of by-product credits (sold) (US\$/tonne)	1,122.5	2,019.0	(140.8)	1,644.6	139.5	665.7	—	686.9
Workers participation & bonus	1.8	0.8	25.3	3.4	1.1	32.4	—	32.4
Royalties	1.7	1.6	—	1.4	1.2	5.9	—	5.9
Corporate G&A	—	—	—	—	—	—	31.5	31.5
AISC net of by-product credits (sold) ⁽²⁾	—	—	—	—	—	—	0.0	327.3
(US\$/tonne)	—	—	—	—	—	—	0.0	872.7

(1) "Others" includes Enercan, inactive operations and non-operational provisions and reversals.

(2) Starting in 2018, certain expenses that were previously presented as General and administrative expenses and Other income and expenses, net in our income statement were reclassified as Mineral exploration and project development expenses. As a result of this change, we have adjusted our calculations of AISC.

Smelting operations

Cash cost, net of by-product credits: For our smelting operations, cash cost, net of by-product credits includes all the costs of smelting, including costs associated with labor, net energy, maintenance, materials, consumables and other on-site costs, as well as raw material costs. Cash cost is calculated on a contained zinc sold basis after the deduction of by-product credits attributable to smelting operations.

Sustaining cash cost, net of by-product credits: Sustaining cash cost, net of by-product credits is defined as the cash cost, after by-product credits *plus* non-expansion capital expenditure, including sustaining health, safety and environment, modernization and other non-expansion-related capital expenditures.

All-in sustaining cost, net of by-product credits: All-in sustaining cost is defined as sustaining cash cost, net of by-product credits *plus* general and administrative expenses and workers' participation.

Our cash cost and AISC net of by-products credits are measured with respect to zinc sold.

For our smelting operations, we present below cash cost, net of by-product credits, sustaining cash cost, net of by-product credits and all-in sustaining cost and a reconciliation to our consolidated financial statements.

For the year ended December 31, 2019

	Três Marias	Juiz de Fora	Cajamarquilla	Consolidation of Operations	Corporate and Others⁽¹⁾	Smelting
	(in millions of US\$, unless otherwise indicated)					
Sales Volume (Zinc Contained in Products)						
Tonnes	186,470	85,411	340,293	612,185	—	612,185
Cost of goods sold	456.5	242.3	956.3	1,655.1	—	1,655.062
Cost of services rendered	(11.0)	(4.0)	(40.4)	(55.4)	—	(55.4)
On-site G&A	5.3	5.0	16.0	26.3	0.2	26.5
Depreciation and amortization	(19.1)	(15.1)	(63.8)	(98.0)	—	(98.0)
By-product credits	(12.6)	(19.1)	(108.9)	(140.6)	—	(140.6)
Workers participation & Bonus	(1.7)	(1.2)	(3.8)	(6.6)	(0.0)	(6.6)
Others	(8.0)	(4.5)	0.0	(12.5)	0.0	(12.5)
Cash cost, net of by-product credits (sold)	409.4	203.5	755.4	1,368.3	0.2	1,368.5
Cash cost, net of by-product credits (sold) (per tonne)	2,195.6	2,382.1	2,219.9	2,235.1	—	2,235.4
Non-expansion capital expenditure	26.9	18.7	18.2	63.8	3.8	67.6
Sustaining cash cost, net of by-product credits	436.3	222.1	773.6	1,432.1	4.0	1,436.1
Sustaining cash cost net of by-product credits (sold) (per tonne)	2,339.8	2,600.9	2,273.4	2,339.3	—	2,345.9
Workers' participation	1.7	1.2	3.8	6.6	0.0	6.6
Corporate G&A	0.0	0.0	0.0	0.0	58.5	58.5
AISC net of by-product credits (sold) ⁽²⁾	0.0	0.0	0.0	0.0	—	1,501.2
AISC net of by-product credits (sold) (per tonne)	—	—	—	—	—	2,452.2

For the year ended December 31, 2018

	<u>Três Marias</u>	<u>Juiz de Fora</u>	<u>Cajamarquilla</u>	<u>Consolidation of Operations</u>	<u>Corporate and Others⁽¹⁾</u>	<u>Smelting</u>
	Operations (in millions of US\$, unless otherwise indicated)					
Sales Volume (Zinc Contained in Products)						
Tonnes	197,372	78,106	332,036	607,514	—	607,514
Cost of goods sold	587.7	240.6	1,067.3	1,895.6	(16.9)	1,878.8
Cost of services rendered	(11.5)	(3.5)	(35.9)	(50.8)	—	(50.8)
On-site G&A	4.3	6.6	15.4	26.3	2.2	28.4
Depreciation and amortization	(15.6)	(13.1)	(64.8)	(93.6)	(1.2)	(94.8)
By-product credits	(14.4)	(23.0)	(75.6)	(113.1)	3.8	(109.3)
Workers participation & Bonus	(0.9)	(1.0)	(1.5)	(3.4)	(0.0)	(3.4)
Others	—	—	—	—	—	—
Cash cost net of by-product credits (sold)	549.6	206.5	905.0	1,661.0	(12.1)	1,648.9
Cash cost net of by-product credits (sold) (per tonne)	2,784.6	2,643.4	2,725.5	2,734.1	—	2,714.2
Non-expansion capital expenditure	38.7	20.6	19.3	78.6	6.8	85.5
Sustaining cash cost net of by-product credits	588.3	227.1	924.3	1,739.7	(5.3)	1,734.4
Sustaining cash cost net of by-product credits (sold) (per tonne)	2,980.7	2,907.5	2,783.6	2,863.6	—	2,854.8
Workers' participation	0.9	1.0	1.5	3.4	0.2	3.6
Corporate G&A	—	—	—	—	52.8	52.8
AISC net of by-product credits (sold) ⁽²⁾	—	—	—	—	—	1,790.7
AISC net of by-product credits (sold) (per tonne)	—	—	—	—	—	2,947.6

(1) "Others" includes Enercan, inactive operations and non-operational provisions and reversals.

(2) Starting in 2018, certain expenses that were previously presented as General and administrative expenses and Other income and expenses, net in our income statement were reclassified as Mineral exploration and project development expenses. As a result of this change, we have adjusted our calculations of AISC.

For the year ended December 31, 2017

	<u>Três Marias</u>	<u>Juiz de Fora</u>	<u>Cajamarquilla</u>	<u>Consolidation of Operations</u>	<u>Corporate and Others⁽¹⁾</u>	<u>Smelting</u>
	Operations (in millions of US\$, unless otherwise indicated)					
Sales Volume (Zinc Contained in Products)						
Tonnes	191,158	81,330	312,009	584,497	—	584,497
Cost of goods sold	527.4	235.5	959.8	1,722.6	24.1	1,746.8
Cost of services rendered	(9.3)	(4.0)	(37.3)	(50.6)	1.2	(49.4)
On-site G&A	3.8	2.8	15.5	22.2	2.0	24.2
Depreciation and amortization	(14.4)	(14.9)	(67.4)	(96.7)	(2.7)	(99.4)
By-product credits	(12.4)	(18.6)	(56.6)	(87.6)	(6.4)	(94.0)
Cash cost net of by-product credits (sold)	495.2	200.8	814.0	1,510.0	—	1,528.2
Cash cost net of by-product credits (sold) (per tonne)	2,590.5	2,468.4	2,608.9	2,583.4	—	2,614.6
Non-expansion capital expenditure	43.5	17.5	20.0	81.0	5.4	86.4
Sustaining cash cost net of by-product credits	538.7	218.2	834.0	1,591.0	—	1,614.6
Sustaining cash cost net of by-product credits (sold) (per tonne)	2,818.3	2,683.5	2,673.0	2,722.0	—	2,762.4
Workers' participation	2.0	1.6	1.7	5.2	—	5.2
Corporate G&A	—	—	—	—	63.3	63.3
AISC net of by-product credits (sold) ⁽²⁾	—	—	—	—	—	1,683.1
AISC net of by-product credits (sold) (per tonne)	—	—	—	—	—	2,879.6

(1) "Others" includes Enercan, inactive operations and non-operational provisions and reversals.

(2) Starting in 2018, certain expenses that were previously presented as General and administrative expenses and Other income and expenses, net in our income statement were reclassified as Mineral exploration and project development expenses. As a result of this change, we have adjusted our calculations of AISC.

I. INFORMATION ON THE COMPANY

BUSINESS OVERVIEW

Overview

We are a leading large-scale, low-cost integrated zinc producer with over 60 years of experience developing and operating mining and smelting assets in Latin America.

We operate and own five long-life polymetallic mines, three located in the Central Andes of Peru and two located in the state of Minas Gerais in Brazil. Our operations are large-scale, modern, mechanized underground and open pit mines. Our mines are proximately located to one another, which creates efficiencies. Two of our mines, Cerro Lindo in Peru and Vazante in Brazil, are among the top 20 largest zinc-producing mines in the world and, combined with our other mining operations, placed us among the top five producers of mined zinc globally in 2019, according to Wood Mackenzie. In addition to zinc, which accounted for 64.0% of our mined metal production in 2019 measured on a zinc equivalent basis, we produce substantial amounts of copper, lead, silver and gold as by-products, which reduce our overall costs to produce mined zinc. We are also building our sixth underground mine in Brazil, the Aripuanã project. Aripuanã is an underground polymetallic project containing zinc, lead and copper, located in the state of Mato Grosso, with estimated future annual zinc production of 66.7 thousand tonnes. We expect Aripuanã to be commissioned during 2021.

In 2019, our mining operations produced 361.1 thousand tonnes of zinc contained in concentrates, 38.2 thousand tonnes of copper contained in concentrates, 51.3 thousand tonnes of lead contained in concentrates, 8,901.0 thousand ounces of silver and 25.0 thousand ounces of gold, for a total of 564.2 thousand tonnes of metal on a zinc equivalent basis.

We also own a zinc smelter in Peru (Cajamarquilla) and two zinc smelters in Brazil (Três Marias and Juiz de Fora), which produce metallic zinc, zinc oxide and several by-products. We were the fifth largest producer of refined zinc globally in 2019, according to Wood Mackenzie. Our smelters are the only units in Latin America (excluding Mexico), resulting in benefits from higher premiums. Cajamarquilla is the only operating zinc smelter in Peru and was the fifth largest globally in 2019 by production volume, according to Wood Mackenzie. Peru is the second largest producer of mined zinc in the world, assuring long-term supply of zinc concentrates to Cajamarquilla. Given our proximity to concentrate producers (our own mines and third-party producers), we also benefit from freight parity.

Our smelters produced 624.0 thousand tonnes of zinc metal in different formats and sizes during 2019, along with by-products, including sulfuric acid, silver concentrate, copper cement and copper sulfate. Our smelters process zinc concentrate, 52.4% of which was sourced from our mines during 2019, and 47.6% purchased from third parties or obtained as secondary raw material. Approximately 97.8% of the total volume of the contained zinc in concentrates produced by our mines was processed by our own smelters in 2019, with the remainder and all our copper and lead concentrates sold to third parties. We market our products in Latin America and globally, through our commercial offices in Luxembourg, the United States, Brazil and Peru. We also own energy assets (hydroelectric power plants) in both Brazil and Peru, which provide access to a reliable and competitive power supply.

History

We commenced operating in 1956 under the name “Companhia Mineira de Metais”, in the state of Minas Gerais, Brazil. After a series of restructurings in the subsequent fifty-eight years, in 2014, a new corporate governance model was implemented by our controlling shareholder VSA in the corporate group. VSA took on the roles of providing guidance and portfolio management, while its subsidiaries (including us) gained autonomy. The main consequence of this new corporate model was that the new governance structure demanded a higher level of empowerment and accountability of senior management, and the establishment of a board of directors at each company. In addition, in connection with the implementation of the new corporate governance model, VSA’s equity participations in Nexa CJM (formerly Votorantim Metais – Cajamarquilla S.A.) and Nexa Brazil (formerly Votorantim Metais Zinco S.A.) were transferred to Nexa Resources on June 18, 2014 and July 1, 2014, respectively.

In 2016, VSA reorganized the zinc, copper, aluminum and nickel businesses previously managed under the name Votorantim Metais S.A. The aluminum and nickel businesses of Votorantim Metais S.A. were consolidated under Companhia Brasileira de Alumínio, or CBA. The zinc and copper production units in Brazil and Peru were transferred to Nexa Resources. Following this reorganization, Nexa Resources became the holding entity solely responsible for the zinc and copper business and CBA became responsible for the aluminum and nickel businesses.

In October 2017, we completed our initial public offering and listed our common shares on the New York Stock Exchange and Toronto Stock Exchange under the ticker symbol NEXA. In connection with becoming a public company, VM Holding S.A. changed its corporate name to Nexa Resources S.A. and our subsidiaries Votorantim Metais—Cajamarquilla S.A., Votorantim Metais Zinco S.A. and Compañía Minera Milpo S.A.A. changed their corporate names to Nexa CJM, Nexa Brazil and Nexa Peru, respectively.

In 2018, our board of directors approved the beginning of construction of the Aripuanã greenfield project, an underground polymetallic project containing zinc, lead and copper, located in the state of Mato Grosso, Brazil. We estimate that Aripuanã will have a 13 year mine life with the potential to extend this period. We also believe that we can achieve synergies with our other operations in Brazil including our smelters.

In 2019, we launched the construction phase of the Aripuanã project, and have made progress with respect to developing the mine plan, underground development, building the project infrastructure, procurement and training, among others. In addition, we acquired full ownership of the Aripuanã project through our acquisition of Karmin Exploration Inc. (“Karmin”), which previously indirectly held a 30.0% interest in the Aripuanã project. For additional information, please see “Information on the Company—Mining operations—Greenfield projects—Aripuanã.”

Corporate structure and Principal Subsidiaries

Nexa CJM

Currently, Nexa Resources is the beneficial owner of 99.92% of the outstanding shares of Nexa CJM, and the remaining outstanding shares are owned by Nexa Recursos Minerais S.A. with 0.09% and by other minority shareholders holding 0.001% in aggregate.

Nexa Peru

Currently, Nexa Peru’s share capital consists of 1,309,748,288 common shares. In addition to common shares, Nexa Peru has issued investment shares that represent a participation in its net worth (*patrimonio*). Although the investment shares do not represent a participation in the capital of the company nor grant any voting rights, they grant their holders the right, among others, to participate in any dividend distributions and liquidation proceeds, pro rata to the percentage they represent in the total net worth of Nexa Peru; as well as to participate in any capital increases (in order to maintain the participation they represent in the total net worth) and the right to have their shares redeemed in certain circumstances. As of December 31, 2019, approximately 67.0% of the investment shares are free float and 33.0% are treasury shares.

Both the common shares and the investment shares of Nexa Peru are registered with the Peruvian Public Registry of Securities (*Registro Público del Mercado de Valores*) and listed on the Lima Stock Exchange. As a result, Nexa Peru is required to comply with certain disclosure obligations such as filing quarterly and annual financial statements, reporting on material events (*hechos de importancia*) and disclosing information regarding the economic group to which it belongs.

The following table sets forth information concerning the ownership of the capital stock of Nexa Peru, excluding the investment shares.

Shareholder	Number	Share Capital (%)
Nexa CJM	1,048,621,896	80.06%
Nexa Resources	2,277,601	0.17%
Public float	206,854,856	15.79%
Treasury shares	51,993,935	3.97%
Total	1,309,748,288	100.0%

Nexa Brazil

On February 1, 2019, VSA contributed its outstanding shares in Nexa Brazil to Nexa Resources by means of a share premium contribution without issuance of shares. As a result of such contribution, Nexa Resources is the beneficial owner of 100% of the outstanding shares of Nexa Brazil. This transaction was pre-approved at our annual shareholders' meeting of June 28, 2018, subject to certain regulatory approvals obtained in September 2018.

VGmbH

During 2018, we started the process of liquidating our subsidiary Votorantim GmbH, or VGmbH. We concluded the liquidation on July 11, 2019.

Producing mines and smelters

Our mines are:

- **Cerro Lindo.** Our Cerro Lindo mine is an underground mine located in Peru wholly-owned by Nexa Peru. Operations began in 2007 and, in 2019, the Cerro Lindo mine produced approximately 126.3 thousand tonnes of zinc contained in concentrates, 37.7 thousand tonnes of copper contained in concentrates, 12.3 thousand tonnes of lead contained in concentrates, 3,250.5 thousand ounces of silver contained in concentrates and 4.5 thousand ounces of gold contained in concentrates. The ore is treated at a concentrate plant that has a processing capacity to 21.0 thousand tonnes of ore per day.
- **El Porvenir.** Our El Porvenir mine is an underground mine located in Peru wholly-owned by Nexa Resources El Porvenir S.A.C. Operations began in 1949 and, in 2019, El Porvenir mine produced approximately 54.7 thousand tonnes of zinc contained in concentrates, 0.5 thousand tonnes of copper contained in concentrates, 16.9 thousand tonnes of lead contained in concentrates, 3,412.7 thousand ounces of silver contained in concentrates and 11.2 thousand ounces of gold contained in concentrates. The ore is treated at a concentrate plant that has a processing capacity of 6.5 thousand tonnes of ore per day.
- **Atacocha.** Our Atacocha mine is an underground and open pit mine located in Peru wholly-owned by Nexa Resources Atacocha S.A.A. (formerly Compañía Minera Atacocha). Operations began in 1938 and, in 2019, the Atacocha mine produced approximately 16.7 thousand tonnes of zinc contained in concentrates, 0.04 thousand tonnes of copper contained in concentrates, 16.5 thousand tonnes of lead contained in concentrates, 1,882.1 thousand ounces of silver contained in concentrates and 9.3 thousand ounces of gold contained in concentrates. The ore is treated at a concentrate plant that has a processing capacity of 4.5 thousand tonnes of ore per day.
- **Vazante.** Our Vazante mine is an underground and open pit mine located in Brazil wholly-owned by Nexa Brazil. Operations began in 1969 and, in 2019, the Vazante mine produced approximately 139.0 thousand tonnes of zinc contained in concentrates, 1.0 thousand tonnes of lead contained in concentrates and 333.1 thousand ounces of silver contained in concentrates. The ore is treated at a concentrate plant that has a processing capacity of 4.1 thousand tonnes of ore per day. During the fourth quarter of 2019, repairs of the trunnion used in the concentration plant caused Vazante's processing capacity to be temporarily reduced for 30 days by a total of 8.4 thousand tonnes of zinc in concentrate while the repairs were taking place. Operations resumed in November 2019.
- **Morro Agudo.** Our Morro Agudo is an underground and open pit mine located in Brazil wholly-owned by Nexa Brazil. Operations began in 1988 and, in 2019, the Morro Agudo mine produced approximately 24.4 thousand tonnes of zinc contained in concentrates, 4.7 thousand tonnes of lead contained in concentrates and 22.6 thousand ounces of silver contained in concentrates. The ore mill feed material is treated at a concentrate plant that has a processing capacity of 3.4 thousand tonnes per day.

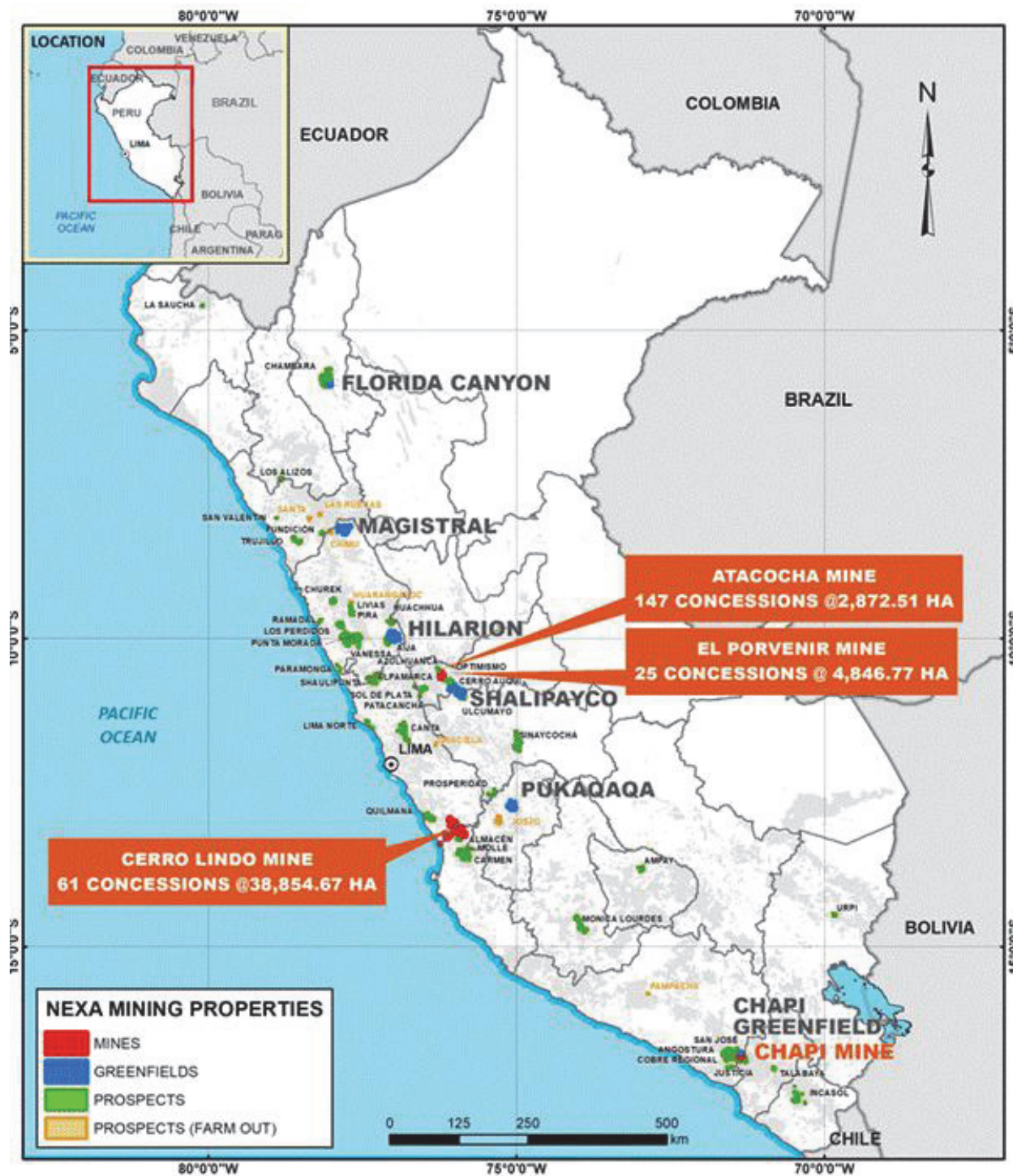
Our smelters are:

- **Cajamarquilla.** Our Cajamarquilla smelter, which is wholly-owned by Nexa CJM, is located in Peru and began operating in 1981. It is currently the largest zinc smelter in Latin America and was the fifth largest zinc smelter in the world in 2019, according to Wood Mackenzie. Cajamarquilla uses Roast-Leach-Electrowinning technology. With a nominal production capacity of 344.4 thousand tonnes of contained zinc per year, Cajamarquilla produced 340.4 thousand tonnes of zinc metal available for sale in 2019 and 330.8 thousand tonnes in 2018. In 2019, 36.9% of the zinc contained in raw material used by Cajamarquilla was sourced from our mines in Peru and 63.1% was purchased from third parties.
- **Três Marias.** Our Três Marias smelter, which is wholly-owned by Nexa Brazil, is located in Brazil and began operating in 1969. Três Marias processes zinc silicate concentrate from our Vazante mine and zinc sulfide concentrate from our Morro Agudo mine and uses Roast-Leach-Electrowinning technology. With a nominal production capacity of 192.2 thousand tonnes per year, Três Marias produced 197.5 thousand tonnes of zinc metal available for sale in 2019 and 207.8 thousand tonnes in 2018. In 2019, 83.5% of the zinc contained in raw materials used by Três Marias was sourced from our mining operations in Brazil and Peru and 16.5% was purchased from third parties or obtained from secondary feed materials.
- **Juiz de Fora.** Our Juiz de Fora smelter, which is wholly-owned by Nexa Brazil, is located in Brazil and began operating in 1980. This smelter uses Roast-Leach-Electrowinning and Waelz Furnace technologies. With a nominal production capacity of 96.9 thousand tonnes per year, Juiz de Fora produced 86.2 thousand tonnes of zinc metal available for sale in 2019 and 78.9 thousand tonnes in 2018. In 2019, 42.0% of the zinc raw material consumption by Juiz de Fora was zinc concentrate sourced from our mining operations, 40.5% was purchased from third parties and 17.6% was obtained from secondary feed materials from electric arc furnace (EAF) and brass oxide.

In addition to our mines and smelters, we have interests in five greenfield mining projects in Peru (Shalipayco, Magistral, Hilarión, Pukaqaqa and Florida Canyon Zinc) and two in Brazil (Aripuanã and Caçapava do Sul). For more information about these projects, please see “Information on the Company—Mining operations—Growth projects.”

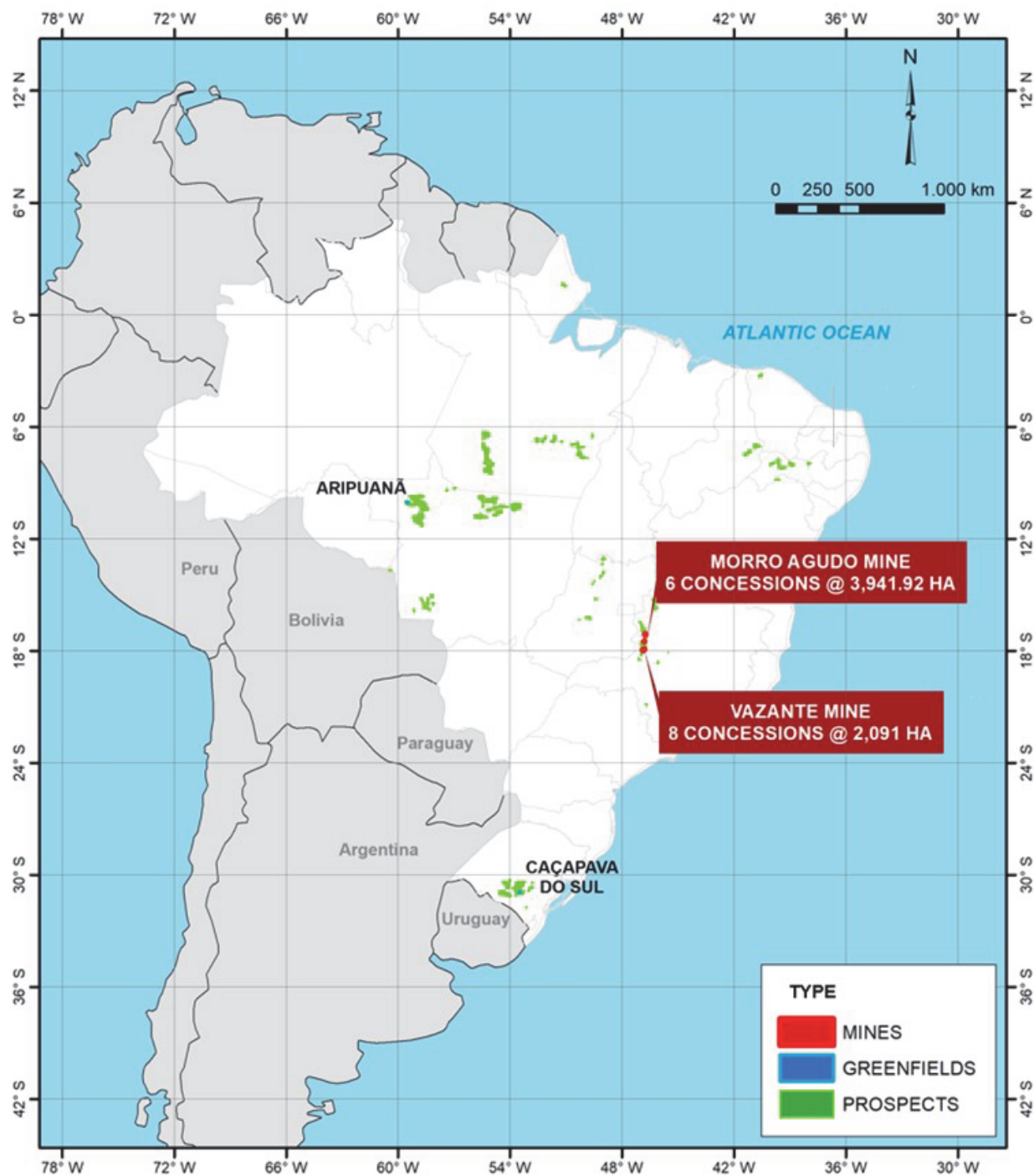
MINING OPERATIONS

Map 1. Mines, Projects and Prospects in Peru



Source: Nexa Resources.

Map 2. Mines, Projects and Prospects in Brazil



Source: Nexa Resources.

The following table summarizes our concentrate production, metal contained in concentrate production in each metal and zinc equivalent production in each of our mines.

To calculate the zinc equivalent production for the years ended December 31, 2019, 2018 and 2017, we convert the relevant metal contained in concentrate production used in the zinc equivalent grade based on the average benchmark prices for 2019, namely, US\$2,546.3 per tonne (US\$1.15 per pound) for zinc, US\$5,999.7 per tonne (US\$2.72 per pound) for copper, US\$1,999.7 per tonne (US\$0.91 per pound) for lead, US\$16.2 per ounce for silver and US\$1,392.6 per ounce for gold.

	For the Year Ended December 31,		
	2019	2018	2017
Treated Ore (in tonnes)	13,001,535	13,051,365	13,014,894
Mining Production—Metal Contained in Concentrate			
Zinc (in tonnes)	361,061	372,793	375,402
Copper (in tonnes)	38,184	39,029	44,161
Lead (in tonnes)	51,349	52,267	52,572
Silver (in oz) ⁽¹⁾	8,900,995	7,992,167	7,945,778
Gold (in oz)	24,955	29,224	32,534
Mining Production—Zinc Equivalent Production			
Cerro Lindo (in tonnes of zinc equivalent)	247,832	254,235	294,982
El Porvenir (in tonnes of zinc equivalent)	96,901	93,682	78,548
Atacocha (in tonnes of zinc equivalent)	46,757	48,986	51,456
Vazante (in tonnes of zinc equivalent)	141,958	144,187	139,011
Morro Agudo (in tonnes of zinc equivalent)	30,765	33,821	27,414
Total	564,214	574,910	591,411

(1) Silver volumes include silver in lead concentrate produced in Vazante.

The following table summarizes the average ore grade for the periods indicated.

	For the Year Ended December 31,		
	2019	2018	2017
Average Ore Grade			
Zinc (%)	3.16	3.27	3.30
Copper (%)	0.37	0.38	0.42
Lead (%)	0.52	0.53	0.53
Silver (in ounces per tonne)	0.94	0.91	0.96
Gold (in ounces per tonne)	0.006	0.005	0.006

Each mine consists of one mine, one treatment plant and related infrastructure. We summarize below information as of December 31, 2019 for each of our five mines.

Cerro Lindo

Location and means of access

The Cerro Lindo mine is an underground, polymetallic mine located in the Chavín District, Chincha Province, Peru, approximately 268km southeast of Lima and 60km from the coast. Access from Lima is available via the paved Pan American Highway south to Chincha, and then via an unpaved road up the Topara River valley to the mine site. Internal roadways connect the various mine-site components. The site is located at an average elevation of 2,000 meters above sea level.

History

Several companies have held interests in the Cerro Lindo mine area, including BTX, Phelps Dodge, and Nexa Peru. Exploration work completed to date includes geological mapping, rock chip and soil sampling, trenching, ground geophysical surveys, and exploration, definition and underground operational core drilling. Feasibility studies were completed in 2002 and 2005, with mine construction commencing in 2006. Formal production started in 2007, and the mine has been operational since that date.

Title, leases and options

All mineral concessions are held in the name of Nexa Peru. The tenure consists of 61 mining concessions and one beneficiation concession, totaling approximately 38,854.7 hectares.

Nexa Peru currently holds surface rights or easements for the following infrastructure at Cerro Lindo: the mine site, access roads, power transmission lines, a water pipeline for the mine, a desalination plant, a water process plant and a water pipeline from the desalination plant to the mine site. There is sufficient suitable land available within the mineral tenure held by Nexa Peru for tailings disposal, mine waste disposal and installations such as the process plant and related mine infrastructure.

Cerro Lindo is not currently subject to mining royalties. When the current tax stability agreement expires in 2021, Nexa Peru will be required to pay levies to the Peruvian government for 2022. For more information, see “Information on the Company—Regulatory matters—Peruvian regulatory framework.” As of December 31, 2019, Nexa Peru had a total of six water licenses, one for use of seawater, and the remaining five for ground water extraction.

Mineralization

Cerro Lindo is classified as a volcanogenic massive sulfide (or VMS) deposit. The Cerro Lindo deposit is 1,500 meters long, 1,000 meters wide, and has a current vertical development of 470 meters below the surface. Mineralization consists of at least 10 discrete mineralized zones. The Cerro Lindo deposit comprises lens-shaped massive bodies, composed of pyrite (50.0% to 90.0%), yellow sphalerite, brown sphalerite, chalcopyrite, and minor galena. Significant barite is present mainly in the upper portions of the deposit. A secondary-enrichment zone, composed of chalcocite and covellite, has formed near the surface where massive sulfides have oxidized. Silver-rich powdery barite remains at the surface as a relic of sulfide oxidation and leaching.

During 2019, we completed approximately 107.5km of diamond drilling, divided between exploratory and infill drilling. We began drilling activities in the Orcocobre region, north of the Topara River and 2km from the Cerro Lindo mine. By the end of 2019, we had drilled 48.5km in 83 diamond drill holes, distributed between surface and underground drilling in the exploratory program. Our brownfield drilling program confirmed the presence of a favorable hydrothermal alteration zone at Orcocobre and the northern extension of the mineralization in orebody 3-4. Both are characteristic of a VMS system, the same type of mineralization found at the known mineralized bodies of Cerro Lindo mine. All our newly discovered deposits are currently located south of the Topara River.

During 2020, we expect to complete a total of 35.0km of diamond drilling, including 8.9km of exploratory drilling and 26.1km for the extension of known mineralized zones, prioritizing the resource definition of orebody 8 and the northern continuity of orebody 13.

In 2019, we spent US\$7.3 million in exploration expenses for Cerro Lindo, primarily associated with diamond drilling, geochemistry analysis, EM geophysical survey and geological research works. We have budgeted US\$5.6 million for mineral exploration expenses in 2020.

On December 18, 2019, we published the results of an updated Technical Report on Cerro Lindo dated December 3, 2019 including updated Mineral Resources and Mineral Reserves estimates prepared in accordance with NI 43-101 (as of July 31, 2019 with a drilling cut-off date of April 30, 2019) based on an improved geological model capturing the mineralization complexity of Cerro Lindo.

Operations and infrastructure

The Cerro Lindo mine is completely mechanized, using rubber-tired equipment for all development and production operations. There is no shaft; all access is through 15 portals servicing adits, drifts and declines. Ore is extracted from nine separate ore bodies and delivered to the process plant via a series of conveyors. All ore is commingled during transport to the concentrator stockpile; ore from different ore bodies is not segregated.

We have completed construction of all key infrastructure required for mining and processing operations, including the underground mine, access roads, power lines, water pipelines, the desalination plant, offices and warehouses, accommodations, the process plant/concentrator, conveyor systems, waste rock facilities, temporary ore stockpiles, the paste-fill plant and the dry-stack tailings storage facilities. A new freshwater pipeline from the desalination plant on the coast to the mine was completed in February 2020 and is operational. The national grid supplies electrical power for the mine site.

In 2019, we spent US\$50.5 million on sustaining capital expenditures for Cerro Lindo, primarily associated with mine development, equipment replacement and other major infrastructure projects.

Production

The Cerro Lindo mine has a treatment plant capacity of 21,000 tonnes of ore per day. The Cerro Lindo unit has an authorized capacity of 20,000 tonnes of ore per day, but Peruvian law allows units to operate at a capacity 5.0% higher than their authorized capacity.

The table below summarizes the Cerro Lindo mine's concentrate production, metal contained in concentrates produced and average grades for the periods indicated.

	As of and for the Year Ended December 31,		
	2019	2018	2017
Treatment ore (in tonnes)	6,799,747	6,914,653	7,297,624
Average ore grade			
Zinc (%)	2.05	2.07	2.33
Copper (%)	0.64	0.64	0.69
Lead (%)	0.25	0.25	0.27
Silver (ounces per tonne)	0.69	0.69	0.69
Gold (ounces per tonne)	0.002	0.002	0.002
Metal contained in concentrates production			
Zinc (in tonnes)	126,310	130,349	155,950
Copper (in tonnes)	37,678	38,338	43,568
Lead (in tonnes)	12,256	12,761	14,837
Silver (in oz)	3,250,479	3,343,551	3,545,824
Gold (in oz)	4,458	4,129	4,022
Cash Cost, net of by-product credits (in US\$/t)	356.0	(50.4)	(188.6)
Cash Cost, net of by-product credits (in US\$/lb)	0.16	(0.02)	(0.09)
Capital Expenditures (in millions of US\$)	50.5	25.9	7.5

El Porvenir

Location and means of access

El Porvenir mine is an underground, polymetallic mine located in the district of San Francisco de Asís de Yarusyacán, in the province of Pasco, Peru. The property is located in the central Andes mountains region of Peru, at approximately 4,200 meters above sea level. The mine is situated at kilometer 340 of the Carretera Central Highway (Lima—Huánuco route), 13km from the city of Cerro de Pasco. The mine is located in the Central Cordillera zone, which contains the communities of Parán, Lacsanga and Santo Domingo de Apache.

History

The El Porvenir mine began its operation as small-scale artisanal mine in 1949. We have been investing in the mine since then and, in 2012, production reached its current capacity of 5,600ktpd. In 2013, we commenced the integration process with the Atacocha mine. In 2015, as part of the second stage of integration, El Porvenir tailings deposit was integrated with Atacocha's. In 2016, we worked on integrating the energy supply between the two mines, which was the third stage of integration.

As of December 31, 2019, we continue the process of integrating our El Porvenir and Atacocha mine operations. The two underground mines were connected allowing us to initiate an exploration program in the integration area. For additional information on the integration of the El Porvenir and Atacocha mines, see "Information on the Company—Mining operations—Growth projects—Pasco mining complex" below.

Title, leases and options

El Porvenir mine is owned by Nexa Resources Peru, S.A.C., a subsidiary of Nexa Peru in which Nexa Peru has a 99.99% equity interest.

El Porvenir mine has a total of 25 concessions covering approximately 4,846.8 hectares, as well as a beneficiation plant, "Acumulacion Aquiles 101." With respect to the surface property at El Porvenir project, there is a mining site of 450.8 hectares, where the mining concession is located, as well as additional surface property where tailings dams/ponds, camps sites and other ancillary infrastructure are located.

Mining operations at El Porvenir mine are subject to certain royalties payable by Nexa Resources El Porvenir S.A.C. For more information, see "Information on the Company—Regulatory matters—Peruvian regulatory framework—Royalties and other taxes on mining activities."

Mineralization

El Porvenir mine is a typical skarn deposit. The mineralization occurs within the contact of the upper Triassic limestone (*i.e.*, exoskarn) and the granodioritic-dacitic intrusive rocks (*i.e.*, endoskarn). There are also recognized veins and replacement manto type, minor disseminated mineralization may occur within the intrusive units. West of the Milpo-Atacocha fault within the Goyllarisquizga Group, mineralization is characterized as veins and disseminations.

Four groups of vein/mineralized structures are reported. Structurally controlled veins are sub-vertical up to 150 meters long, with a vertical extent of 350 meters. Economic mineralogy is mostly comprised of galena, sphalerite, and tetrahedrite, as well as variable and lesser pyrite, quartz and rhodochrosite.

In 2019, we completed approximately 86.5km of diamond drilling, divided between exploratory and infill drilling. The 2019 exploration program at El Porvenir was directed to increasing mineral resources, drilling the high-altitude zones of the mine (at the 3,700 meter level) and looking for new mineralized zones. The exploration program identified zinc, lead, copper, silver, and gold mineralization along the strike, based on the underground drilling program in the targets Sara, Don Lucho, Angélica, Éxito and Integración Sur, which are open for expansion.

We spent approximately US\$5.1 million on the El Porvenir brownfield project in 2019, including in exploration project maintenance and geological activities. In 2019, we drilled 152 drill holes totaling 47.8km at El Porvenir. We have budgeted US\$2.7 million for the project during 2020 and we expect to drill 20km.

Operations and infrastructure

Most of the exploration is generally conducted simultaneously with underground development, which involves diamond core drilling and channel sampling following underground drifting.

El Porvenir project site consists of an underground mine, tailings pond, waste rock stockpiles, a process facility with associated laboratory and maintenance facilities, maintenance buildings for underground and surface equipment. Facilities and structures include a warehouse, office, change house facilities, main shaft, ventilation shaft, backfill plant, explosives storage area, hydroelectric power generation, power lines and substation, fuel storage tanks, a warehouse and laydown area and a permanent accommodation camp.

The electrical power supply for the project comes from two sources: connection to the SEIN national power grid by a main substation located near the site, and the Candelaria Hydro, which consists of three turbines connected to the project through the main substation by a transmission line. All other loads of the project are fed from the main substation through overhead power lines. These power lines are used to deliver power to various locations to support activities during operation of the mine.

Site roads include main roads suitable for use by mining trucks that transport concentrates to Lima and service roads for use by smaller vehicles. The site roads are used by authorized mine personnel and equipment, with access controlled by Nexa Peru. An approximately 15 to 20 kilometer network of service roads was constructed to provide access to the underground mine, processing plant, tailings facility, waste rock stockpile, mine offices, workshops, mine camps and other surface infrastructure.

In 2019, we spent US\$32.9 million on sustaining capital expenditures for this property, primarily associated with mine development, equipment replacement and other major infrastructure.

Production

El Porvenir mine has a treatment plant capacity of 6,500 tonnes of ore per day. The table below summarizes El Porvenir mine's concentrate production, metal contained in concentrates produced and average grades for the periods indicated.

	As of and for the Year Ended December 31,		
	2019	2018	2017
Treatment ore (in tonnes)	2,120,765	2,149,927	1,834,511
Average ore grade			
Zinc (%)	2.92	3.04	2.86
Copper (%)	0.15	0.15	0.13
Lead (%)	1.01	0.98	1.04
Silver (ounces per tonne)	2.08	1.92	2.05
Gold (ounces per tonne)	0.02	0.01	0.02
Metal contained in concentrate production			
Zinc (in tonnes)	54,689	57,872	46,154
Copper (in tonnes)	465	567	493
Lead (in tonnes)	16,914	16,641	14,818
Silver (in oz)	3,412,656	2,533,801	2,357,442
Gold (in oz)	11,191	9,664	8,408
Cash Cost, net of by-product credits (in US\$/t)	1,372.9	1,192.9	1,210.2
Cash Cost, net of by-product credits (in US\$/lb)	0.62	0.54	0.55
Capital expenditures (in millions of US\$)	32.9	25.6	19.8

Atacocha

Location and means of access

Atacocha is a polymetallic underground and open pit mine located in the district of San Francisco de Asís de Yarusyacán, in the province of Pasco, Peru. The property is located in the central Andes mountains region of Peru, at approximately 4,200 meters above sea level. The mine is situated at kilometer 324 of the Carretera Central Highway (Lima—Huánuco route), 16km from the city of Cerro de Pasco. The Atacocha mine is located in a mountain area of Central Peru. The processing plant is located near the Huallaga River valley. Cerro de Pasco and Huánuco cities are connected to the mine area by a paved road with heavy traffic. Atacocha has mine camps near the plant and the valley. Light fuel maintenance and storage facilities are located in the area. Basic supplies are available in the city of Chicrin, with most major items and equipment provided from Lima.

History

The Atacocha mining unit began operating in the early 20th century with a production of lead, silver, zinc and copper ores. Nexa Peru has been conducting exploration and development work at Atacocha since 1949. Most exploration is conducted simultaneously with underground development, which involves diamond core drilling and channel sampling following underground drifting. Systematic underground geological mapping is completed at scale of either 1:500 or 1:250, following underground development on all levels and sub-levels. A total of 29 underground levels have been developed at Atacocha, with additional development on sub-levels. Geological mapping is drawn on paper in the field by the mine/production geologists, and subsequently digitized with the help of a modelling assistant. The geological level plan maps are updated and incorporated in a three-dimensional geological model daily to aid future exploration and mine development planning.

Title, leases and options

The Atacocha mine is owned by Nexa Resources Atacocha S.A.A., which is controlled by Nexa Peru.

The Atacocha mine has a total of 147 concessions covering approximately 2,872.5 hectares, as well as a beneficiation plant, “Chicrin N° 2.” With respect to the surface property at the Atacocha project, there is a mining site of 1,343.0 hectares, where the mining concession is located, as well as additional surface property where tailings dams/ponds, camps sites and other ancillary infrastructure are located. There are royalties payable in respect of mining operations at the Atacocha project for the mining concessions held by Nexa Resources Atacocha S.A.A. For more information, see “Information on the Company—Regulatory matters—Peruvian regulatory framework—Royalties and other taxes on mining activities.”

Mineralization

At Atacocha, mineralization is characterized as either skarn-related mineralization, replacement mineralization, or hydrothermal vein/breccia-style mineralization. Skarn-related mineralization is characterized by pyrite, chalcopyrite, sphalerite, galena, with lesser bismuthinite and a variety of sulfosalts (Bi-bearing) and pyrrhotite, bornite, and covellite at lower elevation. Molybdenite may occur proximate to the skarn-related mineralization. Elevated Bi and Au are reported to be associated with skarn-related mineralization. Veins and veinlets with pyrite, chalcopyrite, sphalerite, galena, with quartz and carbonate occur within marble units, and are spatially associated with skarn bodies. Replacement bodies comprising of pyrite, sphalerite, galena, chalcopyrite, and possibly other fine undistinguished sulfides occur within garnet-skarn, marble, and silicified zones.

In 2019, we completed approximately 79.7km of diamond drilling, divided between exploratory and infill drilling. The 2019 exploration program at Atacocha was focused on increasing mineral resources in the high and low-altitude zones of the mine (at the 3,300 meter level) and finding new mineralized zones. The drilling program identified zinc, lead, copper, silver, and gold mineralization along the strike of San Gerardo underground extension, Veta 27, Ingrid, OV 19, Anita and Integration targets, which are open for expansion.

We spent approximately US\$4.4 million on the Atacocha brownfield project in 2019, including exploration project maintenance and geological activities. In 2019, we drilled 119 drill holes totaling 40.3 km at Atacocha. We have budgeted US\$2.8 million for the project during 2020 and we expect to drill 20km.

Operations and infrastructure

Atacocha operates two mines: the Atacocha underground mine and the San Gerardo open pit mine. The operation is currently mining ore from both the Atacocha underground mine and the San Gerardo open pit mine. Both mining operations feed the Atacocha processing plant.

The Atacocha site also includes older tailings ponds, waste rock stockpiles, a process plant facility with associated laboratory and maintenance facilities, and maintenance buildings for underground and surface equipment. Facilities and structures include: a warehouse, mine office, change house, tailings pumping station, main shaft, ventilation shaft, mine access ramps, main haulage drift (level 3600), backfill plant, explosives storage area, hydroelectric power generation, power lines and substation, fuel storage tanks and a permanent accommodation camp. Currently, Atacocha tailings are disposed at the El Porvenir tailings pond.

In 2019, we spent US\$11.8 million on sustaining capital expenditures for this property, primarily associated with mine development, equipment replacement and other major infrastructure.

Production

The Atacocha mine has a treatment plant capacity of 4,500 tonnes of ore per day. The table below summarizes the Atacocha mine's concentrate production, metal contained in concentrates produced and average grades for the periods indicated.

	As of and for the Year Ended December 31,		
	2019	2018	2017
Treatment ore (in tonnes)	1,505,428	1,551,472	1,506,826
Average ore grade			
Zinc (%)	1.43	1.43	1.43
Copper (%)	0.08	0.10	0.09
Lead (%)	1.30	1.18	1.22
Silver (ounces per tonne)	1.52	1.42	1.43
Gold (ounces per tonne)	0.01	0.02	0.02
Metal contained in concentrate production			
Zinc (in tonnes)	16,668	17,323	16,950
Copper (in tonnes)	40	125	99
Lead (in tonnes)	16,464	15,595	15,958
Silver (in oz)	1,882,138	1,678,920	1,687,016
Gold (in oz)	9,306	15,431	20,105
Cash cost, net of by-product credits (in US\$/t)	1,052.0	1,115.5	(191.1)
Cash cost, net of by-product credits (in US\$/lb)	0.48	0.51	(0.09)
Capital expenditures (in millions of US\$)	11.8	16.9	5.9

Vazante

Location and means of access

The Vazante mine is an underground and open pit, polymetallic mine located about 7km from the municipality of Vazante, in the state of Minas Gerais, Brazil. The project area has elevations ranging from 690 to 970 meters above sea level. Access from Brasilia is via federal highway BR-040 toward Paracatu. Internal roadways connect the various mine-site components. Concentrates are trucked about 250km to the Três Marias smelter. The closest commercial airport is located in Brasilia. The Vazante municipal airport for light aircraft is adjacent to the mine site.

History

Mineralization was initially exploited by artisanal miners during the 1950s. Mechanized open pit mining and underground mining commenced in 1969 and 1983, respectively. The current primary ore types mined are hydrothermal zinc silicates and willemite. Initial mining operations exploited supergene calamine ores and a mixture of the zinc secondary minerals hemimorphite and smithsonite, which are derived from the weathering of silicate ore.

Title, leases and options

Nexa Brazil owns 100.0% of the Vazante project. Mineral concessions are divided into core tenements, where the known mineral deposits are located and where we have active mining operations, and the surrounding exploration concessions. Nexa Brazil holds eight mining concessions in the core tenements that have a total area of approximately 2,091.1 hectares, which host the active mining operations. Nexa Brazil also has five outstanding exploration requests (for approximately 1,383.9 hectares) and holds 61 exploration authorizations (approximately 46,035.8 hectares), one mining concession (approximately 52.5 hectares) and one mining concession request (approximately 190.0 hectares), totaling 47,662.2 hectares, in addition to core tenements.

Nexa Brazil holds surface rights sufficient to support the current operations. Some surface rights agreements require annual payments to the owners. Three easements have been granted in support of the mining activities. There is sufficient suitable land available within the mineral tenure held by Nexa Brazil for tailings disposal, mine waste disposal, and installations such as the process plant and related mine infrastructure.

Brazilian companies that hold mining concessions are subject to a royalty payment imposed by the National Mining Agency. For more information, see “Information on the Company—Regulatory matters—Brazilian regulatory framework—Royalties and other taxes on mining activities.”

Nexa Brazil holds six licenses for water usage for the operations. Nexa Brazil has lodged renewal applications, where applicable, for the water licenses in use.

Mineralization

The Vazante and Extremo Norte zinc deposits are epigenetic zinc silicate deposits, and Vazante is one of the largest deposits of its type worldwide. Mineralization exists within a sequence of pelitic carbonate rocks belonging to the Serra do Poço Verde formation of the Vazante group. The major structural control is the Vazante fault.

We are conducting ongoing tests to explore extensions of known mineralization, infilling areas where no data are currently available, and identifying other areas where mineralization may be present. Examples of exploration successes using these methods within the Vazante mine area include our projects Lumiadeira, Ramp 29, and Deep Exploration.

In 2019, we completed approximately 100.9km of diamond drilling, divided between exploratory and infill drilling. In 2019, the Vazante exploration project focused on the extension of the Vazante mine ore bodies, exploring the targets Lumiadeira and Extremo Norte, as well as drilling into other brownfield targets such as Varginha, which may contain minerals close to the known deposit.

In 2019, we spent US\$1.8 million on brownfield projects for life of mine extension, including exploration project maintenance and geological activities. In 2019, we drilled 53 exploration drill holes, including in the Vazante and Calamina projects, totaling 19.9km. We have budgeted US\$2.0 million for the project during 2020 and we expect to drill 11.2km.

Operations and infrastructure

Exploration conducted in the Vazante project area to date has included: geological mapping; rock, pan concentrate, stream sediment and soil sampling; airborne and ground magnetic surveys; auger drilling; and core drilling. Production drilling operations have been performed by company personnel using a variety of drilling machines throughout the history of the Vazante mine.

The Vazante underground mine has been in operation since 1983 and is a fully mechanized mine using rubber-tired diesel equipment for development and production activities. Access is through two portals for Vazante and one portal for Extremo Norte. As development progresses at Extremo Norte, a connecting drift will be established from Vazante to Extremo Norte.

All infrastructure required for the current mining and processing operations has been constructed and is operational. This includes the underground mines, access roads, power lines, water pipelines, offices and warehouses, a process plant/concentrator, conveyor systems, waste rock facilities, temporary ore stockpiles, paste-fill plants, and tailings storage facilities.

The state grid supplies electrical power for the Vazante mine site. Two independent transmission lines feed the site. An additional 60 MW power transmission line is currently under development and will be completed by 2021. Two diesel generators can provide backup power in case of a power failure.

In 2019, we spent US\$42.5 million on sustaining capital expenditures for this property, primarily associated with mine development, equipment replacement and other major infrastructure. In addition, we invested US\$27.5 million in capital expenditures related to the Vazante mine deepening, focusing on expansion. For more information, see “Information on the Company—Mining Operations—Growth Projects—Vazante mine deepening project.”

Production

The Vazante mine has a treatment plant capacity of 4,100 tonnes of ore per day. The table below summarizes the Vazante mine’s concentrate production, metal contained in concentrates produced and average grades for the periods indicated.

	As of and for the Year Ended December 31,		
	2019	2018	2017
Treatment ore (in tonnes)	1,407,199	1,374,380	1,321,240
Average ore grade			
Zinc (%)	11.45	12.13	12.30
Lead (%)	0.31	0.34	0.34
Silver (ounces per tonne)	0.57	0.62	0.56
Metal contained in concentrate production			
Zinc (in tonnes)	139,041	140,842	135,379
Lead (in tonnes)	1,015	1,180	1,153
Silver (in oz)	333,141	380,190	355,496
Cash cost, net of by-product credits (in US\$/t)	1,138.5	834.5	965.3
Cash cost, net of by-product credits (in US\$/lb)	0.52	0.38	0.44
Capital expenditures (in millions of US\$)	70.0	89.9	55.3

Morro Agudo

Location and means of access

The Morro Agudo project consists of an underground mine and open pit, polymetallic mine, as well as three deposits along what is known as the Ambrosia Trend (Ambrosia Sul, Ambrosia Norte, and Bonsucesso). The Morro Agudo mine site is situated on Traíras Farm, about 45km south of the municipality of Paracatu, Brazil. The mine access from Paracatu is via the BR-040 highway. The Ambrosia Trend deposits are situated about 15 to 20km northeast of Paracatu. Access is via the MG-188 highway to the village of Santo Antônio.

History

Modern underground mining commenced in 1988 at the Morro Agudo mine. The Ambrosia Norte deposit was discovered in 1973, Ambrosia Sul in 2011, and Bonsucesso in 2014. Mining of the Ambrosia Sul deposit commenced in 2017.

Title, leases and options

Nexa Brazil owns 100.0% of Morro Agudo. The total Morro Agudo project area is about 80km long and 10km wide at the widest extent and covers a significant strike extent of the lithologies that host mineralization at the Morro Agudo mine and along the Ambrosia Trend.

Nexa Brazil holds two granted mining concessions in the Morro Agudo mine area of approximately 827.6 hectares, with a valid mining concession application for an additional area of approximately 618.5 hectares. In the Ambrosia Trend area, Nexa Brazil has one granted mining concession (999.3 hectares), and two mining concession applications (1,496.5 hectares).

Mineralization

The Morro Agudo and Ambrosia Trend deposits are classified as examples of Irish-style sedimentary hosted deposits. Mineralization is hosted within a sequence of pelitic carbonate rocks belonging to the Morro do Calcário Formation that is part of the regional Vazante group. The deposits occur on the Brasília Fold Belt.

Both oxide and sulfide mineralization have developed in the Morro Agudo and Ambrosia Trend deposits. Oxide mineralization is primarily in the form of smithsonite and cerussite. Sulfide mineralization is primarily sphalerite and galena. The geological setting and understanding of the mineralization setting are adequately known to support mineral resource and mineralized material estimation and mine planning.

Exploration activities conducted to date have included geological mapping; rock chip, pan concentrate, stream sediment, and soil sampling; airborne and ground geophysical surveys and drilling. In 2019, the brownfield exploration program was directed towards intensifying the diamond drilling work at the Bonsucesso target, confirming zinc and lead mineralization along the strike of the mineralized zone and opening the potential to extend de mineralized bodies.

Morro Agudo does not currently have any estimated mineral reserves under Industry Guide 7.

Operations and infrastructure

All infrastructure required for the current Morro Agudo mining and processing operations has been constructed and is operational. This includes the underground mine, access roads, power lines, water pipelines, offices and warehouses, process plant/concentrator, conveyor systems, waste rock facilities, temporary mill feed stockpiles and tailings storage facilities. Electric power is supplied by a regional energy supplier in the state of Minas Gerais.

In 2019, we spent US\$15.9 million on sustaining capital expenditures for this property, primarily associated with the mine development and maintenance of plant and equipment.

Production

The Morro Agudo mine has a treatment plant capacity of 3,400 tonnes of mill feed per day. The table below summarizes the Morro Agudo mine's concentrate production, metal contained in concentrates produced and average grades for the periods indicated.

	As of and for the Year Ended December 31,		
	2019	2018	2017
Treatment ore (in tonnes)	1,168,396	1,060,932	1,054,692
Average ore grade			
Zinc (%)	2.33	2.70	2.18
Lead (%)	0.52	0.71	0.69
Metal contained in concentrate production			
Zinc (in tonnes)	24,353	26,408	20,969
Lead (in tonnes)	4,700	6,097	5,805
Silver (in oz)	22,581	55,704	--
Cash cost, net of by-product credits (in US\$/t)	2,076.7	1,363.8	1,644.3
Cash cost, net of by-product credits (in US\$/lb)	0.94	0.62	0.75
Capital expenditures (in millions of US\$)	15.9	13.3	18.6

Concentrate Sales

All the metal produced by our mines is contained in concentrates. Our mining operations sell the concentrates that they produce to third parties and to our own smelters pursuant to arm's length transactions. Each mine bears the cost of transporting the concentrate to the point of sale where the smelter or trader purchases the concentrate. The smelter or trader pays the mine for the percentage of metals contained in the concentrate, net of charges for treating the concentrate and refining the metals. The typical payable percentage is 85% for zinc contained in concentrate minus treatment charges. Mines that transfer all their zinc concentrates to our own smelters (Vazante, Morro Agudo and Cerro Lindo) receive payment for the recoverable metal plus a premium, and only pay smelter conversion costs.

Growth projects

Vazante mine deepening project

One of our principal brownfield projects is the Vazante Mine Deepening Project, which involves extending the mine life of Vazante mine from 2022 until 2027. The total capital expenditures related to this project in 2019 totaled US\$27.5 million and we expect to invest US\$15.5 million in 2020. This project began in 2013 and is expected to end in 2022.

In addition, we are conducting exploration activities below the mine's current level of operation and alongside the ore body, which we believe will maintain the Vazante mine's production at 135,000 tonnes of zinc per year until 2029. As part of this project, we expect to invest in ongoing exploration activities and infrastructure, including expansion of an underground pumping station, an increase in the capacity of the ventilation system, emergency paths, access ramps, electrical networks and substations. During 2019, we concluded works related to the assembly of our EB140 pumping station and the shaft that connects it to the surface. For 2020, our plan is to complete the assembly of the EB347 pumping station.

Bonsucesso

The Bonsucesso project is a brownfield mine project that belongs to the Morro Agudo complex (Ambrosia Trend) and is expected to extend the life of mine of the Morro Agudo complex. The project is located 8 km north of the Ambrosia Sul mine and approximately 60km north of the Morro Agudo mine. The run-of-mine of Bonsucesso will feed the Morro Agudo processing plant.

The project is currently in the feasibility study stage. We estimate that we will finalize the study by year-end 2020, when we expect to evaluate the development of the project. Construction will depend on approval of the environmental licenses and the conclusion of the feasibility study. The total capital expenditures related to this project, which includes all project studies (from the scoping study to the feasibility study) and anticipated expenses related to construction and operating infrastructure will be confirmed after the conclusion of the feasibility study. We expect to use the existing infrastructure of the Ambrósia open pit mine for the main offices and mine facilities and the Morro Agudo plant for processing.

In 2019, the drilling program at Bonsucesso focused on growth and infill drilling. The growth drilling extended in a northward direction and confirmed zinc and lead mineralization more than 800 meters along the strike. High grade and thick intercepts revealed the continuity of the structure and the potential for expansion. In addition, the Bonsucesso exploratory drilling at the central sector also confirmed new zinc and lead mineralization located to the west of the main mineralized zone.

Our expenditures for this project in 2019 were US\$3.0 million, which was primarily related to exploration and geological activities. In 2019, we drilled 18 exploration drill holes, including Bonsucesso and regional targets, totaling 13.5km. We have budgeted US\$2.5 million in expenditures for 2020, and we expect to drill 11.1km.

Pasco mining complex

The Pasco mining complex project involves the integration of the El Porvenir and Atacocha mines. The project is intended to capture synergies between the two mining operations resulting from their proximity and operational similarities, with the goal of obtaining costs and investment savings and reducing our environmental footprint.

The integration project is being developed through four stages. The first stage involved the administrative integration of both mines, which was completed in 2014. The second stage involved the integration of the tailing disposal system, which consolidated the operations of the two mines with a single tailing disposal system and thereby helped reduce the environmental footprint. This stage was completed in 2015 and the integrated tailing disposal system commenced operations in the beginning of 2016. The third stage, which was completed in 2016, involved the construction of a new energy transmission line with a 138 kilovolt connection that supplies both mines, replacing the prior 50 kilovolt transmission lines. The development of 3.5km connecting both underground mines was concluded in 2019. Our management committee is evaluating the strategies before finalizing the final stage of the project, which includes completing the integration of the underground operations and underground facilities.

Greenfield projects

Project Name	Current Project Status
Aripuanã	In execution
Magistral	Ongoing feasibility study
Pukaqaqa	Ongoing pre-feasibility study
Shalipayco	Ongoing pre-feasibility study
Hilarión	Exploration phase
Florida Canyon Zinc	Exploration phase
Caçapava do Sul	On hold

We summarize below certain information, including the outlook, for each of our greenfield projects. As of the date of this report, none of our greenfield projects have known reserves under Industry Guide 7.

Aripuanã

Aripuanã is a world-class underground polymetallic project containing zinc, lead and copper, located in the state of Mato Grosso, Brazil. On October 30, 2019, Nexa communicated the closing of the 30% minority stake acquisition in the Aripuanã project, which was initially announced in August 2019. Nexa and its affiliates have 100% ownership of a high-quality asset that we believe has the potential to have an extended mine life and to result in synergies with our other operations in Brazil.

The Aripuanã zinc polymetallic deposits are VMS deposits. The project's zinc processing plan was developed considering conventional technologies for treatment, including the sequential flotation for the recovery of zinc, copper and lead as separate concentrates. In 2018, after the conclusion of the feasibility study and detailed analysis by our management, our board of directors approved the beginning of construction of the Aripuanã project. We also published an NI 43-101 technical report that summarizes the results of the feasibility study.

Construction works continue to advance and 28% of physical progress was achieved by the end of 2019. This is behind our original schedule due to factors including weather conditions, upgrade of the public bridge and a delay in our detailed engineering studies. As announced in February 2020, we are working on re-baselining the schedule and we have advanced as planned. We continue to expect an updated plan by the second quarter of 2020, which will also include an update to the project's Capex. At the same time, we expect to be able to accelerate the ramp-up period compared to our initial estimates.

By year-end 2019, approximately 27.5 thousand tonnes of treated ore was stockpiled, in advance of the project commissioning planned for 2021. This was possible given the conclusion of both the Arex and Link mine ramp tunnels (in 2Q19 and 3Q19, respectively) and our continued progress in mine development reaching 1,497 meters by December versus 873 meters in October 2019. We also continued to make progress on related project infrastructure. This included placing lean concrete in the grinding area and constructing pipe rack foundations, temporary buildings, laydown areas, and roads providing access to the site, water dam, beneficiation plant and waste ore stockpile. During 2019, we completed 45% of earthworks for the mine's waste stockpile (drainage and waterproofing).

In addition, we received initial components for the mills and vibrating screen at the temporary buildings and laydown areas and continued negotiations with suppliers. We closed 20 critical packages and expect to close an additional 45 during the first semester of 2020. Archeological activities for the transmission line foundation towers at the site were completed and Energisa Company was awarded the installation contract.

As of December 2019, there were over 1,400 people working in the main construction areas. We also implemented a qualification program for future mine and operation plant professionals which had 1,481 candidates enrolled in 2019, of which approximately 500 received professional qualifications on maintenance and automation and geology and surveying. Of the total number of participants, 52% were women.

In 2019, the drilling campaign at Aripuanã focused on exploring the Babaçu mineralized zones and confirmed the presence of mineralization along 1.3 km of the strike. We spent US\$3.2 million on Aripuanã exploration, maintenance, and geological activities. In 2019, we drilled 14 drill holes, including Aripuanã brownfield and regional targets, totaling 12.6 km. For 2020, we expect to invest an additional US\$3.8 million in a brownfield exploration program, drilling 9.7 km.

In 2019, we invested US\$123.8 million in capital expenditures on the project. In 2020, we estimate that we will invest US\$220.0 million in Aripuanã, which represents 56% of the US\$392 million in total estimated capital expenditures for the project with the remainder expected to be spent in 2021.

The Aripuanã project is currently scheduled to start operations in 2021. As of the date of this report, construction activities at the project have not yet been affected. Additional safety measures and procedures are being discussed with our contractors to mitigate any potential impact of the global COVID-19 outbreak, including a revision to the construction schedule.

Magistral

The Magistral mining project is located in the Ancash department in Peru and is intended to be an open pit copper mine. In 2016, ProInversión approved an initial feasibility study, which set forth production rates starting at 10 ktpd. Also in 2016, the MINEM approved an environmental impact assessment (or EIA), which allows us to expand our treatment capacity up to 30 ktpd.

Nexa Peru was awarded the contract to develop the Magistral mining project in 2011, which has been amended from time to time. Nexa made an initial payment of US\$8.0 million to acquire the Magistral concessions, subject to a 2.0% NSR royalty upon production. Under the terms of the contract, Nexa Peru exercised the option by committing to perform investments in the Magistral project until September 2024. Pursuant to the terms of this commitment, Nexa Peru would be required to pay a penalty in the event it fails to invest the specified amounts during this period. Nexa Peru currently holds a 100.0% interest in 11 of the 34 concessions comprising the Magistral project.

We spent approximately US\$11.8 million on the project in 2019, including US\$2.4 million in operating expenses for the conclusion of the pre-feasibility study and US\$9.4 million in capital expenditures for the ongoing feasibility. We expect the feasibility study for the project to be concluded in the second half of 2020. Due to changes in our engineering studies, after the conclusion of FEL3 the issuance of an updated technical report will be re-evaluated. The development of the Magistral mining project is subject to various factors, including the successful conclusion of the feasibility study, approval by the board of directors of Nexa of the development of the project, approval of required permits and availability of financing. The estimated capital expenditures for completion of the feasibility study are US\$9.1 million.

Pukaqaga

The Pukaqaga project contemplates the development of an open pit copper and molybdenum mine, with gold credits, and is located in the Huancavelica region, Peru. The mineralization is hosted by an epithermal breccia system that is associated with exoskarn and endoskarn alterations. Given the geological setting, we believe that a porphyry copper system remains undiscovered below the currently explored mineralization, which will be explored in the following phases.

In 2015, the MINEM approved Pukaqaga's EIA, which allowed for treatment capacity of up to 30ktpd. In 2017, a scoping study was developed by JRI, a Chilean engineering firm. We commenced a pre-feasibility study relating to the project in 2018.

In 2019, we spent approximately US\$6.0 million on this project primarily related to metallurgical tests and engineering development. A new phase of metallurgical tests is ongoing and is expected to be concluded in the second quarter of 2020. We have budgeted US\$3.5 million for the Pukaqaga project for 2020.

Shalipayco

The Shalipayco project, located in the Central Andes of Peru, is a joint venture between Nexa Peru (which holds a 75.0% interest) and Pan American Silver Perú S.A.C. (which holds the remaining 25.0%). It is a potential underground polymetallic project containing zinc, lead and silver deposits. This project consists of mining concessions with evidence of MVT mineralization, which is a deposit type similar to our Morro Agudo mine. The Shalipayco mineralization is mainly located within the Chambará formation that is part of the Pucará Group, considered the most important Peruvian location for MVT mineralization.

In 2019, we spent approximately US\$0.6 million on this project relating to exploration activities, geological studies, as well as environmental, community relations, and social issues. The pre-feasibility study continued to advance and we are still analyzing alternatives in order to determine the project's scope. Meanwhile, negotiations with the local community of Carhuamayo are still ongoing in order to obtain our social license.

Hilarión

The Hilarión Project is located in the Department of Ancash, approximately 230 km north of the capital of Peru, Lima, and approximately 80km south of the city of Huaraz and is accessible by paved road from Lima. It consists of 70 mineral concessions covering an area of approximately 15,029.7 hectares and one mineral claim totaling 334.5 hectares. Hilarión is a skarn mineral deposit made of vertical tabular ore bodies containing sulfide zinc, lead, silver and copper deposits. Hilarión and El Padrino and other occurrences in proximity to them (Mia, Eureka and others) constitute a large mineralized system, open in several directions for a potential increase in resources, extended mine life and increased production capacity in the future. The conceptual plan for the project includes the development of an underground mine that could either use its own processing plant or use one of the several existing plants in the area, such as Pachapaqui, Huanzala and Atalaya plants.

From 2005 to 2014, in addition to mapping, remote sensing, topographical and geophysical surveys, we completed four drilling campaigns totaling 244.0km on Hilarión and El Padrino deposits. During 2018-2019, two additional drilling campaigns totaling 17.1km were carried out. The recent 2018-2019 drilling predominantly focused on the Hilarión North zone. During 2019, we drilled 12 drill holes totaling 9.1 km at Hilarión. High grade and thick intercepts revealed continuity of the mineralized zones of the deposit to the north and south and demonstrated the potential for resource increase.

In December 2019, a drilling program started at the Mia target to the east of the El Padrino region, with the objective of extending the mineral potential of the deposit. In addition, we reached an agreement with three different surrounding communities, which gave us the social license to conduct mineral research at Hilarión in subsequent years. In 2020 we plan to execute 6.0 km of drilling targeting the extension of the Hilarión mineralization trend to the northeast towards the Mia and Eureka targets.

In 2019, we spent approximately US\$6.5 million on the Hilarión project, including project maintenance, exploration activities including geological mapping, rock chip, diamond drilling and permits. We have budgeted US\$5.3 million for drilling at the Hilarión project during 2020.

On March 5, 2020, we filed results of a Preliminary Economic Assessment (or PEA) for the Hilarión project, prepared jointly by Nexa and Roscoe Postle Associates Inc (or RPA), disclosing an updated Mineral Resource estimate in accordance with NI 43-101 (as of December 31, 2019 with a drilling cut-off date of December 5, 2014).

Florida Canyon Zinc

The Florida Canyon Zinc project, comprised of 16 contiguous mining concessions, covering approximately 12,600.0 hectares, is owned and operated by Minera Bongará S.A., a joint venture between Nexa Peru, Solitario Exploration and Royalty Corp. and Minera Solitario Peru S.A.C. (collectively, Solitario) in existence since 2006. As of December 31, 2019, Nexa Peru owns a 61.0% interest in this joint venture, which may increase up to 70.0% upon Nexa Peru's satisfaction of certain conditions. Although a pre-feasibility study relating to the Florida Canyon Zinc was released in 2017, the project continues to be treated as an advanced mineral exploration project.

During 2019, we started work to improve the access road, which we expect to reduce logistical costs. We also drilled in the Florida Canyon region, focusing on two sulfide concentration areas, which are related to feeders that generate the concentration of sulphides in the mantos, bodies and veins mineralization.

In 2019, we spent approximately US\$6.5 million on this project. We have budgeted \$1.3 million for the Florida Canyon Zinc project for 2020, including US\$0.7 million for maintenance of the project structure, consolidation of geological and geochemical data, in addition to social programs for the local community.

Caçapava do Sul

The Caçapava do Sul project is a joint venture between Mineração Santa Maria Ltda., a wholly owned subsidiary of Nexa Brazil, which holds a 56.00% interest, and IAMGOLD Corporation, which holds a 44.00% interest. Nexa Brazil is the operator of the joint venture. The Caçapava do Sul project is a polymetallic project that has the potential to be mined by open pit and underground methods.

On March 28, 2019, we announced the new Copper Stockwork exploration target (which features copper, lead and gold deposits) in the Caçapava do Sul project. During 2019, our exploration program was focused on the extension of this Copper Stockwork system and drilling associated with geophysical anomalies. We drilled copper Stockwork zone which presented good drill holes mineralized intersections. The geological potential of the system remains under-evaluated.

In 2019, we spent approximately US\$3.0 million on the Caçapava do Sul project, drilling 14.3km in 29 holes. For 2020, we budgeted US\$0.7 million on project maintenance. We have placed the Caçapava do Sul project on hold as a result of our capital allocation strategy.

Permits & authorizations for greenfield projects

The following table summarizes the status of the main permits and authorizations for our greenfield projects.

Project	Status
Aripuanã	On December 20, 2018, SEMA/MT granted the installation license for the Aripuanã project, which allowed us to begin construction. The project is under development.
Magistral	The environmental impact assessment (or EIA) was renewed in 2019 and is valid for an additional two years, until 2021.

Pukaqaqa	The EIA was approved in 2015, was later extended, and is currently in the process of being modified. In addition, in 2019, a new environmental impact statement (or EIS) was prepared, with the purpose of developing exploration activities for the Pukaqaqa Sur exploration project.
Shalipayco	The EIA for exploration approved in 2017 was modified in early 2019 and extended to 2023. Negotiations with the land possessors to obtain permission to initiate activities are being carried out before the MINEM.
Hilarión	The most recent EIA was approved in 2014 and is valid until 2022. A fifth modification to the EIA for the Hilarión project (to obtain approval for new exploration platforms, access roads to the new platforms, auxiliary components, and a revised drilling schedule) was submitted to the MINEM in May 2019 and is currently pending approval. El Padrino deposit has an authorization for exploration activities until 2022 and a detailed environmental impact study was submitted to SENACE in 2018 and is still under evaluation. For Azulmina, one of the potential locations for the plant and tailings facilities, there is an approved EIS that allows the execution of exploration activities and is valid until 2021.
Florida Canyon Zinc	During 2018, we obtained a new exploration permit to resume exploration activities, which is valid until 2022.
Caçapava do Sul	The most recent exploration authorization was approved in 2014. During 2018, we received a special exploration authorization, which is valid until 2021. An EIA was submitted in 2016 to the Fundação Estadual de Proteção Ambiental Henrique Luiz Roessler and we expect to receive approval in 2021.

Tailings disposal

Regulatory framework

We are subject to several environmental regulations related to the use of tailings dams and effluent dams.

In Brazil, recent tailings dams' failures have triggered the issuance of new regulations. On January 25, 2019, there was a tragic failure of a tailings dam in the city of Brumadinho, in the state of Minas Gerais, Brazil. The Brumadinho dam was built using the upstream method and belongs to Vale S.A. A report by a panel of technical experts commissioned by Vale S.A. found that the tailings dam failure was the result of flow liquefaction within the tailings in the dam. Another upstream-method tailings dam in Brazil, the Fundão tailings dam owned by Samarco Mineração S.A., failed in November 2015. Each of these failures released muddy tailings downstream, flooded certain communities, caused fatalities and resulted in extensive environmental damage to the surrounding area.

In response to these tragedies, the state of Minas Gerais enacted regulations in February 2019 affecting the use of dams in the state, including tailings dams and effluent dams that mandate the decommissioning of all upstream tailings dams and prohibit construction of new tailings dams using the upstream method. Additionally, a rule approved by the ANM requires all inactive upstream dams to be decommissioned by 2021 and active upstream dams to be decommissioned by 2023. We have not been impacted by these regulations as all of our tailings dams in Brazil are downstream.

In addition, in February 2019, the state of Minas Gerais enacted regulations that prohibit the construction of a new dam or the expansion of existing dams if communities are established within its self-rescue zone, an area encompassing the portion of the valley downstream of the dam where timely evacuation and intervention by the competent authorities in emergency situations is not possible. As of the date of this report, we are continuing to assess the potential impact of these regulations on our operations. Currently, we have two tailings dams projects at our smelters, one in Três Marias and one in Juiz de Fora. We believe these projects would not be impacted by these regulations. In Três Marias there are no communities living within the self-rescue zone and, in Juiz de Fora, installation licensing was obtained prior to the new state legislation entering into force. However, future licensing for new tailings facilities could take longer than expected to obtain or not be viable at all.

In Peru, the upstream method has long been an abandoned practice due to seismic concerns in the region. As of 1995, compulsory guidelines were passed prohibiting the use of such method. Subsequently, in 2014 environmental regulators, and later technical regulators, in 2015, adopted the same guidelines prohibiting construction and operation under the upstream method, allowing only the use and construction under the centerline and downstream methods. A specialized governmental agency carries out annual inspections of tailings dam and mining infrastructure, ensuring technical and environmental regulations are complied with. In addition, mining operations must submit biannual stability studies, to which they are held liable.

For more information, see “Risk factors—Operational risks—The failure of a tailings dam could negatively impact our business, reputation and results of operations, and the implementation of associated regulations and decommissioning processes may be expensive.”

Nexa's practices

We monitor tailings and waste dams according to international best practice guidelines for management and project design based on criteria set by the International Commission on Large Dams (or ICOLD) and the Canadian Dam Association (or CDA) dam safety guidelines. In September 2019, all of our mining tailings dams in Brazil and Peru received Stability Condition Declarations (or DCEs), certifying that these facilities are safe and stable. These certifications are carried out every semester in Brazil and once per year in Peru. In addition, all our dams and dry stacking structures are monitored under a system known as SIGBAR/SIGDEP (*Sistema de Gestão de Barragens ou Depósitos*), which consists of procedures, tools and sensors, monthly reports and monitoring and analysis by an independent Geotechnical Engineer. The monitoring procedures include regular inspections, as well as internal and external audits.

In addition to the above-mentioned policies and procedures, in 2019 we established a sustainability committee of our board of directors to oversee sustainability related issues, including the management and governance of our tailings disposals. We have also created tailings management policies and manuals, as well as conducted emergency training and simulation tests involving communities living within the self-rescue zones at our four Brazilian operations, involving over 2,000 participants. Additionally, we have created “golden rules,” which establish clear administrative consequences in case of non-compliance with internal procedures.

We use four disposal options for tailings. Our preferred option is to convert part or all of the tailings material into a commercially viable product. We use this method at our Morro Agudo mine, where most of the tailings that we produce are ZinCal, a limestone rich in zinc that is used as fertilizer. This option does not require disposal of tailings materials.

When the conversion method is not available, we prefer to use the backfill method for our underground mines. This technique involves removing moisture from tailings, creating a mixture with cement and filling open spaces in the mines with this combination. We believe this method reduces safety risks related to tailings disposal given that it provides greater geotechnical stability and does not involve the building of a dam or dry stacking structure.

If neither the conversion nor the backfill method is available, we prefer to use the dry stacking method, which involves removing moisture from tailings and stacking them in layers to form an artificial mountain covered with soil and vegetation, causing it to integrate into the local landscape. We use the dry stacking and backfill methods at our Cerro Lindo mine in Peru since the startup of our mine. In 2019, we started operating a dry stacking facility, which substituted the tailings dam in Vazante. With this new structure, over 80% of our tailings disposal is done either through backfill or dry stacking, reducing our exposure to dams. We also expect to use the backfill and dry stacking methods at our Aripuanã greenfield project once it becomes operational.

When neither of these three methods is possible, we use tailings dams, which are open spaces built between two walls, which forms a reservoir where the tailings are stored. The dam acts as a solid barrier engineered to prevent the tailings material from escaping to the environment around the mine. We use this method in Peru at our El Porvenir and Atacocha mines and at our Cajamarquilla smelter, and in Brazil at our Vazante and Morro Agudo mines and Juiz de Fora and Três Marias smelters. We also use a combination of the backfill method and tailings dams at our El Porvenir and Atacocha mines in Peru.

We raise our tailings dams using the following two methods: (i) the downstream method, where the building material is disposed downstream of the crest of the dam body; and (ii) the center-line method, where the building material is disposed partially downstream and partially upstream of the crest of the dam body, while maintaining the same center-line of the crest. Historically, we have also used the upstream method – where the building material is disposed upstream of the crest of the dam body – in certain instances.

In addition, we also use effluent dams, which are dams used to treat water that contains tailings particles or other solid particles. The effluent dams separate the tailings particles or other solid particles from the water by retaining the particles and releasing the clean water downstream. Finally, we use products dams for the provisional storage of ZinCal prior to its sale.

We currently have 47 disposal facilities (including tailings dams, dry stacking facilities, effluent dams and products dams), 22 of which are operational. Of our eight operational tailings dams, seven were raised using either the downstream method or the center-line method, and one dam was at one point raised using the upstream method but was later raised using the downstream and the center-line methods. Of our 25 non-operational tailings dams, 16 are in the process of being decommissioned, and we have plans to decommission the others. Three of our non-operational dams in Peru were originally raised using the upstream method.

The following is an overview of the dams we have in place at our principal mining and smelting facilities:

Peru

- At Cerro Lindo, we have no tailings dams, and tailings are disposed of using a combination of the backfill method, two dry stacking structures and two effluent dams.
- At El Porvenir and Atacocha, tailings are disposed of using a combination of the backfill method and tailings dams; there are two tailings dams in active use and four non-operational tailings dams, which are in the process of being decommissioned.
- At Cajamarquilla, there are three tailings dams in active use and four non-operational tailings dams, which are in the process of being decommissioned.
- At the Chapi mine property, which is currently inactive, there are five non-operational tailings dams.
- At the Sinaycocha property, which is part of our Atacocha mine property, there are two non-operational tailings dams.

Brazil

- At Morro Agudo, most tailings are converted for sale, and the product is stored temporarily at two products dams until it is sold. A separate tailings dam is used to store tailings that are not convertible into product.
- At our Ambrósia mine, there is one effluent dam in active use.
- At Vazante, tailings are disposed of using a combination of tailings dams and dry stacking; there is one tailings dam and one effluent dam in active use.
- At Juiz de Fora, there is one tailings dam in active use, three effluent dams in active use and six non-operational tailings dams, five of which are in the process of being decommissioned.
- At Três Marias, there are three tailings dams in active use and three non-operational tailings dams, which are in the process of being decommissioned.

SMELTING OPERATIONS

The table below provides an overview of our smelting facilities:

Smelting Unit	Location	Smelting Process	Principal Refined Zinc Products	Plant Capacity (in tonnes of refined zinc per year)	Metallic Zinc Production in 2019 (in tonnes of zinc metal available for sale, includes alloys)	Zinc Oxide Production in 2019 (in tonnes of zinc oxide)	Other Products
Cajamarquilla	Peru	RLE	Metallic zinc (SHG, CGG jumbos and alloys)	344,436	340,369	—	Sulfuric acid, silver concentrate, copper cement and cadmium sticks
Três Marias	Brazil	RLE	Metallic zinc (SHG, CGG jumbos, alloys and Zamac) and zinc oxide	192,199	197,508 ⁽¹⁾	38,064	Cadmium briquettes
Juiz de Fora	Brazil	Waelz Furnace and RLE	Metallic zinc (SHG, alloys and Zamac)	96,923	86,155 ⁽²⁾	—	Sulfuric acid, sulfur dioxide, silver concentrate, copper sulfate and zinc ash
Total				633,558	624,032	38,064	

(1) Including 28,218 tonnes of zinc ashes and drosses, as well as metallic zinc used in the production of zinc oxide, zinc granules and zinc powder. Does not include zinc cathode from Juiz de Fora.

(2) Including 2,538 tonnes of zinc ashes and drosses and 2,776 tonnes of zinc cathodes transferred to Três Marias.

Notes: RLE stands for Roast-Leach-Electrowinning.

Alloys are zinc-based products with the addition of up to 1.0% of a specified metal, which are primarily used in the galvanizing market.

Special alloys are zinc-based products with addition of specified metals, which are primarily used in galvanizing market.

Zamac is a zinc-based product with the addition of specified metals, which are primarily used in the die casting market.

Zinc contained in smelting products sold

We produce various kinds of refined zinc products. In 2019, we sold a total of 584,538 tonnes of our metallic zinc line of products (including SHG, CGG jumbos, alloys, and Zamac). In addition, we commercialized 36,689 tonnes of zinc oxide at 80.0% standard zinc content in 2019, totaling 621,227 tonnes of zinc metal products sold.

Cajamarquilla

The Cajamarquilla smelter is located in the district of Lurigancho/Chosica in Lima, Peru, and is accessible by road.

The Cajamarquilla smelter is currently the largest zinc smelter in Latin America and the only zinc smelter in Latin America outside Mexico and Brazil, according to Wood Mackenzie. It uses the RLE process to produce metallic zinc. With an annual production capacity of 344.4 thousand tonnes of metallic zinc, the Cajamarquilla smelter produced 340.4 thousand tonnes of zinc metal available for sale in 2019. In recent years, Cajamarquilla developed operational efficiencies, including debottlenecking projects, which increased the production of calcine from concentrates obtained from Nexa Peru, and the use of calcine processed by third parties. See “Risk factors—Operational risks—Inadequate supply of zinc secondary feed materials and zinc calcine could affect the results of our smelters.”

The Cajamarquilla smelter produces zinc primarily from zinc concentrates and, to a lesser extent, recycled zinc secondary feeds (also referred to as pre-treated concentrate). In 2019, the Cajamarquilla smelter consumed approximately 366.0 thousand tonnes of zinc contained in concentrates. In 2019, 36.9% of the zinc contained in concentrates used by the Cajamarquilla smelter was sourced from our mines in Peru and 63.1% was purchased from third parties.

In 2019, the Cajamarquilla smelter sold approximately 340.8 thousand tonnes of metallic zinc, of which 31.2% of the volume was sold to Latin America (including Mexico), 20.0% to Europe, 15.5% to the United States and Canada, 13.3% to international traders, 19.1% to Asia and 0.9% to Africa. The Cajamarquilla smelter also produces sulfuric acid, silver concentrate, copper cement and cadmium sticks. These products are sold primarily to international traders and local customers.

The following table presents the historical concentrates processed and zinc recovery rate in Cajamarquilla for the periods indicated.

	For the Year Ended December 31,		
	2019	2018	2017
Input (in tonnes)			
Zinc Contained in Concentrate from Our Mines	135,104	132,546	139,967
Zinc Contained in Concentrate from Third Parties	230,938	215,132	188,318
Secondary Raw Material	—	—	654
Total Inputs	366,042	347,678	328,939
Zinc Recovery (%)	94.1	93.8	95.5

Brownfield project

Conversion to Jarosite process

In 2017, we announced our intention to convert our Cajamarquilla smelter to the Jarosite process, which would allow for the recovery of a greater percentage of zinc. The project was estimated to improve the zinc recovery rate by 3.0% at the Cajamarquilla smelter. We initiated the construction phase in 2018 and during 2019 civil works and procurement activities continued to progress. However, the implementation of the conversion process was delayed due to problems with contractors and suppliers, and in December we decided to suspend and re-evaluate its implementation timeline. In light of the current macroeconomic environment, the project may not be resumed in 2020.

Três Marias

The Três Marias smelter is located in the municipality of Três Marias in the state of Minas Gerais, Brazil, 250km from the Morro Agudo mine and 253km from the Vazante mine and is accessible by road.

The Três Marias smelter was built to treat the zinc silicate concentrates from the Vazante mine (willemite and calamine) and sulfide concentrates from the Morro Agudo mine, from Nexa Peru and from third-party concentrates. Currently, this smelter is integrated with the operations of the Vazante and Morro Agudo mines, and it uses the RLE process to produce metallic zinc and zinc oxide. The annual production capacity of our Três Marias smelter is 192.2 thousand tonnes of metallic zinc per year. Production in 2019 totaled 197.5 thousand tonnes of zinc metal available for sale.

The Três Marias smelter produces zinc primarily from zinc contained in concentrates and, to a lesser extent, recycled zinc secondary feeds. In 2019, this smelter consumed approximately 201.4 thousand tonnes of zinc contained in concentrates and 2.6 thousand tonnes of secondary raw material.

In 2019, Três Marias sold approximately 157.7 thousand tonnes of metallic zinc and 36.7 thousand tonnes of zinc oxide, of which 69.7% of the volume was sold to Latin America (including Mexico), 11.5% to international traders, 9.6 % to Africa, 3.5% to Asia, 3.7% to Europe and 2.0% to the United States. The Três Marias smelter also produces copper/cobalt cement and cadmium briquettes. These products are sold to local customers.

The Três Marias smelter contains a zinc oxide production plant intended for the chemical, pneumatic, ceramic, animal feed and fertilizer industries. In 2019, the production of zinc oxide was approximately 38.1 thousand tonnes. In zinc content, approximately 73.3% of the raw material was electrolytic zinc that originated from the melting stage. In addition, we purchased 26.7% of raw material from third parties, in the form of dross and skims, to produce zinc oxide as well as the generation of by-products.

The following table presents the historical concentrates processed and zinc recovery rate in Três Marias for the periods indicated.

	For the Year Ended December 31,		
	2019	2018	2017
Inputs (in tonnes) ⁽¹⁾			
Zinc Contained in Concentrate from Our Mines	178,928	185,970	181,334
Zinc Contained in Concentrate from Third Parties	22,470	16,483	14,442
Secondary Raw Material	2,642	933	717
Total Inputs	204,040	203,387	196,493
Zinc Recovery (%)	94.3	93.7	94.7

(1) Impacted by higher secondary raw material consumption and concentrates with contaminants (mainly iron and arsenic).

Juiz de Fora

The Juiz de Fora smelter is located in the municipality of Juiz de Fora in the state of Minas Gerais, Brazil, and is accessible by road.

The Juiz de Fora smelter produces zinc from sulfide concentrates and secondary sources such as EAF dust, batteries, and brass oxide, and uses the RLE process to produce metallic zinc. The annual production capacity of our Juiz de Fora smelter is 96.9 thousand tonnes of metallic zinc per year. In 2019, Juiz de Fora produced 86.2 thousand tonnes of zinc metal available for sale. In recent years, Juiz de Fora used calcine processed by third parties in its production process.

The Juiz de Fora smelter produces zinc from zinc concentrates and recycled zinc secondary feeds. In 2019, this smelter consumed 76.9 thousand tonnes of zinc contained in concentrates and 16.4 thousand tonnes of zinc from secondary raw material and secondary sources.

In 2019, the Juiz de Fora smelter sold approximately 86.1 thousand tonnes of metallic zinc, of which 91.7% of the volume was sold to Latin America (including Mexico) and 8.3% to international traders. This smelter also produces sulfuric acid, sulfur dioxide, silver concentrate and copper sulfate.

The following table presents the historical concentrates processed and zinc recovery rate in Juiz de Fora for the periods indicated.

	For the Year Ended December 31,		
	2019	2018	2017
Inputs (in tonnes)			
Zinc Contained in Concentrate from Our Mines	39,125	45,537	43,257
Zinc Contained in Concentrate from Third Parties	37,763	32,004	32,228
Secondary Raw Material	16,367	19,165	19,096
Total Inputs	93,255	96,706	94,581
Zinc Recovery (%)	93.4	93.5	91.0

OTHER OPERATIONS

Transportation and shipping

Concentrates in our mines

Our Cerro Lindo operation transports 100.0% of its concentrates by road. The concentrates are trucked in a dedicated fleet through the Panamericana Sur road to the port of Callao that is approximately 255 km north, or to the Cajamarquilla smelter. This transportation is covered by long-term contracts entered with two trucking companies.

Our Atacocha and El Porvenir operations use both road and rail transportation. The concentrates are trucked through the Carretera Central road to the port of Callao that is approximately 315 km west, or to the Cajamarquilla smelter. We also use railway transportation to secure logistic availability and maintain high environmental standards. Our use of railway transportation is covered by a long-term contract.

The zinc concentrate produced in the Cerro Lindo, Atacocha and El Porvenir mines supply both our Peruvian and Brazilian smelters, as well as third-party customers, while the lead and copper concentrates produced by these mines are transported to third-party customers from the port of Callao. Our smelters use zinc concentrate supplied from our mines and from third-party suppliers to meet the blending needs of each smelter.

The Peruvian zinc concentrate supplied to the Brazilian smelters is loaded in bulk 28,000 tonne shipments and sent to the Port of Rio de Janeiro, where it is cleared through customs and then loaded into railcars to the Juiz de Fora smelter or into trucks and railcars to the Três Marias smelter. The ocean freight for this Peruvian zinc is covered by a long-term freight contract.

All the zinc concentrates produced at our Vazante and Morro Agudo mines are transported by road to the Três Marias smelter using two trucking companies. These mines also produce lead and lead/silver concentrates, which are loaded into containers at the mine and are transported using trucks and trains to the Sepetiba Tecon Terminal in Itaguaí, Rio de Janeiro, Brazil. The lead and lead/silver concentrates are then shipped to customers in Asia in accordance with our annual contracts with container shipping lines.

Smelters

The metallic zinc produced in the Cajamarquilla smelter is transported by train or truck to the terminals. The material intended for the Peruvian domestic market is distributed by truck from these terminals, while exports to foreign markets are loaded into containers and transported by truck from these terminals to the port of Callao.

The metallic zinc produced in the Juiz de Fora and Três Marias smelters is transported by truck for either local customers or exports. In the case of exports, the material is transported to terminals near the ports of Rio de Janeiro or Itaguaí, both in the state of Rio de Janeiro, or the port of Santos, in the state of São Paulo. The material is then loaded into containers at the terminal and transported to the ports by truck, where it is shipped to customers abroad.

The metallic zinc and zinc oxide production process in our smelters also produces by-products. The most relevant by-products are sulfuric acid and silver concentrate. Sulfuric acid produced in the Cajamarquilla smelter is loaded into dedicated FCCA tank railcars and transported to be stored. The sulfuric acid is then loaded in bulk into chemical ship-tanks destined to our customers and discharged at the Chilean ports of Mejillones and Barquito. The silver concentrate produced in the Cajamarquilla and Juiz de Fora smelters is loaded into containers and are dispatched to the port of Callao in Peru or to the port of Itaguaí.

We ship all our refined zinc and silver concentrate exports in containers. Transportation of this material is covered by annual agreements with the liner shipping providers, which are responsible for 70.0% of these shipments.

Sales and marketing

We sell most of our products through supply contracts with terms between one and four years. Only a small portion of our products is sold on the spot market. The agreements with our customers include customary international commercial terms, such as CIF, FOB and other delivery terms based on Incoterms 2010. Our ability to deliver significant volumes across several regions worldwide makes us a significant supplier to a client base of end-users and global traders. As a result, we can obtain competitive commercial terms for our products in the long-term. In 2019, our top 10 metallic zinc customers represented approximately 49.1%

of the total sales volume for such products, with our top 10 zinc oxide customers representing 71.4% of the total sales volume for that product, and our top three concentrate customers represented approximately 83.8% of the total sales volume for such products, in each case excluding intercompany sales.

Concentrates

In 2019, the majority (approximately 98%) of our total production volume of zinc concentrates went to our smelting operations in Peru and Brazil. In 2019, we sold 4,166 tonnes of zinc contained in concentrates produced from our Peruvian operations to third-party customers. Sales prices are established mainly by reference to prices quoted on the LME less a discount based on either the treatment charge or smelter charge. The LME price quotes are based on prevailing LME average prices for the period set forth in our sale agreements, and generally refer to either the month following the shipment or the period near the execution date of the relevant agreement.

We also purchase zinc contained in concentrate from third-party suppliers to meet our raw material requirements. In 2019, 52.4% of the total zinc raw material consumption in our smelters was produced by our mines and 47.6% was purchased from third parties or obtained from secondary raw materials.

Refined metals

Our metallic zinc and zinc oxide are sold worldwide through our commercial offices located in:

- São Paulo, Brazil;
- Lima, Peru;
- Houston, United States; and
- Luxembourg, Grand Duchy of Luxembourg.

We hold a leadership position in our home market, Latin America (excluding Mexico), with a market share of 86.0% in 2019, according to our sales volume, import databases and demand forecasts sourced from specialized consultancy groups and customs websites. In other regions, we hold a strategic position, with market share of 15.3% in Africa, 4.3% in North America, 3.3% in Europe and 0.8% in Asia, according to our sales volumes, import databases and demand forecasts sourced from specialized consultancy groups and customs websites. In recent years, we have increased our sales of metallic zinc and zinc oxide to end-users in attractive markets, consolidating a commercial network in place to support volume growth.

In 2019, 80.9% of our total sales of refined metals were to customers in the continuous galvanizing, general galvanizing, die casting, transformers and alloy segments and 19.1% of our total sales were to international traders. Our products are sold to end-users in the transport, construction, infrastructure, consumer goods and industrial machinery industries. Of our volume of metallic zinc and zinc oxide sales in 2019, 51.6% were to Latin America (including Mexico), 12.2% to Europe, 9.2% to the United States and Canada, 3.5% to Africa and 11.52% to Asia, with the remaining 12.0% to international traders. Sales prices are mainly established by reference to prices quoted on the LME plus a negotiable premium. Pricing is based on prevailing LME average prices for a period set forth in our sale agreements, which generally refer to the month prior to shipment.

By-products

We sell a wide variety of chemical and metallurgic by-products generated during the production processes in our smelters and mines to a broad customer base. Our sales include more than 25 different by-products, most of which are sold locally based on the characteristics of each market or region.

Power and energy supply

Peru

With respect to our Peruvian operating units, we obtained 96.8% (1,888.5 GWh) of the electricity for our operations from the SEIN and 3.2% (62.2 GWh) from our own hydroelectric power plants. We own three hydroelectric power plants, two at Atacocha and one at El Porvenir, with a total installed gross rated capacity of 10,568 kilowatts, or KW. We also received our energy from third parties through electricity supply contracts. Our Cerro Lindo, El Porvenir and Atacocha units have electricity supply contracts with Engie Energía Perú S.A., which cover 14.6% (284.3 GWh), 5.7% (111.2 GWh) and 2.4% (47.0 GWh) of their electricity requirements, respectively. The Cajamarquilla unit entered into a long-term electricity supply contract with Engie Energía Perú S.A. (formerly Enersur S.A.) on March 2017 and had a supply contract with Enel Generación Perú S.A.A. (formerly Edegel S.A.A.). Both contracts expired in December 2019 and on July 2019, we signed a new long-term energy agreement with Electroperú S.A, a well-known Peruvian state-owned company, to supply our operations in Peru.

The following table sets forth the energy sources and electricity consumption with respect to our Peruvian operating units in 2019.

Operating Unit	Energy Source	Total Energy Consumed in 2019 (GWh)	Percentage of Total Energy Usage in 2019
Third Party			
Cerro Lindo	Third Party (Engie Energía Perú S.A.)	284.3	14.6%
El Porvenir	Third Party (Engie Energía Perú S.A.)	111.2	5.7%
Atacocha	Third Party (Engie Energía Perú S.A.)	47.0	2.4%
Cajamarquilla	Third Party (Engie Energía Perú S.A.)	1,030.1	52.8%
Cajamarquilla	Third Party (Enel Generación Perú S.A.)	416.0	21.3%
Total Energy Usage		1,888.5	96.8%
Own Power Plant			
El Porvenir	Own Power Plant (Candelaria)	26.2	1.3%
Atacocha	Own Power Plant (Chaprin and Marcopampa)	36.0	1.8%
Total Energy Usage		62.2	3.2%

Hydroelectric plants

Candelaria

The El Porvenir unit has one hydroelectric plant, the Candelaria Hydroelectric Power Plant, which is located along the Lloclla River. The plant contains three separate hydroelectric turbines, two of which have been operational since 1957 and the third since 1998, and which together have an installed rated capacity of 4.2 MW. During 2019, El Porvenir consumed 26.2 GWh, which represented approximately 1.3% of the energy usage of the unit.

Chaprin and Marcopampa

The Atacocha unit has two hydroelectric plants. The Chaprin Hydroelectric Power Plant is located along the Lagia Ravine near the Huallaga River. The plant has been operating since 1953 and its installed rated capacity is 5.4 MW. The Marcopampa Hydroelectric Power Plant has been operating since 1937, and was overhauled in 1984, increasing its installed rated capacity of 1.0 MW. During 2019, Atacocha consumed 36.0 GWh from these plants, which represented approximately 1.8% of the energy usage of the mine.

Brazil

With respect to our Brazilian operations, as of December 31, 2019, energy supply comes from five hydroelectric plants in which our subsidiary Pollarix S.A. (or Pollarix), has directly or indirectly the following interests: a 21.0% equity participation in the consortium Enercan (Campos Novos hydroelectric power plant), 100.0% ownership of the hydroelectric power plant Picada located in Minas Gerais, a 12.6% equity participation in the consortium Amador Aguiar I, a 12.6% equity participation in the consortium Amador Aguiar II and a 23.9% equity participation in the consortium Igarapava. These consortiums have hydroelectric power plants in the states of Minas Gerais and Santa Catarina. Igarapava provides electricity exclusively to Vazante and Três Marias, while the other four sources (Picada, Amador Aguiar I and II and Campos Novos) provide electricity to the four operating units (Vazante, Morro Agudo, Três Marias and Juiz de Fora).

The only activity of Pollarix is to own our energy assets and sell energy to our Brazilian operating subsidiaries at market prices. We own all the common shares of Pollarix, which represents 33.33% of its total share capital. The remaining shares are preferred shares with limited voting rights, which are owned by our shareholder VSA and/or its affiliates. Under the terms of the preferred shares, VSA is entitled to dividends per share equal to 1.25 times the dividends per share payable on the common shares. See “Operating and financial review and prospects—Overview—Key factors affecting our business and results of operations—Operating costs and expenses—Energy costs.”

In addition, in the third quarter of 2019, we entered into a new long-term energy supply agreement with Furnas, a Brazilian energy company controlled by Eletrobras, to help address the increased electricity demand in our operations. Nexa Brazil currently consumes nearly all the energy supplied by Pollarix and Votorantim Energia in its existing operations. With the Furnas agreement, Nexa will have an excess energy supply which it intends to use in the Aripuanã operation. Furnas will supply 13.8MW per year of energy with a reference price of R\$154/MWh (price will be annually adjusted for inflation). The agreement is valid for 15 years, beginning in January 2020.

The following table sets forth our energy sources and consumption with respect to our Brazilian operations in 2019.

Operating Unit	Energy Source	Power Plant	Percentage of Pollarix Ownership	Total Energy Consumed in 2019 (GWh)	Percentage of Total Energy Usage in 2019
Morro Agudo, Vazante, Três Marias and Juiz de Fora	Enercan Consortium	Campos Novos	21.0%	675.54	42.8%
	Picada	Picada	100.0%	264.26	16.8%
	Amador Aguiar I	Amador Aguiar I	12.6%	155.80	9.9%
	Amador Aguiar II	Amador Aguiar II	12.6%	155.80	9.9%
	Votener	N/A	N/A	49.12	3.1%
Vazante and Três Marias	Igarapava	Igarapava	23.9%	276.95	17.6%
Total Energy Usage	—	—	—	1,557.44	100%

Hydroelectric plants*Campos Novos*

Campos Novos is a hydroelectric plant located along the Canoas River. The plant has an installed capacity of 880 MW and has been authorized by ANEEL, to produce 377.90 MWavg. During 2019, the plant generated a total of 3,216.87 GWh. 21.0% of the total generation is allocated to our operating plants. During 2019, our Morro Agudo, Vazante, Três Marias and Juiz de Fora units consumed 675.54 GWh from Campos Novos, which represented approximately 42.8% of our total energy usage.

Picada

Picada is a hydroelectric plant located along the Peixe River. The plant has an installed capacity of 50 MW and has been authorized by ANEEL to produce 27 MWavg. During 2019, our Morro Agudo, Vazante, Três Marias and Juiz de Fora units consumed 264.26 GWh, which represented 16.8% of our total energy usage.

Igarapava

Igarapava is a hydroelectric plant located along the Grande River. The plant has an installed capacity of 210 MW and has been authorized by ANEEL to produce 130.51 MWavg. During 2019, our Morro Agudo, Vazante, Três Marias and Juiz de Fora units consumed 276.94 GWh from Igarapava, which represented approximately 17.6% of our total energy usage.

Amador Aguiar I

Amador Aguiar is a hydroelectric plant located along the Araguari River. The plant has an installed capacity of MW and has been authorized by ANEEL to produce 155 MWavg. During 2019, our Morro Agudo, Vazante, Três Marias and Juiz de Fora units consumed 155.79 GWh from Amador Aguiar I, which represented 9.9% of our total energy usage.

Amador Aguiar II

Amador Aguiar is a hydroelectric plant located along the Araguari River. The plant has an installed capacity of 210 MW and has been authorized by ANEEL to produce 131 MWavg. During 2019, our Morro Agudo, Vazante, Três Marias and Juiz de Fora units consumed 155.79 GWh from Amador Aguiar II, which represented 9.9% of our total energy usage.

Sustainability initiatives

Through efficient and sustainable management, we are committed to operational excellence at all levels at Nexa and thus seek to create more value to our stakeholders. In 2019 we established a sustainability committee of our board of directors to oversee sustainability-related issues, which include the conduct of safe and sustainable business practices, with respect to environmental, health, safety and social matters.

Additionally, we have an integrated management system based on the ISO 14000 series of environmental standards, with an emphasis on the control of specific risks for mining. This system includes sustainability guidelines for new projects, including meeting pluriannual corporate goals for eight material topics (waste, emissions, water, local development, health and safety, people, human rights and decommissioning). Our sustainability obligations are set out in our Code of Conduct and Compliance and Sustainability policies. We adhere to the United Nation's Global Compact and the goals related to our eight material topics seek to contribute to fulfilling the UN's Sustainable Development Goals (SDGs). Our eight material topics goals strive to meet the SDGs.

Our material topics and sustainability initiatives are further discussed below.

- **Waste.** We aim to reduce our residue footprint. Our activities generate a significant amount of waste. We seek to reduce the generation of mining and metallurgical waste, complying with applicable local legislation, and acting in accordance to our strategic commitment, attempting to co-create a positive legacy for society. Our Morro Agudo site is considered a pioneer in eliminating waste production with one of the main projects being agricultural lime powder, also known as Zincal200. The project is based on technology created to reprocess the tailings produced in the zinc beneficiation process, which used to be dumped in dams. In addition, our Cerro Lindo and Vazante mines already use the dry stacking method for tailings disposal (and our Aripuanã project is also designed to use the same).
- **Emissions.** One of our commitments is to reduce greenhouse gas emissions in an effort to minimize our impact on climate change. We consume large amounts of energy due to the nature of our activities and transportation processes, which is why we seek new technologies and progress in sustainable energy generation. One of the highlights in energy efficiency was the implementation of a project for a biomass boiler at the Três Marias unit, in which fuel oil was substituted by eucalyptus wood chips and sugar cane bagasse. The boiler is owned by a supplier and is installed within the unit. Another important initiative is underway at the Cajamarquilla unit in Peru, which includes the substitution of diesel oil with natural gas, made viable through the implementation of a gas pipeline in the region.

- **Water.** Our target is to reduce water consumption and increase recirculation. Mining activity involves technical procedures in which water assumes an important role, both for extraction and processing. Thus, it is even more important to reduce water use and increase reuse throughout the value chain. Advanced investments in efficient water recirculation programs contribute not only to lowering the intake of new water but also reducing the volume of effluents and the environmental impact of the discharge. We earmark 14.8% of environmental spending resources towards efforts to have our effluents disposed through proper treatment. In our Cerro Lindo mine, we have a high rate of water recirculation (about 90%). We use a desalination plant, extracting salt by a reverse osmosis process and pumping it up to a plant, at an altitude of 2,200 meters. In an area with scarcity of water resources, this technology is important to avoid competing with the local population in demand for water. In addition, we encourage and guide the community in the region to store rainwater.
- **Local development.** We aim to develop mutually beneficial relationships with the communities in which we operate. Nexa's social strategy is aimed at leaving a long-lasting relevant legacy for local communities. The overall objective is to contribute to improving social indicators and the quality of life of the people living in the municipalities near our operations. Nexa's social investments focus mostly on four levers for community improvement: economic diversification; childhood and youth; public administration and social participation; and socio-environmental development. Our achievements include the development and improvement of Nexa's social governance program. In addition, from 2017 to 2019 we dedicated over 22,000 hours to volunteer work across our units, benefitting more than 30,000 people. We aim to develop our greenfield projects aligned with social best practices, like Aripuanã's Socio-economic Integrated Plan and Bonsucesso's Social Entrance Plan. We have conducted a sanitation diagnosis (water and sewage) in all communities surrounding our operations. In Aripuanã, we have a qualification program in place for future mine and operation plant professionals. In 2019, we had 1,481 candidates enrolled, of which approximately 500 received professional qualifications on maintenance and automation and geology and surveying. Of the total number of participants, 52% were women.
- **Health and safety.** Our goal is to reduce injury frequency rate and to reduce fatalities to zero. We continuously invest in strengthening a culture focused on safety and health for both our own as well as outsourced employees, through training, especially for risky activities, and in enhancing working conditions. We launched a quality of life program in 2016, seeking to emphasize the dimensions of integral health. We also have health initiatives in place for the Aripuanã project, aimed at disease prevention and a much healthier operating environment (i.e., Dust Zero Project). We also try to maintain the adequacy level of Nexa's chemical management flow, which includes both the products used and produced. For further discussion of our safety records, please refer to "Health and safety compliance" in the following section.
- **People.** We target the increase of plurality in the workplace. Our personnel management model and our policies and tools have guided the development of people based on performance, enthusiasm and courage.. For further information please see "Corporate Governance, management and employees—Board of directors— Diversity" section.
- **Human rights.** We believe that safeguarding human rights is an essential condition for building long-term partnerships. Therefore, our contracting practices involve several relevant requirements, such as the adoption of specific clauses, compliance with legal obligations and supplier assessment. All these measures are important for our suppliers to develop and implement appropriate business processes. In 2015, we established criteria for social and environmental reviews of suppliers including labor practices, human rights, compliance with environmental legislation, health and safety. These criteria are used as the basis for the evaluation of Nexa's existing and new suppliers. In 2016, we inserted social and environmental criteria in the process of qualification and adaptation of the checklist for audits on suppliers' premises.
- **Decommissioning.** Our activities impact the environment and the communities in the vicinity of our units. As a way of minimizing these impacts, we seek to designate alternative future uses, with the goal of co-creating a positive legacy in neighboring communities, free of environmental liabilities. Some of our achievements include: the definition of general guidelines for decommissioning (governance and corporate committee for approval of new plans); assessment of future uses and preliminary liabilities valuation; integrated management of decommissioning cash flow; and review of our decommissioning plans and updated Asset Retirement Obligation (or ARO) costs and liabilities. We also perform benchmark visits to assess best practices in decommissioning. For further details on our ARO and environmental obligations revisions, see Note 27 to our consolidated financial statements.

We have developed decommissioning plans for all of our units which, not only go beyond adopting best-practices and regulatory requirements from our operating markets (Peru and Brazil) but are also based on international standards from Environmental Protection Authority (or EPA) and Minerals Council of Australia (or MCA), in addition to Environmental Resource Management (or ERM) consultants from Canada. These plans are developed at early stages of the projects, which are initially conceptual, and are revised and updated every five years or whenever there is a material change in the unit's operations. In addition, we develop a technical execution plan to decommission two years prior to closure which are submitted to local authorities in Brazil, while in Peru the execution plan submission is defined when the EIA is approved.

Health and safety compliance

Health and safety in the workplace are among our highest priorities, and our policies and procedures seek to eliminate accidents. Nevertheless, mining is an activity that involves substantial risks. In 2017, we had seven fatalities at Nexa. Following these occurrences, we conducted a comprehensive review, and our board of directors approved a plan for Nexa's Brazilian and Peruvian operations with three main safety related objectives: (i) prevent fatalities; (ii) reduce the frequency and severity of injuries; and (iii) improve safety culture, particularly in our Peruvian operations. It includes initiatives related to leadership development and training for our employees and third-party contractors, preventive procedures, such as digital mining, and an automation plan. This plan has facilitated the improvement of our health and safety indicators, including zero fatalities in 2018 and, unfortunately, one fatality in 2019. On May 16, 2019, an employee of Nexa Resources Peru, suffered a fatal accident while operating a scoop truck during mineral ore extraction due to the destabilization at one of the ore passes at our Cerro Lindo mine, Peru.

We have also sought to improve our safety record as it relates to recordable injury frequency, lost worktime incident, and severity rates, in conformity with standards in the mining industry. In 2019, our total recordable injury frequency rate was 2.02, compared to 2.23 in 2018 and 2.46 in 2017. This rate is defined as the number of injuries with and without lost time per one million man-hours worked. In 2019, our lost worktime incident rate was 0.82, compared to 1.01 in 2018 and 1.15 in 2017. This rate is defined as the number of injuries with lost time per one million man-hours worked. Our severity rate for 2019 was 188, compared to 77 in 2018 and 1,384 in 2017. To calculate the severity rate, we consider the sum of lost, transported and debited days, divided by the total number of man-hours worked times one million. In addition to these efforts, we also operate programs aimed at improving working conditions, including medical services, for our mining operations and monitoring employees' health.

RESERVES

Disclosure of mineral reserves

This report contains disclosure that has been prepared in accordance with the requirements of Industry Guide 7 promulgated by the SEC, or Industry Guide 7.

As a reporting issuer in Canada, we are subject to National Instrument 43-101—*Standards of Disclosure for Mineral Projects*, or NI 43-101, which is an instrument administered by the provincial and territorial securities regulatory authorities that governs how issuers in Canada disclose scientific and technical information about their mineral projects to the public. NI 43-101 imposes certain requirements in respect of such disclosure, including the requirement to have prescribed information prepared by, or under the supervision of, a qualified person and the filing of NI 43-101 technical reports in the prescribed circumstances. We reference those reports in this report for informational purposes only, and such reports are not incorporated herein by reference.

NI 43-101 requirements differ significantly from the requirements under Industry Guide 7. Among other things, Industry Guide 7 does not contemplate the term “resource,” and the requirements under Industry Guide 7 for identification of “reserves” are not the same as the requirements under NI 43-101. Under Industry Guide 7, mineralization may not be classified as a “reserve” unless the determination has been made that the mineralization could be economically and legally produced or extracted at the time the reserve determination is made. Under Industry Guide 7, a “final” or “bankable” feasibility study is required to report reserves; the three-year historical average price, to the extent possible, is used in any reserve or cash flow analysis to designate reserves; and the primary environmental analysis or report must be filed with the appropriate governmental authority. One consequence of these differences is that “reserves” calculated in accordance with Canadian requirements may not qualify as “reserves” under Industry Guide 7 standards.

Descriptions in this report of our mineral deposits prepared in accordance with Industry Guide 7, as well as similar information provided by other issuers in accordance with Industry Guide 7, may not be comparable to similar information prepared in accordance with NI 43-101 that is presented elsewhere outside of this report.

Disclosures of mineral reserves in this report have not been adjusted to reflect our ownership interest of the entities that ultimately own the assets. The information includes each mine, smelter and project of our consolidated subsidiaries, presented as a whole; however, we do not own undivided equity interests in certain of these mines and projects.

Thiago N. Teixeira, B.Eng., FAusIMM, a Nexa Resources employee, has reviewed and approved the scientific and technical information contained in this Form 20-F, and is a “qualified person” for the purpose of NI 43-101.

For a table summarizing the mineral reserves estimates prepared in accordance with Industry Guide 7 for our mines, see “Information on the Company—Mining operations” below. For the meanings of certain technical terms used in this report, see “Additional information—Glossary.”

Presentation of information concerning reserves

The estimates of proven and probable ore reserves at our mines and projects and the estimates of mine life included in this annual report have been prepared by our staff of experienced geologists and engineers, unless otherwise stated, and in accordance with the technical definitions established by the SEC. Under the SEC’s Industry Guide 7:

- Reserves are the part of a mineral deposit that could be economically and legally extracted or produced at the time of the reserve determination.
- Proven reserves are reserves for which (a) quantity is computed from dimensions revealed in outcrops, trenches, workings or drill holes; grade and/or quality are computed from the results of detailed sampling; and (b) the sites for inspection, sampling and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth and mineral content of reserves are well-established.

- Probable reserves are reserves for which quantity and grade and/or quality are computed from information similar to that used for proven reserves, but the sites for inspection, sampling and measurement are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for proven reserves, is high enough to assume continuity between points of observation.

We periodically revise our reserve estimates when we have new geological data, economic assumptions or mining plans. During 2019, we performed an analysis of our reserve estimates for certain operations, which is reflected in new estimates as of December 31, 2019. Reserve estimates for each operation assume that we either have or expect to obtain all the necessary rights and permits to mine, extract and process mineral reserves at each mine. Where we own less than 100% of the operation, reserve estimates have not been adjusted to reflect our ownership interest. Certain figures in the tables, discussions and notes have been rounded. For a description of risks relating to reserves and reserve estimates, see “Risk factors—Risks related to our mineral reserves.”

Our reserve estimates are based on certain assumptions about future prices. We have determined that our reported reserves could be economically produced if prices for the products identified in the following table were equal to the three-year average historical prices from September 1, 2016 to August 30, 2019. For this purpose, we used the three-year historical average prices set forth in the following table.

Commodity	Three-year average historical price
Zinc	US\$ 2,798 per tonne
Lead	US\$ 2,191 per tonne
Copper	US\$ 6,149 per tonne
Silver	US\$16.34 per oz.
Gold	US\$1,280 per oz.

(1) Reserves prices were updated on different prices, each calculated based on the average price of the previous three years. For more information, see the footnotes to the table of reserves estimates below.

In October 2018, the SEC adopted revisions to mining disclosure rules in order to modernize the property disclosure requirements for mining registrants and related guidance. The changes bring the reporting guidance up to date with advances made in the industry and global regulatory practices for mineral reserve determinations. We are studying the impact of the new SEC guidelines for reporting of our mineral reserves estimates. The new SEC guidelines have not gone into effect and have not been used in the determination of our mineral reserves estimates for year-end 2018. We will be required to comply with these new SEC guidelines in connection with our annual report on Form 20-F for the fiscal year 2021.

Mining operations

The following table shows our estimates of mineral reserves prepared in accordance with Industry Guide 7 and other information about our mines as of December 31, 2019. We did not report mineral reserves for Atacocha underground mine or Atacocha open pit mine for fiscal year ended December 31, 2018 and for the previous years. We have reported mineral reserves for the fiscal year ended December 31, 2019 since the application of three-year trailing averages for NSR calculations in accordance with Industry Guide 7 results in economically recoverable reserves for both Atacocha underground and Atacocha open pit. The Morro Agudo mine does not have known mineral reserves under Industry Guide 7.

	Ownership Interest ⁽¹⁾	Class	Total (millions of tonnes)	Grade					Contained Metal Content				
				Zinc	Copper	Silver	Lead	Gold	Zinc	Copper	Silver	Lead	Gold
				(%)	(%)	(g/tonne)	(%)	(g/tonne)	(thousands of tonnes)	(thousands of tonnes)	(kg)	(thousands of tonnes)	(kg)
Cerro Lindo Mine ⁽²⁾	80.16	Proven	21.52	1.53	0.63	19.0	0.19	—	330	135.4	409,702	40.1	—
		Probable	26.84	1.05	0.67	18.7	0.14	—	281.4	179.6	502,535	37.6	—
		Subtotal	48.37	1.26	0.65	18.9	0.16	—	611.4	315	912,236	77.7	—
El Porvenir Mine ⁽³⁾	80.16	Proven	6.99	3.51	0.21	52.3	0.82	—	245.5	14.7	365,697	57.3	—
		Probable	9.22	3.84	0.24	42.7	0.7	—	354.2	22.5	393,807	64.7	—
		Subtotal	16.21	3.7	0.23	46.9	0.75	—	599.7	37.2	759,504	122.1	—
Atacocha Mine (Underground) ⁽⁴⁾	72.94	Proven	2.32	3.95	0.22	75.4	1.86	—	91.64	5.10	175,021	43.15	—
		Probable	1.59	3.51	0.24	83.6	1.54	—	55.81	3.82	132,988	24.49	—
		Subtotal	3.91	3.77	0.23	78.8	1.73	—	147.45	8.92	308,008	67.64	—
Atacocha Mine (open pit) ⁽⁴⁾	72.94	Proven	3.17	1.21	0.03	29.7	0.85	0.24	38.50	0.90	94,256	27.00	752
		Probable	2.16	0.93	0.02	29.9	0.88	0.26	20.12	0.49	64,679	19.04	562
		Subtotal	5.33	1.10	0.03	29.8	0.86	0.25	58.62	1.40	158,935	46.05	1,314
Vazante Mine ⁽⁶⁾	100	Proven	8.47	9.22	—	15.0	0.29	—	780.6	—	126,706	24.2	—
		Probable	9.09	8.96	—	11.1	0.24	—	814.2	—	101,141	21.8	—
		Subtotal	17.56	9.08	—	13.0	0.26	—	1,594.80	—	227,847	46	—
Total		Proven	42.47	3.50	0.37	27.6	0.45	0.02	1486.16	156.08	1,171,381	191.79	752
		Probable	48.90	3.12	0.42	24.4	0.34	0.01	1525.78	206.40	1,195,150	167.71	562
		Total	91.38	3.30	0.40	25.9	0.39	0.01	3011.95	362.48	2,366,531	359.49	1,314

Notes: Totals may not sum due to rounding.

(1) The mineral reserve estimates with respect to our mines were prepared by Nexa Resources.

- (2) The production and content amounts presented in this table have not been adjusted to reflect our ownership interest. The information presented in this table includes 100% of the mineral reserve estimates of our consolidated subsidiaries and of our joint ventures, certain of which are not wholly-owned, as set out in this ownership interest column.
- (3) Mineral reserves are reported within engineered stope outlines assuming the following underground mining methods: sublevel open stoping (SLOS) or vertical retreat mining (VRM) with paste backfill, and mechanized drift and fill/cut and fill (D&F/C&F) with paste backfill. Mineral Reserves are estimated at NSR cut-off values of US\$32.91/t processed and US\$40.00/t processed for sub-level open stoping (SLS) and cut and fill (CAF) respectively. Several incremental stopes (down to US\$28/t NSR value) are included in the estimate. Metal prices used for the NSR calculation are three-year trailing average as allowed under Industry Guide 7: Zn: US\$2,798/t (US\$1.27/lb); Pb: US\$2,191/t (US\$0.99/lb); Cu: US\$6,149/t (US\$2.78/lb) and Ag: US\$16.34/oz. NSR calculations are based on polynomial equations for each of the concentrate elements and consider sliding smelter payments that vary depending on the grade of the concentrate. A minimum mining width of 5.0 m was used for both CAF and SLS stopes and 4.0 m for pillar recovery CAF stopes. Nexa entered into a silver streaming agreement with Triple Flag, beginning in December 2016. The result is that revenues from silver sales will be lower than from assumed price. The reduced silver revenue has not been considered in NSR calculations or cut-off grade but is not expected to make a material difference in the reserve estimates. The revenue reduction has been included in financial analysis.
- (4) Minimum mining widths of 5 m and 4 m were applied to the C&F and SLS stopes, respectively. Average Bulk density of 3.35 t/m³. The NSR cut-offs are calculated based on the LOM costs depending on the mining method used: Sub level stoping (SLS): US\$48.38/t; and Cut and fill (C&F): US\$56.15/t. Metal prices used for the NSR calculation are three-year trailing average as allowed under Industry Guide 7: Zn: US\$2,798/t (US\$1.27/lb); Pb: US\$2,191/t (US\$0.99/lb); Cu: US\$6,149/t (US\$2.78/lb) and Ag: US\$16.34/oz. NSR calculations are based on polynomial equations for each of the concentrate elements and consider sliding smelter payments that vary depending on the grade of the concentrate.
- (5) We did not report mineral reserves for Atacocha Underground or Atacocha Open Pit for fiscal year ended December 31, 2018 or for previous years. We have reported mineral reserves for the fiscal year ended December 31, 2019 since the application of three-year trailing averages for NSR calculations in accordance with Industry Guide 7 results in economically recoverable reserves for both Atacocha Underground and Atacocha Open Pit. Mineral Reserves are estimated at NSR cut-offs of US\$ 71.13/t processed and US\$61.99/t processed for CAF and SLS, respectively, at Atacocha Underground; and US\$17.97/t processed at Atacocha Open Pit. Metal prices used for the NSR calculation are three-year trailing average as allowed under Industry Guide 7: US\$2,798/t (US\$1.27/lb); Pb: US\$2,191/t (US\$0.99/lb); Cu: US\$6,149/t (US\$2.78/lb), Ag: US\$16.34/oz and Au: US\$ 1,280/oz.
- (6) Mineral Reserves are reported within engineered stope outlines assuming the following underground mining methods: sublevel stoping (SLS), vertical retreat mining (VRM) and Cut and fill (C&F). Dilution and mining recovery are considered. A minimum mining width of 4 m was applied. Average Bulk density of 3.22 t/m³. Metal prices used for the NSR calculation are three-year trailing average as allowed under Industry Guide 7: US\$2,798/t (US\$1.27/lb); Pb: US\$2,191/t (US\$0.99/lb) and Ag: US\$16.34/oz.

CAPITAL EXPENDITURES

Our capital expenditures from January 1, 2017 through December 31, 2019 totaled US\$907.6 million and we have budgeted US\$ 410.0 million for 2020 for investments in projects that are currently underway, reflecting a 0.07% increase compared to our 2019 investment budget. The following table sets forth our capital expenditures for the periods indicated.

	For the Year Ended December 31,		
	2019	2018	2017
	(in millions of US\$)		
Capital Expenditures			
Expansion ⁽¹⁾	188.5	90.5	48.8
Modernization	18.5	15.0	21.4
Sustaining	138.0	90.2	59.4
Health, Safety and Environment	57.4	89.1	62.1
Others	7.7	11.7	6.1
Subtotal	410.1	296.5	197.8
Reconciliation to Financial Statements ⁽²⁾	0.2	3.2	(0.2)
Total	410.3	299.7	197.6

(1) For a description of the projects, see “Information on the Company—Mining operations.”

(2) The amounts under “Reconciliation to Financial Statements” are related to capitalization of interest net of advanced payments.

Our main capital expenditures during the years ended December 31, 2019, 2018 and 2017 include the following.

- In 2019, our capital expenditures were US\$410.3 million, mainly allocated to the following projects: the continuation of construction at the Aripuanã greenfield project; the Vazante mine deepening project; sustaining capital expenditures; and the construction of our dry-stacking tailings disposal facility in Vazante.
- In 2018, our capital expenditures were US\$299.7 million, mainly allocated to the following projects: the Vazante life of mine extension; implementation of dry stacking tailings disposal at Vazante; the start of construction at the Aripuanã greenfield project; and the change from the Goethite conversion process to the Jarosite conversion process at Cajamarquilla. In addition, we also invested in non-expansion projects related to environmental, health and safety, sustaining, and investments in tailings dams.
- In 2017, our capital expenditures were US\$197.6 million, allocated to the following projects: the Vazante mine deepening project, for which the largest investment was in excavation; waste treatment and dam projects at Três Marias and El Porvenir; the Ambrosia mine project, for which the largest investment was in excavation; and a pump station project at Vazante.

For 2020, we have budgeted US\$410.0 million to invest in projects that are currently underway. Our main projects include US\$247.0 million directed towards expansion projects—of which US\$220.0 million is allocated to construction of the Aripuanã project and US\$16.0 million to the Vazante mine deepening project—and US\$163.0 million towards non-expansion projects.

We expect to meet these capital expenditure needs from our operating cash flow and our current cash position. We may need to incur indebtedness to finance a portion of these expenditures or also incur indebtedness if financing is available at attractive terms. Our actual capital expenditures may vary from the expected amounts we have described here, both in terms of the aggregate capital expenditures we incur and when we incur them.

REGULATORY MATTERS

We are subject to a wide range of governmental regulation in the jurisdictions in which we operate. The following discussion summarizes the kinds of regulation that have the most significant impact on our operations.

Brazilian regulatory framework

Mining rights and regulation of mining activities

Mining activities in Brazil are governed by the Brazilian Federal Constitution of 1988, the Brazilian Mining Code and other decrees, laws, ordinances and regulations, such as the Decree n° 9.406/2018 which renewed the regulation of the Mining Code. These regulations impose several obligations on mining companies relating to, among other things, the way mineral deposits are exploited, the health and safety of workers and local communities where mines are located, and environmental protection and remediation measures. They also set forth the Brazilian federal government's jurisdiction over, and scope of activities within, the industry. The MME and ANM regulate mining activities in Brazil. As of July 2017, the ANM replaced the DNPM, and is responsible for monitoring, analyzing and promoting the performance of the Brazilian mineral economy, granting rights related to the exploration and exploitation of mineral resources and other related activities in Brazil.

Under the Brazilian Federal Constitution, surface property rights are distinct from mineral rights, which belong exclusively to the Brazilian federal government, the sole entity responsible for governing mineral exploration and mining activity in Brazil.

Summary of Brazilian concessions

In Brazil, we hold exploration authorizations (*autorizações de pesquisa*), mining concessions (*concessões de lavra*), mining concession applications (*requerimento de lavra*) and exploration authorizations applications (*requerimentos de pesquisa*), which we broadly and collectively refer herein to as mineral rights, that cover a total area of 2,714,656.0 hectares, of which: (i) 2,292,357.6 hectares, or 84.44%, are exploration authorizations, (ii) 7,235.9 hectares, or 0.27%, are mining concessions, (iii) 12,891.1 hectares, or 0.47%, are mining concession applications, and (iv) 402,171.4 hectares, or 14.81%, remain as exploration authorization applications and are presently under initial geological reconnaissance.

In addition to Vazante and Morro Agudo, we held a third mine concession in Fortaleza de Minas, where nickel production activities have been suspended since 2013 due to international market conditions. The price of nickel is not expected to recover to historical levels due to structural changes in supply, as low-cost nickel pig-iron production has replaced a substantial share of traditional nickel sources. Nickel is currently not part of our strategic plan. In May 2018, we entered into an agreement to sell assets and transfer certain liabilities of the Fortaleza de Minas facility to a third party. In April 2019, the transfer was concluded before the ANM.

The term of each of the mining concessions mentioned above is valid for the life of the mine, evaluated pursuant to the specific mining project. All our mineral rights in Brazil are in good standing. Maintaining our mineral rights in Brazil in good standing involves: (i) maintaining production on the mineral concessions and/or satisfying the ANM's requirements if production has been suspended; (ii) developing exploration work and paying an annual property fee for the exploration authorizations; and (iii) complying with all the legal requirements, including not only as to mining, but also as to environmental and real estate requirements applicable to claiming a property with respect to exploration applications.

Failure to pay the applicable fees for any given year will result in us forfeiting our mineral rights. As of December 31, 2019, we have paid all applicable royalties, taxes and fees on our mineral rights. Our mineral rights in Brazil that are not currently undergoing exploration or production will not expire unless we fail to timely pay the applicable royalties, taxes and fees, as well as the applicable penalties and meet the ANM's and environmental authorities' requirements, as applicable. See "Information on the Company—Regulatory matters—Brazilian regulatory framework—Royalties and other taxes on mining activities."

The following table summarizes our mineral rights in Brazil.

	Project	Mineral Right	
		Titles	Area (hectares)
Mines	Morro Agudo / Ambrósia		
	Trend	6	3,941.9
	Vazante mine	8	2,091.1
Greenfield Projects	Aripuanã	4	3,640.7
	Caçapava do Sul	3	2,947.3
Prospective Projects	Various	906	2,702,035.0
Total		927	2,714,656.0

Exploration authorization and mining concession regimes

Exploration authorizations grant the rights to conduct exploration activities for a period from one to three years, which may be renewable for an additional period (and potentially additional renewals on a case-by-case basis). Exploration authorizations are granted on a first come, first serve basis, and the ANM will only grant one exploration authorization for any given area. Mining concessions are currently valid until the mineral deposit reserves are exhausted. Mining concessions may be transferred to eligible third parties with the ANM's prior approval, pursuant to applicable legislation.

Decommissioning

In Brazil, enterprises dedicated to the exploitation of mineral resources shall submit a recovery plan to receive a mining concession. Accordingly, the environmental recovery of the degraded areas caused by mineral exploitation activities shall have been planned since their conception. According to Minas Gerais law, entrepreneurs must also submit to the environmental agency an environmental plan for closing two years before the planned mine closing.

The state of Minas Gerais has also passed legislation on decommissioning plans for industrial activities. The Três Marias unit was the first metal production operation to prepare a decommissioning plan at the licensing stage, including the calculation of a financial provision. In the case of the Aripuanã and Caçapava do Sul greenfield projects, presentation of a decommissioning plan is one of the requirements for obtaining an environmental license.

Royalties and other taxes on mining activities

Revenues from mining activities are subject to CFEM which is paid to the ANM. CFEM is a monthly royalty based on the sales value of minerals, net of taxes levied on the respective sale. When the produced minerals are used in its internal industrial processes, CFEM is determined based on the costs incurred to produce them. CFEM is determined by a reference price of the respective mineral to be defined by the ANM. The applicable rate varies according to the mineral product (currently 2.0% for zinc, lead, copper and silver). In addition, we are required to make certain fee payments for exploration authorizations known as the Annual Fee per Hectare (*Taxa Anual por Hectare*). There is also a monthly inspection fee related to the transfer and commercialization of certain minerals in some Brazilian states, such as Minas Gerais, where the concessions are located.

Environmental regulations

We are subject to several environmental regulations related to, among other matters, water resources, caves, waste management, contaminated areas, areas of permanent preservation, and conservation of protected areas. Specifically, we have taken the following actions regarding contaminated areas and areas of permanent preservation:

Contaminated areas. We have carried out environmental assessments on our operation units to verify the existence of contamination in groundwater and soil. The assessments prepared for the Brazilian units identified deviations in soil, groundwater and surface water quality standards. We are committed to improving the management of areas identified as contaminated. For most of the identified deviations, we developed a robust remediation plan in order to comply with all legal requirements. We recorded provisions in our consolidated financial statements in respect of any potential liabilities associated with these deviations from applicable standards. See “Operating and financial review and prospects—Overview—Key factors affecting our business and results of operations—Environmental expenses.” We continue to conduct similar assessments with respect to the Peruvian operating units.

Areas of permanent preservation. Permanent Preservation Areas (*Áreas de Preservação Permanente*, or APP) are areas that, because of their importance for preserving water resources, geological stability, biodiversity protection and erosion control, receive special legal protection. The existence of such protected areas within a property, whether in urban or rural locations, may cause restrictions to the performance of the intended activities. Interference or removal of APP vegetation is only allowed in cases of public utility (such as mining activities), social interest or low environmental impact, if there is a prior authorization from the applicable environmental authorities. Most of our properties in the state of Minas Gerais interfere in APPs in some way. For such properties, we have either already established an advanced ongoing regularization process or have started the process for other properties. The regularization process includes the implementation of rigid controls over the properties.

Environmental licenses

The Brazilian Federal Constitution grants federal, state and municipal governments the authority to issue environmental protection laws and to publish regulations based on those laws. While the Brazilian federal government has authority to issue environmental regulations setting general standards for environmental protection, state governments have the authority to issue stricter environmental regulations. Municipal governments may only issue regulations regarding matters of local interest or as a supplement to federal or state laws.

Under Brazilian law, the construction, installation, expansion and operation of any establishment or activity that uses environmental resources, or is deemed to be actually or potentially polluting, as well as those capable of causing any kind of environmental degradation, is subject to a prior licensing process.

Notably, in addition to the general guidelines set by the Brazilian federal government, each state is legally competent to promulgate specific regulations governing environmental licensing procedures under its jurisdiction. Depending on the level of environmental impact caused by the exploration/exploitation activities, the procedures for obtaining an environmental license may require assessment of the environmental impact and public hearings, which may considerably increase the complexity and duration of the licensing process and expose the exploration/exploitation activities to potential legal claims.

Environmental liability

Environmental liability may be determined by civil, administrative and criminal courts, with the application of administrative and criminal sanctions, in addition to the obligation to redress the damages caused. All our operating units have obtained certification under the ISO 14001 standard.

Regulation of other activities

In addition to mining and environmental regulation, we must abide by regulations related to, among other things, the use of explosives and fuel storage. We are also subject to more general legislation on labor, occupational health and safety, and support of communities near mines, among other matters.

Peruvian regulatory framework

Mining rights and regulation of mining activities

The Natural Resources chapter of the Peruvian Constitution, enacted in 1993, states that mineral resources are the property of the Nation, and the Peruvian State is sovereign in their administration. The Peruvian Government may establish by law the conditions for granting exploitation rights and titles to individuals and legal entities.

The General Mining Law (*Texto Único Ordenado de la Ley General de Minería*) is the primary law governing both metallic and non-metallic mining activities in Peru and is complemented by other regulations approved by the MINEM. Under the General Mining Law, mining activities such as exploration, exploitation, mining labor, beneficiation and mining transport (except storage, sampling, prospecting and trade) are carried out exclusively by means of concessions. The DGM (*Dirección General de Minería*) is the regulatory body of the MINEM responsible for proposing and evaluating regulations in the Peruvian mining sector as well as authorizing the commencement of mining activities in Peru.

A mining concession allows its holder to carry out exploration and exploitation activities within the area established in the respective concession title, provided that prior to the beginning of any mining activity, such concession title is granted by the INGEMMET (*Instituto Geológico, Minero y Metalúrgico*) and other applicable administrative authorizations are obtained (e.g., mining, environmental, use of water, use of explosives, etc.). A concession provides its titleholder with the exclusive right to undertake mineral exploration and mining activity within a determined area but does not grant the titleholder the right to own the surface land where the concession is located. Therefore, for the holder of a mining concession to develop exploration and/or exploitation works, the latter has to purchase the corresponding surface land from the owners, reach an agreement for its temporary use or obtain the imposition of a legal easement by the MINEM, which is rarely granted. There are special proceedings for purchasing or acquiring temporary rights over barren lands owned by the state.

Summary of Peruvian concessions

In Peru we hold, through Nexa Peru and its subsidiaries, 948 mining and exploration concessions, which cover a total area of 434,898.4 hectares. Of our mines in Peru, the Atacocha mine property includes 147 mining concessions that cover an area of 2,872.5 hectares, the El Porvenir mine property includes 25 mining concessions that cover an area of 4,846.8 hectares, the Cerro Lindo mine has 61 mining concessions, and one beneficiation concession that cover an area of 38,854.7 hectares and the inactive Chapi mine property includes 32 mining concessions that cover an area of 4,625.6 hectares. In addition, we have 220 mineral rights concessions for greenfield projects in Peru that cover a total area of 81,720.7 hectares. Our prospective projects include 463 mining concessions that cover an area of 301,978.2 hectares.

All our mining and processing concessions in Peru are in good standing. Maintaining our concessions in Peru in good standing involves, among other requirements, (i) paying the annual validity fee and production penalties (when applicable) for mining concessions with no production or with no effective exploration or (ii) paying the annual validity fee and complying with minimum production or investment requirements established in mining law.

Failure to pay such validity fees or production penalties (when applicable) for two consecutive years results in the cancellation of the respective mining concessions or benefit concessions granted by the Peruvian government. Our mining and benefit concessions will not expire unless we do not comply in paying these fees or with minimum production or investment as required by law and depending on the applicable regime.

The following table summarizes our mining concessions in Peru.

	Project	Concessions	
		Titles	Area (hectares)
Mines	Atacocha mine	147	2,872.5
	El Porvenir mine	25	4,846.8
	Cerro Lindo mine	61	38,854.7
	Chapi mine (inactive)	32	4,625.6
	Florida Canyon Zinc	16	12,600.0
Greenfield Projects	Chapi Greenfield	14	5,855.6
	Hilarión	70	15,029.7
	Magistral	34	14,495.2
	Pukaqaqa	34	11,131.3
	Shalipayco	52	22,609.0
Prospective Projects	Various	463	301,978.2
Total		948	434,898.4

Exploration and authorization and mining concession regimes

Mining concessions are granted for an indefinite term, though dependent on the fulfillment of certain legal obligations. The commencement and re-commencement of exploration and/or exploitation mining activities are subject to the prior obtainment of an authorization for the commencement of activities before the DGM. Such authorizations could be subject to a prior consultation procedure if the DGM determines that development of the project could impact the rights of indigenous communities.

As of December 31, 2019, we primarily owned metallic mining concessions with respect to zinc, copper, silver and lead. Substantially all of Nexa Peru's concessions were granted prior to 2008. Our mining rights and concessions are in full force and effect under applicable Peruvian laws. We believe that we comply in all material respects with the terms and requirements applicable to our mining rights and concessions.

Decommissioning

Titleholders of mining exploitation and beneficiation activities, and, in some cases, of exploration activities require the prior approval of a mine closure plan, which includes the environmental rehabilitation, restoration and remediation measures that shall be executed along with the mining operations and until its closure. Once the corresponding mine closure plan is approved, an environmental guarantee must be granted in favor of the MINEM to back up the costs associated with the execution of the mine closure plan. Mining exploitation and beneficiation activities may only be initiated once the mine closure plan is approved and the corresponding environmental guarantee is duly submitted before the competent authority. The corresponding environmental guarantee is submitted yearly. If the titleholder of an ongoing mining operation fails to comply with this obligation, the MINEM is entitled to suspend the execution of such mining operation.

Royalties and other taxes on mining activities

Holders of mining concessions are required to pay a mining royalty (*regalía minera*) to the Peruvian government for the exploitation of metallic and non-metallic resources. The amount of the royalty is now payable on a quarterly basis and is equal to the greater of (i) an amount determined in accordance with a statutory scale of marginal tax rates from 1.0% to 12.0% based on a company operating income margin and applied to that company's operating income and (ii) 1.0% of a company's sales, in each case during the applicable quarter. We are required to pay annual fees (*derecho de vigencia*) for our mining concessions and, in some cases, mining production penalties for not reaching the minimum production levels set by Peruvian mining law.

Holders of mining concessions are also required to pay a Special Mining Tax (*Impuesto Especial a la Minería*) to the Peruvian government. The Special Mining Tax is payable on a quarterly basis and is calculated based on the operating income derived exclusively from the sale of metallic resources, with marginal rates between 2.0% and 8.4%.

Holders of mining concessions that are subject to administrative legal stability (in force as of the effective date) under an Agreement of Guarantees and Measures for Investment Protection entered into with the MINEM and Mining shall enter into an agreement with the Peruvian government for the payment of a Special Charge on Mining (*Gravamen Especial a la Minería*). The Special Charge on Mining is payable on a quarterly basis and is calculated based on the operating income derived exclusively from the sale of metallic resources, with marginal rates between 4.00% and 13.12%.

Tax stability agreements

On March 26 of 2002, Nexa Peru entered into an Agreement of Guarantees and Measures for Investment Protection with MINEM with respect to our Cerro Lindo unit. Pursuant to section 9 of said Agreement, until December 31 of 2021, certain guarantees will benefit with respect to operations of the Cerro Lindo unit including, among others, free commercialization of the products proceeding from such unit, free disposition of the currencies generated from the export of the products proceeding from such unit, the right to use the global depreciation rate applicable on the fixed assets relating to the Cerro Lindo unit up to 20.0% per year, the right to keep the accounting corresponding to the Cerro Lindo unit in U.S. dollars, and tax stability.

Municipal permits

The regularization process for Nexa CJM's administrative offices and construction permits was fully completed on September 22, 2017. The permit for construction of a new locker room at Nexa CJM's facilities was obtained on December 11, 2019. Nexa CJM is also in the final stage of the process of obtaining a municipal license for the operation of its water catchment plant located in Carapongo, Peru.

Environmental regulations

The development of economic activities in the Peruvian territory, such as those related to the mining industry, are subject to a broad range of general environmental laws and regulations related to the generation, storage, handling, use, disposal and transportation of hazardous and controlled materials; the emission and discharge of hazardous materials into the ground, air or water; and the protection of migratory birds and endangered and threatened species and plants. These regulations also set environmental quality standards for noise, water, air and soil, which shall be considered for the preparation, assessment and approval of the corresponding environmental management instrument.

The Ministry of Environment and other administrative entities, such as the DGAAM (*Dirección General de Asuntos Ambientales Mineros*), have the authority to enact regulations related to environmental matters. Additionally, the Environmental Supervision Agency (*Organismo de Evaluación y Fiscalización Ambiental*, or OEFA), is the competent authority in charge of supervising and imposing sanctions on mining companies upon non-compliance of applicable environmental legislation. In addition, there are other competent governmental agencies or authorities on specific environmental matters such as water, forestry resources, and aquatic environment that regulate and supervise environmental compliance and liability.

Environmental permit regularization processes

Supreme Decree 040-2014-EM provided special procedures allowing us to acquire environmental and operational permits for mining operations and to regularize the mining of certain areas within the Cerro Lindo and Atacocha mines. It also provided for special procedures to regularize the construction and operation of certain mining components in Nexa CJM's "Poza de Lodos Neutros" and "Poza No. 5," which lacked the corresponding mining and environmental permits. With respect to Cerro Lindo, this permit regularization process was fully completed on July 5, 2017. With respect to the Atacocha mine, on December 18, 2017, we completed the permit regularization with respect to the areas that will be exploited. With respect to Nexa CJM's "Poza de Lodos Neutros" and "Poza No. 5," the regularization processes have been concluded and, therefore, these components currently have sufficient environmental and mining permits in place. These regularization procedures are independent from any sanctioning administrative procedure that the OEFA may initiate in connection with the construction and operation of mining components without the corresponding environmental permits.

Regulation of other activities

In addition to mining and environmental regulation, we must abide by regulations related to, among other activities, the use of explosives, fuel storage, and electricity concessions. We are also subject to more general legislation on labor, occupational health and safety, and peasant and indigenous communities, among others.

II. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

OVERVIEW

Executive summary

During 2019, we faced macroeconomic headwinds, downward pressure on commodity prices and operational setbacks that affected our results. These headwinds will likely continue in 2020 with the spread of the coronavirus and, more recently, the oil trade war between OPEC and Russia. It is uncertain and difficult to predict their impact on the world's economy and health. On the other hand, 2019 was also a year during which we focused on reviewing our internal processes and our capital allocation strategy, prioritizing investments in operating efficiency initiatives. These initiatives continue into 2020.

In mid-2019, we initiated the Nexa Way program to enhance our operational performance. The program not only comprises a revision of our procedures to structurally improve our business model, but also involves changes in our organizational culture. During the second semester of 2019, we implemented initiatives that we expect to generate EBITDA gains throughout 2020 and 2021. In 2019, the program incurred non-recurring costs of US\$41.3 million, included in our general and administrative expenses. The program is estimated to end in September 2020 and potential new initiatives are under analysis. We estimate the implementation of these new initiatives could generate additional gains, as well as some additional non-recurring costs. For 2020, we expect to improve our operational performance, which should help offset market-related challenges. In the longer term, we believe that our strategy is aligned with market fundamentals and that Nexa enjoys a unique position in Latin America with a solid operation and robust project pipeline.

In 2019, we also continued to pursue exploration activities that aim to replace and increase mineral reserves and resources, and to develop our pipeline of growth projects (both greenfield and brownfield). We advanced in construction of the Aripuanã project in Brazil, as the project's start-up is planned for 2021. This project is aligned with our objective to increase integration between our mining and smelting operations and reducing third-party zinc concentrate supply needs. In 2019, we acquired Karmin Exploration Inc., which owned 30% of the project, consolidating our ownership in the project, providing us marketing and sales flexibility to improve our margins in the future. As a result, Nexa and its subsidiaries now own 100% of a high-quality asset that should increase synergies with our Brazilian operations, and provides additional flexibility to Nexa in continuing the development of the Aripuanã project.

In terms of our brownfield projects, we reached two significant milestones in our Vazante operations: we began operating our new dry-stacking tailings disposal facility and made significant advances in our Vazante mine deepening project. The dry-stacking project included the installation of a new filtering, drying, handling and disposal process of dry tailings that meets the life of mine of Vazante and that substitutes the Aroeira dam's conventional tailings disposal. The ramp-up was concluded in the third quarter 2019 and is already operational. In terms of our mine deepening, we reached 85% of physical progress including the completion of phase 1 of the EB-140 pumping station with 8 pumps concluded. During 2019, production at the deeper levels of the mine (Level 326) represented 69% of Vazante's zinc production.

Another milestone achieved in 2019 was the signing of new energy agreements that will generate savings in Peru and Brazil starting in January 2020. In Peru, we signed a new long-term energy agreement with Electroperú S.A., a well-known Peruvian state-owned company, to supply our operations, with potential savings of up to US\$50.0 million during the 7-year contract term. In Brazil, we signed a 15-year energy agreement with Furnas, a Brazilian energy company controlled by Eletrobras that will supply 13.8MW per year of energy with a reference price of R\$154/MWh (price will be annually adjusted for inflation). With the Furnas agreement, Nexa will have an excess energy supply that it intends to use in the Aripuanã operation.

Our 2019 financial results were adversely impacted by factors including: (i) lower overall metal prices, which impacted our revenues, despite the increase in zinc metal sales volumes from our smelters driven by higher global recovery; (ii) the drop in zinc head grade despite relatively stable treated ore volumes in our mines; (iii) the non-recurring expenses of US\$41 million related to the Nexa Way program; and (iv) higher unit costs in our mining segment due to increased operating costs (i.e., maintenance and personnel costs). In addition, our 2019 results were impacted by the recognition of a US\$142.0 million non-cash impairment loss related to the Cerro Pasco cash-generating unit primarily driven by a reduction in mine life.

In 2019, we had a 1.9% decrease in our mine production, from 574.9 thousand tonnes in 2018 to 564.2 thousand tonnes in 2019, and a 0.7% increase in metal sales in our smelting operations, from 616.9 thousand tonnes in 2018 to 621.2 thousand tonnes in 2019.

In 2019, our net revenues were 6.4% lower compared to 2018, reaching US\$2,332.3 million, primarily impacted by lower average London Metal Exchange (LME) prices compared to the 2018 average. In 2019, adjusted EBITDA was US\$349.0 million, a 42.3% decrease compared to 2018, primarily as a result of lower LME prices, higher operating costs, including the non-recurring expenses of Nexa Way, and partially offset by the appreciation of the U.S dollar against the Brazilian real and the increase in by-products credits.

Our capital expenditures totaled US\$410.3 million in 2019, a US\$110.6 million increase compared to 2018, which aligns with our growth strategy. In 2019, our primary focus was the construction of our Aripuanã greenfield project and the life of mine extension at Vazante, which aims to extend the life of mine to 2029. We spent US\$123.8 million on Aripuanã and US\$27.5 million on the Vazante deepening in 2019.

During 2020, we plan to work towards the following objectives:

- improving our operating performance, including through the implementation of our operating productivity and financial performance program, Nexa Way;
- continuing our investments in the construction of our Aripuanã development project — with an estimated investment of US\$220 million in 2020 - in order to have the mine ready to begin operations by 2021; and
- continuing to advance with our pipeline of greenfield projects:
 - o Magistral copper project - we intend to conclude the final phase of our engineering studies (FEL3) and an updated technical report should be disclosed after the studies are concluded;
 - o Hilarión project (currently in exploration stage) - we intend to continue our advance exploration drilling campaign to increase our mineral resources;
 - o Shalipayco and Pukaqaqa projects – continue the PFS stage, pending approval of the social license and the results of metallurgical tests, respectively, to advance to the next engineering study phase.

In 2020, we estimate that we will produce between 338.0 thousand tonnes and 375.0 thousand tonnes of zinc contained in concentrate; between 40.0 thousand tonnes and 46.0 thousand tonnes of copper contained in concentrate; between 50.0 thousand tonnes and 55.0 thousand tonnes of lead contained in concentrate; and between 8,825 thousand ounces to 9,230 thousand ounces of silver contained in concentrate. These estimates assume, among other things: (i) lower average zinc head grade at our Cerro Lindo mine partially offset by improved average copper grade; (ii) improved performance at our Vazante mine driven by the mine deepening project, ore sorter, and dilution reduction initiatives; and (iii) higher overall production at our Cerro Pasco unit driven by increased lead production in El Porvenir and improved overall performance in Atacocha.

In 2020, we expect to sell between 578.0 thousand tonnes and 596.0 thousand tonnes of metallic zinc product volume and between 37.0 thousand tonnes and 39.0 thousand tonnes of zinc oxide product volume. These estimates assume, among other things, an increase in performance through regular production across our smelters with productivity gains driven by: (i) the increase in silicate mix feed to the Três Marias smelter; (ii) the improvement in secondary mix feed to the Juiz de Fora smelter; and (iii) the continuous improvement in our Cajamarquilla operation.

Over the next three years, we are expecting zinc equivalent metal production to increase 6.4% on average (based on the midpoint of the guidance range from 2020 to 2022), mostly driven by the commissioning of Aripuanã in 2021. We expect to produce, in terms of zinc equivalent, between 539.0 and 595.0 thousand tonnes in 2020, 553.0 and 634.0 thousand tonnes in 2021, and 600.0 to 695.0 thousand tonnes in 2022. For the forecasted period, zinc head grade is expected to be in the range of 2.98% and 3.01%, copper head grade is expected to be in the range of 0.34% and 0.38%, and lead head grade is expected to be in the range of 0.52% and 0.63%.

Metal sales volume at the midpoint of the guidance range (615.0 to 635.0 thousand tonnes) in 2020 is estimated to increase 4 thousand tonnes compared to 2019. For 2021, metal sales volume is forecasted to increase 5 thousand tonnes over 2020 (ranging from 620.0 to 640.0 thousand tonnes), and a further 10 thousand tonnes in 2022 over 2021 (ranging from 630.0 to 650.0 thousand tonnes). This estimated increase in performance is explained by regular production across our smelters with productivity gains driven by the increase in silicate mix feed to the Três Marias smelter, improvement in secondary mix feed to the Juiz de Fora smelter and continuous improvement in Cajamarquilla operation.

We also provided our cash cost net of by-product credits estimates for 2020. For our mining segment, we estimated cash cost after by-product credits at US\$0.52 per pound of zinc sold mainly due to market related factors as we forecasted higher treatment charges and lower metal prices when compared to 2019. On the other hand, market-related factors positively affect our smelting segment and cash cost after by-product credit is estimated at US\$0.90 per pound of zinc sold, a decrease of 10.9% compared to 2019.

In 2020, we also expect to incur approximately US\$79.0 million in mineral exploration and project development expenses, with US\$56.7 million allocated to mineral exploration (including brownfields, greenfields, mining properties and administrative issues) and US\$22.0 million allocated to project development. In mineral exploration, we plan to continue our efforts to replace and increase mineral resources and reserves. Our estimated mineral exploration expenses relate mainly to greenfield exploration (US\$30.5 million). Our estimated project development expenses will be directed towards projects in the scoping study and pre-feasibility study stages.

These estimates should be considered preliminary, subject to change and are based on several assumptions that management believes to be reasonable as of the date of this report. The estimates presented in this report do not include any potential impact on our business from the coronavirus outbreak. As of the date of this report, we continue to monitor developments related to the recent coronavirus outbreak. We cannot predict how and to what extent the outbreak may impact our current plans and objectives for 2020, including our current capital expenditure, mineral exploration and project development disbursement. See “Forward-looking statements.” For cash cost guidance, see “Presentation of financial and other information—Non-IFRS measures.”

Key factors affecting our business and results of operations

Reporting segments

We have two reportable segments: mining and smelting. A major part of our zinc mining production, representing approximately 97.8% of production in 2019, is processed in our own smelters. Similarly, a major part of the zinc raw material consumption for our smelting operations, representing approximately 52.4% of concentrates in 2019, comes from our own mines. As a result, the revenues of our mining segment include sales to the smelting segment, and the costs of our smelting segment include purchases from the mining segment. We calculate internal transfer prices from our mines to the smelters on an arm's length basis to evaluate the performance of our mining and smelting segments individually. These revenues and costs are eliminated in our consolidated financial statements.

The profitability of our mining segment depends primarily on world prices of the metals we produce, and on our costs to produce concentrates. It is also affected by treatment charges, which are amounts representing the cost of further processing that are applied to reduce the price of concentrate. Other factors affecting pricing are discussed below.

The profitability of our smelting segment does not depend directly on market prices for metals because they have a similar impact on our revenues and our costs. It is affected primarily by treatment charges (which reduce our costs to acquire concentrates), by the premium over the market price of metals that we can charge for our products, and by the operating costs of our smelters and their efficiency in recovering the metal content of the concentrates we purchase.

Segments are reported in accordance with IFRS 8 “Operating Segments,” and the information is presented to the chief executive officer, who is the chief operating decision maker in accordance with IFRS 8. Segment results are derived from the accounting records and are adjusted for reallocations between segments, exceptional items, and transfer pricing adjustments. See Note 2 to our consolidated financial statements.

Metal prices

Our financial performance is significantly affected by the market prices of zinc, copper and lead, and, to a lesser extent, silver, gold and the other by-products of our smelting operations. Metal prices have historically been subject to wide fluctuations and are affected by numerous factors beyond our control, including the impact such factors have on industries representing first-uses and end-uses of our products. These factors, which affect each metal to varying degrees, include international economic and political conditions, levels of supply and demand, the availability and cost of substitutes, inventory levels maintained by producers and others and, to a lesser degree, inventory carrying costs and currency exchange rates. In addition, market prices have on occasion been subject to rapid short-term changes due to speculative activities.

The market prices for zinc, copper and lead are typically quoted as the daily cash seller and settlement price established by the LME. LME zinc prices are influenced by global supply and demand for metallic zinc and zinc oxide. The supply of metallic zinc and zinc oxide depends on the amount of zinc concentrates and secondary feed materials produced and the availability of smelting capacity to convert them into refined metal. This also applies to copper and lead.

The table below sets forth the average published market prices for the metals and periods indicated:

Average Market Prices of Base Metals	For the Year Ended December 31,					
	2019		2018		2017	
	(US\$/tonne)	(US\$/lb)	(US\$/tonne)	(US\$/lb)	(US\$/tonne)	(US\$/lb)
Zinc (LME)	2,546.34	115.50	2,921.95	132.54	2,895.94	131.36
Copper (LME)	5,999.73	272.14	6,523.04	295.88	6,165.97	279.68
Lead (LME)	1,999.68	90.70	2,242.43	101.71	2,317.46	105.12

Average Market Prices of Precious Metals	For the Year Ended December 31,		
	2019	2018	2017
		(in US\$/oz)	
Silver (LBMA)	16.21	15.71	17.05
Gold (Fix)	1,392.60	1,268.49	1,257.15

The key drivers and recent trends of each of the metals that we produce are discussed below.

Zinc

Zinc is a major material for the construction and transport industries, which represent approximately 50% and 21% of the zinc end-use, respectively, according to Wood Mackenzie.

The annual average price of zinc on the LME as of December 31, 2019, was 12.8% lower when compared to the corresponding period in 2018. During 2019 and according to LME data, zinc stocks remained low, reaching its lowest level on November 11, 2019 and approximately 60.4% below the closing inventory registered on December 31, 2018. Despite strong fundamentals, there was an overall downward trend in zinc prices throughout the year, mainly due to macroeconomic factors, specifically the impacts of the trade dispute between the United States and China.

Spot treatment charges for imported concentrates in China increased from US\$213 per tonne in January 2019 to US\$305 per tonne in December 2019, as reported by Wood Mackenzie, while long-term treatment charges increased from US\$147 per tonne in 2018 to US\$241 per tonne in 2019, as reported by Wood Mackenzie.

According to Wood Mackenzie's fourth quarter report, the zinc metal market closed 2019 with a deficit of 425.4 thousand tonnes resulting from a metal production of 13.6 thousand tonnes (2.8% higher than 2018) and consumption of 14.0 thousand tonnes (1.1% lower than 2018). As of February 2020, refined zinc stock levels remained low, with stocks available for consumption of less than 10 days.

Refined zinc supply presented an increase as a result of the return of Chinese players that had had their operations suspended due to enforcement of new environmental regulations. China also contributed to an increase in demand, which was 132.0 thousand tonnes, or 1.9%, higher compared to 2018.

Copper

Copper is used for building construction, power generation and transmission, electronic product manufacturing and the production of industrial machinery and transportation vehicles. The annual average price of copper on the LME as of December 31, 2019 was 8.0% lower than in the corresponding period in 2018. Copper prices increased 12.6% from the beginning of 2019, reaching its peak in March 2019, however, according to LME data, copper prices were pressured by an increase on stocks from March 2019 until August, 2019, when stocks peaked at 337.7 thousand tonnes during the year.

In December 2019, copper closing stocks in the LME increased by 10.2%, to 145.7 thousand tonnes, compared to 132.1 thousand tonnes in December 2018. Total mine production, as well as global demand for refined copper, remained flat in 2019 compared to 2018, according to Wood Mackenzie.

Lead

Lead is used in batteries as energy storage and in other products such as ammunition, oxides in glass and ceramics, casting metals and sheet lead. The annual average price of lead on the LME as of December 31, 2019 was 10.8% lower than in the corresponding period in 2018. This decrease was also due to the macro scenario above mentioned. Mining production was 1.7% higher in 2019 compared to 2018, according to Wood Mackenzie.

Silver

Silver is considered a precious metal and generally seen as a store of value, so its price tends to be resilient in times of economic uncertainty. In addition, applications in electronics and solar cells have added to the already broad range of uses of silver in currency, jewelry and silverware. The annual average London Bullion Market Association (or LBMA) silver price for the year ended December 31, 2019 was 3.2% higher than in the corresponding period in 2018. This was mainly due to increased demand for commodities that are perceived to be stable investments in a volatile economic scenario, such as silver. During the year, prices increased by 16.9%, from US\$15.44 per ounce on January 2, 2019, the first day of trading, to US\$ 18.05 per ounce on December 31, 2019, the last day of trading.

Production volumes, ore grade and metal mix

Our production volumes, the ore grade from our mines and the mix of metals in our product portfolio affect our business performance. For more details, see "Information on the Company—Mining operations." Our zinc, copper and lead contained in concentrates production decreased by 3.2%, 2.17%, and 1.77%, respectively, in 2019, mainly due to lower ore grades. Production of silver contained in concentrates increased by 11.4% in 2019.

Commercial terms

We sell our concentrates and metallic zinc and zinc oxide products mostly through supply contracts with terms between one and four years, and only a small portion is sold on the spot market. The agreements with our customers include customary international commercial terms, such as cost, insurance and freight, or CIF; free on board, or FOB; free carrier, or FCA; and cost and freight, or CFR; pursuant to Incoterms 2010, as published by the International Chamber of Commerce. For concentrates, revenues are recorded at provisional prices and, typically, an adjustment is then made after delivery, based on the pricing terms provided for under the relevant contract.

Sales prices for our products are based on LME and/or LBMA quotations. Concentrates are typically sold at the LME price reference minus a discount (treatment charge for zinc and lead; treatment charge and refining charge for copper). Metallic zinc and zinc oxide are typically sold at the LME quotation averaged during a quotation period, such as the month after shipment, the month prior to shipment or another agreed period, plus a negotiable premium that varies based on quality, shape, origin, and delivery terms and also according to the market where metal will be sold. In 2019, 52.4% of the total zinc raw material consumption in our smelters was produced by our mines and 47.6% was purchased from third parties or was obtained from secondary raw materials (including oxide). We buy zinc concentrates from different suppliers in the market to meet our raw material requirements. We sell the balance of our zinc concentrates production and all our copper and lead concentrates production to metal producers and international traders, on international market terms.

Our sales of metallic zinc are highly diversified. Our customer base is composed mainly of end users. Our products reach the following end use industries: transport, construction, infrastructure, consumer goods and industrial machinery. In 2019, 80.9% of our total sales were to customers in the continuous galvanizing, general galvanizing, die casting, transformers and alloy segments and 19.1% were to international traders. Our ten largest customers represented approximately 49.1% of our total sales volume in 2019. In 2019, we sold to more than 357 customers across 43 different countries.

Free zinc, treatment charges, premiums and smelter by-products

Smelters are processing businesses that achieve a margin on the concentrates and other feedstocks they process; in large part, the price for the underlying metal is effectively passed through from the miner supplying the concentrate, or the supplier of the secondary feed material, to the smelter's customer. Our smelters use zinc concentrate as feedstock, which is supplied from our mines and from third-party suppliers. The smelter earns revenue from (i) the treatment charge reflected as a discount in the purchase price it pays, (ii) the refined metal it can produce and sell over and above the metal content it has paid for in concentrates purchased from the miner (free metal) and (iii) any premium it can earn on the refined products it sells to its customers. By-products can also contribute to a smelter's revenue. By-products from our smelting operations include silver, gold, copper, cement, sulfuric acid, lead concentrate, lead-silver concentrate, agricultural lime and copper sulfate.

Free zinc and treatment charges

Free zinc is the difference between the amount of zinc that is paid for in the concentrates and the total zinc recovered for sale by the smelter. The value of the zinc that is paid for corresponds to 85.0% of zinc content, which has historically been the industry standard, multiplied by the LME price of zinc. The zinc content which is not paid for is considered "free zinc." The margin of a zinc smelter improves as the amount of metal in zinc concentrates that it can recover increases.

The treatment charge (or TC) is a discount per tonne of concentrates, which is determined by negotiation between the seller (a mine or a trading company) and the buyer (a smelter). Treatment charges can be benchmark (negotiated by the major miners and buyers, or Benchmark TC), spot or negotiated.

We apply a Benchmark TC for our integrated mining and smelter operations in Peru. For our other purchases of zinc concentrate from third-party miners and trading companies, the treatment charge is based on the Benchmark TC, spot treatment charges or treatment charges negotiated annually with miners or trading companies.

In order to reduce volatility, for the majority of our third-party contracts, which are renewed throughout different periods during the year, we consider the 3-years average benchmark TC. The reference (average benchmark TC of 2019, 2018 and 2017) for 2019 stood at US\$188/t concentrate, up 6.4% from the previous reference (average benchmark TC of 2018, 2017 and 2016).

The market trend for treatment charges reflects the supply and demand for concentrates in the market. Treatment charges tend to fall when demand increases relative to supply, and they tend to rise when demand falls. In other words, when there is an excess of concentrate compared to the smelting processing capacity, treatment charges tend to rise and when there is a deficit of concentrate in the market, treatment charges tend to fall. For information regarding our actual treatment charges, see "Information on the Company—Smelting operations."

The following table sets forth, for the periods indicated, the zinc realized Benchmark TC, expressed in dollars per dry metric tonne (or dmt) of concentrate.

	For the Year Ended December 31,		
	2019	2018	2017
Treatment Charge (in US\$/dmt)	241	147	172

Source: Wood Mackenzie.

Premiums

Like other smelters, we sell metallic zinc and zinc oxide products at a premium over the base LME price. The premium reflects a combination of factors, including the service provided by the smelter in delivering zinc or lead of a certain size, shape or quality specified by its customers and transportation costs, as well as the conditions of supply and demand prevailing in the regional or local market where the metal is sold.

Premiums tend to vary from region to region, as transportation costs and the value attributable to customer specifications tend to be influenced by regional or local customs rather than being a function of global market dynamics.

The following table sets forth, for the periods indicated, information on premiums for the markets indicated, expressed in U.S. dollars per tonne.

	For the Year Ended December 31,		
	2019	2018	2017
Rotterdam (in US\$/tonne)	114	125	135
Singapore (in US\$/tonne)	130	131	137
United States (in US\$/tonne)	187	187	180

Source: Wood Mackenzie.

The following table sets forth, for the periods indicated, the gross premium over the base LME price for zinc oxide realized by our smelting operations in Brazil, expressed in dollars per tonne.

	For the Year Ended December 31,		
	2019	2018	2017
Brazilian operations (in US\$/tonne)	497	494	482

Smelter by-products

The quantity of by-products produced in our smelters depends on several factors, including the chemical composition of the concentrate and the recovery rates achieved. Concentrates from some mines contain higher levels of by-product metals than concentrates from other mines. In addition, the higher rate of by-product recovery, increase the number of by-products that can be produced and sold.

Sulfuric acid is the principal by-product we sell. It is manufactured from the sulfur dioxide gas generated from roasting zinc concentrates. While the zinc smelters use sulfuric acid in their leach plants, almost all this requirement is generated in each zinc smelter's electrolysis plant, and only small amounts of the sulfuric acid produced are used in its facilities, leaving the rest available for sale. We sell sulfuric acid under annual or multi-year contracts and spot sales.

Silver concentrate is another relevant by-product that we produce at our Cajamarquilla and Juiz de Fora smelters. Silver concentrate is one of the components of zinc concentrate and is obtained during the zinc metallurgical flotation process. Recovered silver is sold primarily to international traders and local customers.

Operating costs and expenses

Our ability to manage our operating costs and expenses is a significant driver of our business performance. We focus on controlling and limiting our costs and expenses so that we are better prepared to overcome less favorable pricing conditions.

Energy costs

Our total cost of energy is composed of the operating costs of our own hydroelectric power plants, long-term electricity supply contracts, transmission and distribution charges and fees.

In Peru, the energy market is more stable in terms of generation (hydrology forecast) and prices. We obtain 3.2% of the electricity for our operations from our own hydroelectric power plants and 96.8% from third parties with contracts with terms ranging from one to two years.

In Brazil, the electricity for our operations comes from five hydroelectric plants in which our subsidiary Pollarix has directly or indirectly the following interests as of December 31, 2019: a 21.0% participation in the consortium Enercan (Campos Novos hydroelectric power plant), 100.0% ownership of a hydroelectric power plant (Picada) located in Minas Gerais, a 12.6% participation in the consortium Amador Aguiar I, a 12.6% participation in the consortium Amador Aguiar II and a 23.9% participation in the consortium Igarapava. We account for the consortiums as joint operations, as discussed in Note 3 to our consolidated financial statements. On a consolidated basis, our costs for electricity in Brazil reflect the operating costs of the hydroelectric facilities and are sensitive to a variety of factors, including hydrologic variables.

The only activity of Pollarix is to own our energy assets, and it sells energy to our Brazilian operating subsidiaries at market prices. We own all the common shares of Pollarix, which represents 33.33 % of its total share capital and/or its affiliates. The remaining shares are preferred shares with limited voting rights, which are owned by our major shareholder VSA. Under the terms of the preferred shares, VSA is entitled to dividends per share equal to 1.25 times the dividends per share payable on the common shares. See “Information on the Company—Other operations—Power and energy supply—Brazil.” As a result, in future periods we expect that a substantial part of the profits recognized by Pollarix from selling energy to our Brazilian operating subsidiaries will represent non-controlling interest in our income statement.

Environmental expenses

Our mines and smelters operate under licenses issued by governmental authorities that control, among other things, air emissions and water discharges and are subject to stringent laws and regulations relating to waste materials and various other environmental matters. Additionally, each operation, when it ultimately ceases operations permanently, will need to be rehabilitated.

We have made significant investments to reduce our environmental impact in the areas in which we operate and to ensure that we are able to comply with environmental standards. All our operational units have environmental improvement initiatives relating to reducing emissions and waste and improving the efficiency of use of natural resources and energy.

Where appropriate, we establish environmental provisions for restoration or remediation of existing contamination and disturbance, with all material issues being reviewed annually. Provisions associated with smelter and mining operations sites primarily relate to soil and groundwater contamination.

Since 2016, we have conducted an extensive study and update of our decommissioning plans, including potential environmental obligations. During this period, we also modified our internal policies for decommissioning and environmental issues, which require frequent updates of environmental studies to reflect the best international practices. As a result of these adjustments, we recorded additional environmental provisions of US\$18.3 million and US\$3.9 million in 2018 and 2019, respectively. Although not expected in the near future, changes in legislation and adjustments to our internal policies after the ongoing evaluations could require additional provisions. As of December 31, 2019, the total expected cash outflow related to outstanding environmental and asset retirement obligation was US\$293.8 million and US\$428.9 million, discounted and undiscounted, respectively. See Note 27 to our consolidated financial statements.

Macroeconomic conditions of the countries and regions where we operate

Peru

The following table sets forth Peruvian inflation rates, interest rates and exchange rates for the dates and periods indicated.

	For the Year Ended December 31,		
	2019	2018	2017
GDP growth rate ⁽¹⁾⁽²⁾	2.3%	4.0%	2.5%
Internal demand growth rate ⁽²⁾	2.4%	4.3%	1.4%
Private investment growth rate ⁽²⁾	4.0%	4.4%	0.2%
Reference interest rate	2.3	2.8%	3.3%
CPI Index ⁽²⁾	2.1%	1.3%	2.8%
Appreciation (devaluation) of sol against the U.S. dollar	1.7%	(4.0)%	3.5%
Exchange rate of sol to US\$1.00	3.3120	3.3755	3.2405

Sources: Central Reserve Bank of Perú, Peruvian Ministry of Economy and Finance.

(1) Preview: Bloomberg consensus rate.

(2) Accumulated during each period.

Brazil

The following table sets forth Brazilian inflation rates, interest rates and exchange rates for the dates and periods indicated.

	For the Year Ended December 31,		
	2019	2018	2017
GDP growth rate ⁽¹⁾⁽²⁾	1.1%	1.1%	1.0%
Inflation rate (IGP-M) ⁽²⁾	7.3%	7.5%	(0.5)%
Inflation rate (IPCA) ⁽²⁾	4.3%	3.8%	3.0%
CDI rate ⁽²⁾	4.4%	6.4%	6.9%
SELIC rate	4.5%	6.5%	7.0%
TJLP	5.57%	7.0%	7.0%
Appreciation (devaluation) of real against the U.S. dollar	(4.0)%	(17.1)%	(1.5)%
Exchange rate of real to US\$1.00	4.0307	3.8748	3.3080

Sources: IBGE, the Central Bank, B3 S.A., and FGV.

(1) Preview published by the Central Bank official report (Focus) as of January 3, 2020.

(2) Accumulated during each period.

Effects of exchange rate fluctuations

Prices for our products are based on international indices, such as LME prices, and denominated in U.S. dollars. A portion of our production costs, however, is denominated in *reais*, so there is a mismatch of currencies between our revenue and costs. In 2019, 20.1% of our production costs and operational expenses were denominated in *reais*. A smaller portion of our costs is denominated in *soles* since most of our costs in Peru are in U.S. dollars. In 2019, 16.3% of our production costs and operational expenses were denominated in *soles*. As a result, our results of operations are affected by changes in exchange rates between *reais* and, to a lesser extent, *soles*, and the U.S. dollar.

In addition, our Brazilian subsidiary Nexa Brazil has substantial intercompany debt to Nexa Resources that is denominated in U.S. dollars. The functional currency of Nexa Brazil is the *real*, so Nexa Brazil recognizes exchange gains or losses when the value of the *real* rises or falls against the U.S. dollar. These gains and losses are not eliminated in consolidation because the functional currency of Nexa Resources is the U.S. dollar, so they do not recognize offsetting gains or losses. As of December 31, 2019, the aggregate amount outstanding under these intercompany loans was US\$250.6 million.

The following table sets forth for the periods indicated (i) the high and low exchange rates, (ii) the average of the exchange rates on the last day of each month for each year and daily for each month and (iii) the exchange rate at the end of each period, expressed in *soles* per U.S. dollar (*sol*/US\$) and *reais* per U.S. dollar (*real*/US\$) as reported by the Peruvian Central Bank and the Brazilian Central Bank, respectively.

	Exchange Rates of S/ and R\$ per US\$1.00							
	Period-End		Average ⁽¹⁾		High		Low	
	S/	R\$	S/	R\$	S/	R\$	S/	R\$
Year ended December 31,								
2017	3.2374	3.3080	3.2613	3.1925	3.3944	3.3807	3.2315	3.0510
2018	3.3685	3.8748	3.2874	3.6558	3.3865	4.1879	3.2100	3.1391
2019	3.3130	4.0307	3.3363	3.9461	3.4054	4.2602	3.2826	3.6519
Month								
January 2020	3.3860	4.2695	3.3279	4.1495	3.3860	4.2695	3.2995	4.0213
February 2020	3.4095	4.4987	3.3849	4.3410	3.4105	4.4987	3.3620	4.2381
March 2020 (through March 16)	3.4620	4.9471	3.4362	4.6748	3.4620	4.9471	3.4190	4.4883

Source: Central Reserve Bank of Peru, Brazilian Central Bank, official offer exchange rates.

(1) Annually, represents the average of the exchange rates during the periods presented; monthly.

Income taxes

Income taxes in Luxembourg, Peru and Brazil have a significant impact on our results. Due to economic and political conditions, tax rates in various jurisdictions may be subject to significant changes. Our future effective tax rates could be affected by changes in the mix of earnings in countries with different statutory tax rates, changes in the valuation of deferred tax assets and liabilities and changes in tax laws or their interpretation.

Luxembourg

The combined applicable income tax rate (including an unemployment fund contribution) is 24.94% from 2019 onwards.

Brazil

Our Brazilian subsidiaries are subject to corporate income tax on their Brazilian and non-Brazilian income. In addition to corporate income tax, a social contribution tax is imposed on their worldwide income, and the combined applicable rate is 34.0%.

Peru

Our Peruvian subsidiaries are subject to Peruvian income tax on their worldwide income and are eligible for a potential credit for foreign taxes paid on income derived from foreign sources. The general income tax rate is 29.5% from 2017 onwards.

To promote investments in Peru, investors and Peruvian companies may enter into an agreement with the Peruvian government, a Legal Stability Agreement, to provide a stable legal and tax regime for a specified period. In March 2002, Nexa Peru entered a guarantee and investment protection contract, or the stability agreement. Pursuant to the stability agreement, Nexa Peru can apply a special income tax rate of 20.0% from 2007 through 2021. The 29.5% income tax rate will become applicable to Nexa Peru in 2022. While Nexa Peru remains subject to the stability agreement, it is required to pay the special charge on mining, or GEM (*Gravamen Especial a la Minería*), at marginal rates that vary from 4.00% to 13.12% of operating income, depending on the operating margin.

Our Peruvian subsidiaries Nexa Resources El Porvenir S.A.C. and Nexa Resources Atacocha S.A.A., do not have stability agreements with the Peruvian government and are therefore subject to a special mining tax, or IEM (*Impuesto Especial a la Minería*), with marginal rates from 2.00% and 8.40% of operating income, depending on the operating margin. In addition, these companies are subject to a mining levy (*regalia minera*). In 2022, Nexa Peru will become subject to an IEM and mining royalties tax once its tax stability agreement with the Peruvian government expires.

Dividends distributed to us by our Peruvian subsidiaries are subject to withholding tax, at a rate of 5.0% for profits earned beginning in 2017 and onwards.

RESULTS OF OPERATIONS

The following discussion and analysis of our financial position and results of operations is based on our consolidated financial statements. The following table sets forth our summarized results of operations for the periods indicated.

	For the Year Ended December 31,			Variation		% of Net Revenue from Products Sold		
	2019	2018	2017	2019/ 2018	2018/ 2017	2019	2018	2017
	(in millions of US\$)			(percentage)		(percentage)		
Consolidated income statement information:								
Net revenues	2,332.3	2,491.2	2,449.5	(6.4)	1.7	100.0	100.0	100.0
Cost of sales	(1,944.7)	(1,888.9)	(1,752.8)	3.0	7.8	(83.4)	(75.8)	(71.6)
Gross profit	387.6	602.3	696.7	(35.6)	(13.5)	16.6	24.2	28.4
Operating expenses:								
Selling, general and administrative	(216.5)	(159.6)	(154.5)	35.7	3.3	(9.3)	(6.4)	(6.3)
Mineral exploration and project development	(113.0)	(126.3)	(92.7)	(10.5)	36.2	(4.8)	(5.1)	(3.8)
Impairment loss	(142.1)	(3.3)	—	n.m.	—	(6.1)	—	—
Other income and expenses, net	(27.0)	21.5	(47.9)	—	—	(1.2)	0.9	(2.0)
Operating income (loss)	(111.0)	334.6	401.6	(133.2)	(16.7)	(4.8)	13.4	16.4
Financial income	37.6	67.5	29.9	(44.3)	126.0	1.6	2.7	1.2
Financial expenses	(129.6)	(121.7)	(106.2)	6.5	14.6	(5.6)	(4.9)	(4.3)
Foreign exchange (loss) gain, net	(12.9)	(148.5)	(53.9)	(91.3)	175.6	(0.6)	(6.0)	(2.2)
Net financial results	(104.9)	(202.7)	(130.2)	(48.3)	55.7	(4.5)	(8.1)	(5.3)
Share in the results of associates	—	—	0.1	—	(100.0)	—	—	—
Income before income tax	(215.9)	131.9	271.5	(263.7)	(51.4)	(9.3)	5.3	11.1
Current income tax	(46.4)	(71.8)	(125.7)	(35.4)	(42.9)	(2.0)	(2.9)	(5.1)
Deferred income tax	103.3	30.9	19.5	234.5	58.3	4.4	1.2	0.8
Net income (loss) for the year	(159.0)	91.0	165.3	(274.8)	(45.0)	(6.8)	3.7	6.7

The following is a discussion of results of operations for 2019, compared to 2018. For a discussion of the financial condition and results of operations for 2018 compared to 2017, please refer to "Operating and financial review and prospects" in our Annual Report on Form 20-F for the year ended December 31, 2018, filed with the SEC on April 3, 2019.

Net revenues

In 2019, net revenues decreased by 6.4%, or US\$ 158.9 million. This decrease was primarily due to lower metal prices. In 2018, net revenues increased by 1.7%, or US\$41.7 million. This increase was primarily due to slightly higher metal prices combined with higher metal sales and offset by lower sales volumes of by-products.

In 2019, zinc, copper and lead average LME prices decreased by 12.9%, 8.0%, and 10.8%, respectively. The average LME price of zinc decreased from US\$2,921.95 per tonne in 2018 to US\$2,546.34 per tonne in 2019.

The following table shows a breakdown of our net revenues by destination of our sales.

	For the Year Ended December 31,		
	2019	2018	2017
	(in millions of US\$)		
Brazil	625.0	693.4	721.6
Peru	595.6	674.2	696.5
Luxembourg	145.5	172.8	130.7
United States of America	159.7	141.1	158.1
Switzerland	101.6	126.2	108.8
Singapore	99.5	37.5	60.9
Korea	95.9	54.9	7.1
Chile	80.8	51.2	38.1
Japan	71.4	93.5	69.6
Argentina	60.9	90.3	79.5
Austria	39.9	40.5	37.3
Colombia	37.1	51.7	47.7
Turkey	33.9	48.3	35.5
Germany	20.7	20.9	23.2
China	9.9	9.5	18.2
Italy	9.0	5.3	15.8
Others	145.8	179.8	201.0
Net revenues	2,332.3	2,491.2	2,449.5

The following table sets forth the components of our production and sales volumes for the metals and periods indicated.

	For the Year Ended December 31,		
	2019	2018	2017
Treatment Ore (in tonnes)	13,001,535	13,051,365	13,014,894
Mining Production—Metal Contained in Concentrate			
Zinc contained in concentrates (in tonnes)	361,061	372,793	375,402
Copper contained in concentrates (in tonnes)	38,184	39,029	44,161
Lead contained in concentrates (in tonnes)	51,349	52,267	52,572
Silver contained in concentrates (in oz)	8,900,995	7,992,167	7,945,778
Gold contained in concentrates (in oz)	24,977	29,224	32,534
External Mining Sales ⁽¹⁾			
Zinc concentrates (in dry metric tonnes)	7,365	15,036	8,863
Copper concentrates (in dry metric tonnes)	147,608	147,704	169,590
Lead concentrates (in dry metric tonnes)	98,662	89,831	94,486
External Mining Sales—Metal Contained in Concentrate ⁽²⁾			
Zinc contained in concentrates (in tonnes)	4,166	7,533	4,459
Copper contained in concentrates (in tonnes)	38,300	38,932	44,165
Lead contained in concentrates (in tonnes)	52,472	48,453	50,631

	For the Year Ended December 31,		
	2019	2018	2017
Smelting Production—Zinc Contained in Product Volumes			
Cajamarquilla (metal available for sale in tonnes)	340,369	330,766	310,512
Três Marias (metal available for sale in tonnes)	197,508	207,195	197,465
Juiz de Fora ⁽⁴⁾ (metal available for sale in tonnes)	86,155	78,748	81,649
Total zinc metal available for sale production (in tonnes)	624,032	616,708	589,806
Zinc Oxide Production—Zinc Contained in Product Volumes			
Três Marias ⁽³⁾ (Zinc oxide, contained zinc in tonnes)	38,064	38,565	38,766
Smelting Sales—Product Volumes			
Metallic zinc (in tonnes)	584,538	578,144	555,419
Zinc oxide (in tonnes)	36,689	38,152	38,472
Total smelting sales volumes (in tonnes)	621,227	616,882	593,891
Smelting Sales—Zinc Contained in Product Volumes⁽³⁾			
Metallic zinc (in tonnes)	582,627	576,918	553,720
Zinc oxide (in tonnes)	29,351	30,522	30,777
Total zinc contained in product volumes (in tonnes)	611,978	607,440	584,497

(1) Excluding intercompany sales.

(2) Based on typical zinc contents in metallic zinc products and zinc oxide. For more details, see “Information on the Company—Smelting operations—Zinc contained in smelting products sold.”

(3) Including 27,754 tonnes of zinc ashes and drosses in 2019, as well as metallic zinc used in the production of zinc oxide in 2019, 27,885 in 2018 and 29,335 in 2017.

(4) Including 2,538 tonnes of zinc ashes and drosses in 2019, 2,236 in 2018 and 2,453 in 2017.

Cost of sales

In 2019, our cost of sales increased by 3.0%, or US\$55.7 million, primarily due to higher unit costs in our mining segment due to an increase in operating costs (maintenance and third-party services), partially offset by decreased costs in our smelting segment, primarily driven by lower raw material prices and better recovery rates.

In 2018, our cost of sales increased by 7.8%, or US\$136.1 million, primarily due to higher costs related to improvements to safety standards at our mines and higher costs for concentrate purchased by our smelters in the first half of 2018.

Selling, general and administrative expenses

In 2019, our selling, general and administrative expenses increased by 35.7%, or US\$56.9 million, including US\$41.4 million non-recurring expenses related to our operational efficiency initiatives program – Nexa Way - implemented during 2019.

In 2018, our selling, general and administrative expenses increased by 3.3%, or US\$5.1 million, mainly due to higher volume sold and incremental expenses associated with being a public company following our 2017 initial public offering.

Mineral exploration and project development

In 2019, our mineral exploration and project development expenses decreased by 10.5%, or US\$13.3 million. During the second half of 2019, we reduced our project development expenditures mainly due to the postponement of certain greenfield projects. On the other hand, we continued the execution of our mineral exploration program focused on identifying new ore bodies and upgrading resources classification through infill drilling campaigns. We have been prioritizing the activities in our brownfield projects and consolidating the geological potential of our Hilarión and Florida Canyon projects. In 2019, our exploration drilling totaled 220.7 km.

In 2018, our mineral exploration and project development expenses increased by 36.2%, or US\$33.6 million, primarily due to higher costs related to the development of greenfield and brownfield projects in the scoping study and pre-feasibility study stages.

Efficiency program – Nexa Way

During 2019, Nexa initiated a program to enhance its operational performance with the support of external consulting firms. The initiatives have included a review and revision of internal processes to structurally improve our business model in the long run. The payment to such consultants is based on a success fee at the time these initiatives are implemented and totaled US\$41.4 million in the second half of 2019.

Impairment loss

As of September 30, 2019, Nexa performed an impairment test for all its cash-generating units (or CGUs): Cerro Lindo, Cerro Pasco, Cajamarquilla, Três Marias and Juiz de Fora. As a result, we recognized an impairment loss of US\$142.1 million related to the Cerro Pasco CGU, resulting from the reduction in the mineral reserves and resources estimates that led to a shortening of the life of mine of the CGU. No impairment losses were identified in the other CGUs. For more information, see Note 31 to our consolidated financial statements.

Other income and expenses, net

In 2019, our other income and expenses, net negatively impacted our results by US\$27 million, primarily due to an increase in non-cash provisions with respect to labor claims and an inventory write-off in the second quarter, mining obligations; and other operating expenses.

In 2018, our other income and expenses, net positively impacted our results by US\$66.1 million, primarily due to an October 2018 decision by regional federal court, which granted our subsidiary Nexa Brazil the right to recover US\$60.0 million in federal tax credits. Of that US\$60.0 million, approximately US\$34.0 million corresponds to principal and was recognized in Other operating expenses, net. The remaining US\$26.0 million corresponds to interest and was recognized as Financial income.

The following table sets forth our other income and expenses, net for the periods indicated. See Note 9 to our consolidated financial statements.

	For the Year Ended December 31,		
	2019	2018	2017
	(in millions of US\$)		
Other income and expenses, net			
Tax credits	4.7	37.6	0.1
Remeasurement of environmental obligations	2.5	12.1	0.4
Commodities derivative financial instruments	(0.8)	17.5	(18.8)
Gain (loss) on sale of property, plant and equipment.	(0.9)	(9.9)	(0.7)
Gain on sale of investments	—	0.3	4.6
Projects and contribution to communities	(5.2)	(13.4)	(12.9)
Provision(reversal) for legal claims	(4.4)	(3.7)	0.3
Mining obligations	(14.0)	(12.6)	(11.5)
Other operating income (expenses), net	(8.9)	(6.4)	(9.3)
Total other income and expenses, net	(27.0)	21.5	(47.9)

Net financial results

We recognized a net financial loss of US\$104.9 million in 2019 compared to a net financial loss of US\$202.7 million in 2018. This decrease was mainly due to lower net foreign exchange loss of US\$12.9 million recognized in 2019 compared to a net foreign exchange loss of US\$148.5 million in 2018.

Net foreign exchange gains (losses) reflect the accounting effect of the appreciation (depreciation) of the *real* against the U.S. dollar on certain U.S. dollar-denominated loans made by Nexa Resources to Nexa Brazil (which uses the *real* as its functional currency). During 2019, the 7.9% average depreciation of the *real* against the U.S. Dollar resulted in a foreign exchange loss. During 2018, the 14.6% average depreciation of the *real* against the U.S. dollar also resulted in a foreign exchange loss.

Excluding the effect of foreign exchange variation, the net financial result in 2019 increased 69.8% to US\$92.0 million compared to US\$54.2 million in 2018, driven mainly by lower interest income from tax credits.

In 2019, our financial income decreased by 44.3%, or US\$29.9 million, to US\$37.7 million. The decrease in 2019 was due to the US\$26.0 million in Brazilian federal tax credits awarded to Nexa Brazil in 2018.

In 2019, our financial expenses increased by 6.5%, or US\$7.9 million, to US\$129.6 million. The increase was due to an increase in interest on lease liabilities (related to the adoption of IFRS 16) and an increase in interest on other liabilities related to the re-measurement of the Asset Retirement Obligation. In 2018, our financial expenses increased by 14.6%, or US\$15.5 million, to US\$121.7 million due to higher interest expense on borrowings, including a US\$16.0 million increase in interest expense with respect to our 2017 bond offering.

Income before income tax

As a result of the factors described above, our loss before income tax was US\$215.9 million in 2019, as compared to income before tax of US\$131.9 million in 2018.

Income tax

In 2019, we recorded a net income tax benefit of US\$56.9 million. In 2018, we recorded a net income tax expense of US\$40.9 million.

In 2019, our current income tax expense decreased by 35.4%, or US\$ 25.4 million, to US\$ 46.4 million, mainly as a result (i) foreign exchange tax losses on the payment of intercompany debt between Nexa Brazil and Nexa Resources; and (ii) a decrease in LME prices. In 2018, our current income tax expense decreased by 42.9%, or US\$ 53.9 million, to US\$71.8 million, mainly as a result of: (i) foreign exchange tax losses on the payment of intercompany debt between Nexa Brazil and Nexa Resources; (ii) the tax deduction of equity accounting from our subsidiaries; and (iii) a decrease in LME prices.

In 2019, we recorded a deferred income tax benefit of US\$103.2 million, mainly as a result of foreign exchange losses and the depreciation and amortization of fair value adjustment to property, plant, equipment and intangible assets. In 2018, we recorded a deferred income tax benefit of US\$30.9 million, mainly as a result of foreign exchange losses and the depreciation and amortization of fair value adjustment to property, plant, equipment and intangible assets. In 2019, we had a nominal tax rate and an effective tax rate of 24.9% and 26%, respectively. The difference between the nominal and effective tax rates in 2019 is primarily a result of differences in tax rates from subsidiaries outside Luxembourg, a temporary special mining levy in Peru and the withholding tax on dividends paid by subsidiaries. In 2018, we had a nominal tax rate and an effective tax rate of 26.0% and 31.0%, respectively. The difference between the nominal and effective tax rates in 2018 is primarily a result of differences in tax rates from subsidiaries outside Luxembourg and a temporary special mining levy in Peru.

Net income (loss)

As a result of the foregoing, we had a net loss of US\$159.0 million in 2019 as compared to net income of US\$91.0 million in 2018.

Results by segment

The following table sets forth our summarized results of operations by segment for the periods indicated.

	For the Year Ended December 31,			Variation		Variation	
	2019	2018	2017	2019/ 2018	2018/ 2017	2019/ 2018	2018/ 2017
	(in millions of US\$)			(percentage)			
Consolidated Income							
Statement Information:							
Net revenues:							
Mining	1,000.2	1,163.7	1,213.2	(163.6)	(49.5)	(14.1%)	(4.1%)
Smelting	1,865.7	2,030.6	1,952.0	(164.8)	78.6	(8.1%)	4.0%
Intersegments Sales	(535.8)	(704.0)	(721.5)	168.3	17.4	(23.9%)	(2.4%)
Adjustments ⁽¹⁾	2.2	0.9	5.7	1.3	(4.8)	135.8%	(83.8%)
Total	2,332.3	2,491.2	2,449.5	(158.9)	41.7	(6.4%)	1.7%
Cost of sales:							
Mining	(802.0)	(707.8)	(680.8)	(94.2)	(26.9)	13.3%	4.0%
Smelting	(1,655.1)	(1,878.8)	(1,746.8)	223.7	(132.0)	(11.9%)	7.6%
Intersegments Sales	535.8	704.0	721.4	(168.3)	(17.4)	(23.9%)	(2.4%)
Adjustments ⁽¹⁾	(23.4)	(6.5)	(46.7)	(17.0)	40.3	262.7%	(86.2%)
Total	(1,944.7)	(1,888.9)	(1,752.8)	(55.7)	(136.1)	3.0%	7.8%
Gross profit:							
Mining	198.2	456.0	532.4	(257.8)	(76.4)	(56.5%)	(14.4%)
Smelting	210.7	151.8	205.2	58.9	(53.4)	38.8%	(26.0%)
Adjustments ⁽¹⁾	(21.2)	(5.5)	(40.9)	(15.7)	35.5	283.9%	(86.5%)
Total	387.6	602.3	696.7	(214.6)	(94.4)	(35.6%)	(13.6%)

(1) See Note 2 to our consolidated financial statements.

Mining**Net revenues**

In 2019, our net revenues in the mining segment decreased by 14.1%, or US\$163.6 million. This decrease was primarily due to lower average metal prices and higher treatment charges compared to the previous year. In 2018, our net revenues in the mining segment decreased by 4.1%, or US\$49.5 million. This decrease was primarily due to lower zinc and copper volumes, which was partially offset by a slight increase in zinc and copper prices.

Our production of zinc contained in concentrates decreased by 3.2% to 361.0 thousand tonnes in 2019, primarily due to lower average zinc grade and a slight decrease in treated ore volume. Production was also affected by the temporary reduction in processing capacity in Vazante for the repair of the trunnion used in the concentration plant. In 2018, our production of zinc contained in concentrates remained stable, primarily due to lower zinc grades partially offset by higher amount of treated ore.

In 2019, our production volumes of copper contained in concentrates decreased by 2.2% to 38.2 thousand tonnes of metal contained in concentrates, primarily due to lower treated ore volume. In 2018, our volumes of copper contained in concentrates decreased by 11.6% to 39.0 thousand tonnes of metal contained in concentrates, primarily due to a 12.0% decrease in copper contained in concentrates production at Cerro Lindo.

In 2019, our production volumes of lead contained in concentrates decreased by 1.8% to 51.3 thousand tonnes of metal contained in concentrates, primarily as a result of slightly lower lead grade and the decrease in treated ore volume. In 2018, our volumes of lead contained in concentrates decreased by 0.6% to 52.3 thousand tonnes of metal contained in concentrates, primarily as a result of a 14.0% decrease in lead contained in concentrates at Cerro Lindo.

In 2019, our external sales volumes of zinc contained in concentrates decreased by 44.7% to 4.2 thousand tonnes of metal contained in concentrates, primarily due to higher intercompany volume. In 2018, our external sales volumes of zinc contained in concentrates increased by 68.9% to 7.5 thousand tonnes of metal contained in concentrates, primarily reflecting the impact of unusually severe rains in 2017, which led to a decrease in our production and external sales volumes for that year.

Cost of sales

In 2019, our cost of sales in our mining segment increased by 13.3%, or US\$94.2 million, mainly due to increased personnel, maintenance, and third-party services costs. In 2018, our cost of sales in our mining segment increased by 4.0%, or US\$26.9 million, mainly due to costs relating to efforts to improve safety conditions in our mines.

Smelting

Net revenues

In 2019, our net revenues in the smelting segment decreased by 8.1%%, or US\$164.8 million, mainly due to the decrease in the average zinc metal prices which was partially offset by an increase in sales volume. In 2018, our net revenues in the smelting segment increased 4.0%, or US\$78.6 million, mainly due to higher sales volumes in our Cajamarquilla and Juiz de Fora smelters.

Our total metal sales were 621.2 thousand tonnes in 2019, 0.7%, or 4.4 thousand tonnes higher compared to 2018. Sales volume of zinc metal of 584.5 thousand tonnes increased 5.8 thousand tonnes versus 2018, driven by higher sales from Cajamarquilla and Juiz de Fora, as mentioned above, which were up 2.4% and 9.4%, respectively. Cajamarquilla sold 340.8 thousand tonnes and Juiz de Fora 86.1 thousand tonnes of zinc metal.

In 2019, our sales volumes of metallic zinc (mainly SHG, CGG and alloys produced in our smelting facilities) increased by 1.0% to 584.5 thousand tonnes, mainly due to higher production and sales from our Cajamarquilla and Juiz de Fora smelters. In 2018, our sales volumes of metallic zinc (mainly SHG, CGG and alloys produced in our smelting facilities) increased by 4.2% to 578.7 thousand tonnes, mainly due to higher production.

In 2019, our sales volumes of zinc oxide decreased by 3.8%, or 1.5 thousand tonnes, to 36.7 thousand tonnes. In 2018, our sales volumes of zinc oxide decreased by 0.8% to 38.2 thousand tonnes.

Cost of sales

In 2019, our cost of sales in our smelting segment decreased by 11.9%, or US\$223.7 million, primarily due to the decrease in average metal prices, increase in treatment charges, and the depreciation of the *real* against the U.S. Dollar during the year. In 2018, our cost of sales in our smelting segment increased by 7.6%, or US\$132.0 million, primarily due to higher metal sales volume and slightly higher zinc prices.

LIQUIDITY AND CAPITAL RESOURCES

Overview

In the ordinary course of business, our principal funding requirements are for working capital requirements, capital expenditures relating to maintenance and expansion investments, servicing our indebtedness and distributions to our shareholders. We typically meet these requirements through operational cash flows, long-term borrowings from private banks, the Brazilian Economic and Social Development Bank (*Banco Nacional de Desenvolvimento Econômico e Social*), or BNDES, international export credit agencies, and the issuance of debt securities in the international capital markets.

Our financing strategy is to fund our necessary capital expenditures and to preserve our liquidity while meeting our debt payment obligations. We believe that our cash and cash equivalents on hand, cash from operations and available borrowings will be adequate to meet our capital expenditure requirements and liquidity needs for our current requirements. We may require additional capital to meet our longer-term liquidity and future growth requirements. Although we believe that our sources of liquidity are adequate, weaker economic conditions in Brazil, Peru or globally could materially adversely affect our business and liquidity.

Sources of funds

Our principal sources of funds are cash flows from operations and borrowings. The availability of cash flows from operations is affected by our working capital requirements, share premium reimbursements, dividends and investment activities, as well as a need to service our indebtedness. In 2019, our operating activities generated cash flows of US\$122.8 million, compared to US\$347.6 million in 2018, primarily due to the decrease in our operating income during the year.

Uses of funds

In the ordinary course of business, our principal funding requirements are used for capital expenditures, dividend payments and debt service. During 2019, we used funds primarily for capital expenditures and the payment of dividends. In addition, in October 2019, we paid US\$71.1 million (including transaction costs) for the acquisition of the minority interest in Aripuanã as part of our goal to consolidate our ownership in a strategic project for us.

Capital expenditures

Our capital expenditures in 2019 totaled US\$410.3 million, mainly due to the following projects: the continuation of construction at the Aripuanã greenfield project; the Vazante mine deepening project; the Jarosite conversion project at our Cajamarquilla smelter; sustaining capital expenditures; and maintenance of our tailings dams.

For 2020, we have budgeted US\$410.0 million to invest in projects that are currently underway. Our main projects include US\$247.0 million directed towards expansion projects—of which US\$220.0 million is allocated to construction of the Aripuanã project and US\$16.0 million to the Vazante mine deepening project—and US\$163.0 million towards non-expansion projects, which includes sustaining and tailings dams.

Expenses related to project development and exploration

We expect continue to advance with our exploration and drilling campaigns and develop our pipeline of projects. In 2020, we estimate to spend US\$94.0 million on expenses relate primarily to mineral exploration (US\$57.0 million) and project development (US\$22.0 million) activities.

These estimates should be considered preliminary and subject to change. The estimates presented in this report do not include any potential impact on our business from the coronavirus outbreak. As of the date of this report, we continue to monitor developments related to the recent coronavirus outbreak. We cannot predict how and to what extent the outbreak may impact our current plans and objectives for 2020, including our current capital expenditure, mineral exploration and project development disbursements. See “Forward looking statements.”

Distributions and repurchases

On February 15, 2019, the board of directors approved a cash dividend of up to US\$70.0 million, corresponding to US\$0.53 per share paid to the shareholders on March 28, 2019. On February 13, 2020, the board of directors approved a cash dividend in the aggregate amount of approximately US\$50.0 million, corresponding to US\$0.377533 per share on the record date of March 16, 2020 and to be paid on March 30, 2020. The determination to pay dividends and the payment of dividends or other distributions (including reimbursements of share premium) will be subject to the approval of our board of directors and/or our shareholders, as applicable, and will depend on a number of factors, including, but not limited to, our cash balance, cash flow, earnings, capital investment plans, expected future cash flows from operations, our strategic plans and cash dividend distributions from our subsidiaries, as well as restrictions imposed by applicable law and contractual restrictions (although as of the date of this report there are no contractual restrictions on our ability to pay dividends or other distributions to our shareholders), and other factors our board of directors may deem relevant at the time. See “Share ownership and trading—Distributions.”

We repurchased US\$8.1 million of our common shares during 2019, excluding fees. The program was concluded in November 2019. For more information, see “Share ownership and trading—Purchases of equity securities by the issuer and affiliated purchasers.”

Debt

As of December 31, 2019, our total outstanding consolidated indebtedness (current and non-current loans and financings, including accrued interest as of December 31, 2019) is US\$1,508.6 million, consisting of US\$33.2 million of short-term indebtedness, including the current portion of long-term indebtedness (or 2.2% of the total indebtedness), and US\$1,475.4 million of long-term indebtedness (or 97.8% of the total indebtedness). As of December 31, 2019, none of our outstanding consolidated indebtedness was guaranteed by sureties.

Our U.S.-dollar denominated indebtedness as of December 31, 2019 was US\$1,389.5 million (or 92.1% of our total indebtedness) and our Brazilian *real*-denominated indebtedness was US\$119.1 million (or 7.9% of our total indebtedness).

As of December 31, 2019, US\$366.6 million, or 24.3% of our total consolidated indebtedness, bears interest at floating rates, including US\$118.3 million of *real*-denominated indebtedness that bore interest at rates based on the SELIC rate or TJLP (*Taxa de Juros de Longo Prazo*) and TLP (*Taxa de Longo Prazo*) rates (the long-term interest rates set by the Brazilian National Monetary Council and the basic costs of financing of the BNDES), and US\$248.3 million of foreign currency-denominated indebtedness that bore interest at rates based on LIBOR or the BNDES Monetary Unit (*Unidade Monetária BNDES*), or UMBNDES, rate.

The following table sets forth selected information with respect to our total outstanding consolidated indebtedness as of December 31, 2019.

Indebtedness	Average Annual Interest Rate	As of December 31, 2019		
		Current	Long-term	Total
		Portion ⁽¹⁾	Portion	
		(in millions of US\$)		
Eurobonds	5.13% (fixed)	8.7	1,035.1	1,043.8
Debt with banks	LIBOR plus 1.27%	—	197.9	197.9
BNDES	TJLP plus 2.82%	7.5	87.8	95.3
	SELIC plus 3.10%			
	IPCA plus 5.22%			
Debentures	107.5% of CDI	7.0	13.3	20.3
Export Credit Note	LIBOR plus 1.54%	0.8	96.6	97.4
Other	TJLP plus 0.71%	9.3	44.7	53.9
Total		33.2	1,475.4	1,508.6

(1) Includes principal and interest.

As of December 31, 2019, US\$95.3 million remains outstanding under our loan agreements with BNDES, with Nexa Brazil as borrower and Nexa Resources as guarantor.

Many of our debt instruments also contain other covenants that restrict, among other things, our ability and the ability of certain of our subsidiaries to incur liens and merge or consolidate with any other person or sell or otherwise dispose of all or substantially all of its assets. These instruments also contained covenants requiring that we comply with certain financial ratios, including:

- a debt service coverage ratio of 1.0:1.0;
- a net debt to EBITDA ratio of 4.0:1.0; and
- a total debt to total capitalization ratio of 0.7:1.0.

As of December 31, 2019 we were in compliance with the above stated ratios.

Short-term indebtedness and revolving credit lines

Our consolidated short-term indebtedness, including the current portion of our long-term debt, was US\$33.2 million, including principal and interest, as of December 31, 2019.

On October 25, 2019, Nexa Resources entered a US\$300.0 million revolving credit facility with a syndicate of lenders. This facility is guaranteed by Nexa Brazil and Nexa CJM. If drawn, this facility will bear interest at three-month LIBOR plus 1.00% per annum and will mature on October 25, 2024. As of December 31, 2019, no amounts were drawn under this facility.

On March 12, 2020, Nexa Peru entered a US\$100.0 million Term Loan. This facility bears interest at 2.45% per annum and matures on March 19, 2025. The proceeds from this facility were used to fund general corporate expenses.

We believe that we will continue to be able to obtain sufficient credit to finance our working capital needs based on current market conditions and our liquidity position. See “Risk factors—Financial risk— Our business requires substantial capital expenditures and is subject to financing risks.”

Long-term indebtedness

The following discussion briefly describes our principal financing agreements as of December 31, 2019.

Export Credit Facility. On October 23, 2019, Nexa Brazil entered a US\$90.0 million export credit facility with Citibank as lender. This facility bears interest at three-month LIBOR plus 1.54% per annum and matures on October 23, 2024. The proceeds from this facility were used to fund general corporate expenses. Simultaneously with entering this facility, we entered into a foreign currency swap to convert this facility’s cash flows to reais and the interest rate to the CDI rate plus 1.30% per annum. As of December 31, 2019, our outstanding principal amount under this facility was US\$90.0 million.

ECA facility: On June 27, 2018, we entered into an export credit agency, or ECA, facility, with BBVA as lender, the Italian agency SACE S.p.A as insurer and Nexa Brazil as guarantor. This facility amounts to US\$62.5 million and bears interest at six-month LIBOR plus 1.10%. The proceeds were used to finance several capital expenditures in Brazil. Principal and interest repayments are semi-annual, commencing on December 27, 2018 and maturing in June 2026. As of December 31, 2019, the outstanding principal under this loan agreement was US\$50.3 million.

Export prepayment facilities. In May 2018, we renegotiated our export prepayment facility with ABN Amro Bank N.V., in an amount of US\$100.0 million, bearing interest at a rate of six-month LIBOR plus 1.27%. The proceeds for this loan were originally used to repay a portion of existing 2014 export prepayment facilities. In the same month, we entered a new export prepayment facility with Scotiabank & Trust (Cayman) Ltd., in an amount of US\$100.0 million and interest rate of six-month LIBOR plus 1.27%. The proceeds for this transaction were used to repay our existing export prepayment facility with Natixis New York Branch, in the amount of US\$100.0 million and bearing interest at a rate of three-month LIBOR plus 2.55%. The export prepayment facility with ABN Amro Bank N.V. is guaranteed by Nexa Brazil and Nexa CJM, and the export prepayment facility with Scotiabank & Trust (Cayman) Ltd. is guaranteed by Nexa Brazil and Nexa CJM. These export prepayment facilities are secured by liens on certain collection accounts associated with these facilities. As of December 31, 2019, the outstanding principal amount under these loan agreements was US\$200.0 million: US\$100.0 million with Scotiabank & Trust (Cayman) Ltd., and US\$100.0 million with ABN Amro Bank N.V.

Nexa Resources Bond. On May 4, 2017, we issued an aggregate principal amount of US\$700.0 million in bonds maturing in 2027 and bearing interest at 5.375% per year, receiving net proceeds of US\$691.2 million. These securities are guaranteed by our subsidiaries Nexa Brazil, Nexa Peru and Nexa CJM. As of December 31, 2019, the outstanding amount under these bonds was US\$697.7 million, which is related to a principal amount of US\$700.0 million plus an accrual of US\$5.9 million related to interest, net of borrowing costs of US\$8.2 million. See Note 26 to our consolidated financial statements.

Nexa Peru Bond. On March 28, 2013, Nexa Peru issued 4.625% senior notes due 2023, or the 2023 Notes, in an aggregate principal amount of US\$350.0 million, maturing on March 28, 2023. The 2023 Notes bear interest at a rate of 4.625% per annum, payable on a semi-annual basis on March 28 and September 28 of each year. As of December 31, 2019, the outstanding principal amount under these notes was US\$343.0 million. On February 24, 2020, we completed a tender offer to purchase for cash any and all of the outstanding 2023 Notes, of which holders of the Notes withdrew an aggregate principal amount of US\$214.5 million, or 62.55% of the outstanding principal amount as of the date of the offer.

BNDES and FINEP. BNDES has been an important source of debt financing for our capital expenditures in Brazil. We, through our Brazilian subsidiaries, have entered into several loan agreements with BNDES for the expansion and modernization of certain fixed assets, studies and engineering projects, environmental investments and the acquisition of machinery and equipment. As of December 31, 2019, our aggregate outstanding principal amount under BNDES loan agreements was US\$95.1 million. For further details on our long-term financings with BNDES, please see the table below.

On December 27, 2018, we renegotiated a portion of our BNDES debt, in the principal amount of US\$59.5 million. Nexa Brazil extended the payment term to 120 installments, ending on December 15, 2028. As a result of our renegotiations, the debt now bears interest at the TLP rate plus 2.18% per annum. It previously bore interest at the TJLP rate plus 2.68% per annum. The renegotiation also changed the index of the debt to TLP. As of December 31, 2019, the outstanding principal amount of this portion of our BNDES debt was US\$53.7 million.

In December 2014, Nexa Brazil entered into a loan agreement with the Brazilian Financing Agency for Studies and Projects (*Financiadora de Estudos e Projetos*), or FINEP, to finance the research and development of various projects. As of December 31, 2019, our outstanding principal amount under this loan agreement was US\$2.7 million.

Liquidity and Capital Resources

The following table sets forth selected information with respect to Nexa Brazil's principal long term financings with BNDES and our outstanding amount under these financings as of December 31, 2019.

Indebtedness	Borrower	Guarantor	Interest Rate	Principal Payment Dates	Maturity Date	Principal Amount Outstanding As of December 31, 2019 (in millions of US\$)
R\$1,000.0 million BNDES Revolving Credit Agreement	Nexa Brazil	Nexa Resources	TLP plus 2.09% per annum	120 monthly installments commencing on January 15, 2019	December 15, 2028	17.5
Total						17.5
	Nexa Brazil	Nexa Resources	SELIC plus 3.10% per annum	60 monthly installments commencing on October 15, 2021	September 15, 2026	26.0
R\$1,200.0 million BNDES Revolving Credit Agreement ⁽¹⁾	Nexa Brazil	Nexa Resources	TJLP plus 2.82% per annum	60 monthly installments commencing on September 15, 2017	September 15, 2026	15.6
	Nexa Brazil	Nexa Resources	TLP plus 2.22% per annum	120 monthly installments commencing on January 15, 2019	December 15, 2028	36.2
Total						77.8
Total BNDES Long-Term Indebtedness						95.3

(1) Consists of three tranches.

Cash flows

The table below sets forth our cash flows from operating activities, investing activities and financing activities for the years ended December 31, 2019 and 2018.

	For the Year Ended December 31,	
	2019	2018
	(in millions of US\$)	
Consolidated Statement of Cash Flows Information		
Net cash flows provided by (used in):		
Operating activities	122.8	347.6
Investing activities	(335.4)	(158.1)
Financing activities	(119.3)	(177.4)
Effects of exchange rates on cash and cash equivalents	(2.5)	1.8
Increase (decrease) in cash and cash equivalents	(334.3)	13.9
Cash and cash equivalents at the beginning of the year	1,032.9	1,019.0

Cash and cash equivalents at the end of the year	698.6	1,032.9
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In 2019, our net cash flow provided by operating activities was US\$122.8 million, primarily due to the decrease in our operating income during the year, increase in working capital, combined with lower interest and foreign exchange cash gain. We had a negative impact from working capital driven by an increase in inventory and recoverable taxes during the year.

Liquidity and Capital Resources

In 2019, our net cash flow used in investing activities was US\$335.4 million, mainly due to capital expenditures, which totaled US\$396.7 million in 2019, partially offset by a net purchase of financial investments of US\$54.7 million.

In 2019, our net cash flow used in financing activities was US\$119.3 million, mainly impacted by the US\$71.1 million investment acquisition of the non-controlling interest in the Aripuanã project (including transaction costs) and US\$69.8 million dividend payment related to fiscal year 2018.

At December 31, 2019, our cash and cash equivalents were US\$698.6 million, US\$334.3 million lower compared to our cash and cash equivalents at December 31, 2018.

CONTRACTUAL OBLIGATIONS

The following table sets forth certain of our contractual obligations as of December 31, 2019.

	Payments Due by Period				More than 5 years
	Total	Less than 1 year	1 - 3 years	3 - 5 years	
	(in millions of US\$)				
Loans and financings ⁽¹⁾	1,886.6	91.5	342.1	610.8	842.2
Lease liabilities ⁽²⁾	34.4	17.9	16.4	0.1	0
Derivative financial instruments ⁽³⁾	21.8	8.3	6.9	6.6	0.1
Trade payables	414.1	414.1	0	0	0
Confirming payable ⁽⁴⁾	82.8	82.8	0	0	0
Salaries and payroll charges	58.9	58.9	0	0	0
Dividends payable	6.7	6.7	0	0	0
Related parties	0.8	0	0.8	0	0
Provisions - Asset retirement obligation ⁽⁵⁾	337.3	15.4	26.3	60.4	235.2
Use of public assets ⁽⁶⁾	38.9	1.4	3.2	3.6	30.7
Long-term commitments ⁽⁷⁾	336.6	165.8	58.3	112.5	0
Total	3,218.9	862.8	454.0	794.0	1,108.2

(1) Reflects projected undiscounted cash flow of principal and interest as of December 31, 2019.

(2) Represents the Nexa's obligation to make lease payments arising from the lease.

(3) See Note 17 to our consolidated financial statements.

(4) Certain of our subsidiaries have entered into agreements extending payment terms from 90 to 180 days with several suppliers. These suppliers have discounted their receivables with banks.

(5) Represents the undiscounted cash flows to settle the provision for asset retirement, including interest to be incurred.

(6) Represents the amounts established in the concession contracts regarding the rights to hydroelectric power generation (onerous concession) under use of public assets agreements. The amounts are accounted in "Other liabilities" in our consolidated balance sheet.

(7) Represents capital expenditures commitments related to our Aripuanã, project and forward purchase commitments for process input materials used in our operations and disbursements related to development activities in certain greenfield projects. For additional information, see Note 32 to our consolidated financial statements.

OFF-BALANCE SHEET ARRANGEMENTS

As of December 31, 2019, we did not have off-balance sheet arrangements of the type that we are required to disclose under Item 5.E of Form 20-F.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

The following discussion and analysis of our financial position and results of operations is based on our consolidated financial statements. The preparation of our consolidated financial statements requires us to make estimates and judgments that affect the reported amount of assets and liabilities, revenues and expenses and related disclosure of contingent assets and liabilities at the date of our consolidated financial statements. In the preparation of our consolidated financial statements, we believe that certain estimates and assumptions and other factors were reasonable and relevant. These estimates and assumptions are periodically reviewed, and adjustments are made to our consolidated financial statements, when appropriate. Each of the corresponding notes to our consolidated financial statements provides a detailed discussion of our significant accounting policies, as well as critical accounting estimates.

Critical accounting policies reflect significant estimates or judgments about matters that are both inherently uncertain and material to our financial position or results of operations. Below is a description of our critical accounting policies that require significant estimates and judgments.

Impairment of goodwill

We annually test whether goodwill has suffered any impairment, in accordance with the accounting policy stated in Note 31 to our consolidated financial statements. We assess the recovery of the carrying amount of goodwill of each cash generating unit or group of cash generating units based on value in use or fair value less costs to sell, using a discounted cash flow model.

We also assess, at each reporting date, whether there is an indication that goodwill may be impaired. If any indication exists, such as volume and price reductions or unusual events that can affect the business, we estimate the recoverable amount of the cash generating unit or group of cash generating units.

The process of estimating the value in use and the fair value less costs to sell involves assumptions, judgment and projections of future cash flows. Our assumptions and estimates of future cash flow used for impairment testing of goodwill are subject to risk and uncertainties, particularly for markets—such as metals—subject to higher volatilities, which are outside our control. The calculations used for the impairment testing are based on discounted cash flow models as of September 30, 2019, market assumptions, such as LME prices, market interest rates and other available data regarding global demand. The discount factor applied to the discounted cash flow model is our pre-tax weighted average cost of capital for the applicable region, adjusted for country-specific risk factors. These calculations use cash flow projections before taxes on income, based on financial and operational budgets for a five-year period. After the five-year period, the projections are extended to the end of the mine life for our mines and indefinitely for our smelters. We do not use growth rates in cash flow projections of the terminal value for our smelters.

Impairment analysis

When performing its annual impairment assessments, we identified the following impairment indicators:

- A reduction in the life of mine of Cerro Pasco Complex operations due to a decrease in mineral reserves and resources estimates;
- The spot average zinc LME prices declined substantially in comparison with prior years;
- The carrying amount of our net assets is persistently above our market value.

We concluded that the combination of these indicators could result in the recoverable amount of its cash-generating units being lower than the carrying amount. An impairment test of all our CGUs was performed. See Note 31 to our consolidated financial statement.

Fair value of derivatives and other financial instruments

We determine the fair value of financial instruments not traded in an active market by using valuation techniques. We use judgment to select among a variety of methods and make assumptions that are mainly based on market conditions existing at the end of each reporting period.

The main financial instruments and the assumptions we make for their valuation are described below.

- We consider the nature, terms and maturity of cash and cash equivalents, financial investments, trade accounts receivable and other current assets. The carrying amount of these items are similar to their respective fair value.
- Financial liabilities are subject to typical market interest rates. The market value is based on the present value of expected future cash disbursement, at interest rates currently available for debt with similar maturities and terms. We also consider Nexa's credit risk when assessing the fair value of financial liabilities.
- The fair value of derivative financial instruments that we use for hedging transactions is evaluated by calculating their present value through yield curves at the closing dates. The curves and prices used in the calculation for each group of instruments are developed based on data from the Brazilian Securities, Commodities and Futures Exchange, Central Bank of Brazil, LME and Bloomberg, interpolated between the available maturities.
 - o Swap contracts: The present value of both the assets and liabilities is calculated through the discount of forecasted cash flows by the interest rate of the currency in which the swap is denominated. The difference between the present value of the assets and the liabilities generates its fair value.
 - o Forward contracts: The present value is estimated by discounting the notional amount multiplied by the difference between the future price in the reference date and contracted price. The future price is calculated using the convenience yield of the underlying asset. It is common to use Asian non-deliverable forwards for hedging non-ferrous metals positions. Asian contracts are derivatives in which the underlying asset price is the average price of certain assets over a range of days.
 - o Option contracts: The present value is estimated based on pricing methodologies such as the Black model, with assumptions that include the underlying asset price, strike price, volatility, time to maturity and interest rate. The underlying asset price is the monthly average of the relevant foreign exchange rate.

Asset retirement obligations

Provisions are made for asset retirement obligation, restoration and environmental costs when the liability arises due to the development or mineral production of an operating asset, based on the net present value of estimated closure costs. Our initial recognition and any subsequent revision of asset retirement obligations also considers assumptions such as interest rates, inflation and useful lives of the assets. We review these estimates on a quarterly basis. Management uses its judgment and previous experience to determine the potential scope of restoration work that is required for the asset, as well as any related costs associated with such work.

The cash flows are discounted to present value using a credit risk-adjusted rate that reflects current market assessments of the time value of money and the specific risks for the asset to be restored. The interest rate charges relating to the liability are recognized as an accretion expense in net financial results. Differences in the settlement amount of the liability are recognized in the income statement. For additional information, see Note 27 to our consolidated financial statements included herein.

Tax, civil, labor and environmental provision

We are party to ongoing labor, civil, tax and environmental lawsuits, which are pending at different court levels. We establish provisions for potentially unfavorable outcomes of litigation in progress and update them based on management evaluation, with support from the positions of external legal counsel. For additional information, see Note 28 to our consolidated financial statements.

Income tax and other taxes

We are subject to income tax in all countries in which we operate. Significant judgment is required in determining the income tax provision. The ultimate tax determination is uncertain for many transactions and calculations. We also recognize liabilities for anticipated tax audit issues based on estimates of whether additional taxes will be due. Where the final tax outcome of these matters is different from the amounts that were initially recorded, such differences will impact the current and deferred tax assets and liabilities in the period in which such determination is made. For additional information, see Note 11 to our consolidated financial statements.

Determination of mineral reserves and inferred resources as basis to determine life of mine

Mineral reserves are deposits estimated to be economically feasible for extraction under economic conditions as of the applicable measurement date. The amortization method and rates applied to the rights to use natural resources reflect the pattern in which the benefits are expected to be used by us and based on the estimated life of mine. Any changes to the life of mine, including as a result of changes in estimates of mineral deposits and mining plans, may affect prospective amortization rates and carrying values of these assets. The process of estimation of mineral deposits is based on a technical evaluation, which includes accepted geological, geophysics, engineering, environmental, legal and economic estimates. These estimates, when evaluated in the aggregate, can have a relevant impact on the economic viability of the mineral deposits. We use various assumptions with respect to conditions, such as metal prices, inflation rates, exchange rates, technology improvements and production costs, among others. Estimates of mineral reserves and resources are reviewed periodically, and any changes are adjusted to reflect life of mine and, consequently, adjustments to amortization periods. Costs for the acquisition of rights to explore and costs to develop mineral properties incurred as of the start of the feasibility study phase known as front end loading 3, or FEL 3, are capitalized. Since April 1, 2018, these costs are amortized using the units of production method over the estimated useful lives of the mines. The impacts of the change in the accounting estimation were not considered to be material, and the change was accounted for prospectively. Once the mine is operational, these costs are amortized and considered a production cost.

Recently issued accounting standards and interpretations not yet adopted

For a discussion of new standards, interpretations and amendments to IFRS, see Note 5 to our consolidated financial statements.

RISK MANAGEMENT

Risk management is considered one of the key points in our business strategy and contributes to value creation and increasing the level of confidence in Nexa by its main stakeholders, including shareholders, employees, customers, suppliers and the local communities.

As a result, we have adopted an Enterprise Risk Management (ERM) Policy, that describes Nexa's Risk Management Model, and its activities are an integral part of the processes in our operational units, corporate departments and projects, and provides support for decision-making by our Executive Officers and Board of Directors.

The risk assessment cycle is performed annually focusing on our strategy, operational aspects and key projects. We seek to identify material risks, which are then assessed with consideration of the potential health, safety, environmental, social, reputational, legal and financial impacts. By embedding risk management into our work processes and critical business systems, we work to ensure we make decisions based on relevant inputs and valid data. The material risks identified during the risk management process are monitored and reported to the Executive Team, Audit Committee and Board of Directors.

We consider market risk to be the potential loss arising from adverse changes in market rates and prices. We are exposed to several market risks arising from our normal business activities. These market risks, which are beyond our control, principally involve the possibility that changes in commodity prices, interest rates or exchange rates will adversely affect the value of our inventory, financial assets and liabilities or future cash flows and earnings. For information on our risk management policies, see Note 12 to our consolidated financial statements.

Financial risk

Our financial risk management policy seeks to preserve our liquidity and protect our cash flow and its operating components (revenues and costs), as well as financial components (financial assets and liabilities) against adverse credit and market events such as fluctuations in currency and interest rates.

A significant portion of the products we sell are commodities, with prices based on international indices and denominated in U.S. dollars. A portion of our costs, however, are denominated in *reais* and *soles*, and therefore leads to a mismatch of currencies between our revenues and costs. Additionally, our indebtedness is based on different indices and currencies, which may impact our cash flows.

Our current financial risk management policy includes:

- **Foreign Exchange Exposure Management.** Foreign exchange exposure is our exposure to fluctuations in the currencies that make up our commercial, operational and financial relations (the *real* and *sol*), and that may impact our U.S. dollar cash flow. All actions in the financial risk management process are intended to hedge our cash flow in U.S. dollars, to maintain our ability to pay our financial obligations and to comply with liquidity and indebtedness levels defined by our management team. Our foreign exchange hedge mechanisms are based on the foreign exchange exposure that is projected at least for 12 months after a reference date.
- **Interest Rate Exposure Management.** Exposure to the interest rate is our exposure to fluctuations in each of the indices of interest rates (mainly CDI, LIBOR and TJLP) from loans and financing transactions and financial investment that may impact our cash flow. Interest rate fluctuations would also result in gains or losses in the market value of our fixed rate debt portfolio due to differences in market interest rates and the rates at the execution of the debt agreements.
- **Commodity Exposure Management.** Exposure to commodity prices is our exposure to income and operating costs fluctuations due to changes in the reference prices for commodities (e.g., zinc, copper, silver) based on demand, production capacity, producers' inventory levels and commercial strategies and the availability of substitutes in the global market. We calculate our exposure at least for 12 months after a reference date, considering any derivative financial instrument that has a certain commodity as the underlying asset.

- **Counterparties' and Issuers' Risk Management.** This policy establishes exposure limits for financial and non-financial institutions that are counterparties of financial transactions and/or issuers of debt securities. The purpose of our counterparties' and issuers' risk management is to mitigate the occurrence of negative impacts on our cash flows from the non-fulfillment of financial obligations by these issuers and counterparties. In the case of financial investments (cash allocation), we measure exposure to credit risk of issuers by the sum of gross balances of financial investments. In the case of derivative transactions, the credit risk exposure of a certain counterparty and transaction is measured by the pre-settlement risk using statistical models. Exposure limits are determined based on ratings assigned by rating agencies and the equity of the relevant financial institution.
- **Liquidity and Financial Indebtedness Management.** This policy establishes guidelines for managing our liquidity and financial indebtedness. The main instrument for measuring and monitoring liquidity is a cash flow projection, considering a minimum projection period of 12 months from the reference date. Liquidity and debt management considers as an objective the comparable metrics provided by global credit rating agencies for investment grade entities. With respect to indebtedness, metrics considered compatible with the relevant objective are considered.

All proposals must comply with the guidelines and rules set forth in our Financial Risk Management Policy and subsequently submitted for review by our finance committee and then for our board of directors' approval, under the governance structure set forth in our Financial Risk Management Policy.

Foreign exchange risk

We are subject to foreign exchange risks resulting from the fluctuation of the *real* and the *sol* against the U.S. dollar, our functional currency. All actions in the financial risk management process related to our foreign exchange exposure are intended to hedge our cash flow in U.S. dollars, to maintain our ability to pay our financial obligations and to comply with liquidity and indebtedness levels defined by our management. We are also exposed to financial risk associated with changes in foreign currency exchange rates as certain costs incurred are in currencies other than our functional currency.

Assuming an exchange rate appreciation (devaluation) of 10.0% of the U.S. dollar against the real as of December 31, 2019, we estimate that our EBITDA for the year would have increased (decreased) by US\$64.9 million for 2019. This calculation assumes that each exchange rate would change in the same direction relative to the U.S. dollar. In addition to the direct effects of changes in exchange rates, changes in exchange rates may also affect the volume of sales as other market participants become more or less competitive. This sensitivity analysis does not factor in a potential change in sales levels or actions that management could take to manage the potential impact. Accordingly, the actual effect of exchange rate fluctuations will vary from period to period. However, assuming all other factors are held constant, we would expect future fluctuations like those analyzed above to have a similar potential impact on our results for future periods. See "Forward-looking statements."

Interest rate risk

A portion of our outstanding debt bears interest at variable rates and, accordingly, is sensitive to changes in interest rates. Based upon our indebtedness as of December 31, 2019, an increase/(decrease) in LIBOR of 25.0% would impact our profit and cash flows by US\$0.39/(0.36) million. We calculate our exposure to fluctuations in interest rates at least for 12 months after a reference date, considering any derivative financial instrument that has certain index as the underlying asset. Based on these exposures, we prepare financial protection proposals, which are submitted for our finance committee's approval. The hedges of interest rates, in general, seek to exchange fixed interest rate to floating interest rate or vice versa.

Metal price sensitivity

We are subject to financial risks arising from the volatility of prices of zinc, copper, lead and silver, and to a lesser extent gold. Assuming that expected metal production and sales are achieved, that tax rates are unchanged, and giving no effect to potential hedging programs, metal price sensitivity factors would indicate the following change in our 2019 Adjusted EBITDA (as previously defined) attributable to us resulting from metal price changes.

	Zinc	Copper	Silver
Change in metal price (in percentage)	10.0%	10.0%	10.0%
Change in Adjusted EBITDA (in millions of US\$)	104.07	23.65	11.83

Derivative instruments

To hedge against financial risk, we enter derivative transactions under our Financial Risk Management Policy. Those transactions are carried out in the over-the-counter market under master agreements such as International Swaps and Derivative Association and Brazilian CGD (*Contrato Geral de Derivativos*) Agreements.

None of the derivative transactions we are party to as of December 31, 2019 have corporate guarantees or require margin calls or any kind of collateral. None of the derivatives we were party to as of December 31, 2019 was entered into for speculative or arbitrage purposes.

We have the following recurring hedge programs in place:

- Fixed price commercial transactions (customer hedge): Hedging transactions that convert sales at fixed prices to floating prices in commercial transactions with customers interested in purchasing products at fixed prices. The purpose of this strategy is to maintain the revenue flow of the business unit with prices linked to the LME prices. These operations usually relate to purchases of zinc for future settlement on the over-the-counter market.
- Hedges for mismatches of “quotation periods” (book hedge): Hedges that set prices for the different “quotation periods” between the purchases of certain inputs (metal concentrate) and the sale of products arising from the processing of these inputs, or different “quotation periods” between the purchase and the sale of the same product. These operations usually relate to purchases and sales of zinc and silver for future trading on the over-the-counter market.
- Hedges for “operating margin” (strategic hedge): Derivatives contracted to reduce the volatility of the cash flow from its zinc, copper and silver operations. With a view to ensuring a fixed operating margin in *reais* for a portion of the Brazilian production of metals, the mitigation of risks is carried out through the sale of zinc forward contracts with the sale of U.S. dollar forward contracts.

To execute our hedge programs, as well as any sporadic hedging demands, we and our subsidiaries mainly enter into average-rate (Asian) forwards, collars and swaps and standard interest rate swaps. These are the types of derivatives applicable for the hedge of our exposures, according to our Financial Risk Management Policy.

We initially recognize derivative instruments at fair value on the date a derivative contract is entered into and subsequently re-measure at their fair value. The method of recognizing the resulting gain or loss depends on whether we designate the derivative as a hedging instrument, in the case of adoption of hedge accounting, and if so, the nature of the item being hedged. We adopt the hedge accounting procedure and designate certain derivatives as either:

- hedges of the fair value of recognized assets or liabilities or a firm commitment (fair value hedge); or
- hedges of a particular risk associated with a recognized asset or liability or a highly probable forecast transaction (cash flow hedge).

We document the relationship between hedging instruments and hedged items at the inception of the hedging transaction, as well as the risk management objective and strategy for the undertaking of the various hedge transactions. We also document our assessment, both at the inception of the hedge and on an ongoing basis, of whether the derivatives that are used in hedging transactions have been and will continue to be highly effective in offsetting changes in fair values or cash flows or fair values of hedged items.

III. SHARE OWNERSHIP AND TRADING

MAJOR SHAREHOLDERS

As of March 16, 2020, Nexa Resources has 133,320,513 common shares, with par value of US\$1.00 per share. The table below sets forth the list of our shareholders and their participation in our capital stock.

Votorantim S.A., or VSA, is Nexa Resources' controlling shareholder. VSA does not have any different voting rights, but as long as it holds a majority of our voting stock, it can influence or control matters requiring approval by our shareholders, including the appointment of directors. VSA acquired all its shares in Nexa Resources on February 26, 2014.

Shareholder	Number	Share Capital (%)
VSA	85,655,128	64.25%
Treasury	881,902	0.66%
Public	46,783,483	35.09%
Total	133,320,513	100.00%

VSA

As of March 16, 2020, Hejoassu Administração S.A., or Hejoassu, is the sole shareholder of VSA's capital stock, which consists of 18,278,788,894 common shares. Hejoassu is indirectly wholly-owned by Ermírio Pereira de Moraes, Maria Helena Moraes Scripilliti, José Ermírio de Moraes Neto, José Roberto Ermírio de Moraes, Neide Helena de Moraes and the descendants of Antonio Ermírio de Moraes through controlled companies.

RELATED PARTY TRANSACTIONS

We enter transactions with VSA and companies that are owned or controlled, directly or indirectly, by VSA in our ordinary course of business. These transactions in the ordinary course of business are conducted on an arms' length basis and in accordance with applicable laws and our corporate governance policies. See "Risk factors—Risks relating to our corporate structure—VSA has substantial control over us, which could limit our shareholders' ability to influence the outcome of important corporate decisions." In accordance with article 441-7 of the Luxembourg law of August 10, 1915 concerning commercial companies, as amended (or 1915 Law), any member of our board of directors having a direct or indirect financial interest conflicting with that of Nexa Resources in a transaction put before the board for consideration must advise the board thereof and cause a record of such member's statement to be included in the minutes of the meeting. The director may not take part in these deliberations and at the next following general meeting of shareholders of Nexa Resources, before any other resolution is put to vote, a special report shall be made on any such conflicted transactions. This shall not apply where the decision of the board relates to ordinary business entered into under normal market conditions.

Nexa has controls in order to identify related parties on an annual basis and approve related party transactions. Such controls consist of a pre-clearance process that is a required step for the financial execution of any identified related party transaction.

The table below sets forth the balances of our principal related party transactions as of the dates and periods indicated. The entities disclosed are entities part of the Votorantim Group. The transactions relate to shared project costs such as environmental protection; administrative services provided by the Center of Excellence (*Centro de Excelência*); sales of limestones and cement purchases, mainly for the Aripuanã project; purchases of energy to be used in Nexa Brazil operation units and construction services for the Aripuanã project. For more information, see "Cost-sharing agreement with VSA," "Other shared arrangements," and "Purchasing of electricity from Votener."

	As of December 31,
	2019
	(in millions of US\$)
Related Party Transaction Balances	
Related Party Assets	
Current assets	
Trade Accounts Receivable	
Companhia Brasileira de Alumínio	1.8
Votener - Votorantim Comercializadora de Energia Ltda.	0.3
Votorantim Cimentos S.A.	1.5
Other	—
Total	3.6
Non-current assets	
Votorantim Cimentos S.A.	0.7
Total	0.7
Trade payables	
Votorantim S.A.	0.5
Andrade Gutierrez Engenharia S.A.	1.4
Companhia Brasileira de Alumínio	0.3
Votorantim Cimentos S.A.	—
Votener - Votorantim Comercializadora de Energia Ltda.	7.2
Votorantim International CSC S.A.C.	0.5
Other	1.4
Total	11.3
Dividends payable	
Other	6.7
Total	6.7
Current and non-current liabilities	
Other	0.8
Total	0.8

We summarize below some of our principal transactions with VSA and its affiliates.

Related Party Transactions

For the Year Ended December 31,
2019
(in millions of US\$)

Related Party Transaction Revenues and Expenses	
Sales	
Votorantim S.A.	—
Companhia Brasileira de Alumínio	2.2
Votener - Votorantim Comercializadora de Energia Ltda.	3.3
Votorantim Cimentos S.A.	0.2
Other	0.5
Total	6.2
Purchases	
Votorantim S.A.	6.2
Andrade Gutierrez Engenharia S.A.	5.0
Companhia Brasileira de Alumínio	2.0
Votener - Votorantim Comercializadora de Energia Ltda.	9.6
Votorantim Cimentos S.A.	2.2
Votorantim International CSC S.A.C.	5.6
Other	1.6
Total	32.1

Cost-sharing agreement with VSA

We entered into an agreement with VSA on September 4, 2008, for services provided by the Center of Excellence (*Centro de Excelência*) of VSA related to administrative activities, human resources, back office services, accounting, taxes, technical assistance, and training, among other activities. Under a cost sharing agreement, Nexa reimburses VSA for the expenses related to these activities that pertain to Nexa. We do not expect to negotiate any material changes in the terms and conditions of our cost-sharing agreement with VSA.

Andrade Gutierrez Engenharia S.A

As part of the execution of the Aripuanã project, Nexa entered into a mining development services agreement in the amount of US\$65.9 million with Andrade Gutierrez Engenharia S.A.. One of the Nexa director's close family members holds an executive position in a holding company that indirectly controls the counterparty to this contract. The contract was executed in accordance with customary market terms.

Other shared arrangements

We have entered a number of shared services contracts with other entities in the Votorantim Group in an effort to achieve operational efficiencies. These include joint contracts for insurance coverage and information technology. Entities in the Votorantim Group with whom we maintain such contracts have access to a substantial level of information about us. In addition, VSA negotiates our insurance coverage at the level of the Votorantim group and we thus depend on choices made by VSA for selecting the service providers to be used for all insurances contracted by us, including coverage related to property, transport, liability, credit and engineering risk insurances. We retain the right of approval of contract renewal terms negotiated by VSA.

In addition, all executive officers participate in the Fundação Senador José Ermírio de Moraes (or FUNSEJEM) pension fund, a private, closed and not-for-profit pension fund responsible for the management of the pension plans for the employees of companies linked to the Votorantim Group.

See "Risk Factors—Risks relating to our corporate structure—VSA has substantial control over us, which could limit our shareholders' ability to influence the outcome of important corporate decisions."

DISTRIBUTIONS

Distributions to our shareholders are subject to the requirements of Luxembourg law and the approval of our board of directors or our shareholders, as applicable, and will depend on a number of factors, including, but not limited to, our cash balance, cash flow, earnings, capital investment plans, expected future cash flows from operations, our strategic plans and cash dividend distributions from our subsidiaries, as well as legal requirements and other factors we may deem relevant at the time. As of December 31, 2019, there are no contractual restrictions on our ability to make distributions to our shareholders. Subject to these considerations, we estimate to distribute each year amounts equal to at least 2.0% of our average market capitalization for the previous fiscal year. For this purpose, our average market capitalization for a fiscal year is the sum of the daily market capitalization for each NYSE trading date in such fiscal year divided by the number of NYSE trading days in such fiscal year, where the daily market capitalization for any trading day is the product of the NYSE closing price per share in U.S. dollars of our common shares on such trading day and the number of common shares outstanding on such trading day.

Each common share entitles the holder to participate equally in distributions, unless the right to distributions has been suspended in accordance with our articles of association or applicable law.

Distributions in our common shares may be made in the form of either dividends or reimbursements of share premium. Under Luxembourg law, dividends are determined by a simple majority vote at a general shareholders' meeting based on the recommendation of our board of directors. Furthermore, pursuant to our articles of association, the board of directors has the power to declare interim dividends and/or proceed with reimbursements of share premium in accordance with the 1915 Law.

We and our subsidiaries are subject to certain legal requirements that may affect our ability to pay dividends or other distributions. Distributions to shareholders (including in the form of dividends or reimbursement of share premium) may only be made from amounts available for distribution in accordance with Luxembourg law, determined based on our standalone statutory accounts prepared under Luxembourg GAAP. Under Luxembourg law, the amount of a distribution paid to shareholders (including in the form of dividends or reimbursement of share premium) may not exceed the amount of the profits at the end of the last financial year plus any profits carried forward and any amounts drawn from reserves that are available for that purpose, less any losses carried forward and sums to be placed in reserve in accordance with Luxembourg law or our articles of association. Furthermore, no distributions (including in the form of dividends or reimbursement of share premium) may be made if at the end of the last financial year the net assets as set out in the standalone statutory accounts prepared under Luxembourg GAAP are, or following such a distribution would become, less than the amount of the subscribed share capital plus the non-distributable reserves. Distributions in the form of dividends may only be made from net profits and profits carried forward, whereas distributions in the form of share premium reimbursements may only be made from available share premium.

Luxembourg law also requires at least 5.0% of our net profits per year to be allocated to the creation of a legal reserve until such reserve has reached an amount equal to 10.0% of our issued share capital. If the legal reserve subsequently falls below the 10.0% threshold, at least 5.0% of net profits again must be allocated toward the reserve. The legal reserve is not available for distribution. As of December 31, 2019, the legal reserve is US\$ US\$13,332,051.30.

The balance of the share premium account as of December 31, 2019 was US\$1,102.0 million. This amount was calculated based on the share premium reserve, plus any profits made since the end of last financial year, less losses carried forward, as set forth in our standalone statutory accounts as of December 31, 2019 prepared under Luxembourg GAAP.

The table below describes the distributions paid to our shareholders. Distributions for 2016, 2017 and 2018 were paid in the form of a share premium reimbursements. Distributions for 2019 were made in the form of a cash dividend.

	For the Year Ended December 31,			
	2019	2018	2017	2016
	(in millions of US\$)			
Distributions paid to shareholders	69.8	80.0	430.0	69.9

(1) Amount paid in 2017 represents amounts distributed prior to the completion of our initial public offering.

On February 13, 2020, the board of directors approved a cash advance on dividends of approximately US\$50 million, corresponding to US\$0.377533 per share expected to be paid to the shareholders on March 30, 2020.

Nexa Resources is a holding company and has no material assets other than its ownership of shares in its subsidiaries. When Nexa Resources pays a dividend or other distribution on its common shares in the future, it generally causes its operating subsidiaries to make distributions to it in an amount sufficient to cover any such dividends or distributions. The ability of subsidiaries of Nexa Resources to make distributions to Nexa Resources is subject to their capacity to generate sufficient earnings and cash flow and may also be affected by statutory accounting and tax rules in Brazil and Peru, as well as any conditions under the corporate law applicable to each subsidiary. As of December 31, 2019, there are no material contractual restrictions on the ability of subsidiaries of Nexa Resources to make distributions to Nexa Resources.

A Luxembourg withholding tax of 15.0% is generally due on dividends and similar distributions made by Nexa Resources to its shareholders. However, distributions on Nexa Resources' common shares that are sourced from a reduction of share capital or share premium are not subject to Luxembourg withholding tax if Nexa Resources does not have distributable reserves or profits in its standalone statutory accounts prepared under Luxembourg GAAP. See "Additional information—Taxation—Luxembourg tax considerations—Shareholders."

There is no law, governmental decree or regulation in Luxembourg that would affect the remittance of dividends or other distributions by Nexa Resources to nonresident holders of its common shares, other than withholding tax requirements. In certain limited circumstances, the implementation and administration of international financial sanctions may affect the remittance of dividends or other distributions. There are no specified procedures for nonresident holders to claim dividends or other distributions.

Computershare Trust Company, N.A. is the paying agent for shareholders who hold common shares listed on the NYSE and on the TSX. Dividends and other distributions on our common shares will be declared and paid in U.S. dollars. Dividends and other distributions on common shares listed on the NYSE will be the same as for common shares listed on the TSX.

TRADING MARKETS

Our publicly traded share capital consists of common shares with a par value of US\$1.00 per share. Our common shares are publicly traded in the United States on the New York Stock Exchange (or NYSE), under the ticker symbol NEXA. Our common shares also trade on the Toronto Stock Exchange (or TSX), under the ticker symbol NEXA. On March 16, 2020, there were 133,320,513 common shares issued.

PURCHASES OF EQUITY SECURITIES BY THE ISSUER AND AFFILIATED PURCHASERS

On September 13, 2018, the general meeting of shareholders of Nexa Resources approved a general authorization to the board of directors to establish, from time to time for a period of three years, share buyback programs pursuant to which we, directly or indirectly through our subsidiaries, may purchase, acquire, receive or hold and sell shares of Nexa Resources listed on the New York Stock Exchange or Toronto Stock Exchange.

On September 20, 2018, our board of directors approved a share buyback program, under which we, directly or indirectly through our subsidiaries, were authorized to repurchase, up to US\$30.0 million of our outstanding common shares listed on the New York Stock Exchange over a 12-month period beginning on November 6, 2018 and ending on November 6, 2019. Under this share buyback program, we were authorized to repurchase our common shares for cash in accordance with all applicable securities laws and regulations and within the limits of the authorization approved in the general meeting of shareholders of Nexa Resources held on September 13, 2018.

During 2019, we repurchased 769,514 common shares, at an average price of US\$10.51 per share, for an aggregate purchase price of US\$8.1 million. Since the beginning of the program, we repurchased a total of 881,902 common shares, for an aggregate amount of US\$9.4 million. The common shares repurchased during the program represent 1.9% of the free float of common shares outstanding before the launch of the program and were held in treasury. The share buyback program expired on November 6, 2019.

Our last share repurchase activity occurred on June 21, 2019. The results of our share repurchase program as of the date of expiration are set forth below.

Period	Total number of shares (or units) purchased ⁽¹⁾	Average price paid per share (or units) (in US\$)	Total number of shares (or units) purchased as part of publicly announced plans or programs	Maximum number (or approximate US\$ value) of shares (or units) that may yet be purchased under the program ⁽²⁾
<i>Common shares</i>				
January 1-31, 2019	161,735	10.04	161,735	6,225,877
February 1-28, 2019	141,334	9.75	141,334	6,084,543
March 1-31, 2019	62,244	11.98	62,244	6,022,299
April 1-30, 2019	130,895	12.25	130,895	5,891,404
May 1-31, 2019	171,427	10.00	171,427	5,719,977
June 1-21, 2019	101,879	10.03	101,879	5,618,098
Total	769,514	10.51	769,514	5,618,098

(1) All shares purchased in 2019 through the program publicly announced on September 20, 2018.

(2) The board of directors authorized Nexa Resources to purchase up to US\$30 million of its outstanding common shares listed on the New York Stock Exchange. The program expired on November 6, 2019.

IV. CORPORATE GOVERNANCE, MANAGEMENT AND EMPLOYEES

CORPORATE GOVERNANCE

Our corporate governance model is aimed at facilitating the flow of information between our executives and other key decision-makers on our management team, specifically, our board of directors, advisory committees and management committee. Our corporate governance model also provides a framework for the duties of our management team, including oversight of Nexa's performance and decision-making. Our main corporate governance activities include support for board of directors, board advisory committees and executive board meetings; contribution to the process of preparing the annual report on governance practices; and elaboration of governance documents and updating of best practices.

Our corporate governance model is designed to ensure that the proper corporate governance principles are consistently applied within our organization. We have adopted certain corporate governance policies and practices in line with the *Corporate Governance Guidelines* (or Canadian Corporate Governance Guidelines) issued by the Canadian Securities Administrators pursuant to National Policy 58-201, together with certain related disclosure requirements pursuant to National Instrument 58-101—*Disclosure of Corporate Governance Practices*. These include adopting board internal rules for the board of directors and appointing key committees that have independent representation and leadership, including an audit committee and a compensation, nominating and governance committee. The charter for the compensation, nominating and governance committee includes responsibility for reviewing and assessing the size, composition and operation of the board of directors to ensure effective and independent decision making, advising on potential conflicts of interest situations and developing corporate governance guidelines and principles. The disclosure set out below describes in further detail our approach to corporate governance in relation to the Canadian Corporate Governance Guidelines.

Code of conduct

We work with all of our employees, as well as third parties who interact with them, to ensure they behave in a manner consistent with our values, code of conduct and the key principles of our compliance program, particularly as these relate to the environment, human rights and labor related issues, health and safety, and anti-bribery and corruption. In 2018, we updated our compliance program based on the anti-corruption, anti-money laundering, anti-terrorist financing and antitrust laws in effect in the countries where we operate. As a result of this, the code of conduct was revised and is supported by compliance-related policies and procedures that are in the process of dissemination and implementation throughout Nexa. Our directors and executives have certified that they have read and that they will comply with our code of conduct. A conduct committee is in charge of promoting the implementation of the code and supervising the application of disciplinary measures.

We have introduced several anti-corruption, anti-money laundering and antitrust initiatives, including, among other things, ethics and compliance training and an ethics hotline which enables employees and third parties to report misconduct. Information reported through our ethics hotline is investigated and following the investigation, disciplinary action may be taken, if necessary. We have not granted any implicit or explicit waivers from any provision of our code of conduct since its adoption.

Our code of conduct and main compliance-related policies are publicly available on our website at <https://www.nexaresources.com>. We will disclose future amendments to, or waivers of, our code of conduct on the same page of our corporate website. Information contained on our website is not incorporated by reference into this report, and you should not consider information contained on our website to be part of this report.

Foreign private issuer and controlled company exemptions

Because we are a foreign private issuer, the NYSE rules applicable to us are considerably different from those applied to U.S. companies. Accordingly, we intend to take advantage of certain exemptions from NYSE governance requirements provided in the NYSE rules for foreign private issuers. Subject to the items listed below, as a foreign private issuer we are permitted to follow home country practice in lieu of the NYSE's corporate governance standards. Luxembourg law does not require that a majority of our board consist of independent directors or the implementation of a compensation committee or nominating and corporate governance committee. As a foreign private issuer, we must comply with four principal NYSE corporate governance rules: (i) we must satisfy the requirements of Exchange Act Rule 10A-3 relating to audit committees; (ii) our chief executive officer must promptly notify the NYSE in writing after any executive officer becomes aware of any non-compliance with the applicable NYSE corporate governance rules; (iii) we must provide the NYSE with annual and interim written affirmations as required under the NYSE corporate governance rules; and (iv) we must provide a brief description of any significant differences between our corporate governance practices and those followed by U.S. companies under NYSE listing standards.

In addition, for purposes of the NYSE rules, as VSA beneficially owns a majority of our outstanding common shares, we are a “controlled company.” “Controlled companies” under those rules are companies of which more than 50.0% of the voting power is held by an individual, a group or another company. Accordingly, we are eligible to take advantage of certain exemptions from NYSE governance requirements provided in the NYSE rules. Specifically, as a controlled company under NYSE rules, we are not required to have a majority of independent directors or a compensation, nominating and corporate governance committee composed entirely of independent directors.

As described further above, we recognize that good corporate governance plays an important role in our overall success and in enhancing shareholder value and, accordingly, we have adopted certain corporate governance policies and practices that reflect our consideration of the recommended Canadian Corporate Governance Guidelines. The following table briefly describes the significant differences between our practices and the practices of U.S. domestic issuers under NYSE corporate governance rules.

Section	NYSE corporate governance rule for U.S. domestic issuers	Our approach
303A.01	A listed company must have a majority of independent directors. “Controlled companies” and “foreign private issuers” are not required to comply with this requirement.	<p>We are a controlled company because more than a majority of our voting power for the appointment of directors is controlled by VSA. We are a foreign private issuer because we are incorporated in Luxembourg. As a controlled company and foreign private issuer, we are not required to comply with the majority of independent director requirements.</p> <p>Four of our ten directors are independent. Our board of directors has adopted internal rules equivalent to a charter. See “Corporate Governance, management and employees—Board of directors” for a description of our board and processes our board has implemented to promote the exercise of independent judgment.</p>
303A.03	The non-management directors of a listed company must meet at regularly scheduled executive sessions without management.	We do not have any non-management directors.
303A.04	<p>A listed company must have a nominating/corporate governance committee composed entirely of independent directors, with a written charter that covers certain minimum specified duties.</p> <p>“Controlled companies” and “foreign private issuers” are not required to comply with this requirement.</p>	<p>As a controlled company and foreign private issuer, we are not required to comply with the nominating/corporate governance committee requirements. However, we do have a compensation, nominating and governance committee composed of two independent directors and one non-independent director, which has adopted a committee charter.</p> <p>As set for in the committee’s charter, this committee is responsible for, among other matters:</p> <ul style="list-style-type: none"> • identifying individuals qualified to be nominated as members of the board of directors; • suggesting names to fill any vacancies on the board of directors; • developing corporate governance guidelines and principles; and • evaluating the performance and effectiveness of the board of directors, the CEO and each of committees.

See “Corporate Governance, management and employees—Board of directors—Committees of our board of directors.”

Section	NYSE corporate governance rule for U.S. domestic issuers	Our approach
303A.05	<p>A listed company must have a compensation committee composed entirely of independent directors, with a written charter that covers certain minimum specified duties.</p> <p>“Controlled companies” and “foreign private issuers” are not required to comply with this requirement.</p>	<p>As a controlled company and foreign private issuer, we are not required to comply with the compensation committee requirements. However, we do have a compensation, nominating and governance committee composed of two independent directors and one non-independent director, which has adopted a committee charter.</p> <p>As set forth in the committee’s charter, this committee is responsible for, among other matters:</p> <ul style="list-style-type: none"> • reviewing and proposing new compensation models and changes to current compensation models; and • determining compensation of executives, directors and committee members. <p>See “Corporate governance, management and employees—Board of directors—Committees of our board of directors.”</p>
303A.06	<p>A listed company must have an audit committee with a minimum of three independent directors who satisfy the independence requirements of Rule 10A-3 under the Exchange Act, with a written charter that covers certain minimum specified duties.</p>	<p>We have an audit committee composed of three members, all of whom qualify as independent under Rule 10A-3 and applicable NYSE standards. Each member of the audit committee also satisfies the financial literacy requirement under applicable standards. The audit committee has adopted a committee charter, which was duly approved by our board of directors.</p> <p>As set forth in the committee’s charter, the committee shall assist the board of directors in fulfilling its oversight responsibilities with respect to:</p> <ul style="list-style-type: none"> • quality and integrity of our financial reporting and related financial disclosures; • the effectiveness of our internal control over financial reporting and disclosure controls and procedures; • our compliance with legal and statutory requirements as they relate to financial statements and related financial disclosures; • our risk management and monitoring processes; and • the qualifications, performance and independence of our independent auditors and performance of the internal audit function. <p>See “Corporate governance, management and employees—Board of directors—Committees of our board of directors.”</p>

Section	NYSE corporate governance rule for U.S. domestic issuers	Our approach
303A.08	Shareholders must be given the opportunity to vote on all equity-compensation plans and material revisions thereto, with limited exemptions set forth in the NYSE rules.	Our articles of association require shareholder approval of overall remuneration, including any equity-compensation plans of members of the board of directors and members of board committees.
303A.09	A listed company must adopt and disclose corporate governance guidelines that cover certain minimum specified subjects.	We have published formal corporate governance guidelines.
303A.10	A listed company must adopt and disclose a code of business conduct and ethics for directors, officers and employees, and promptly disclose any waivers of the code for directors or executive officers.	We have adopted a formal code of conduct, which applies to our directors, officers and employees. Our code of conduct has a scope that is similar, but not identical, to that required for a U.S. domestic company under the NYSE rules.
303A.12	<p>(a) Each listed company CEO must certify to the NYSE each year that he or she is not aware of any violation by the company of NYSE corporate governance listing standards.</p> <p>(b) Each listed company CEO must promptly notify the NYSE in writing after any executive officer of the listed company becomes aware of any non-compliance with any applicable provisions of this Section 303A.</p> <p>(c) Each listed company must submit an executed Written Affirmation annually to the NYSE. In addition, each listed company must submit an interim Written Affirmation as and when required by the interim Written Affirmation form specified by the NYSE.</p>	As a foreign private issuer, we are subject to (b) and (c) of these requirements, but not (a).

BOARD OF DIRECTORS

Our board of directors is responsible for the general guidance of our business and affairs, including providing guidance and strategic oversight to our executives and other members of our management team. It is also responsible for ensuring that we meet our objectives, as well as for monitoring our performance and ensuring business continuity. The board of directors is vested with broad powers to act on behalf of Nexa and to perform or authorize all acts of administrative or ancillary nature necessary or useful to accomplish our corporate purpose. All powers not expressly reserved by law to the shareholders fall within the competence of our board of directors.

Appointment and term limits of members of our board of directors

In accordance with our articles of association and the 1915 Law, the members of our board of directors are elected by a resolution of a general meeting of shareholders adopted with a simple majority of the votes validly cast, regardless of the portion of capital represented at such general meeting. Votes are cast for or against each nominee proposed for election to the board and cast votes shall not include votes attaching to shares for which the shareholder has not participated in the vote, has abstained or has returned a blank or invalid vote.

Our directors are appointed for a one-year term and may be reelected. Members of our board of directors may be removed at any time, with or without cause, by a resolution adopted at a general meeting of our shareholders. Under Luxembourg law, in the case of a vacancy of the office of a director appointed by the general meeting of shareholders, the remaining directors may, unless the articles of association provide differently, fill the vacancy on a provisional basis. In these circumstances, the following general meeting of shareholders shall make the final appointment of the director.

Composition of the board of directors

Our board of directors is comprised of a minimum of five and a maximum of eleven members and currently has ten members, of which four are independent directors and six are non-independent, as set out below. The non-independent directors are non-independent on the account of such directors either also being executive officers of Nexa, its subsidiaries or its controlling shareholder, as applicable, or having been retained to provide consulting services to Nexa.

The following table sets forth our current directors, their respective board positions and their respective date of election to the board. In 2019, two directors, Ian Wilton Pearce and Jaime Ardila, were elected to our board for the first time. Most of our current directors were first elected when our articles of association provided for two-year terms for directors. Our articles of association now provide that directors are appointed for terms not to exceed one year. The term of each and all of our directors expires at the next annual general meeting of shareholders in 2020.

Name	Age	Principal Residence	Position	Elected Since
Luís Ermírio de Moraes*			Chairman of the	
	59	São Paulo, Brazil	Board	August 25, 2016
Daniella Elena Dimitrov ⁽¹⁾⁽³⁾	50	Toronto, Canada	Director	December 14, 2017
Diego Cristóbal Hernandez Cabrera***	71	Vitacura, Chile	Director	August 25, 2016
Eduardo Borges de Andrade Filho ^{(1)*}	53	São Paulo, Brazil	Director	August 25, 2016
Edward Ruiz ⁽¹⁾⁽²⁾	69	New Haven, USA	Director	December 14, 2017
Ian Wilton Pearce***	63	Toronto, Canada	Director	June 18, 2019
Jaime Ardila**	64	Miami, USA	Director	June 18, 2019
Jane Sadowsky ⁽¹⁾⁽⁴⁾	58	New York City, USA	Director	December 14, 2017
Jean Simon***	64	Quebec, Canada	Director	August 25, 2016
João Henrique Batista de Souza Schmidt**	41	São Paulo, Brazil	Director	October 18, 2016

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- (1) Independent pursuant to Rule 10A-3 under the Exchange Act (Rule 10A-3) and applicable NYSE standards, as well as National Instrument 52-110 and Section 311 of the TSX Company Manual.
 - (2) Edward Ruiz is a member of both the audit and finance committees.
 - (3) Daniella Elena Dimitrov is a member of both audit and sustainability committees.
 - (4) Jane Sadowsky is a member of both audit and compensation, nomination and governance committees.
- * Member of the compensation, nomination and governance committee.
** Member of the finance committee.
*** Member of the sustainability committee.

The business address of each member of our board of directors is our corporate office, which is 37A, Avenue J.F. Kennedy, L-1855, Luxembourg, Grand Duchy of Luxembourg.

We present below a brief biographical description of each member of our board of directors:

Luis Ermírio de Moraes. Mr. Moraes has been a member and the Chairman of our board of directors since 2016. He has also been a member and the Chairman of the board of directors of Nexa Brazil since 2014. Mr. Moraes has over 35 years of experience working in mining and metallurgical operations. He is currently Vice President and a member of the board of directors of VSA, which is the Portfolio Manager Board of the Votorantim Group. Mr. Moraes is Chairman of CBA, the largest integrated aluminum producer in Brazil. He is a board member of Hejoassu, which is the ownership board of Votorantim. Mr. Moraes previous roles include director of VSA since 2000. Mr. Moraes also worked as an engineer in various processes in the areas of alumina refinery, smelter and aluminum smelting, pyrometallurgical and hydrometallurgical mineral processing of nickel laterites, developing novel projects for the separation and refining of cobalt. In the early 2000s, Mr. Moraes was the shareholder responsible for the creation and development of a new Votorantim business area with investments in IT and biotechnology. Mr. Moraes received a bachelor's degree in mineral and chemistry engineering from the Colorado School of Mines, in the state of Colorado, United States, in 1982.

Daniella Elena Dimitrov. Ms. Dimitrov has been a member of our board of directors since January 2018. Ms. Dimitrov has over 20 years of leadership experience in building, leading and operating businesses in mining and financial services, including as CEO, COO and CFO. She is currently a partner at Sprott Capital Partners, a division of Sprott Capital Partners LP, a merchant bank with a focus on natural resources. Ms. Dimitrov is also a director of International Petroleum Corp. and Excellon Resources Inc. Ms. Dimitrov's previous roles include President and CEO and CFO of a multi-mine gold/copper producer; Executive Vice-Chair of an iron ore developer through its acquisition following a hostile take-over bid; COO of a Canadian national wealth management and capital markets firm; and various corporate development roles in mining and financial services. Ms. Dimitrov has been a director of various mining companies and has served as a member and chair of various board committees, including audit, technical, health and safety, compensation and governance. Ms. Dimitrov has a Global EMBA from Kellogg School of Management and Schulich School of Business and a law degree from University of Windsor. She was chosen as one of the top 100 Global Inspirational Women in Mining in 2016.

Diego Cristóbal Hernandez Cabrera. Mr. Hernández has been a member of our board of directors since 2016. He has also been a member of the board of directors of Nexa Brazil since 2014. Mr. Hernández has over 44 years of experience in the mining industry. He is currently the President of the Sociedad Nacional de Minería in Chile and Advisor to the Chairman of BAL Group. He also integrates the Executive Committee of the Confederación de la Producción y del Comercio de Chile. He served as CEO of Antofagasta Minerals from August 2012, and in September 2014 was appointed CEO of Antofagasta plc, a position he held until April 2016. He was CEO of CODELCO in 2010/2012 and President of Base Metals in BHP Billiton and Chairman of Minera Escondida during 2004/2010, based in Santiago. He served as Executive Director, Non-Ferrous Metals in Vale in 2001/2004, CEO of Compañía Minera Doña Inés of Collahuasi in 1996/2001 and has held other senior positions in Anglo American and Rio Tinto. Mr. Hernandez received a civil mining engineer degree from the University of Chile and from the École Nationale Supérieure des Mines de Paris. In 2010, he received an award granted by the Copper Club of New York, and in 2013 the Chilean Institute of Engineers awarded him the "Gold Medal" for his distinguished career and important contribution to the development of engineering in Chile.

Eduardo Borges de Andrade Filho. Mr. Andrade has been a member of our board of directors since 2016. He has also been a member of the board of directors of Nexa Brazil and CBA since 2014 and 2017, respectively. Mr. Andrade has over 20 years of experience working with large industrial conglomerates and international consulting firms on relevant issues related to strategy, corporate development, corporate finance, governance and organization. He is founder and managing director of Otinga Investimentos, a private equity firm focusing on mid-size companies in Brazil. Between 2011 and 2014, he was corporate planning officer at VSA and served as board member of four other companies of the Votorantim Group. From 2010 to 2011, he was vice president for corporate development at Usiminas, a steel company, where he was responsible for mining and capital goods businesses, as well as strategy, business development and M&A. Prior to that, between 1997 to 2010, he was a Partner at McKinsey & Company, a consulting firm, where he took various leadership roles such as the Basic Materials Practice and the Knowledge Committee in Latin America. He started his professional career as an entrepreneur and engineer in his home state of Minas Gerais. Mr. Andrade received a bachelor's degree in civil engineering from Fundação Mineira de Educação e Cultura in 1991 and holds a MBA from the University of Chicago in 1995.

Edward Ruiz. Mr. Ruiz has been a member of our board of directors since January 2018. Mr. Ruiz brings over 48 years of experience in public and private accounting. Mr. Ruiz currently serves on the audit committee of several publicly traded companies in Brazil, including Iochpe-Maxion SA and Arezzo & Co. He is a Certified Public Accountant since 1972 and has been responsible for audits of companies in the mining and energy sectors in Brazil and the United States. Mr. Ruiz retired from Deloitte in 2012, where he was employed since 1997 and most recently served as an audit partner and member of Deloitte's IFRS specialist group. As head of the Capital Markets group for Deloitte, Mr. Ruiz advised companies on financial and regulatory reporting matters related to initial public offerings and secondary offerings in the Brazilian, United States and European capital markets. Prior to Deloitte, he held executive positions in internal audit at JP Morgan and PepsiCo in the United States. He started his career in public accounting with Arthur Young in 1971. Mr. Ruiz obtained his bachelor's degree from Pace University, New York City in 1971.

Ian Wilton Pearce. Mr. Pearce has been a member of our board of directors since June 2019. He served as CEO at Xstrata Nickel from 2006 to 2013, after which he launched X2 Resources, a mid-tier diversified mining and metals company, serving as one of its founding partners from 2013 to 2017. Prior to these roles, Mr. Pearce was responsible for the day-to-day management of several engineering, procurement and construction projects in South Africa, Zimbabwe, Chile, Canada, the United States, and Indonesia. Mr. Pearce has over 35 years of professional experience in metallurgy and mining-related industries and an extensive background in leadership positions including COO and Senior Vice President at Falconbridge, Limited, and as Project Engineer and Project Director with Fluor Inc. and Fluor Daniel Canada Inc. Currently, Mr. Pearce serves as chair and director on two public company boards and one private company board. He also has served as advisor to the board of MineSense Technologies since 2013. Mr. Pearce earned his Diploma in Mineral Process Engineering from Technikon Witwatersrand and his bachelor's degree from the University of Witwatersrand, both in South Africa. He also trained in general and strategic management at Wits Business School and Henley Business School. Mr. Pearce served as a member and Chair of the executive management boards at the Nickel Institute and the Mining Association of Canada, in addition to other professional affiliations.

Jaime Ardila. Mr. Ardila founded The Hawksbill Group in 2016, which provides business advisory services, including strategy, operations, public relations, communications and investment advice. Prior to that, he held several positions at General Motors Company in the U.S., Europe and South America in a career spanning 30 years. He also worked at the Planning Department and the Ministry of Industry and Trade for the Government of Colombia from 1981 to 1984 and the investment bank Rothschild from 1996 to 1998. At General Motors, Mr. Ardila served CFO of General Motors Chile; President and Managing Director of General Motors Ecuador; President of General Motors Colombia; President of General Motors Argentina; CFO for Latin America, Africa and the Middle East; President for Brazil and Mercosur; and President of General motors South America from 2010-2016. He is currently a member of the Board of Directors of Accenture and Goldman Sachs, BDC. Mr. Ardila earned his master's degree in Economics at the London School of Economics in 1981 and his bachelor's degree in Economics at the University of Bogota in 1977.

Jane Sadowsky. Ms. Sadowsky has been a member of our board of directors since January 2018. Ms. Sadowsky has a broad and diverse range of finance and deal-related expertise and also has sector expertise in power and utilities and the related fields of commodities, renewables, power technology, infrastructure, and energy. She has a depth of knowledge and experience in mergers and acquisitions, public and private debt and equity, corporate restructurings and cross border transactions. Ms. Sadowsky retired from Evercore Partners, after more than 22 years as an investment banker. Prior to Evercore Partners, she worked in Citigroup's Investment Bank and began her investment-banking career at Donaldson, Lufkin & Jenrette. Currently, Ms. Sadowsky serves on the board and the audit committee of Yamana Gold, a publicly traded gold mining company based in Toronto, Canada, and chairs Yamana's governance committee. She also serves as a senior advisor with responsibility for diversity and inclusion at Moelis & Company, a U.S. publicly traded company. Ms. Sadowsky earned her MBA from the Wharton School in 1989 and her bachelor's degree in Political Science and International Relations from the University of Pennsylvania in 1983. She is a National Association of Corporate Directors Governance Fellow and a frequent speaker at board governance conferences throughout the United States.

Jean Simon. Mr. Simon has been a member of our board of directors since 2016. He has also been a member of the board of directors of Nexa Brazil since 2014. He has over 33 years of professional experience in aluminum primary metals, bauxite and alumina and in strategy, business management, operations and R&D, labor negotiations and stakeholder management. Mr. Simon served as served as general manager of several facilities and as regional vice president and president of Primary Metal North America; then president for Rio Tinto Alcan Primary Metal, with operations in North America, Europe, Middle East and Africa. He is currently a board member of the Bank of Canada and a board member of Aluquebec, an aluminum cluster, which coordinates working groups within the Québec aluminum processing industry. Mr. Simon received a bachelor's degree in physics engineering from Laval University in 1978 and a degree in Business Administration from the Université du Québec in 1982. He also graduated from the Directors Education Program in partnership with the Institute of Corporate Directors, the Mc Gill Executive Institute and the Rotman School of Management, University of Toronto in 2013.

João Henrique Batista de Souza Schmidt. Mr. Schmidt has been a member of our board of directors since 2016. He is currently the Executive Director for Corporate Development at VSA, a position he has held since August 2014. He is the President of the Board of Directors of Votorantim Geração de Energia S.A., a position he has held since 2014 and was recently elected as President of the Board of Directors of CESP – Companhia Energética de São Paulo. He also serves as member of the Board of Directors of Citrosuco S.A. since 2014 and Nexa Brazil since 2016. Mr. Schmidt was previously a member of the board of directors of Fibria Celulose S.A. from 2014 to 2019. Prior to joining VSA, Mr. Schmidt had 15 years of experience in the financial sector. Mr. Schmidt was a Managing Director of Goldman Sachs do Brasil Banco Múltiplo S.A., where he worked from April 2010 to August 2014, and prior to that worked at Citigroup and Goldman Sachs in different capacities. Mr. Schmidt received a bachelor's degree in Business Administration from Fundação Getulio Vargas in 2001.

Internal Rules of the board of directors

Our board of directors adopted board internal rules, which includes the following, among other things:

- establish the general guidance of our business, defining its mission, strategic goals and guidelines;
- ensure that the executive officers comply with such mission, strategic goals and guidelines;
- approve the budget and a strategic plan which takes into account, among other things, the opportunities and risks of the business;
- recommend the shareholders to approve mergers, spin-offs, incorporations, acquisitions, divestitures and joint venture operations related to Nexa according to our articles of association;
- deliberate and approve any acts or transactions involving Nexa which have not been formally delegated to other corporate bodies, such as transactions with an individual amount of US\$100.0 million or more, including any transactions relating to investments, loans or derivative contracts;
- promote and ensure compliance with our corporate objectives;
- ensure the sustainable, long-term continuity of Nexa, including with regard to economic, social and environmental considerations;

- develop our approach to corporate governance, including the creation and review, from time to time, of corporate governance principles and guidelines that are specifically applicable to us;
- evaluate the performance of our CEO and executive officers;
- exemplify and, together with the management committee, create a culture of integrity throughout the organization;
- approve and monitor compliance with the following policies: (a) code of conduct; (b) disclosure policy; (c) anti-insider trading policy; (d) dividend policy; (e) compliance policy; (f) antitrust/competition policy; (g) anti-corruption policy; and (h) money laundering and terrorist financing prevention policy;
- approve board members and executive officers' compensation, the amount of which shall not exceed the amount determined by the general meeting;
- ensure appropriate succession planning for our board of directors, CEO and executive officers;
- deliberate and approve the terms and conditions of any compensation arrangements or proposed material amendments to any terms and conditions of existing compensation arrangements entered into between Nexa and any of our executive officers; and
- all further tasks as required by applicable law and our articles of association.

The board internal rules are available on our website.

The board has at its disposal a set of provisions and practices that promotes independence in the decision-making process of the board. In accordance with the board's internal rules, the independent members of the board may hold separate meetings and each director has a duty to declare, prior to any board meeting, the existence of a particular reason or conflict of interest with Nexa with respect to a subject matter being discussed or considered by the board. Accordingly, such board member would be refrained from discussing and voting on a matter that could present a conflict of interest. Additionally, our board members are prohibited from holding executive positions with Nexa and/or serving on more than four boards of directors of companies that do not belong to the same conglomerate. As discussed above, our audit committee is comprised entirely of independent directors and we also have independent representation on our compensation committee.

Description of the position of Chairman

Our board of directors has developed a written position description for the chairman of the board of directors. The chairman of the board has the following responsibilities, subject to any other matters that may be set forth in our articles of association or provided for under applicable law:

- ensure the efficiency and proper performance of the board of directors;
- preside over the board meetings;
- prepare, organize, elaborate and distribute the agenda and minutes of the meetings aided by the board secretary, including all information necessary to discuss the matters on the agenda;
- coordinate the activities of other board members;
- ensure that all board members receive comprehensive information about the items on the board agenda in a timely manner;

- propose the board's annual budget to the board of directors;
- propose the annual corporate calendar to the board in coordination with Nexa's CEO, which shall necessarily set forth the dates of corporate events;
- organize the onboarding and education sessions for incoming members of the board in coordination with Nexa's CEO; and
- periodically arrange for continuing education opportunities for all board members, so that individuals may maintain or enhance their skills and abilities as members, and ensure that their knowledge and understanding of Nexa's business remains current.

The chairman of our board of directors is not an independent director of Nexa Resources. The board of directors has carefully considered governance issues relating to chairman independence and believes that the chairman carries out separate responsibilities diligently and that, with the compensating practices in place, the board of directors operates effectively and in Nexa's best interest.

Meetings of the board of directors and attendance

The board of directors ordinarily meets in person or by other means of communication as may be required. The frequency of and agenda items for board meetings will vary depending on the state of affairs, requirements for approvals and opportunities available to Nexa and the risks and issues which Nexa faces. The agenda for meetings places priority and focuses on key issues for Nexa, which are identified by the chairman of our board. Routine business is dealt with after substantive discussions on the key issues.

Under the board of directors' internal rules and our articles of incorporation, the board can validly consider any matters and make decisions provided at least a majority of the members are in attendance in person or by representation. The board of directors' internal rules further provides that each member is entitled to one vote either in person or where duly represented as required by the board's internal rules. In fiscal year 2019, our board of directors held eight meetings, in which the rate of attendance in person or by representation was 97.4% of the directors.

Director	Board Meetings	Meetings Attended	Overall % Attendance
Luís Ermírio de Moraes	8	8	100%
Daniella Elena Dimitrov	8	8	100%
João Henrique Batista de Souza Schmidt	8	8	100%
Eduardo Borges de Andrade Filho	8	8	100%
Diego Cristóbal Hernandez Cabrera	8	8	100%
Jean Simon	8	8	100%
Edward Ruiz	8	7	88%
Ivo Ucovich (until June 18, 2019)	3	3	100%
Jane Sadowsky	8	8	100%
Ian Wilton Pearce	5	4	80%
Jaime Ardila	5	5	100%

As set forth in the board of directors' internal rules, the independent directors may hold meetings in which members of the management team and the non-independent directors are not present. In 2019, our directors held in-camera sessions without members of the management team prior or at the conclusion of each board meeting.

Committees of our board of directors

Our board of directors has an audit committee, a finance committee, a compensation, nominating and governance committee and a sustainability committee. Our board of directors may have other committees as it may determine from time to time. Each of the standing committees of our board of directors has the composition and responsibilities assigned to them by the meeting of the board of directors that created such committee and as set forth in their respective committee charters. These charters set out, among other things, the roles and responsibilities of the chair of each committee. As set forth in the respective charters of

the committees, each of the committees may meet with or without the management, as the case may be, at the discretion of the committee. The charter for each of the committees of our board of directors is available on our website.

Audit committee

Our audit committee is a standing committee established by our board of directors on March 28, 2017 to assist the board of directors in fulfilling certain of its oversight responsibilities. The audit committee may be composed of three to five members, each appointed by our board of directors for a term of one year. Daniella Elena Dimitrov, Edward Ruiz and Jane Sadowsky currently serve as its members. These individuals are independent under Canadian securities regulators' National Instrument 52-110 Audit Committees, as well as under Rule 10A-3 and applicable NYSE standards. In addition, each of them satisfies the financial literacy requirement under applicable rules. Our board of directors has determined that Mr. Edward Ruiz qualifies as an "audit committee financial expert."

Our audit committee's primary responsibilities are to assist the board of directors' oversight of: (i) quality and integrity of our financial reporting and related financial disclosure; (ii) the effectiveness of our internal control over financial reporting and disclosure controls and procedures; (iii) our compliance with legal and statutory requirements as they relate to financial statements and related financial disclosures; (iv) risk management and monitoring processes; and (v) the qualifications, performance and independence of our independent auditors and performance of the internal audit function.

Nexa has established policies and procedures that require any engagement of our independent auditor for audit or non-audit services to be submitted to and pre-approved by the audit committee. In addition, our audit committee may delegate the authority to pre-approve non-audit services to one or more of its members. All non-audit services that are pre-approved pursuant to such delegated authority must be presented to the full audit committee at its first scheduled meeting following such pre-approval. Our audit committee shall pre-approve all audit and non-audit services to be provided to us by our independent auditor and also has the authority to recommend pre-approval policies and procedures to our board of directors and for the engagement of our independent auditor's services.

Finance committee

Our finance committee is a standing committee established by our board of directors on March 28, 2017 to assist the board of directors in fulfilling certain of its oversight responsibilities. The finance committee may be composed of three to five members, each appointed by our board of directors for a term of one year. Jaime Ardila, Edward Ruiz and João Henrique Batista de Souza Schmidt currently serve as its members.

Our finance committee's primary responsibilities are to assist the board of directors by monitoring and overseeing Nexa's balance sheet and by providing recommendations on our capital management strategy and capital structure, including indebtedness, investments and returns, among others.

Compensation, nominating and governance committee

Our compensation, nominating and governance committee is a standing committee established by our board of directors on March 28, 2017 to assist the board of directors in fulfilling certain of its oversight responsibilities. The compensation, nominating and governance committee may be composed of two to five members, each appointed by our board of directors for a term of one year. Luís Ermírio de Moraes, Eduardo Borges de Andrade Filho and Jane Sadowsky currently serve as its members. Two of the three members of the compensation, nominating and governance committee are independent directors. External advisors with broad experience in the area have been retained to assist our compensation, nominating and governance committee in carrying out its mandate.

Our compensation, nominating and governance committee is responsible for: (1) new compensation models and changes to compensation models currently used by us, in order to guide and influence our actions; (2) the compensation of the executive board, of the members of the board of directors and of the members of the committees of the board of directors; (3) the proposal of candidates to the chair of chief executive officer, when applicable, or any serious restrictions on the candidates proposed by the chief executive officer to the other chairs of the executive board; (4) development of corporate governance guidelines and principles; (5) identification of individuals qualified to be nominated as members of the board of directors and suggesting nominees to fill any vacancies on the board of directors; (6) the structure and composition of board committees; (7) evaluation of the performance and effectiveness of the board of directors, the chief executive officer and each of the board's standing committees; and (8) any related matters required by applicable laws and stock exchange rules.

Sustainability committee

Our sustainability committee is a newly created standing committee established by our board of directors on April 29, 2019 to assist the board of directors in fulfilling certain of its oversight responsibilities. The sustainability committee may be composed of at least three and no more than five members, each appointed by our board of directors for a term of one year. Diego Cristóbal Hernandez Cabrera, Jean Simon, Daniella Elena Dimitrov and Ian Wilton Pearce currently serve as its members.

Our sustainability committee's primary responsibilities are to assist the board of directors by supporting safe and sustainable business practices in the conduct of our activities in respect of environmental, health, safety and social matters, including tailings management. The committee also assists in the oversight of the estimate and disclosure of mineral resources and reserves related to our operations and projects.

Orientation and continuing education

We implemented an orientation program for new directors under which each new director meets with the chairman of our board of directors and our executives. New directors are provided with comprehensive orientation and education as to our business, operations and corporate governance (including the role and responsibilities of the board of directors and each committee).

The chairman of our board of directors is responsible for overseeing directors' continuing education and ensure that it is designed to maintain or enhance the skills and abilities of our directors and to ensure that their knowledge and understanding of our business remains current. The chair of each committee is responsible for coordinating orientation and continuing director development programs relating to the committee's mandate.

Our ongoing director education programs entails site visits, presentations from outside experts and consultants, discussions on ongoing governance trends and guidelines for public companies, briefings from staff and management, and reports on issues relating to our projects and operations, sustainability and social matters, competitive factors, reserves, legal issues, economic, accounting and financial disclosure, mineral and hydrocarbon education and other initiatives intended to keep the board abreast of new developments and challenges that we may face.

Evaluation of directors

Our compensation, nominating and governance committee established a framework for the implementation and administration of processes to assess the effectiveness of the board and each of its members. This includes peer reviews of each director's performance and self-assessments, as well as full board and committee review of the board and the respective committees, by way of questionnaires, interviews and sessions with the chairman. In addition to hiring external advisors to develop and undertake this assessment, the compensation, nominating and governance committee is also responsible for overseeing the process and evaluating the results, with the objective of improving the performance of each director and the board of directors as a whole.

Considerations in evaluating director nominees

Our board of directors is responsible for nominating members for election to the board and for filling vacancies on the board that may occur between annual meetings of shareholders. The process for nominating a new director initiates with our compensation, nominating and governance committee which evaluates Nexa's current circumstances and establishes a profile for a director candidate. Such profile is then shared with a specialized external executive search firm, who assists the compensation, nominating and governance committee in selecting candidates for interviews. Prior to the interview, the specialized external firm is responsible for a background check with former employers and colleagues of the respective candidates.

Following the interview(s), our compensation, nominating and governance committee recommends the nomination of the director candidate to our board of directors based upon an assessment of the independence, skills, qualifications and experience of such candidate. Specifically, the board seeks members from diverse professional and personal backgrounds who combine a broad spectrum of experience and expertise with a reputation for integrity.

Diversity

We value diversity of abilities, experience, perspective, education, gender, background, race and national origin. We believe that having a diverse board of directors can offer a breadth and depth of perspectives that enhance our performance. Recommendations concerning director nominees are based on merit and past performance as well as expected contribution to the board's performance and, accordingly, diversity is taken into consideration. We believe that having a diverse and inclusive organization overall is beneficial to our success, and we are committed to diversity and inclusion at all levels of our organization to ensure that we attract, retain and promote the brightest and most talented individuals. We have recruited and selected executives that represent a diversity of business understanding, personal attributes, abilities and experience.

The compensation, nominating and governance committee and our board of directors have the responsibility to review and assess the composition of the board and each of its committees, and to identify, evaluate and recommend potential new directors. With respect to our executive officers, the compensation, nominating and governance committee reviews candidates recommended by the chief executive officer and makes the final recommendation to the board of directors. In new director and executive officer appointments and ongoing evaluations of the effectiveness of our board and management team, each of the board's committees and each director, the board will take into consideration diversity as one of the factors in order to maintain an appropriate mix and balance of diversity, attributes, skills, experience and background on our board of directors and each of its committees and the management team. Ultimately, appointments to our board of directors and management team are based on merit against objective criteria and with due regard to the benefits of diversity in board and management team composition and the desire to maximize the effectiveness of corporate decision-making, having regard to our best interests and strategies and objectives, including the interests of our shareholders and other stakeholders. During our selection process for board appointments, we seek to ensure that women candidates are always considered on the shortlist for nominations. Currently, two (or 20%) of our ten members of the board are women, and on a general basis, 12.8% of our overall employees are women.

Further, we established a diversity committee composed of three levels: strategic diversity committee, corporate diversity committee and local diversity committees representing each of our corporate offices and production plants. The structure, governance and scope of the diversity committee is currently under review to reposition this subject within Nexa. Pursuant to these committees' guidelines, "diversity" discussions include attributes such as gender, disability, ethnicity, age and other factors. In connection with this diversity initiative, we have adopted targets for gender at companywide levels and expect to adopt targets for other diversity representation. In 2018, the diversity committee's initiatives were honored with a second-place award in the "Equal opportunities between women and men" category, promoted by the Peruvian Labor Ministry. In 2019, our gender target was to have 14.5% of women represented companywide, and we achieved 12.8% representation of women in total. For 2020, our gender target is to reach 17.0%, while for 2025 we intend to increase such target to 20% of women companywide. These targets are frequently monitored, global and locally, and action plans are implemented to achieve the proposed targets.

Compensation-setting process

Our compensation, nominating and governance committee is responsible for assisting our board of directors in fulfilling its governance and supervisory responsibilities, and advising our board of directors with respect to evaluation and monitoring of compensation models and policies performed every two years, which takes into account peer companies and the challenges and opportunities we face. The committee's responsibilities also include administering and determining our compensation objectives and programs, reviewing and making recommendations to our board of directors concerning the level and type of the compensation payable, evaluating performance, implementing evaluation and improvement processes, and ensuring that policies and processes are consistent with our philosophy and the objectives of our compensation program.

Share ownership

Luís Ermírio de Moraes, the chairman of our board of directors, directly and indirectly owns 2,379,071, or 1.78%, of our common shares. As of December 31, 2019, none of our executive officers own, beneficially or of record, any of our common shares.

EXECUTIVE OFFICERS AND MANAGEMENT COMMITTEE**Executive officers**

We have global executives and management teams for our main subsidiaries. Each subsidiary team has a management structure that adheres to our corporate governance rules. Our executives currently are as follows:

Name	Age	Principal Residence	Position
Tito Botelho Martins Júnior	57	São Paulo, Brazil	President and Chief Executive Officer
Rodrigo Menck	45	São Paulo, Brazil	Senior Vice President Finance and Group Chief Financial Officer
Mauro Davi Boletta	59	São Paulo, Brazil	Senior Vice President Smelting
Leonardo Nunes Coelho	42	Lima, Peru	Senior Vice President Mining
Valdecir Aparecido Botassini	59	São Paulo, Brazil	Senior Vice President Project Development & Execution
Jones Aparecido Belther	52	São Paulo, Brazil	Senior Vice President Mineral Exploration & Technology
Felipe Baldassari Guardiano	57	São Paulo, Brazil	Vice President Sustainability, Strategic Planning & Corporate Affairs
Gustavo Cicilini	44	São Paulo, Brazil	Vice President Human Resources
Ricardo Moraes Galvão Porto	46	Lima, Peru	Senior Vice President Commercial & Supply Chain

The business address of our executives is Avenida Engenheiro Luís Carlos Berrini, nº 105, 6th floor, São Paulo, State of São Paulo, Brazil.

A brief biographical description of each of our executives is presented below:

Tito Botelho Martins Júnior. Mr. Martins has been our Chief Executive Officer since 2012. Mr. Martins has more than 30 years of experience in the metals and mining industry, and extensive board experience in different countries. Currently he serves on the board of CBA, as well as Nexa Peru and Nexa Resources Atacocha S.A.A., which are both listed in the Peruvian Stock Exchange. In 2014 and 2015, he was Chairman of the Board of the Brazilian Aluminum Association (ABAL). Prior to joining Nexa Resources, Mr. Martins was Executive Director for Base Metals at Vale S.A., a leading Brazilian mining company, from 2006 to 2012. During this period, he also served as board member of Norsk Hydro, an aluminum producer listed in Norway. He was also a member of the Brazilian Mining Institute. From 2003 to 2006, Mr. Martins was the CEO of Caemi S.A., a Brazilian diversified mining company listed on the São Paulo Stock Exchange. Earlier in his career, he worked for Vale S.A. from 1985 to 2003, where he held several positions in the finance and corporate areas. He graduated with a degree in Economics in 1984 from Universidade Federal de Minas Gerais in Brazil and has an MBA in 1984 from the Instituto de Pesquisa Economica e Administrativa of Universidade Federal do Rio de Janeiro, Brazil. In May 2017, the newspaper Valor Economico recognized Mr. Martins as the Valor Executive of the mining and metallurgy sector.

Rodrigo Menck. Mr. Menck has been our Senior Vice President Finance and Group Chief Financial Officer since March 2019. Mr. Menck has more than 20 years of experience in treasury, structured finance and capital markets. He joined Nexa Resources in 2016 as Head of Treasury & Investor Relations. He was also directly involved in Nexa Resources' initial public offering in 2017 as well as Nexa Resources' first debt issuance in May 2017. Prior to joining Nexa Resources, Mr. Menck held positions at BankBoston Corp., Itau Unibanco Holding S.A., WestLB A.G., Citibank and BNP Paribas S.A. He also worked at Braskem S.A. as a Structured Finance Manager and Finance and Shared Services Director and at Construtora Norberto Odebrecht S.A., as Head of Risk, Investments & Structured Finance (Latin America). Mr. Menck holds a degree in Business Administration and an MBA from the University of São Paulo, Brazil.

Mauro Davi Boletta. Mr. Boletta has been our Senior Vice President Smelting since 2016. Mr. Boletta has over 30 years of experience with operations. He joined Votorantim Metais S.A. in 1986, having served in several production areas. Between 2010 and 2011, he was responsible for the design review of an aluminum smelter in Trinidad and Tobago. Mr. Boletta graduated with a degree in electrical engineering from the Federal University of Itajubá, UNIFEI in 1985 and holds an MBA from FGV.

Leonardo Nunes Coelho. Mr. Coelho has been our Senior Vice President Mining since 2017. Mr. Coelho has over 17 years of experience managing mining operations with focus at gold and zinc. Prior to joining us, Mr. Coelho worked for Anglo Gold Ashanti Ltd. for 15 years, where he initiated his career as a Trainee. In Anglo Gold Ashanti Ltd., Mr. Coelho has led mining operations and the expansion of mining projects and served as General Manager of the Cuiabá and Lamego complexes as his last position at this company. Mr. Coelho graduated with a degree in Mine Engineering in 2001 from the Federal University of the State of Minas Gerais (UFMG), and has obtained graduate degrees from the Kellogg Graduate School of Management in 2015 in the United States, the Dom Cabral Foundation in 2009 in Brazil and the University of Cape Town in 2005 in South Africa as well as a qualification at INSEAD in digital transformation in 2018.

Valdecir Aparecido Botassini. Mr. Botassini has been our Senior Vice President Project Development & Execution since 2016. He joined Nexa Brazil (formerly Votorantim Metais S.A.) in 1985. Mr. Botassini held several leadership positions between 1985 and 2016, serving as General Manager of Mining and Metallurgy Operations, Nickel Business Director, Zinc Business Director and Polymetallic Operations Director. Mr. Botassini graduated with a degree in mechanical engineering from Universidade Presbiteriana Mackenzie in Brazil and holds a specialization certificate in Process Engineering from the Escola Politécnica of the University of São Paulo, USP. He also attended the STC program at the Dom Cabral Foundation in Brazil, in partnership with the Kellogg School of Management in the United States.

Jones Aparecido Belther. Mr. Belther has been our Senior Vice President Mineral Exploration & Technology since 2014. He has over 28 years of experience in the area. He held the same position at Votorantim Metais S.A. between 2004 and 2014. Prior to joining us, he was country manager at Vale in Peru between 2002 and 2004. He has worked in Brazil and abroad in companies such as Rio Tinto Brasil, Golden Star Resources, in Suriname, Phelps Dodge in Brazil and Chile, Vale in Brazil and Peru, and other companies. Mr. Belther graduated with a degree in Geology in 1991 from the São Paulo State University, UNESP, in Brazil, where he also obtained a Master's degree in 2000 in Mineral Exploration.

Felipe Baldassari Guardiano. Mr. Guardiano has been our Vice President Sustainability & Strategic Planning since 2014 and has also been our Vice President for Corporate Affairs since 2019. Prior to that, he served as Director of Performance Management at Votorantim Metais S.A. between 2012 and 2014. He is responsible for developing and implementing company policies for sustainability and coordinating the elaboration and implementation of the company strategic plan. In addition, he is responsible for establishing targets for performance improvement at all operations and corporate divisions through the development and implementation of the Votorantim Performance Management System. In 2012, before joining Votorantim Metais S.A., he worked at Vale for seven years as Director of Performance Management and, later, as a Director of Pellet Plants. Prior to Vale, he worked as a consultant, serving as an engagement manager associate at McKinsey & Co. for approximately five years. Prior to 1999, he lived in the United States for 12 years, where he worked as a Geostatistician and Reserve Specialist for Mineral Resources Development Inc., or MRDI. While at MRDI, he provided advisory expertise on mines in the United States, Canada, Africa, Brazil, Australia, Chile and other countries. Mr. Guardiano graduated in Mining Engineering from the Ouro Preto School of Mines (Minas Gerais, Brazil), and holds a Master's degree in Mining Engineering from the Montana College of Mineral Sciences and Technology (Butte, Montana, United States), as well as executive education program certificates from the Massachusetts Institute of Technology (Boston, Massachusetts, United States), and the IMD (Lausanne, Switzerland).

Gustavo Cicilini. Mr. Cicilini became Vice President Human Resources in 2019. Mr. Cicilini joined Nexa Resources in 2018 as senior Human Resources manager for attraction, development and culture and has been responsible for leading a culture transformation program. He has 20 years of professional experience in various business sectors, including telecommunication, food and beverage, mobility solutions, industrial technology, consumer goods, energy and building technology. He has previously worked in companies including Algar Telecom, AmBev and Robert Bosch and been located throughout Latin America, including in Peru, Colombia, Ecuador, Venezuela, Panama and Costa Rica. Mr. Cicilini previously worked as Regional Corporate Human Resources Project Manager and has been responsible for change management and innovation, business intelligence and cross-selling functions. He holds a degree in Psychology and an MBA in Business Administration.

Ricardo Moraes Galvão Porto. Mr. Porto has been our Senior Vice President Commercial and Supply Chain since July 2018. His previous position was as Vice President Commercial and Supply Chain at Nexa, a position he held since 2014. Mr. Porto has also been Chief Executive Officer at Nexa Peru since November 2017. Mr. Porto held a management position at Votorantim Metais S.A. between 2013 and 2014. Mr. Porto began its career as commercial manager at Esso do Brasil, an Exxon Mobil affiliate. Prior to joining Votorantim Metais S.A., from 2004 until 2012, Mr. Porto worked in several senior management positions as supply chain executive at Vale S.A., reaching the position of officer Procurement Director. After, served as Executive Officer at the Bravante Group, an oil & gas company. Mr. Porto graduated with a degree in chemical engineering from the Federal University of Rio de Janeiro, UFRJ, and holds an Executive MBA from Fundação Dom Cabral. He has also obtained executive education program certificates from the Massachusetts Institute of Technology, and Kellogg Graduate School of Management in the United States and the IMD in Switzerland.

Evaluation of executive officers

On an annual basis, the performance of our executive officers is evaluated by the chief executive officer, the compensation, nomination and governance committee and ultimately, the board of directors. We strive to create a strong ethical and high performance culture, as well work to ensure an appropriate succession plan that ensures the continuity of our business. In addition to future business needs, we consider the core skills, experience and diversity necessary to carry out our strategy.

Each year, our chief executive officer presents to the board of directors a report on potential successors to his position, which considers the ability of succession candidates to succeed the chief executive officer in an emergency, on an interim or permanent basis, as well as critical experiences and other attributes required in order for each candidate to enhance his or her readiness for succession. Our board of directors discusses potential successors with the chief executive officers, as well as potential successors to each member of the management team.

Position descriptions

Our board of directors has developed position descriptions for each of the chief executive officer and chief financial officer, which are discussed below.

Chief executive officer

Our board of directors believes that our chief executive officer must have experience in, among other things: leading businesses of a similar complexity and scale; carrying out growth and value creation mandates; participating in mergers and acquisitions; articulating and executing long-term corporate strategies; and facilitating development within high-achieving organizations. In addition, our board of directors expects our chief executive officer to have knowledge of the mining and metals industry, international experience and an extensive global network. According to our board of directors, our chief executive officer should possess the following attributes, among others: a hands-on approach to the business; an alignment with our values; resiliency and credibility; a good reputation within the market; and the ability to communicate with and influence stakeholders.

Chief financial officer

Our board of directors believes that our chief financial officer must have experience in, among other things: leading accounting, controllership, financial planning and analysis, investor relations, treasury matters, mergers and acquisitions and risk management activities; formulating a company's plan and direction for the future; developing financial, operational and tax-related strategies; managing transactions; overseeing internal controls in compliance with applicable laws and regulations; and implementing all financial-related activities within a company. In addition, our board of directors expects our chief financial officer to have public company experience, strong analytical and business valuation skills, knowledge of national securities exchanges, such as the NYSE and TSX, international experience and an extensive global network. According to our board of directors, our chief financial officer should possess the following attributes, among others: a hands-on approach to the business; an alignment with our values; resiliency and credibility; a good reputation in the market; and the ability to communicate with and influence stakeholders.

Management committee

In accordance with our articles of association, the board of directors may delegate its powers to conduct our management and affairs, as well as its representation of us with respect to such matters, to a management committee. The management committee consists of at least three, and a maximum of seven, members. The members are not required to be shareholders or directors of Nexa. The board of directors may not delegate its powers related to general guidance of our business or acts reserved to the board of directors pursuant to the 1915 Law.

The following table sets forth the members of our management committee, and their respective positions as of December 31, 2019. The term of the members of our management committee expires on the day of the first board meeting held after the 2020 general shareholders' meeting.

Name	Age	Principal Residence	Position
Tito Botelho Martins Júnior	57	São Paulo, Brazil	Chief Executive Officer
Rodrigo Menck	45	São Paulo, Brazil	Senior Vice President Finance and Group Chief Financial Officer
Mauro Davi Boletta	59	São Paulo, Brazil	Senior Vice President Smelting
Leonardo Nunes Coelho	42	Lima, Peru	Senior Vice President Mining
Valdecir Aparecido Botassini	59	São Paulo, Brazil	Senior Vice President Project Development & Execution
Jones Aparecido Belther	51	São Paulo, Brazil	Senior Vice President Mineral Exploration & Technology
Ricardo Moraes Galvão Porto	46	Lima, Peru	Senior Vice President Commercial & Supply Chain

Conduct Committee

Our conduct committee is a committee reporting to our management committee and created on January 1, 2014. Its internal rules were revised and updated on December 2, 2019.

The conduct committee may be composed of at least seven members, such members being necessarily the Chief Executive Officer, the Senior Vice President Finance and Group Chief Financial Officer, the Head of Internal Audit, the Group General Counsel, the Head of Compliance and two representatives of the Ethics Line program, a confidential reporting system available to internal and external parties designed to allow anonymous reporting of violations of our Code of Conduct, policies and internal procedures or applicable laws.

Our conduct committee's primary responsibilities are to assist the management committee in enforcing the code of conduct, reviewing any claims raised through the Ethics Line program, and identifying claims that should be rated as critical. The conduct committee also assists our audit committee by ensuring that any claim filed through the Ethics Line program and rated as critical is properly elevated to the audit committee for further review.

Family relationships among executives

Our executives do not have any family relationships among themselves or with any other of our employees.

EXECUTIVE AND DIRECTOR COMPENSATION

The following discussion describes the significant elements of the compensation of our executive officers and directors for the year ending December 31, 2019.

In 2019 our executive compensation program includes cash compensation in the form of base salary, short-term incentives and long-term incentives. We provide base salary to compensate executives for their day-to-day responsibilities, which is aligned to a market reference based on industry analysis. We evaluate our total compensation practices on an annual basis to ensure that our compensation remains competitive in light of market and industry trends.

Our compensation, nominating and governance committee is responsible for assisting our board of directors in fulfilling its governance and supervisory responsibilities and advising our board of directors with respect to evaluation and monitoring of compensation models and policies and other related matters. The committee's responsibilities also include administering and determining our compensation objectives and programs, reviewing and making recommendations to our board of directors concerning the level and type of the compensation payable, evaluating performance, implementing evaluation and improvement processes, and ensuring that policies and processes are consistent with our philosophy and the objectives of our compensation program.

Compensation framework

Our compensation is comprised of three principal components: (i) base salary, (ii) short-term incentive and (iii) long-term incentive.

Principal elements of compensation

Base salary

Base salaries for executive officers are established based on the scope of their responsibilities and competencies and taking into consideration the median market reference. Adjustments to base salaries are expected to be determined annually and may be increased based on performance, as well as to maintain market competitiveness. Additionally, base salaries may be adjusted as warranted throughout the year to reflect promotions or other changes in the scope or breadth of roles or responsibilities.

Short-term incentive program / bonuses

The annual bonus or short-term incentive program aims to align short-term priorities with Nexa's strategic planning by rewarding achievement of our goals and targeted annual results, resulting in an alignment with the interests of Nexa. Each named executive officer has a panel of individual goals, with scales of minimum performance, target and surpass results. Measurement in these panels is based on financial and non-financial indicators. These indicators represent the specific goals and challenges attributable to the position in alignment with Nexa's performance and strategic planning.

Financial indicators are based on internal metrics and represent up to 60.0% of the individual panel. In 2019 the metrics used were EBITDA and free cash flow.

Strategic goals represent up to 40.0% of the individual panel and are comprised of qualitative and quantitative factors. In 2019, the metrics used in this assessment included performance targets related to cash cost, production volume, cost, safety and reserves and resources.

In 2019, the financial indicators applicable to our CEO represented up to 50.0% of the individual panel, and the metrics used were EBITDA and free cash flow. Strategic goals represented up to 50.0% of the individual panel and are comprised of qualitative and quantitative factors. In 2019 the metrics used in this assessment included performance targets related to the Aripuanã project, as well as cost, safety and personnel management.

Long-term incentive program

Our long-term incentive (or LTI) program is designed to provide strong incentives for making decisions with a view to creating value for shareholders by linking cash compensation to Nexa's long-term performance, and by guiding executive actions towards the achievement of our strategic goals and growth plans.

The LTI program aligns interests among our executives and shareholders to ensure continued value creation. This incentive system is also intended to engage management in developing and delivering a consistent strategic plan, as well to attract and retain executive officers.

The LTI program is based on a five-year vesting period and comprised of two parts, base grant and supplementary grant. Both grants are defined amounts approved by the board of directors to be paid out at the end of the five-year vesting period. The base grant amount appreciates according to the total shareholder return (TSR) over the vesting period. The payment of the supplementary grant is based on a targeted Company TSR combined with a performance curve, both approved by our board of directors at each granting period. The performance curve determines the amount to be paid in case of a performance equal or lower than expected in the targeted TSR. If the targeted TSR is achieved, the payment is fully due. If the performance of the TSR is greater than expected, the supplementary grant to be paid will be adjusted by up to 100%.

The methodology is referenced to the market value of Nexa Resources' shares at the end of the vesting period, calculated based on the weighted average price of the common shares during the months of October, November and December in the year immediately prior to the year in which the respective settlement date for the award occurs, together with dividends paid during the respective grant cycle.

Change of control

Upon the occurrence of a change of control event, all of the phantom shares will continue under the same terms, conditions and due dates, with the following exceptions:

- If Nexa terminates an executive's employment without cause or if the executive resigns for good reason within 24 months of the change of control event, any unvested phantom shares will immediately fully vest as of the date of such termination or resignation for good reason. The exercise price will be calculated based on the weighted average price of the common shares during the three months immediately preceding the month of termination. In case termination occurs on the same date of the change of control event, the exercise price will be the share price (in US\$/share) used as reference for the transaction that resulted in the change of control event.
- If the executive resigns within twelve months of the change of control event, he or she will be entitled to a portion of the granted shares, proportionate to the length of time served (1/60 for each 30-day period served), which will become immediately vested as of the date of resignation. The exercise price will be calculated based on the weighted average price of the common shares during the three months immediately preceding the month of resignation. The Board may approve special cases and adjust the aforementioned rules provided that the basic rights of the new shareholders as well as the executives are preserved.

Short selling

According to our insider trading policy, directors and officers must refrain from active or speculative trading involving Nexa's securities based on short-term fluctuations in the price of Nexa's securities or other market conditions. This includes, but is not limited to, short sales, trading in puts, calls or options or similar rights or obligations to buy or sell Nexa's securities or derivative securities relating to Nexa's securities, and the purchase of the Nexa's securities with the intention of quickly reselling them. In addition, directors and officers may not purchase financial instruments, such as prepaid variable forward contracts, equity swaps or collars, designed to hedge or offset a decrease in the market value of Nexa's securities.

2019 executive compensation

During fiscal year 2019, our executive officers received cash compensation in an aggregate amount of approximately US\$5,390,932. The following table summarizes compensation we paid to our executive officers during the fiscal year 2019, including base salary, short-term incentive programs or bonuses, long-term incentive programs and pension value.

Non-equity Incentive Plan Compensation

Name and Title	Base Salary (US\$)	Short-term incentive programs / bonuses (US\$)	Long-term incentive programs (US\$)	Pension Value (US\$)	Total Compensation (US\$)
<i>Tito Botelho Martins Júnior Chief Executive Officer</i>	773,332	412,335	268,088	42,111	1,495,866
<i>Mario Bertoncini⁽¹⁾ Senior Vice President Finance & Group Chief Financial Officer</i>	47,993	175,655	79,419	2,880	305,947
<i>Rodrigo Menck Senior Vice President Finance & Group Chief Financial Officer</i>	194,722	71,181	25,540	10,574	302,017
<i>Mauro Davi Boletta Senior Vice President Smelting</i>	209,220	104,403	38,430	11,381	363,435
<i>Leonardo Nunes Coelho Senior Vice President Mining</i>	400,345	122,590	-	13,455	536,391
<i>Valdecir Aparecido Botassini Senior Vice President Project Development & Execution</i>	281,888	171,551	73,471	15,341	542,251
<i>Jones Aparecido Belther Senior Vice President Mineral Exploration and Technology</i>	220,705	110,747	46,380	12,011	389,843
<i>Arlene Domingues⁽²⁾ Vice President Human Resources</i>	215,210	107,075	45,580	11,681	379,546
<i>Gustavo Cicilini Vice President Human Resources</i>	38,034	-	-	1,521	39,556
<i>Ricardo Moraes Galvão Porto Senior Vice President Commercial & Supply Chain</i>	356,034	277,029	41,500	11,729	686,292
<i>Felipe Baldassari Guardiano Vice President Sustainability, Strategic Planning & Corporate Affairs</i>	213,931	83,177	41,172	11,509	349,789

(1) Mario Bertoncini was succeeded by Rodrigo Menck as Senior Vice President Finance and Group Chief Financial Officer on March 1, 2019.

(2) Arlene Domingues was succeeded by Gustavo Cicilini as Vice President Human Resources on November 1, 2019.

2019 director compensation

During fiscal year 2019, our directors received total compensation in an aggregate amount of US\$1,995,333.34 for their services as members of our board of directors. The chairman of our board of directors received US\$240,000.00 in annual fees, while each board member received US\$200,000.00. In addition, each director is entitled to reimbursement for reasonable travel and other expenses incurred in connection with attending board meetings and meetings for any committee on which he or she serves.

We have no service contracts with members of our board of directors providing for benefits upon termination of employment.

Annual compensation levels for the directors are as set out below:

Name	Fees earned (US\$)	Total Compensation
Luís Ermírio de Moraes	240,000.00	240,000.00
Daniella Dimitrov ⁽¹⁾	219,000.00	219,000.00
Diego Hernandez	200,000.00	200,000.00
Eduardo Andrade	200,000.00	200,000.00
Edward Ruiz ⁽¹⁾	224,000.00	224,000.00
Jean Simon	200,000.00	200,000.00
João Schmidt	200,000.00	200,000.00
Jane Sadowsky ⁽¹⁾	219,000.00	219,000.00
Ivo Ucovich (until June 18, 2019)	60,000.00	60,000.00
Ian Wilton Pearce (from June 18, 2019)	116,666.67	116,666.67
Jaime Ardila (from June 18, 2019)	116,666.67	116,666.67

- (1) The audit committee members are entitled to additional compensation of US\$10,000.00 per year. The chair of the audit committee is entitled to additional compensation of US\$15,000.00 per year. All members also receive an extra fee of US\$1,500.00 per meeting attended.

Compensation consultants

We retained Korn Ferry as compensation advisors in 2019 to provide competitive market analysis to assist in determining the appropriate level of compensation for executives. Korn Ferry has over 40 years of experience and deep knowledge in the Brazilian market. Korn Ferry was asked to provide comprehensive competitive market clearing information on incentives, policies and benefits for each executive position. We paid Korn Ferry US\$52,959.57 in consulting services fees in 2019.

We used survey reports compiled by the Bedford Consulting Group to assist in considerations related to board compensation. The Bedford Consulting Group's mining industry reports offer in-depth analysis to support mining companies in benchmarking executive and director compensation practices relative to peer group competitors.

Retirement benefit plans

All executive officers participate in the Fundação Senador José Ermírio de Moraes, or FUNSEJEM, pension fund, a private, closed and not-for-profit pension fund responsible for the management of the pension plans for the employees of the companies that are linked with the Votorantim group.

The pension plan is a defined contribution plan. Participation is voluntary and thus supplemental to the Brazilian government's mandatory social security system. The plan is offered to employees through a specific fund that is maintained separately from the funds of each of the sponsoring organizations.

The plan's assets correspond to 100% of the value of the liabilities. Annually, an actuarial assessment is made in compliance with the current legislation. However, there is no risk of deficit, since it is a defined contribution plan, whose formation of the reserve results from the capitalization of the respective contributions to the plan.

An employee may choose to contribute between 0.5% and 6% of his or her base wage. Nexa also matches the contribution made by the participant depending on such participant's salary.

EMPLOYEES

As of December 31, 2019, we had 5,760 employees and 7,030 independent contractors. The following tables show the number of employees and contractors as of December 31, 2019, 2018 and 2017.

Number of Employees			
	As of December 31,		
	2019	2018	2017
Brazil	3,310	3,198	3,163
Peru	2,427	2,367	2,254
United States, Austria and Luxembourg	23	26	29
Total	5,760	5,591	5,446

Number of Independent Contractors			
	As of December 31,		
	2019	2018	2017
Brazil	1,046	1,181	1,026
Peru	5,984	5,574	5,856
Total	7,030	6,755	6,882

Most of our employees are represented by labor unions. We negotiate collective bargaining agreements, relating to salaries, working conditions and welfare, with the various unions that represent our employees. Although we believe our present labor relations are good, there can be no assurance that a work slowdown, stoppage or strike will not occur prior to or upon the expiration of the current collective bargaining agreements, and we are unable to estimate the effect of any such work slowdown, stoppage or strike on our production levels, in spite of an established contingency plan. In 2019, we experienced labor strikes in our Peruvian mining operations at Atacocha, El Porvenir and Cerro Lindo, which ended after reaching an agreement with our workers. The strikes did not affect our production. Interactions between Nexa and the labor unions are carried out by members of our human resources area, consistent with market practice.

We regularly invest in programs that ensure employee development and meet our specific business needs while continuously enhancing the qualifications of our staff so as to maintain and reinforce our competitiveness and our know-how as we continue to grow. The training programs include Technical/Operative Trainings, Mentoring Program, Leadership Development Program, Young Professional Training and an Individual Development Plan that, among other things, indicates the training that a given employee requires in order to continue to grow within Nexa Resources. In addition, we have a Trainee Program and the Academy of Excellence, a program created by Votorantim for leaders within Votorantim.

V. ADDITIONAL INFORMATION

LEGAL PROCEEDINGS

As of December 31, 2019, we were party to various legal and administrative proceedings relating to labor, civil, environmental and tax matters in which the disputed amount for probable and possible claims was an aggregate of approximately US\$702.8 million. It is our policy to make provisions for legal contingencies when, based upon our judgment and the advice of our legal counsel, the risk of loss is probable. As of December 31, 2019, we had established a net provision in the amount of US\$26.1 million to cover contingencies for proceedings for which the risk of loss was deemed probable.

The following tables summarize judicial and administrative proceedings to which we are a party, the amounts in dispute in these proceedings in which a loss is considered probable or possible and the aggregate amount of the net provision established for losses that may arise from these proceedings.

	As of December 31, 2019	
	Total Proceedings ⁽¹⁾	Total Net Provisions ⁽²⁾
	(in millions of US\$)	
Civil and other proceedings ⁽³⁾	139.8	4.5
Tax judicial and administrative proceedings	206.2	7.7
Labor judicial and administrative proceedings	56.8	13.8
Total	402.8	26.1

(1) Does not include claims with expectation of loss classified as remote.

(2) Net of judicial deposits.

(3) Includes environmental legal and administrative proceedings.

Civil and environmental liabilities and contingencies

As of December 31, 2019, we were party to civil and environmental judicial and administrative proceedings, with a probable or possible chance of loss in the aggregate amount of US\$139.8 million, for which we have recorded a net provision in the amount of US\$4.5 million for proceedings with probable losses. The civil and environmental judicial claims filed against us primarily relate to pollution and collection lawsuits, repossession actions and indemnity actions related to contract disputes.

Tax liabilities and contingencies

As of December 31, 2019, we were party to tax-related judicial and administrative proceedings, with a probable or possible chance of loss in the aggregate amount of US\$206.2 million, for which we have recorded a net provision in the amount of US\$7.7 million for proceedings with probable losses.

The tax-related judicial and administrative claims filed against us primarily relate to (i) value added tax on sales and on transportation and telecommunication services (ii) corporate income tax and social contribution on net profit, (iii) CFEM, (iv) PIS (*Programa de Integração Social*) and (v) COFINS (*Contribuição para o Financiamento da Seguridade Social*).

Labor liabilities and contingencies

As of December 31, 2019, we were party to labor-related judicial and administrative proceedings, with a probable or possible chance of loss in the aggregate amount of US\$56.8 million, for which we have recorded a net provision in the amount of US\$13.8 million for proceedings with probable losses. The labor-related judicial and administrative claims filed against us primarily relate to (i) overtime payments, (ii) health and safety conditions and (iii) outsourcing and subcontracting certain activities.

ARTICLES OF ASSOCIATION

Company objectives and purposes

We were incorporated in Luxembourg as a public limited liability company (*société anonyme*) on February 26, 2014. Our articles of association provide that our corporate purpose is to, among others, (i) take participations and interests, in any form whatsoever, in any commercial, industrial, financial or other, Luxembourg or foreign companies or enterprises; (ii) acquire through participations, contributions, underwriting, purchases or options, negotiation or in any other way any securities, rights, patents and licenses and other property, rights and interest in property as we shall deem fit; (iii) generally to hold, manage, develop, sell or dispose of the same, in whole or in part, for such consideration as Nexa Resources may deem fit, and in particular for shares or securities of any company purchasing the same; (iv) enter into, assist or participate in financial, commercial and other transactions; (v) grant to any holding company, subsidiary or sister company, or any other company that belong to the same group as Nexa Resources, any assistance, loans, advances or guarantees (in the latter case, even in favor of a third-party lender of any affiliates); (vi) borrow and raise money in any manner and to secure the repayment of any money borrowed; (vii) to carry out any trade, business or commercial activities whatsoever, including, but not limited to, the purchase, exchange and the sale of goods and/or services to third parties; and (viii) generally to do all such other things as may appear to Nexa Resources to be incidental or conducive to the attainment of the above objects or any of them. We can perform all commercial, technical and financial operations, connected directly or indirectly in all areas as described above, in order to facilitate the accomplishment of its purpose, provided always that Nexa Resources will not enter into any transaction that would constitute a regulated activity of the financial sector without due authorization under Luxembourg law.

Our common shares are governed by Luxembourg law and our articles of association. The following is a summary of the material terms of our common shares based on our articles of association and Luxembourg law. These rights may differ from those typically provided to shareholders of U.S. companies under the corporation laws of some states of the United States. We encourage you to read the complete form of our articles of association.

Common shares

On April 11, 2016, our shareholders approved the reduction of our share capital through the cancellation of 350,000,000 common shares, decreasing our share capital from US\$1,280,505,254 to US\$930,505,254.

On April 19, 2016, our shareholders approved the issuance of 110,910,811 new common shares fully paid via cash contributions by certain shareholders, increasing our capital from US\$930,505,254 to US\$1,041,416,065.

On June 28, 2017, our shareholders approved the reduction of our share capital through the cancellation of 200,000,000 common shares, decreasing our share capital from US\$1,041,416,065 to US\$841,416,065.

On September 18, 2017, our shareholders approved the reduction of our share capital through the cancellation of 300,000,000 common shares, decreasing our share capital from US\$841,416,065 to US\$541,416,065.

On October 6, 2017, our shareholders approved the reduction of our share capital through the cancellation of 428,595,552 common shares, decreasing our share capital from US\$541,416,065 to US\$112,820,513.

On October 31, 2017, our shareholders approved the issuance of 20,500,000 new common shares fully paid via cash contributions by certain shareholders, increasing our share capital from US\$112,820,513 to US\$133,320,513.

On September 13, 2018, our shareholders approved a general authorization to the board of directors to establish share buyback programs for a period of three years. On September 20, 2018, our board of directors approved a share buyback program under which we, directly or indirectly through our subsidiaries, may repurchase, from time to time, up to US\$30.0 million of our outstanding common shares listed on the New York Stock Exchange over a 12-month period beginning on November 6, 2018 and ending on November 6, 2019. As of March 25, 2019, we have repurchased 466,231 common shares, at an average price of US\$10.63 per share, for an aggregate purchase price of US\$4.96 million. All of the repurchased common shares have not been cancelled and are held in treasury.

As of December 31, 2019, our issued share capital was US\$133,320,513 represented by 133,320,513 common shares fully paid, with par value of US\$1.00 per share. In addition to our issued share capital, we have an authorized share capital of US\$231,924,819, represented by 231,924,819 common shares.

Distributions

Pursuant to our articles of association, the general meeting of shareholders may approve dividends and the board of directors may declare interim dividends, in each case to the extent permitted by Luxembourg law. Pursuant to our articles of association, the board of directors may also declare distributions to our shareholders in the form of reimbursement of share premium or interim dividends to the extent permitted by Luxembourg law. Each common share entitles the holder to participate equally in any distributions, if and when declared by the general meeting of shareholders or, in the case of interim dividends or reimbursements of share premium, the board of directors, out of funds legally available for such purposes.

Declared and unpaid distributions held by us for the account of the shareholders shall not bear interest. Under Luxembourg law, claims for unpaid distributions will lapse in our favor five years after the date such distribution has been declared.

For additional information regarding our policy on distributions, including procedures provided by Luxembourg law, see “Share ownership and trading—Distributions.”

Voting rights

There are no restrictions on the rights of Luxembourg or non-Luxembourg residents to vote our shares. All of our shareholders, including our public shareholders, hold common shares with identical voting rights, preferences and privileges. Each common share entitles the shareholder to attend a general meeting of shareholders in person or by proxy, to address the general meeting of shareholders and to vote. Each common share entitles the holder to one vote at the general meeting of shareholders.

The board of directors may also decide to allow shareholders to vote by correspondence by means of a proxy form providing for a positive or negative vote or an abstention on each agenda item. The conditions for voting by correspondence are set out in the articles of association and in the convening notice.

The board of directors may decide to arrange for shareholders to be able to participate in the general meeting by conference call, video conference or similar means of communication, whereby (i) the shareholders attending the meeting can be identified, (ii) all persons participating in the meeting can hear and speak to each other, (iii) the transmission of the meeting is performed on an ongoing basis and (iv) the shareholders can properly deliberate without the need for them to appoint a proxyholder who would be physically present at the meeting.

General meeting of shareholders

In accordance with Luxembourg law and our articles of association, any regularly constituted general meeting of our shareholders has the power to order, carry out or ratify acts relating to our operations to the extent that such decisions are the domain of the shareholders and not the board of directors.

Our annual general meeting of shareholders shall be held at our registered office, or at such other place in Luxembourg as may be specified in the notice of the meeting, within six months after the end of the relevant financial year. Except as otherwise specified in our articles of association, resolutions at a general meeting of shareholders are adopted by a simple majority of shares present or represented and voting at such meeting.

A shareholder entitled to vote may act at any general meeting of shareholders by appointing another person (who need not be a shareholder) as his proxy, which proxy shall be in writing and comply with such requirements as determined by our board with respect to the attendance to the general meeting, and proxy forms in order to enable shareholders to exercise their right to vote. All proxies must be received by us (or our agents) no later than the day determined by our board of directors.

Issuance of shares and preferential subscription rights

Our shares may be issued pursuant to a resolution of the general meeting of shareholders. The general meeting of shareholders may also delegate the authority to issue shares to the board of directors for a renewable period of five years. The board of directors has been authorized to issue up to 231,924,819 common shares. Such authorization will expire five years after the date of the general meeting of shareholders held on August 11, 2017 (unless amended or extended by the general meeting of shareholders).

Each holder of shares has preferential subscription rights to subscribe for any issue of shares pro rata to the aggregate amount of such holder's existing holding of the shares. Each shareholder shall, however, have no preferential subscription right on shares issued for a contribution in kind.

Preferential subscription rights may be restricted or excluded by a resolution of the general meeting of shareholders, or by the board of directors if the shareholders so delegate. The general meeting of shareholders has delegated to the board of directors the power to cancel or limit the preferential subscription rights of the shareholders when issuing new shares, so long as the issuance of new shares is carried out through a public offering.

If we decide to issue new shares in the future and do not exclude the preferential subscription rights of existing shareholders, we will publish the decision by placing an announcement in the Luxembourg official journal *Recueil Electronique des Sociétés et Associations* and in a newspaper published in Luxembourg. The announcement will specify the period in which the preferential subscription rights may be exercised. Such period may not be shorter than 14 days from the publication of the offer. The announcement will also specify details regarding the procedure for exercise of the preferential subscription rights. Under Luxembourg law preferential subscription rights are transferable and tradable property rights.

Repurchase of shares

Nexa Resources is prohibited by the 1915 Law from subscribing for its own shares. Nexa Resources may, however, repurchase its own shares or have another person repurchase shares on its behalf, subject to certain conditions, including:

- prior authorization of the general meeting of shareholders setting out the terms and conditions of the proposed repurchase, including the maximum number of shares to be repurchased, the duration of the period for which the authorization is given (which may not exceed five years) and the minimum and maximum consideration per share;
- the repurchase may not reduce the net assets of Nexa Resources on a non-consolidated basis to a level below the aggregate of the issued share capital and the reserves that Nexa Resources must maintain pursuant to the 1915 Law or our articles of association;
- only fully paid-up shares may be repurchased; and
- the acquisition offer is made on the same terms and conditions to all the shareholders who are in the same position; however, listed companies may repurchase their own shares on the stock exchange without making an acquisition offer to the shareholders.

On September 13, 2018, our shareholders authorized us to purchase, acquire, receive or hold and sell shares of Nexa Resources in accordance with the 1915 Law and any other applicable laws and regulations. The authorization is effective immediately after the general meeting and valid for a period of three years. For more information, see "Share ownership and trading—Purchases of equity securities by the issuer and affiliated purchasers."

Form and transfer of shares

Our shares are issued in registered form only and are freely transferable. Luxembourg law does not impose any limitations on the rights of Luxembourg or non-Luxembourg residents to hold or vote our shares.

Under Luxembourg law, the ownership of registered shares is generally evidenced by the inscription of the name of the shareholder, the number of shares held by him or her in the shareholders' register, which is maintained at our registered office. Each transfer of shares is made by a written declaration of transfer recorded in our shareholders' register, dated and signed by the transferor and the transferee or by their duly appointed agent. We may accept and enter into its shareholders' register any transfer based on an agreement between the transferor and the transferee provided a true and complete copy of the agreement is provided to us.

Our articles of association provide that, in case our shares are recorded in the register of shareholders on behalf of one or more persons in the name of a securities settlement system or the operator of such a system, or in the name of a professional depositary of securities or any other depositary or of a sub-depositary designated by one or more depositaries, Nexa—subject to a confirmation in proper form received from the depositary—will permit those persons to exercise the rights attaching to those shares, including admission to and voting at general meetings of shareholders. The board of directors may determine the requirements with which such confirmations must comply. Shares held in such manner generally have the same rights and obligations as any other shares recorded in our shareholder register(s).

TAXATION

Luxembourg tax considerations

Scope of Discussion

This summary is based on the laws of Luxembourg, including the Income Tax Law of December 4, 1967, as amended, the Municipal Business Tax Act of December 1, 1936, as amended and the Net Wealth Tax Act of October 16, 1934, as amended, to which we jointly refer as the “Luxembourg tax law”, existing and proposed regulations promulgated thereunder, and published judicial decisions and administrative pronouncements, each as in effect on the date of this report or with a known future effective date. This discussion does not generally address any aspects of Luxembourg taxation other than income tax, corporate income tax, municipal business tax, withholding tax and net wealth tax. This discussion, while not being a complete analysis or listing of all of the possible tax consequences of holding and disposing of shares, addresses the material tax issues. Also, there can be no assurance that the Luxembourg tax authorities will not challenge any of the Luxembourg tax consequences described below; in particular, changes in law and/or administrative practice, as well as changes in relevant facts and circumstances, may alter the tax considerations described below.

For purposes of this discussion, a “Luxembourg shareholder” is any beneficial owner of shares that for Luxembourg income tax purposes is:

- an individual resident of Luxembourg under article 2 of the Luxembourg Income Tax Law, as amended; or
- a corporation or other entity taxable as a corporation that is organized under the laws of Luxembourg or effectively managed from Luxembourg under article 159 of the Income Tax Law, as amended.

This discussion does not constitute tax advice and is intended only as a general guide. Shareholders should also consult their own tax advisors as to the Luxembourg tax consequences of the ownership and disposition of our common shares. The summary applies only to shareholders who will own our common shares as capital assets and does not apply to other categories of shareholders, such as dealers in securities, trustees, insurance companies, collective investment schemes and shareholders who have, or who are deemed to have, acquired their shares in the capital of Nexa Resources by virtue of an office or employment.

Shareholders

Luxembourg income tax on dividends and similar distributions

A non-Luxembourg shareholder will not be subject to Luxembourg income taxes on dividend income and similar distributions in respect of our common shares, other than a potential Luxembourg withholding tax as described below, unless the shares are attributable to a permanent establishment or a fixed place of business maintained in Luxembourg by such non-Luxembourg shareholder.

An individual Luxembourg shareholder will be subject to Luxembourg income tax on dividend income and similar distributions in respect of its shares in Nexa Resources at the applicable progressive rates. Such payments may benefit from a 50.0% exemption set forth in Article 115 15a of the Luxembourg Income Tax Law (LITL), subject to the conditions set out therein (or 50.0% exemption). If the 50.0% exemption applies, the applicable income tax will be levied on 50% of the gross amount of the dividends at the applicable progressive rates. Taxable dividends are also subject to dependence insurance contribution levied at a rate of 1.4% on the net income where certain Luxembourg shareholders are affiliated to the Luxembourg social security administration.

A corporate Luxembourg shareholder was subject to Luxembourg corporate income tax (CIT) and municipal business tax (MBT) at the aggregate rate of 24.94% in 2020 (i.e. Luxembourg CIT is 18.19% including the surcharge for the unemployment and MBT is 6.75% for having its statutory seat in Luxembourg City). The taxable basis of a corporate Luxembourg shareholder will, in principle, correspond to its accounting results, unless a specific treatment is provided for by the LITL. A corporate Luxembourg shareholder may benefit from the Luxembourg participation exemption (the “participation exemption”) with respect to dividends received if the following two conditions are met: (a) the shareholder holds or commits itself to hold at least 10.0% of the share capital of Nexa Resources or a participation with an acquisition price of at least €1.2 million for an uninterrupted period of at least twelve months and (b) the shareholder is a Luxembourg fully taxable corporation. If these cumulative conditions are met, dividends

received by the corporate Luxembourg shareholder would be fully exempt from CIT and MBT at the level of the corporate Luxembourg shareholder.

If the conditions with respect to the Luxembourg participation exemption are not met, the corporate Luxembourg shareholders can still benefit from the aforementioned 50.0% exemption, subject to the conditions set out therein.

Luxembourg withholding tax—Share capital reductions or share premium reimbursements

Share capital reductions or share premium reimbursements made by Nexa Resources to the Luxembourg and non-Luxembourg shareholders are in principle subject to a 15% Luxembourg withholding tax, unless they have been motivated by genuine economic reasons. Although genuine economic reasons are not defined by law, Luxembourg tax authorities may examine the given reasons. We do not intend to make capital reductions in the near future. Nexa Resources discloses distributable reserves, retained earnings and profits in its chart of accounts according to Decree dated June 10, 2009. As of December 31, 2019, we have the ability to pay dividends and not share premiums, to the extent we have received cash dividend distributions from our subsidiaries. See “Share ownership and trading—Distributions”.

Luxembourg withholding tax—Distributions to shareholders

A Luxembourg withholding tax of 15.0% is due on dividends and similar distributions made by Nexa Resources to its Luxembourg and non-Luxembourg shareholders unless a Luxembourg domestic dividend withholding tax exemption or a double tax treaty reduction is applicable, as described below. The tax will be withheld by Nexa Resources and remitted to the Luxembourg tax authorities within 8 days as of the date the income is made available to the Luxembourg and non-Luxembourg shareholders.

Exemption from Luxembourg withholding tax—Distributions to shareholders

Dividends paid by Nexa Resources will be exempt from Luxembourg withholding tax provided that the following cumulative conditions are met (or domestic exemption):

- at the date of the distribution, the shareholder holds at least 10% of the share capital of Nexa Resources or a participation with an acquisition price of at least €1.2 million for an uninterrupted period of at least twelve months; and
- the dividend is paid to a (i) fully taxable company resident in Luxembourg, (ii) a company resident in a EU Member State fulfilling the conditions of Article 2 of the Parent Subsidiary Directive and listed in the appendix to this directive, (iii) a company resident in a country with which Luxembourg has concluded a double tax treaty and which is fully subject to income tax comparable to the Luxembourg corporate income tax as well as a Luxembourg permanent establishment of such a company, (iv) a company resident of Switzerland and subject to tax without being exempt, (v) a company or a cooperative company resident in a Member State of the European Economic Area, other than a Member State of the EU, and that is fully subject to tax equivalent to the Luxembourg corporate income tax, or (vi) a Luxembourg permanent establishment of a company under (ii) or (v).

Shareholders that are companies resident in countries that have entered a double tax treaty with Luxembourg may qualify for the domestic exemption described above.

For a shareholder to benefit from such exemption upon a distribution date, Nexa Resources must file a properly completed form 900 with the Luxembourg tax authorities within 8 days following the earlier of (a) the distribution decision date in case no payment date is fixed, and (b) the effective date of payment of the dividend. Luxembourg tax authorities may request all relevant documentation showing fulfillment of the above-mentioned conditions (*e.g.*, including a tax residency certificate) Nexa makes no representation that this exemption procedure will be practicable with respect to shares held through a clearing system such as DTC (in the United States) or CDS (in Canada).

Alternatively, a shareholder may file a refund request (form 901bis, stamped and validated by the tax authorities of the State of residency of the shareholder) with the Luxembourg tax authorities before December 31 of the year following the taxable event (*i.e.*, the distribution). Nexa makes no representation that this refund procedure will be practicable for a shareholder residing in the United States, Canada or any other specific jurisdiction.

A shareholder that does not meet the twelve-month holding period described in the first bullet above can request a refund when the twelve-month period has elapsed. The refund request (form 901bis, stamped and validated by the tax authorities of the State of residency of the shareholder) has to be filed with the Luxembourg tax authorities before December 31 of the year following the taxable event.

Forms 900 and 901bis are generally made available on the website of the Luxembourg tax authorities (*Administration des contributions directes*).

The application of the dividend withholding tax exemption to taxable companies' residents in other EU member states or to their EU permanent establishments is not granted if the income allocated is part of a tax avoidance scheme.

Reduction of Luxembourg withholding tax—Distributions to shareholders

As mentioned above, pursuant to the provisions of certain bilateral treaties for the avoidance of double taxation concluded between Luxembourg and other countries, and if certain conditions are met, the aforementioned Luxembourg dividend withholding tax may be reduced. Many such treaties, including the double tax treaty with the United States, provide for a tax rate lower than 15 percent only for a shareholder that holds a substantial (generally, 10 percent or 25 percent) portion of a Luxembourg company's shares. Shareholders that hold such shares should consult their tax advisors to determine how to benefit from the reduction in withholding tax rates.

A shareholder that is a company resident in a country that has entered a double tax treaty with Luxembourg may qualify for the domestic exemption even if the treaty would not reduce the withholding tax rate applicable to dividends paid to that shareholder.

Luxembourg NWT

A non-Luxembourg shareholder will not be subject to Luxembourg net wealth tax (NWT) unless the shares are attributable to a permanent establishment or a fixed place of business maintained in Luxembourg by such non Luxembourg shareholder.

Luxembourg individual shareholders are not subject to Luxembourg NWT. A Luxembourg corporate shareholder will be subject to Luxembourg NWT in respect of the shares held in the capital of Nexa Resources unless it holds more than 10% or €1.2 million of our common shares.

Luxembourg capital gains tax upon disposal of shares

Capital gains derived by a non-Luxembourg shareholder on the sale of our common shares will not be subject to taxation in Luxembourg, unless one of the following conditions applies:

- the shareholder does not benefit from a double tax treaty and (i) holds shares in Nexa Resources representing more than 10% of the share capital of Nexa Resources and such shares were held for less than six months prior to their sale or (ii) has been a resident taxpayer in Luxembourg for at least fifteen years and had acquired nonresident status less than five years prior to the disposal; or
- Our common shares are attributable to a permanent establishment or a fixed place of business maintained in Luxembourg by such non-Luxembourg shareholder. In such case, the non-Luxembourg shareholder is required to recognize capital gains or losses on the sale of such shares, which will be subject to CIT and MBT, unless the participation exemption applies.

Capital gains realized upon the sale of our common shares by a Luxembourg resident individual will be subject to Luxembourg income tax at the level of the Luxembourg resident individual only in case of (i) speculation gains or (ii) gains realized on a substantial participation.

Speculation gains

Capital gains realized upon the sale of our common shares within a shareholding period not exceeding six months will be subject to personal income taxation (unless such capital gain does not exceed €500) in the hands of a Luxembourg resident individual.

Substantial participation

In case where the Luxembourg resident individual has held the shares for at least six months and had a substantial participation, the capital gains realized will be subject to income tax at a rate equal to half the normal progressive rate applicable. A participation is considered as a substantial participation when a Luxembourg resident individual, jointly with his/her spouse and children under the age of 18, holds or has held, directly or indirectly, at any time during the five years prior to the date of the sale, 10.0% or more of the share capital of Nexa Resources.

Capital gains realized by the Luxembourg corporate shareholder (*société de capitaux*) should be exempt from capital gains tax in Luxembourg if at the date of the disposal, the Luxembourg shareholder has held or undertakes to hold, for an uninterrupted period of at least 12 months, a direct participation which represents at least 10.0% of the share capital of Nexa Resources, or which acquisition price was at least €6.0 million. If these conditions are not met, the Luxembourg corporate shareholder would be fully taxed on the capital gains realized upon the sale of the common share. The exempt amount of the capital gains realized will be, however, reduced by the amount of any expenses related to the participation, including decreases in the acquisition cost that could have previously reduced such shareholder's Luxembourg taxable income.

ATAD rules

The European Council has adopted two Anti-Tax Avoidance Directives: Council Directive (EU) 2016/1164 of 12 July 2016 laying down rules against tax avoidance practices that directly affect the functioning of the internal market ("ATAD I") and Directive 2017/952/EU of 29 May 2017 amending ATAD I as regards hybrid mismatches with third countries ("ATAD II") that address many of the issues mentioned above. The measures included in ATAD I were implemented into Luxembourg law on December 21, 2018 and almost all of them have been applicable since January 1, 2019. The measures included in ATAD II were implemented into Luxembourg law on December 19, 2019 and almost all of them have been applicable since January 1, 2020. ATAD I and ATAD II may have a material impact on how returns to shareholders are taxed.

Peruvian tax considerations

The following is a general summary of material Peruvian tax matters, as in effect on the date of this report, and describes our understanding of the principal tax consequences of an investment in our common shares by a person or entity who is not considered a resident of Peru for tax purposes. This summary is not intended to be a comprehensive description of all the tax considerations that may be relevant to a decision to make an investment in the offered shares.

This summary is based on provisions of the Peruvian income tax law and its regulations in force as of the date hereof. No rulings from the Peruvian tax authorities or judicial rulings address the tax treatment of instruments similar to the shares of Nexa Resources. Accordingly, no assurance can be given that the Peruvian tax authorities will agree with the conclusions described below. If the Peruvian tax authorities were to take a position different from the conclusions described below, the Peruvian income tax consequences of investing in Nexa Resources may differ from those summarized below.

Sale, exchange or disposition of the shares or a beneficial interest therein

Investors who decide to invest in the shares of Nexa Resources hold the shares in book-entry form, in the name of a nominee holding such shares for the investors' benefit. Any future trading of such shares will be effected through a conveyance of the beneficial interest held by the investors thereupon through the designated clearing mechanism. Because the conveyance of such beneficial interest does not imply the actual transfer of shares, any capital gains resulting from the conveyance of the beneficial interest in such shares, obtained by a person or entity who is not considered a resident of Peru for Peruvian tax purposes, should not be subject to taxation in Peru.

If, contrary to the conclusion stated above, the sale of our common shares were to qualify as an "indirect transfer of Peruvian shares" (and the transfer of the beneficial interest in the shares were to be considered as an actual transfer of such shares), different rules would apply.

According to Peruvian income tax law, an "indirect transfer of Peruvian shares" is deemed to occur when there is a transfer of shares issued by a non-resident company which, in turn, owns—directly or through one or more companies—shares issued by a Peruvian company, and the following two conditions are concurrently met:

- (i) during any of the 12 months preceding the transfer, the fair market value (FMV) of the shares issued by the Peruvian company held directly or indirectly by the nonresident company which shares are being sold, is equivalent to 50% or more of the FMV of all the shares issued by said non-resident company; and
- (ii) during any 12-month period, the shares transferred by a party, including those transferred by its related parties, represent at least 10% of the shares issued by such non-resident company.

Due to recent modifications to Peruvian income tax law, as of January 1, 2019, even if the abovementioned conditions are not met, an indirect transfer of Peruvian shares will also be deemed to exist if the "total value" of shares of the Peruvian company indirectly transferred within any 12 month period is equivalent to or higher than 40,000 Peruvian tax units (S/168 million or US\$49. million approximately). Said "total value" is determined by multiplying: i) the "percentage" that the FMV of the shares issued by the Peruvian company held (directly or indirectly) by the non-resident company which shares are being transferred, represents with regard to the FMV of all the shares issued by said non-resident company; and, ii) the price agreed for the shares issued by the non-resident company directly transferred. To determine the "total value" threshold, transfers made by those parties which qualify as related to the transferor should also be considered. Nonetheless, the "taxable base" shall be determined, in any case, per party, considering the transfers made by the latter within the abovementioned 12-month period, but excluding those transfers previously taxed.

In case the sale of the shares were to qualify as an "indirect transfer of Peruvian shares" (and the transfer of the beneficial interest on the shares were to be considered as an actual transfer of such shares), any capital gain resulting therefrom will be subject to a 30% tax rate in Peru.

In case the corporate investor that makes the indirect transfer of Peruvian shares has a branch or a permanent establishment with assigned assets in Peru, said corporation will be jointly and severally liable for any income tax that resulted from the transfer of Peruvian shares; it will also be obligated to present to the Peruvian tax authority all the information related to the Peruvian shares of the non-resident investor that are being sold, particularly the information referred to the FMV; participation percentages; capital increase or reduction; issuance and placement of shares or participations; reorganization processes; patrimonial values and balance sheets; etc. **Investors should consult their own tax advisors about the consequences of the acquisition, ownership, and disposition of their investment in the offered shares or any beneficial interest therein, including the possibility that the tax consequences of investing in the offered shares may differ from the description above.**

United States federal income tax considerations

The following is a summary of certain U.S. federal income tax considerations that are likely to be relevant to the purchase, ownership and disposition of our common shares by a U.S. Holder (as defined below).

This summary is based on provisions of the Internal Revenue Code of 1986, as amended (the "Code"), and U.S. Treasury regulations (Regulations), rulings and judicial interpretations thereof, in force as of the date hereof, and the U.S.-Luxembourg Treaty dated December 20, 2000 (as amended by any subsequent protocols). Those authorities may be changed at any time, perhaps retroactively, so as to result in U.S. federal income tax consequences different from those summarized below.

This summary is not a comprehensive discussion of all of the tax considerations that may be relevant to a particular investor's decision to purchase, hold, or dispose of our common shares. In particular, this summary is directed only to U.S. Holders that hold common shares as capital assets and does not address tax consequences to U.S. Holders who may be subject to special tax rules, such as banks, brokers or dealers in securities or currencies, traders in securities electing to mark to market, financial institutions, life insurance companies, tax exempt entities, entities that are treated as partnerships for U.S. federal income tax purposes (or partners therein), holders that own or are treated as owning 10% or more of our common shares by vote or value, persons holding common shares as part of a hedging or conversion transaction or a straddle, nonresident alien individuals present in the United States for more than 182 days in a taxable year, or persons whose functional currency is not the U.S. dollar. Moreover, this summary does not address state, local or foreign taxes, U.S. federal estate and gift taxes, or the Medicare contribution tax applicable to net investment income of certain non-corporate U.S. Holders, or the alternative minimum tax consequences of acquiring, holding or disposing of common shares.

For purposes of this summary, a "U.S. Holder" is a beneficial owner of common shares that is a citizen or resident of the United States, a U.S. domestic corporation or that otherwise is subject to U.S. federal income taxation on a net income basis in respect of such common shares.

U.S. Holders should consult their tax advisors about the consequences of the acquisition, ownership, and disposition of the common shares, including the relevance to their particular situation of the considerations discussed below and any consequences arising under foreign, state, local or other tax laws.

Taxation of dividends

Subject to the discussion below under "Passive Foreign Investment Company Status" the gross amount of any distribution of cash or property with respect to our common shares that is paid out of our current or accumulated earnings and profits (as determined for U.S. federal income tax purposes) will generally be includible in a U.S. Holder's taxable income as ordinary dividend income on the day on which the U.S. Holder receives the dividend and will not be eligible for the dividends-received deduction allowed to corporations under the Code.

We do not expect to maintain calculations of our earnings and profits in accordance with U.S. federal income tax principles. U.S. Holders therefore should expect that distributions generally will be treated as dividends for U.S. federal income tax purposes.

Subject to certain exceptions for short-term positions, dividends received by an individual with respect to the common shares will be subject to taxation at a preferential rate if the dividends are "qualified dividends." Dividends paid on the common shares will be treated as qualified dividends if:

- the common shares are readily tradable on an established securities market in the United States; and
- we were not, in the year prior to the year in which the dividend was paid, and are not, in the year in which the dividend is paid, a passive foreign investment company (PFIC).

The common shares are listed on the NYSE and will qualify as readily tradable on an established securities market in the United States so long as they are so listed. Based on our consolidated financial statements and relevant market and shareholder data, we believe that we were not classified as a PFIC with respect to our prior taxable year. In addition, based on our consolidated financial statements and our current expectations regarding the value and nature of our assets, the sources and nature of our income and relevant market and shareholder data, we do not anticipate becoming a PFIC for our current taxable year or in the foreseeable future. Accordingly, we expect that dividends paid on the common shares will be treated as qualified dividends. U.S. Holders should consult their tax advisors regarding the availability of the reduced dividend tax rate in light of their own particular circumstances.

Dividend distributions with respect to our common shares generally will be treated as "passive category" income from sources outside the United States for purposes of determining a U.S. Holder's U.S. foreign tax credit limitation. Subject to the limitations and conditions provided in the Code and the applicable Regulations, a U.S. Holder may be able to claim a foreign tax credit against its U.S. federal income tax liability in respect of any Luxembourg income taxes withheld at the appropriate rate applicable to the U.S. Holder from a dividend paid to such U.S. Holder. Alternatively, the U.S. Holder may deduct such Luxembourg income taxes from its U.S. federal taxable income, provided that the U.S. Holder elects to deduct rather than credit all foreign income taxes for the relevant taxable year. The rules with respect to foreign tax credits are complex and involve the

application of rules that depend on a U.S. Holder's particular circumstances. Accordingly, U.S. Holders are urged to consult their tax advisors regarding the availability of the foreign tax credit under their particular circumstances.

U.S. Holders that receive distributions of additional common shares or rights to subscribe for common shares as part of a pro rata distribution to all our shareholders generally will not be subject to U.S. federal income tax in respect of the distributions.

Taxation of dispositions of common shares

Subject to the discussion below under “—Passive Foreign Investment Company Status,” a U.S. Holder generally will recognize gain or loss on the sale, exchange or other disposition of common shares in an amount equal to the difference, if any, between the amount realized upon the sale, exchange or other disposition and the U.S. Holder’s adjusted tax basis in the common shares. A U.S. Holder’s adjusted tax basis in its common shares generally will equal the purchase price for the common shares. Any gain or loss will be capital gain or loss and generally will be long-term capital gain or loss if the common shares have been held for more than one year. Long-term capital gain realized by a U.S. Holder that is an individual generally is subject to taxation at a preferential rate. The deductibility of capital losses is subject to limitations. Gain, if any, realized by a U.S. Holder on the sale or other disposition of the common shares generally will be treated as U.S. source income for U.S. foreign tax credit purposes.

Passive foreign investment company status

Special U.S. tax rules apply to companies that are considered to be PFICs. We will be classified as a PFIC in a particular taxable year if either:

- 75 percent or more of our gross income for the taxable year is passive income; or
- the average percentage of the value of our assets that produce or are held for the production of passive income is at least 50 percent.

Passive income generally includes dividends, interest, royalties, rents, annuities, net gains from the sale or exchange of property producing such income, net foreign currency gains and gains from commodities transactions, other than gains derived from “qualified active sales” of commodities and “qualified hedging transactions” involving commodities, within the meaning of the applicable Regulations (Commodity Exception).

Based on certain estimates of our gross income and gross assets and relying on the Commodity Exception, we do not believe that we currently are a PFIC, and do not anticipate becoming a PFIC in the foreseeable future. However, since PFIC status will be determined by us on an annual basis and since such status depends upon the composition of our income and assets, and the nature of our activities (including our ability to qualify for the Commodity Exception or any similar exceptions), from time to time, there can be no assurance that we will not be considered a PFIC for any taxable year. In the event that, contrary to our expectation, we are classified as a PFIC in any year, and a U.S. Holder does not make a mark-to-market election, as described in the following paragraph, the U.S. Holder will be subject to a special tax at ordinary income tax rates on “excess distributions,” including certain distributions by us and gain that the U.S. Holder recognizes on the sale of the common shares. The amount of income tax on any excess distributions will be increased by an interest charge to compensate for tax deferral, calculated as if the excess distributions were earned ratably over the period that the U.S. Holder holds the common shares. Classification as a PFIC may also have other adverse tax consequences.

A U.S. Holder can avoid the unfavorable rules described in the preceding paragraph by electing to mark the common shares to market. If a U.S. Holder makes this mark-to-market election, the U.S. Holder will be required in any year in which we are a PFIC to include as ordinary income the excess of the fair market value of the U.S. Holder’s common shares at year-end over the U.S. Holder’s basis in those shares. The U.S. Holder’s basis in the shares will be adjusted to reflect the gain or loss. In addition, any gain that the U.S. Holder recognizes upon the sale of the common shares will be taxed as ordinary income in the year of sale.

A U.S. Holder that owns an equity interest in a PFIC must annually file IRS Form 8621 and may be required to file other IRS forms. A failure to file one or more of these forms as required may toll the running of the statute of limitations in respect of each of the U.S. Holder's taxable years for which such form is required to be filed. As a result, the taxable years with respect to which the U.S. Holder fails to file the form may remain open to assessment by the IRS indefinitely, until the form is filed.

U.S. Holders should consult their tax advisors regarding the U.S. federal income tax considerations discussed above and the desirability of making a mark-to-market election if we were to be classified as a PFIC.

Foreign financial asset reporting

Certain U.S. Holders that own "specified foreign financial assets" with an aggregate value in excess of US\$50,000 are generally required to file an information statement along with their tax returns, currently on Form 8938, with respect to such assets. "Specified foreign financial assets" include any financial accounts held at a non-U.S. financial institution, as well as securities issued by a non-U.S. issuer that are not held in accounts maintained by financial institutions. The understatement of income attributable to "specified foreign financial assets" in excess of US\$5,000 extends the statute of limitations with respect to the tax return to six years after the return was filed. U.S. Holders who fail to report the required information could be subject to substantial penalties. Prospective investors are encouraged to consult with their tax advisors regarding the possible application of these rules, including the application of the rules to their particular circumstances.

Backup withholding and information reporting

Dividends paid on, and proceeds from the sale or other disposition of, the common shares to a U.S. Holder generally may be subject to the information reporting requirements of the Code and may be subject to backup withholding unless the U.S. Holder provides an accurate taxpayer identification number and makes any other required certification or otherwise establishes an exemption. Backup withholding is not an additional tax. The amount of any backup withholding from a payment to a U.S. Holder will be allowed as a refund or credit against the U.S. Holder's U.S. federal income tax liability, provided the required information is furnished to the U.S. Internal Revenue Service in a timely manner.

A holder that is a foreign corporation or a non-resident alien individual may be required to comply with certification and identification procedures in order to establish its exemption from information reporting and backup withholding.

EXCHANGE CONTROLS AND OTHER LIMITATIONS AFFECTING SECURITY HOLDERS

We are not aware of any governmental laws, decrees, regulations or other legislation in Luxembourg that restrict the export or import of capital, including the availability of cash and cash equivalents for use by our affiliated companies, or that affect the remittance of dividends, interest or other payments to non-resident holders of our securities.

EVALUATION OF DISCLOSURE CONTROLS AND PROCEDURES

Our management, with the participation of our chief executive officer and chief financial officer, has evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2019. There are inherent limitations to the effectiveness of any system of disclosure controls and procedures, including the possibility of human error and the circumvention or overriding of the controls and procedures. Accordingly, even effective disclosure controls and procedures can only provide reasonable assurance of achieving their control objectives.

We have evaluated, with the participation of our chief executive officer and chief financial officer, the effectiveness of our disclosure controls and procedures as of December 31, 2019. Based on our evaluation, our chief executive officer and chief financial officer concluded that our disclosure controls and procedures were effective as of December 31, 2019.

INTERNAL CONTROL OVER FINANCIAL REPORTING

Management report on internal control over financial reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting and for assessing the effectiveness of internal control over financial reporting.

Our internal control over financial reporting is a process designed by, or under the supervision of, our chief executive officer and our chief financial officer, and effected by our board of directors, management and other employees, and is designed to provide reasonable assurance regarding the reliability of financial reporting and of the preparation of our consolidated financial statements, in accordance with IFRS as issued by the IASB.

Due to its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness of internal control over financial reporting to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with our policies or procedures may deteriorate.

Our management has assessed the effectiveness of our internal control over financial reporting as of December 31, 2019, based upon the criteria established in Internal Controls—Integrated Framework (2013), issued by the Committee of Sponsoring Organizations of Treadway Commission (COSO). Based on this assessment and criteria, our management has concluded that our internal control over financial reporting was effective as of December 31, 2019.

Audit of the effectiveness of internal control over financial reporting

Our independent registered public accounting firm, PricewaterhouseCoopers Auditores Independientes, has audited the effectiveness of our internal control over financial reporting, as stated in their report as of December 31, 2019, which is included herein.

Changes in internal control over financial reporting

There were no changes in our internal control over financial reporting during the fiscal year 2019, which have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PRINCIPAL ACCOUNTANT FEES AND SERVICES

The following table summarizes the fees billed to us by our independent auditors PricewaterhouseCoopers Auditores Independientes for professional services in 2019 and 2018:

	Year ended December 31,	
	2019	2018
	(US\$ thousand)	
Audit fees	1,639.1	1,998.5
Audit-related fees	24.9	—
Tax fees	51.3	94.6
Other fees	18.0	—
Total fees	1,733.3	2,093.1

“Audit fees” are the aggregate fees billed by PricewaterhouseCoopers Auditores Independientes for the audit of our annual financial statements, the audit of the statutory financial statements of our subsidiaries, and reviews of interim financial statements and attestation services that are provided in connection with statutory and regulatory filings or engagements. They also include fees for services that only the independent auditor reasonably can provide, including the provision of comfort letters and consents in connection with statutory and regulatory filings and the review of documents filed with the SEC and other capital markets or local financial reporting regulatory bodies. “Audit-related fees” are fees charged by PricewaterhouseCoopers Auditores Independientes for assurance and related services that are reasonably related to the performance of the audit or review of our consolidated financial statements and are not reported under “Audit fees.” “Tax fees” are the aggregate fees billed by PriceWaterhouseCoopers Auditores Independientes for services rendered for tax compliance, tax advice and tax planning. “Other fees” are the aggregate fees billed by PricewaterhouseCoopers Auditores Independientes for services related with assurance and review procedures not related with regulatory or financial reporting of our consolidated financial statements.

Nexa has established policies and procedures that require any engagement of our independent auditor for audit or non-audit services to be submitted to and pre-approved by the audit committee. In addition, our audit committee may delegate the authority to pre-approve non-audit services to one or more of its members. All non-audit services that are pre-approved pursuant to such delegated authority must be presented to the full audit committee at its first scheduled meeting following such pre-approval. Our audit committee also has the authority to recommend pre-approval policies and procedures to our board of directors and for the engagement of our independent auditor’s services.

INFORMATION FILED WITH SECURITIES REGULATORS

We are subject to various information and disclosure requirements in those countries in which our securities are traded, and we file financial statements and other periodic reports with the SEC and Canadian securities regulatory authorities.

- *United States.* We are subject to the information requirements of the Securities Exchange Act of 1934, as amended, and accordingly file reports and other information with the SEC. Our SEC filings are available to the public from the SEC at <http://www.sec.gov>. You may also inspect Nexa Resources' reports and other information at the offices of the New York Stock Exchange, 11 Wall Street, New York, New York 10005, on which our common shares are listed. For further information on obtaining copies of Nexa Resources' public filings at the New York Stock Exchange, you should call (212) 656-5060.
- *Canada.* We must comply with certain Canadian periodic and ongoing disclosure rules under applicable Canadian provincial and territorial securities laws and, as applicable, the rules of the Toronto Stock Exchange. However, with respect to the rules under applicable Canadian provincial and territorial securities laws, we are able to rely on certain exemptions from many of the requirements under such laws through our compliance with U.S. disclosures given our status in the U.S as a foreign private issuer. We may also be able to rely on certain exemptions under the rules of the Toronto Stock Exchange. Our Canadian filings are available to the public from the website maintained by the Canadian Securities Administrators at www.sedar.com.

GLOSSARY

Brownfields project: An exploration or development project near or within an existing operation, which can share infrastructure and management.

Concentration: The process by which crushed and ground ore is separated into metal concentrates and reject material through processes such as flotation.

Concentrate plant: A plant where metal concentration occurs.

Development: The process of constructing a mining facility and the infrastructure to support the facility is known as mine development.

Diamond drilling: A method of drilling that uses a diamond bit, which rotates at the end of a drill rod or pipe. The opening at the end of the diamond bit allows a solid column of rock to move up into the drill pipe and be recovered at the surface. This column of rock is named drill core and is used for geological, geotechnical logging and for sampling for chemical analysis to define the metal content of the rock or mineralized material. Standard core sizes/diameters are 63.5 mm (defined as HQ), 46.7 mm (defined as NQ) and 36.5 mm (defined as BQ). Most drill rods are 10 feet long. After the first 10 feet are drilled, a new section of pipe is screwed into the top end, so the combination of pipes can be driven another 10 feet into the ground.

Exploration: Activities associated with ascertaining the existence, location, extent or quality of a mineral deposit.

Greenfields project: An exploration or development projects that is located outside the area of influence of existing mine operations and/or infrastructure and will be independently developed and managed.

km: kilometer.

ktpd: Thousand tonnes per day.

LBMA: The London Bullion Market Association.

LME: London Metal Exchange.

Metal concentrate: The crushed and ground material obtained after concentration, including zinc, lead and copper concentrates. This is the product from our mining operations. Most of the zinc concentrate we produce is used in our smelting operations and the remaining portion, along with our lead and copper concentrates, is sold to our customers.

Metallic zinc: Pure metal (99.995% zinc) obtained from the electrodeposition of a zinc sulfate solution, free of impurities, through the RLE (Roaster-Leaching-Electrolysis) process.

Mineralization: The process or processes by which a mineral or minerals are introduced into a rock, resulting in a potentially valuable or valuable deposit.

Mineralized material: Mineral bearing material that has been physically delineated by one or more methods, including drilling and underground work, and is supported by sampling and chemical analysis. This material has been found to contain a sufficient amount of mineralization of an average grade of metal or metals to have economic potential that warrants further exploration evaluation. While this material is not currently or may never be classified as ore reserves, it is reported as mineralized material only if the potential exists for reclassification into the reserves category. This material cannot be classified in the reserves category until final technical, economic and legal factors have been determined. Under the SEC's standards, a mineral deposit does not qualify as a reserve unless it can be economically and legally extracted at the time of reserve determination and it constitutes a proven or probable reserve (as defined below).

Mine site: An economic unit comprised of an underground and/or open pit mine, a treatment plant and equipment and other facilities necessary to produce metals concentrates, in existence at a certain location.

Open pit: Surface mining in which the ore is extracted from a pit. The geometry of the pit may vary with the characteristics of the ore body.

Ore: A mineral or aggregate of minerals from which metal can be economically mined or extracted.

Ore grade: The average amount of metal expressed as a percentage, grams per tonne or in ounces per tonne.

Ounces or oz: Unit of weight. A troy ounce equals 31.1034 grams. All references to ounces in this report are to troy ounces unless otherwise specified.

Reclamation: The process of stabilizing, contouring, maintaining, conditioning and/or reconstructing the surface of disturbed land (*i.e.*, used or affected by the execution of mining activities) to a state of “equivalent land capability.” Reclamation standards vary widely, but usually address issues of ground and surface water, topsoil, final slope gradients, overburden and revegetation.

Refining: The process of purifying an impure metal; the purification of crude metallic substances.

Secondary feed materials: By-products of industrial processes such as smelting and refining that are then available for further treatment/recycling. It can cover foundry ashes, zinc oxides from brass and bronze production, electric arc furnace (EAF) dust and slags.

SHG: Special High Grade.

Skarn: Metamorphic zone developed in the contact area around igneous rock intrusions when carbonate sedimentary rocks are invaded by large amounts of silicon, aluminum, iron and magnesium. The minerals commonly present in a skarn include iron oxides, calc-silicates, andradite and grossularite garnet, epidote and calcite. Many skarns also include ore minerals. Several productive deposits of copper or other base metals have been found in and adjacent to skarns.

Tailings: Finely ground rock from which valuable minerals have been extracted by concentration.

Tonne: A unit of weight. One metric tonne equals 2,204.6 pounds or 1,000 kilograms. One short tonne equals 2,000 pounds. Unless otherwise specified, all references to “tonnes” in this report refer to metric tonnes.

Zinc equivalent: A metric used to compare mineralization that is comprised of different metals in terms of zinc. Copper, lead, silver and gold contents in our concentrate production have been converted to a zinc equivalent grade at the average benchmark prices for 2019, *i.e.*, US\$2,546.34 per tonne (US¢115.50 per pound) for zinc, US\$5,999.73 per tonne (US¢272.14 per pound) for copper, US\$1,999.68 per tonne (US¢90.70 per pound) for lead, US\$16.21 per ounce for silver and US\$1,392.60 per ounce for gold.

Zinc oxide: A chemical compound that results from the sublimation of zinc (Zn-metal) by oxygen in the atmosphere. Zinc oxide is in the form of powder or fine grains that is insoluble in water but very soluble in acid solutions.

Industry Guide 7 definitions:

Probable (indicated) reserves: Reserves for which quantity and grade and/or quality are computed from information similar to that used for proven (measured) reserves, but the sites for inspection, sampling and measurement are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for proven (measured) reserves, is high enough to assume continuity between points of observation.

Proven (measured) reserves: Reserves for which (a) quantity is computed from dimensions revealed in outcrops, trenches, working or drill holes; grade and/or quality are computed from the results of detailed sampling and (b) the sites for inspection, sampling and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth and mineral content of reserves are well-established.

Reserves: The part of a mineral deposit that could be economically and legally extracted or produced at the time of the reserve determination.

EXHIBITS

Exhibit Number

<u>1</u>	<u>Amended Articles of Association of Nexa Resources S.A., dated as of June 28, 2018 (incorporated by reference to Exhibit 1 to our Annual Report on Form 20-F (file no. 001-38256) filed with the SEC on April 3, 2019).</u>
<u>2.1</u>	<u>Indenture with respect to the 5.375% Notes due 2027, dated as of May 4, 2017, among VM Holding S.A., as issuer, Votorantim Metais Zinco S.A., Compañía Minera Milpo S.A.A. and Votorantim Metais Cajamarquilla S.A., as guarantors, and The Bank of New York Mellon, as trustee, registrar, paying agent and transfer agent (incorporated by reference to Exhibit 4.1 to our Registration Statement on Form F-1 (file no. 333-220552) filed with the SEC on September 21, 2017).</u>
<u>2.2</u>	<u>Indenture with respect to the 4.625% Notes due 2023, dated as of March 28, 2013, among Compañía Minera Milpo S.A.A., as issuer, Deutsche Bank Trust Company Americas, as trustee, registrar, paying agent and transfer agent, and Deutsche Bank Luxembourg S.A., as Luxembourg paying agent (incorporated by reference to Exhibit 4.2 to our Registration Statement on Form F-1 (file no. 333-220552) filed with the SEC on September 21, 2017).</u>
<u>2.3</u>	<u>Description of Securities.</u>
<u>4.1</u>	<u>Arrangement Agreement, dated as of August 26, 2019, among Nexa Resources S.A., Votorantim Metals Canada Inc., Karmin Exploration Inc. and Kar Gold Inc. (incorporated by reference to Exhibit 99.1 to our Report of Foreign Private Issuer on Form 6-K (file no. 001-38256) furnished to the SEC on August 29, 2019).</u>
<u>8</u>	<u>List of Subsidiaries.</u>
<u>12.1</u>	<u>Certification of Chief Executive Officer of Nexa Resources S.A. pursuant to Rules 13a-14 and 15d-14 under the Securities Exchange Act of 1934, as amended.</u>
<u>12.2</u>	<u>Certification of Chief Financial Officer of Nexa Resources S.A. pursuant to Rules 13a-14 and 15d-14 under the Securities Exchange Act of 1934, as amended.</u>
<u>13.1</u>	<u>Certification of Chief Executive Officer and Chief Financial Officer of Nexa Resources S.A., pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u>
101.INS	XBRL Instance Document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.

SIGNATURES

The registrant hereby certifies that it meets all of the requirements for filing on Form 20-F and that it has duly caused and authorized the undersigned to sign this annual report on its behalf.

NEXA RESOURCES S.A.

By: /s/ Tito Botelho Martins Júnior

Name: Tito Botelho Martins Júnior

Title: *Chief Executive Officer*

By: /s/ Rodrigo Menck

Name: Rodrigo Menck

Title: *Senior Vice President Finance and Group Chief Financial Officer*

Date: March 20, 2020

NEXA RESOURCES S.A. FINANCIAL STATEMENTS



Nexa Resources S.A.

Consolidated financial statements

At December 31, 2019 and independent auditor's report

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Nexa Resources S.A.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Nexa Resources S.A. and its subsidiaries (the “Company”) as of December 31, 2019 and 2018, and the related consolidated income statement, consolidated statement of comprehensive income, consolidated statement of changes in shareholders’ equity and consolidated statement of cash flows for each of the three years in the period ended December 31, 2019, including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company’s internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019 in conformity with International Financial Reporting Standards as issued by the International Accounting Standards Board. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 5 to the consolidated financial statements, the Company changed the manner in which it accounts for leases and the manner in which it accounts for uncertainty over income tax treatments in 2019.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management report on internal control over financial reporting appearing under Item 15. Our responsibility is to express opinions on the Company’s consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (“PCAOB”) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ PricewaterhouseCoopers Auditores Independentes
Curitiba, Brazil
February 13, 2020

We have served as the Company's auditor since 2001.

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Nexa Resources S.A.



Consolidated income statement

Years ended December 31

All amounts in thousands of US dollars, unless otherwise stated

	Note	2019	2018	2017
Net revenues	6	2,332,306	2,491,202	2,449,484
Cost of sales	7	(1,944,683)	(1,888,944)	(1,752,825)
Gross profit		387,623	602,258	696,659
Operating expenses				
Selling, general and administrative	7	(216,511)	(159,603)	(154,494)
Mineral exploration and project development	8	(112,984)	(126,278)	(92,698)
Impairment loss	31	(142,133)	(3,283)	-
Other income and expenses, net	9	(27,021)	21,459	(47,887)
		(498,649)	(267,705)	(295,079)
Operating (loss) income		(111,026)	334,553	401,580
Net financial results	10			
Financial income		37,629	67,509	29,868
Financial expenses		(129,591)	(121,662)	(106,169)
Foreign exchange effect		(12,892)	(148,501)	(53,880)
		(104,854)	(202,654)	(130,181)
Results of investees				
Share in the results of associates		-	-	60
(Loss) income before income tax		(215,880)	131,899	271,459
Income tax	11(a)			
Current		(46,382)	(71,787)	(125,691)
Deferred		103,255	30,864	19,497
Net (loss) income for the period		(159,007)	90,976	165,265
Attributable to NEXA's shareholders		(146,626)	74,860	126,885
Attributable to non-controlling interests		(12,381)	16,116	38,380
Net (loss) income for the period		(159,007)	90,976	165,265
Weighted average number of outstanding shares – in thousand		132,622	133,313	116,527
Basic and diluted earnings (losses) per share – USD	30(f)	(1.11)	0.56	1.09

The accompanying notes are an integral part of these consolidated financial statements

Nexa Resources S.A.



Consolidated statement of comprehensive income

Years ended December 31

All amounts in thousands of US dollars, unless otherwise stated

	Note	2019	2018	2017
Net (loss) income for the period		(159,007)	90,976	165,265
Other comprehensive (loss) income, net of taxes - items that can be reclassified to the income statement				
Cash flow hedge accounting	17	879	(2,192)	12,556
Translation adjustment of foreign subsidiaries	30(e)	(54,765)	(9,959)	(10,742)
		(53,886)	(12,151)	1,814
Total comprehensive (loss) income for the period		(212,893)	78,825	167,079
Attributable to NEXA's shareholders		(207,594)	72,928	125,941
Attributable to non-controlling interests		(5,299)	5,897	41,138
Total comprehensive (loss) income for the period		(212,893)	78,825	167,079

The accompanying notes are an integral part of these consolidated financial statements

Nexa Resources S.A.



Consolidated balance sheet

As at December 31

All amounts in thousands of US dollars, unless otherwise stated

	Note	2019	2018
Assets			
Current assets			
Cash and cash equivalents	15	698,618	1,032,938
Financial investments	16	58,423	91,878
Derivative financial instruments	17	4,835	7,385
Trade accounts receivable	19	177,231	173,204
Inventory	20	295,258	269,705
Other assets	21	140,984	122,857
		1,375,349	1,697,967
Non-current assets			
Financial investments	16	352	355
Derivative financial instruments	17	14,689	3,820
Deferred income taxes	11	262,941	201,154
Related parties	22	744	740
Other assets	21	144,727	120,458
Property, plant and equipment	23	2,122,690	1,968,451
Intangible assets	24	1,538,526	1,742,461
Right-of-use assets	25	29,547	-
		4,114,216	4,037,439
Total assets		5,489,565	5,735,406
Liabilities and shareholders' equity			
Current liabilities			
Loans and financing	26	33,149	32,513
Lease liabilities	25	16,474	-
Derivative financial instruments	17	8,276	8,662
Trade payables		414,080	387,225
Confirming payable		82,770	70,411
Dividends payable		6,662	663
Environmental obligations	27	19,001	20,357
Contractual liabilities	29	26,351	31,992
Related parties	22	-	63
Other liabilities		92,227	99,964
		698,990	651,850
Non-current liabilities			
Loans and financing	26	1,475,408	1,392,354
Lease liabilities	25	17,910	-
Derivative financial instruments	17	13,542	5,560
Asset retirement and environmental obligations	27	274,826	249,925
Provisions	28	26,071	30,641
Deferred income taxes	11	273,278	298,598
Contractual liabilities	29	154,171	167,645
Related parties	22	834	1,517
Other liabilities		34,474	35,515
		2,270,514	2,181,755

Total liabilities	2,969,504	2,833,605
Shareholders' equity		
Attributable to NEXA's shareholders	2,147,452	2,476,593
Attributable to non-controlling interests	372,609	425,208
	2,520,061	2,901,801
Total liabilities and shareholders' equity	5,489,565	5,735,406

The accompanying notes are an integral part of these consolidated financial statements

Nexa Resources S.A.



Consolidated statement of cash flows Years ended December 31 All amounts in thousands of US dollars

	Note	2019	2018	2017
Cash flows from operating activities				
(Loss) income before income tax		(215,880)	131,899	271,459
Impairment loss	31	142,133	3,283	-
Depreciation and amortization	23, 24 and 25	317,892	267,189	270,454
Interest and foreign exchange effect		71,640	143,199	52,287
Loss (gain) on sale of property, plant and equipment and intangible assets	9	(857)	8,616	694
Gain on sale of investment	9	-	(348)	(4,588)
Changes in provisions		3,854	29,777	32,798
Changes in operating assets and liabilities	15 (b)	(71,634)	(53,040)	(85,265)
Interest paid on loans and financings	26	(71,804)	(74,592)	(58,635)
Interest paid on lease liabilities	25	(3,259)	-	-
Income taxes paid		(49,262)	(108,385)	(100,265)
Net cash provided by operating activities		122,823	347,598	378,939
Cash flows from investing activities				
Acquisitions of property, plant and equipment	23	(396,672)	(299,773)	(197,638)
Net (purchases) sales of financial investments		54,710	140,402	(65,661)
Proceeds from the sale of property, plant and equipment		6,570	1,268	16,542
Advance paid for Pollarix acquisition		-	-	(81,615)
Net cash used in investing activities		(335,392)	(158,103)	(328,372)
Cash flows from financing activities				
New loans and financings	26 (c)	105,974	292,901	830,598
Payments of loans and financings	26 (c)	(19,437)	(295,104)	(537,254)
Payments of lease liabilities	25 (b)	(13,280)	-	-
Dividends paid		(113,389)	(3,475)	-
Reimbursement of share premium		-	(80,000)	(430,000)
Repurchase of the Company's own shares		(8,103)	(1,352)	-
Acquisition of non-controlling interest	30 (g)	(71,054)	-	-
Capital reduction related to Pollarix acquisition		-	(87,623)	(55,380)
Disbursement from equity transactions with non-controlling shareholders		-	(2,757)	(61,549)
Proceeds from initial public offering, net of underwriter expenses		-	-	306,431
Net cash (used in) provided by financing activities		(119,289)	(177,410)	52,846
Foreign exchange effect on cash and cash equivalents		(2,462)	1,816	48
Increase (decrease) in cash and cash equivalents		(334,320)	13,901	103,461
Cash and cash equivalents at the beginning of the period		1,032,938	1,019,037	915,576
Cash and cash equivalents at the end of the period		698,618	1,032,938	1,019,037

The accompanying notes are an integral part of these consolidated financial statements

Nexa Resources S.A.



Consolidated statement of changes in shareholders' equity

Years ended December 31

All amounts in thousands of US dollars, unless otherwise stated

	Capital	Treasury shares	Share premium	Additional paid in capital	Retained earnings (cumulative deficit)	Accumulated other comprehensive (loss)	Total	Non-controlling interests	Total shareholders' equity
At January 1, 2017	1,041,416	-	339,228	1,678,456	(138,043)	(73,085)	2,847,972	476,344	3,324,316
Net income for the period	-	-	-	-	126,885	-	126,885	38,380	165,265
Other comprehensive income (loss) for the period	-	-	-	-	3,327	(4,271)	(944)	2,758	1,814
Total comprehensive income (loss) for the period	-	-	-	-	130,212	(4,271)	125,941	41,138	167,079
Reversion of put option	-	-	-	173,734	-	-	173,734	-	173,734
Purchase of Pollarix	-	-	-	(81,615)	-	-	(81,615)	-	(81,615)
Capital reduction related to Pollarix acquisition	-	-	-	(87,711)	-	-	(87,711)	-	(87,711)
Constitution of share premium	(928,596)	-	928,596	-	-	-	-	-	-
Decrease in non-controlling interests	-	-	-	(366,197)	-	-	(366,197)	(38,280)	(404,477)
Increase in participation in associates	-	-	-	2,061	-	-	2,061	(2,061)	-
Reimbursement of share premium	-	-	(430,000)	-	-	-	(430,000)	-	(430,000)
Proceed from initial public offering, net of underwriter expenses	20,500	-	285,931	-	-	-	306,431	-	306,431
Dividends distribution	-	-	-	-	(3,781)	-	(3,781)	(55,073)	(58,854)
Total contributions by and distributions to shareholders	(908,096)	-	784,527	(359,728)	(3,781)	-	(487,078)	(95,414)	(582,492)
At December 31, 2017	133,320	-	1,123,755	1,318,728	(11,612)	(77,356)	2,486,835	422,068	2,908,903
At January 1, 2018	133,320	-	1,123,755	1,318,728	(11,612)	(77,356)	2,486,835	422,068	2,908,903
Impact of the adoption of IFRS 9	-	-	-	-	(1,818)	-	(1,818)	-	(1,818)
At January 1, 2018 after impacts of the adoption of new standards	133,320	-	1,123,755	1,318,728	(13,430)	(77,356)	2,485,017	422,068	2,907,085
Net income for the period	-	-	-	-	74,860	-	74,860	16,116	90,976
Other comprehensive loss for the period	-	-	-	-	-	(1,932)	(1,932)	(10,219)	(12,151)
Total comprehensive income (loss) for the period	-	-	-	-	74,860	(1,932)	72,928	5,897	78,825
Decrease in non-controlling interests	-	-	-	-	-	-	-	(2,757)	(2,757)
Reimbursement of share premium - USD 0.60 per share	-	-	(80,000)	-	-	-	(80,000)	-	(80,000)
Repurchase of the Company's own shares	-	(1,352)	-	-	-	-	(1,352)	-	(1,352)
Total contributions by and distributions to shareholders	-	(1,352)	(80,000)	-	-	-	(81,352)	(2,757)	(84,109)
At December 31, 2018	133,320	(1,352)	1,043,755	1,318,728	61,430	(79,288)	2,476,593	425,208	2,901,801

The accompanying notes are an integral part of these consolidated financial statements

Nexa Resources S.A.



Consolidated statement of changes in shareholders' equity

Years ended December 31

All amounts in thousands of US dollars, unless otherwise stated

	Capital	Treasury shares	Share premium	Additional paid in capital	Retained earnings (cumulative deficit)	Accumulated other comprehensive (loss)	Total	Non-controlling interests	Total shareholders' equity
At January 1, 2019	133,320	(1,352)	1,043,755	1,318,728	61,430	(79,288)	2,476,593	425,208	2,901,801
Impact of the adoption of IFRS 16	-	-	-	-	71	-	71	-	71
Impact of the adoption of IFRIC 23	-	-	-	-	(4,023)	-	(4,023)	-	(4,023)
At January 1, 2019 after impacts of the adoption of new standards	133,320	(1,352)	1,043,755	1,318,728	57,478	(79,288)	2,472,641	425,208	2,897,849
Net loss for the period	-	-	-	-	(146,626)	-	(146,626)	(12,381)	(159,007)
Other comprehensive income(loss) for the period	-	-	-	-	-	(60,968)	(60,968)	7,082	(53,886)
Total comprehensive loss for the period	-	-	-	-	(146,626)	(60,968)	(207,594)	(5,299)	(212,893)
Capital increase from non-controlling interest	-	-	-	-	-	-	-	33,650	33,650
Acquisition of non-controlling interest – note 30(g)	-	-	-	(37,404)	-	-	(37,404)	(33,650)	(71,054)
Repurchase of the Company's own shares	-	(8,103)	-	-	-	-	(8,103)	-	(8,103)
Dividends distribution to NEXA's shareholders - USD 0.53 per share	-	-	-	-	(69,832)	-	(69,832)	-	(69,832)
Dividends distribution to non-controlling interests and to NEXA PERU's investment shares	-	-	-	(2,256)	-	-	(2,256)	(47,300)	(49,556)
Total contributions by and distributions to shareholders	-	(8,103)	-	(39,660)	(69,832)	-	(117,595)	(47,300)	(164,895)
At December 31, 2019	133,320	(9,455)	1,043,755	1,279,068	(158,980)	(140,256)	2,147,452	372,609	2,520,061

The accompanying notes are an integral part of these consolidated financial statements

Notes to the consolidated financial statements

At and for year ended December 31, 2019

All amounts in thousands of US dollars, unless otherwise stated

1 General information

Nexa Resources S.A. (“NEXA”) was incorporated on February 26, 2014 under the laws of Luxembourg as a public limited liability company (société anonyme). Its shares are publicly traded on the New York Stock Exchange (“NYSE”) and the Toronto Stock Exchange (“TSX”). The Company’s registered office is located at 37A, Avenue J. F. Kennedy in the city of Luxembourg in the Grand Duchy of Luxembourg.

NEXA and its subsidiaries (the “Company”) own and operate three polymetallic mines in Peru, and two polymetallic mines in Brazil. The Company is also constructing another polymetallic mine in Brazil. The Company's operations comprise large-scale, mechanized underground and open pit mines. The Company also owns a zinc smelter in Peru and two zinc smelters in Brazil.

The Company’s majority shareholder is Votorantim S.A. (“VSA”), which holds 64.25% of its equity. VSA is a Brazilian privately-owned industrial conglomerate that holds ownership interests in metal, steel, cement and energy companies, among others.

2 Information by business segment

Business segment definition

The Company’s Chief Executive Officer has been identified as the chief operating decision maker (“CODM”), since he has the final authority over resource allocation decisions and performance assessment. The CODM analyzes performance from a product perspective and the Company has identified two reportable segments:

- Mining: consists of five long-life polymetallic mines, three located in the Central Andes of Peru and two located in the state of Minas Gerais in Brazil. In addition to zinc, the Company produces substantial amounts of copper, lead, silver and gold as by-products, which reduce the overall cost to produce mined zinc.
- Smelting: consists of three operating units, one located in Cajamarquilla in Peru and two located in the state of Minas Gerais in Brazil. The facilities recover and produce metallic zinc (SHG zinc and zinc alloys), zinc oxide and by-products, such as sulfuric acid.

Accounting policy

Segment performance is measured based on Adjusted EBITDA, since financial results, comprising financial income and expenses and foreign exchange, and income taxes are managed at the corporate level and are not allocated to operating segments. Adjusted EBITDA is defined as net income (loss) for the period, adjusted by (i) share in the results of associates, (ii) depreciation and amortization, (iii) net financial results, (iv) income tax, (v) gain (loss) on sale of investments, and (vi) impairment and impairment reversals. In addition, management may adjust the effect of certain types of transactions that in management’s judgment are not indicative of the Company’s normal operating activities or do not necessarily occur on a regular basis.

The internal information used for making decisions is prepared using IFRS based accounting measurements and management reclassifications between income statement line items, which are reconciled to the consolidated financial statements in the column “Adjustments”. Reclassifications include mainly derivative financial instruments from Other income and expenses to Cost of sales, and certain overhead cost centers from Other income and expenses to Cost of sales and/or Selling, general and administrative.

Nexa Resources S.A.



Notes to the consolidated financial statements

At and for year ended December 31, 2019

All amounts in thousands of US dollars, unless otherwise stated

The Company uses customary market terms for intersegment sales. The Company's corporate headquarters expenses are allocated to the reportable segments to the extent they are allocated in the measures of performance used by the CODM.

The presentation of segment results and reconciliation to income before income tax in the consolidated income statement is as follows:

	2019				
	Mining	Smelting	Intersegment sales	Adjustments	Consolidated
Net revenues	1,000,170	1,865,733	(535,776)	2,179	2,332,306
Cost of sales	(801,985)	(1,655,062)	535,776	(23,412)	(1,944,683)
Gross profit	198,185	210,671	-	(21,233)	387,623
Selling, general and administrative	(117,280)	(89,540)	-	(9,691)	(216,511)
Mineral exploration and project Development	(103,470)	(9,503)	-	(11)	(112,984)
Impairment loss	(142,133)	-	-	-	(142,133)
Other income and expenses, net	(22,697)	(29,569)	-	25,245	(27,021)
Operating (loss) income	(187,395)	82,059	-	(5,690)	(111,026)
Depreciation and amortization	217,870	97,975	-	2,047	317,892
Exceptional items (i)	142,133	-	-	-	142,133
Adjusted EBITDA	172,608	180,034	-	(3,643)	348,999
Exceptional items (i)					(142,133)
Depreciation and amortization					(317,892)
Net financial results					(104,854)
Loss before income tax					(215,880)

	2018				
	Mining	Smelting	Intersegment sales	Adjustments	Consolidated
Net revenues	1,163,741	2,030,568	(704,031)	924	2,491,202
Cost of sales	(707,751)	(1,878,769)	704,031	(6,455)	(1,888,944)
Gross profit	455,990	151,799	-	(5,531)	602,258
Selling, general and administrative	(54,705)	(87,929)	-	(16,969)	(159,603)
Mineral exploration and project Development	(112,713)	(11,067)	-	(2,498)	(126,278)
Impairment loss	-	(3,283)	-	-	(3,283)
Other income and expenses, net	(30,551)	30,428	-	21,582	21,459
Operating income	258,021	79,948	-	(3,417)	334,553
Depreciation and amortization	172,357	94,832	-	-	267,189
Exceptional items (i)	-	-	-	3,050	3,050
Adjusted EBITDA	430,378	174,780	-	(367)	604,792
Exceptional items (i)					(3,050)
Depreciation and amortization					(267,189)
Net financial results					(202,654)
Income before income tax					131,899

Nexa Resources S.A.



Notes to the consolidated financial statements

At and for year ended December 31, 2019

All amounts in thousands of US dollars, unless otherwise stated

	2017				
	Mining	Smelting	Intersegment sales	Adjustments	Consolidated
Net revenues	1,213,221	1,952,006	(721,463)	5,720	2,449,484
Cost of sales	(680,811)	(1,746,771)	721,463	(46,706)	(1,752,825)
Gross profit	532,410	205,235	-	(40,986)	696,659
Selling, general and administrative	(41,054)	(89,128)	-	(24,312)	(154,494)
Mineral exploration and project Development	(86,119)	(3,989)	-	(2,590)	(92,698)
Other income and expenses, net	(54,777)	(58,749)	-	65,639	(47,887)
Operating income	350,460	53,369	-	(2,249)	401,580
Depreciation and amortization	171,086	99,370	-	-	270,454
Exceptional items (ii)	-	-	-	(4,515)	(4,515)
Adjusted EBITDA	521,546	152,739	-	(6,764)	667,519
Exceptional items (ii)					4,515
Share in the results of associates					60
Depreciation and amortization					(270,454)
Net financial results					(130,181)
Income before income tax					271,459

(i) Exceptional items are composed of impairment loss in the amount of USD 142,133 in 2019 (2018: USD 3,283) and miscellaneous adjustments to reconcile the segments' Adjusted EBITDA to the consolidated Adjusted EBITDA.

(ii) Exceptional items are composed of gain on sale of investments in the amount of USD 4,588 and miscellaneous adjustments to reconcile the segments' Adjusted EBITDA to the consolidated Adjusted EBITDA.

3 Basis of preparation of the consolidated financial statements

The consolidated financial statements of the Company have been prepared in accordance with International Financial Reporting Standards ("IFRS") and interpretations issued by the IFRS Interpretations Committee applicable to companies reporting under IFRS. The consolidated financial statements comply with IFRS as issued by the International Accounting Standards Board.

The consolidated financial statements have been prepared under the historical cost convention, except for some financial assets and financial liabilities (including derivative financial instruments) measured at fair value at the end of each reporting period. Certain prior year amounts have been conformed to the current year's presentation.

The consolidated financial statements of the Company for the year ended December 31, 2019 were approved to be issued in accordance with a resolution of the Board of Directors on February 13, 2020.

4 Principles of consolidation

(a) Subsidiaries

Subsidiaries include all entities over which the Company has control. The Company controls an entity when it (i) has the power over the entity; (ii) is exposed, or has the right, to variable returns from its involvement with the entity; and (iii) has the ability to affect those returns through its power over the entity. Subsidiaries are fully consolidated from the date on which control is transferred to the Company, except when the predecessor basis of accounting is applied. Subsidiaries are deconsolidated from the date that control ceases.

Notes to the consolidated financial statements

At and for year ended December 31, 2019

All amounts in thousands of US dollars, unless otherwise stated

When the Company has less than a majority of the voting rights of an investee, it considers that it has power over the investee when the voting rights are sufficient to give it the practical ability to direct the relevant activities of the investee unilaterally.

Inter-company transactions, balances and unrealized gains on transactions between companies in the consolidated group are eliminated. Unrealized losses are also eliminated unless the transaction indicates impairment of the transferred asset.

Accounting policies of subsidiaries are consistent with the policies adopted by the Consolidated group.

Non-controlling interests in the equity and results of subsidiaries are shown separately in the consolidated balance sheet, income statement, statement of comprehensive income and statement of changes in shareholders' equity.

(b) Joint operations

The Company recognizes its direct right to the assets, liabilities, revenues and expenses of joint operations and its share of any jointly held assets or incurred liabilities and revenues and expenses. These have been included in the consolidated financial statements under the appropriate headings.

A joint operation is a joint arrangement whereby the parties that have joint control of the arrangement have rights to the assets, and obligations for the liabilities, relating to the arrangement. Joint control is the contractually agreed sharing of control of an arrangement, which exists only when decisions about the relevant activities require unanimous consent of the parties sharing control.

Transactions, balances and unrealized gains and losses between consolidated entities are eliminated.

The main entities included in the consolidated financial statements are:

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Notes to the consolidated financial statements

At and for year ended December 31, 2019

All amounts in thousands of US dollars, unless otherwise stated

	Percentage of shares		Headquarter	Activities
	2019	2018		
Subsidiaries				
L.D.O.S.P.E. Geração de Energia e Participações Ltda. - L.D.O.S.P.E."	100.00	100.00	Brazil	Energy
L.D.Q.S.P.E. Geração de Energia e Participações Ltda. - "L.D.Q.S.P.E."	100.00	100.00	Brazil	Energy
L.D.R.S.P.E. Geração de Energia e Participações Ltda. - "L.D.R.S.P.E."	100.00	100.00	Brazil	Energy
Mineração Dardanelos Ltda.	100.00	70.00	Brazil	Mining projects
Nexa Recursos Minerais S.A. - "NEXA BR"	100.00	100.00	Brazil	Mining / Smelting
Mineração Santa Maria Ltda.	99.99	99.99	Brazil	Mining projects
Pollarix S.A. (i)	33.33	33.33	Brazil	Holding and others
Karmin Holding Ltda.	100.00	-	Brazil	Holding and others
Mineração Rio Aripuaña Ltda.	100.00	-	Brazil	Holding and others
Votorantim Metals Canada Inc.	100.00	100.00	Canada	Holding and others
Rayrock Antofagasta S.A.C	99.99	99.99	Chile	Holding and others
Cia. Magistral S.A.C	100.00	100.00	Peru	Mining projects
Nexa Resources El Porvenir S.A.C.	99.99	99.99	Peru	Mining
Minera Pampa de Cobre S.A.C	99.99	99.99	Peru	Mining
Nexa Resources Cajamarquilla S.A. - "NEXA CJM"	99.99	99.99	Peru	Smelting
Inversiones Garza Azul S.A.C	99.75	99.75	Peru	Holding and others
Nexa Resources Perú S.A.A. - "NEXA PERU"	80.23	80.23	Peru	Mining
Nexa Resources Atacocha S.A.A. - "NEXA ATACOCHA"	66.62	66.62	Peru	Mining
Minera Bongará S.A.	61.00	61.00	Peru	Mining projects
Nexa Resources UK Ltd. - "NEXA UK"	100.00	100.00	United Kingdom	Mining
Votorantim US. Inc.	100.00	100.00	United States	Holding and others
Joint-operation				
Campos Novos Energia S.A. - "Enercan"	20.98	20.98	Brazil	Energy
Cia. Minera Shalipayco S.A.C	75.00	75.00	Peru	Mining projects

(i) Pollarix is the energy holding company and sells energy to the Company's Brazilian operating subsidiaries at market prices. NEXA BR owns all the common shares of Pollarix, which represents 33.33% of its total share capital. The remaining shares are preferred shares with limited voting rights, which are owned by NEXA's controlling shareholder, VSA.

(c) Transactions with non-controlling interests

Transactions with non-controlling interests that do not result in a loss of control are accounted within shareholders' equity as transactions with equity owners of the consolidated group. A change in ownership interest results in an adjustment between the carrying amounts of the controlling and non-controlling interests to reflect their relative interests in the subsidiary. Any difference between the amount of the adjustment to non-controlling interests and any consideration paid or received is recognized in additional paid in capital within shareholders' equity.

(d) Foreign currency translation

(i) Functional and presentation currency

Items included in the financial statements of each of the Company's entities are measured using the currency of the primary economic environment in which the entity operates ("the functional currency"). The Company's consolidated financial statements are presented in US Dollars ("USD"), which is NEXA's functional and reporting currency.

Notes to the consolidated financial statements

At and for year ended December 31, 2019

All amounts in thousands of US dollars, unless otherwise stated

(ii) Transactions and balances

Foreign currency transactions are translated into the functional currency using the exchange rates at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation of monetary assets and liabilities denominated in foreign currencies at the end of each reporting period are recognized in the income statement. Translation differences on assets and liabilities carried at fair value are reported as part of the fair value gain or loss.

(iii) Consolidated entities

The results of operations and financial position of consolidated entities that have a functional currency different from the reporting currency are translated into the reporting currency as follows:

- Assets and liabilities for each balance sheet presented are translated at the closing rate at the date of that balance sheet;
- Income and expenses for each income statement and statement of comprehensive income are translated at average exchange rates which is a reasonable approximation of the cumulative effect of the rates prevailing on the transaction dates; and
- All resulting exchange differences are recognized in other comprehensive income and accumulated in a separate component of shareholders' equity.

5 Changes in accounting policies and disclosures

Except for new standards, IFRS 16 and IFRIC 23, which are discussed below, the other amendments to standards that apply from January 1, 2019 are primarily clarifications and none required a change in the Company's accounting policies.

Additionally, the Company has not early adopted any new standards, amendments or interpretations that are effective after December 31, 2019. It does not expect that these new standards, amendments or interpretations will have a material effect on the Company's financial statements.

New and amended IFRS standards that are effective beginning on January 1, 2019

(a) IFRS 16 – “Leases”

Main aspects introduced by the standard

IFRS 16 was issued in January 2016 and applicable for periods beginning after January 1, 2019. It results in certain leases being recognized on the balance sheet by lessees, as the distinction between operating and finance leases is removed. Under the new standard, an asset (the right to use the leased item) and a financial liability to pay rentals are recognized.

Transition method

The Company has applied IFRS 16 from its mandatory adoption date of January 1, 2019, using the simplified transition approach and did not restate comparative amounts for the periods prior to the adoption. The cumulative effect of applying the standard was recognized as an adjustment to the opening balance of retained earnings.

The lease liabilities related to leases previously classified as operating leases, were measured using the present value of the remaining lease payments, discounted by the incremental borrowing rate at the date of initial application.

Notes to the consolidated financial statements

At and for year ended December 31, 2019

All amounts in thousands of US dollars, unless otherwise stated

Right-of-use assets were measured on transition at the same amount of the lease liability, adjusted by any prepaid or accrued lease expense, less impairment provision.

For leases previously classified as finance leases, the lease liability and the right of use asset represents the carrying amount of the lease liability immediately before the date of initial application.

Practical expedients applied at the adoption

In applying IFRS 16 for the first time, the Company has used the following practical expedients permitted by the standard:

- The accounting for low value leases and leases with a remaining term of less than 12 months as at January 1, 2019 as short-term leases;
- The exclusion of initial direct costs from the measurement of the right-of-use asset at the date of initial application; and
- The use of a single discount rate to a portfolio of leases with reasonably similar characteristics.

Impacts of adoption

The Company recognized lease liabilities and right-of-use assets in the amount of USD 41,450 and USD 41,521, respectively. Prepayments made in 2018 in the amount of USD 71 were recognized in retained earnings at January 1, 2019. Net current assets were reduced by USD 18,612 due to the presentation of a portion of the lease liability as a current liability. The Company also reclassified the amount of USD 2,278 from Property, plant and equipment to Right-of-use assets and USD 3,088 from Loans and financing to Lease liabilities corresponding to contracts previously classified as financial leases under IAS 17.

As a result of the adoption, income before tax decreased by USD 3,319 for the year ended December 31, 2019.

(b) IFRIC 23 – Uncertainty over income tax treatments

Nature of change

The interpretation explains how to recognize, and measure current and deferred income tax assets and liabilities where there is uncertainty over a tax treatment.

Transition method

The Company has applied the standard from its mandatory adoption date of January 1, 2019. On initial application, the Company applied the interpretation retrospectively with the cumulative effect of initially applying the interpretation as an adjustment to the opening balance of retained earnings. Comparative information has not been restated.

Impacts of adoption

The interpretation affected primarily the accounting for the Company's uncertain income tax treatments where the likelihood that a taxation authority will not accept such treatments is probable. The impact of the adoption of IFRIC 23 at January 1, 2019 was USD 4,023. The Company also reclassified the amount of USD 6,047 from Provisions to Deferred income taxes.

Notes to the consolidated financial statements

At and for year ended December 31, 2019

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6 Net revenue

Accounting policy

Revenue represents the fair value of the consideration received or receivable for the sale of goods in the ordinary course of the Company's activities. Revenues are shown net of value-added tax, returns, rebates and discounts, after eliminating sales between the consolidated companies.

The Company recognizes revenue when a performance obligation is satisfied by transferring a promised good or service to a customer. The asset is transferred when the customer obtains control of that asset. To determine the point in time at which a customer obtains control of a promised asset the Company considers the following indicators: (i) the Company has a present right to payment for the asset; (ii) the customer has legal title to the asset; (iii) the Company has transferred physical possession of the asset; (iv) the customer has the significant risks and rewards of ownership of the asset; (v) the customer has accepted the asset.

Identification and timing of satisfaction of performance obligations

The Company has two distinct performance obligations included in certain sales contracts, being:

(i) the promise to provide goods to its customers, and (ii) the promise to provide freight services to its customers.

Promise to provide goods: this performance obligation is satisfied when the control of such goods is transferred to the final customer, which is substantially determined based on the Incoterms agreed upon in each of the contracts with customers.

Promise to provide freight service: this performance obligation is satisfied when the freight service contracted to customers is completed.

As a result of the distinct performance obligations identified part of the Company's revenue is presented as revenue from services. Cost related to revenue from services is presented as "Cost of sales".

Determining the transaction price and the amounts allocated to performance obligations

The Company has considered the terms of the contract and its customary business practices to determine the transaction price. The transaction price is the amount of consideration to which the Company expects to be entitled in exchange for transferring promised goods or services to its customers. Transaction price is allocated to each performance obligation on a relative standalone selling price basis.

For the purpose of determining the transaction price, the entity has mainly fixed prices. However, the Company's silver streaming arrangement for Cerro Lindo mine has the transaction price linked to silver production, which might change over time. Therefore, it is accounted for as variable consideration. Revenue related to silver streaming sales was not material for the year ended December 31, 2019.

Nexa Resources S.A.



Notes to the consolidated financial statements

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(a) Composition of net revenues

(i) Gross revenue reconciliation

	2019	2018	2017
Gross revenues	2,552,275	2,779,008	2,709,236
Revenues from products	2,473,534	2,708,112	2,637,613
Revenues from services	78,741	70,896	71,623
Taxes on sales	(216,550)	(284,316)	(257,347)
Return of products sales	(3,419)	(3,490)	(2,405)
Net revenues	2,332,306	2,491,202	2,449,484

(ii) Net revenue of products

	2019	2018	2017
Zinc	1,592,050	1,817,139	1,725,719
Lead	259,238	283,861	302,877
Copper	174,697	151,939	174,274
Silver	63,867	66,112	99,179
Other	163,713	101,255	75,812
Net revenues from products	2,253,565	2,420,306	2,377,861
Taxes on sales	216,550	284,316	257,347
Return of products sales	3,419	3,490	2,405
Gross revenue from products	2,473,534	2,708,112	2,637,613

(b) Information on geographical areas in which the Company operates

The geographical areas are determined based on the location of the Company's customers. The net revenues of the Company, classified by currency and destination, is as follows:

(i) Revenues by destination

	2019	2018	2017
Brazil	625,033	693,409	721,640
Peru	595,601	674,228	696,527
Luxembourg	145,493	172,791	130,723
United States	159,672	141,131	158,060
Switzerland	101,636	126,156	108,798
Japan	71,352	93,474	69,565
Argentina	60,850	90,338	79,463
Korea	95,913	54,894	7,064
Colombia	37,149	51,724	47,734
Chile	80,849	51,215	38,101
Turkey	33,905	48,265	35,522
Austria	39,897	40,531	37,270
Singapore	99,488	37,506	60,857
Germany	20,749	20,906	23,154
China	9,940	9,538	18,172
Italy	9,000	5,327	15,799

Other	145,779	179,769	201,035
Net revenues	<u>2,332,306</u>	<u>2,491,202</u>	<u>2,449,484</u>

(ii) Revenues by currency

	2019	2018	2017
US Dollar	1,731,765	1,806,590	1,729,234
Brazilian Real	600,541	684,612	717,032
Other	-	-	3,218
Net revenues	<u>2,332,306</u>	<u>2,491,202</u>	<u>2,449,484</u>

Notes to the consolidated financial statements

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7 Expenses by nature

				<u>2019</u>	<u>2018</u>	<u>2017</u>
	<u>Cost of sales</u>	<u>Selling, general and administrative</u>	<u>Mineral exploration and project development</u>	<u>Total</u>	<u>Total</u>	<u>Total</u>
Raw materials and consumables used	(1,056,426)	(6,668)	-	(1,063,094)	(1,086,974)	(1,037,288)
Third-party services	(401,598)	(96,996)	(75,634)	(574,228)	(471,266)	(326,889)
Depreciation and amortization	(310,254)	(7,614)	(24)	(317,892)	(267,189)	(270,454)
Employee benefit expenses	(161,110)	(74,183)	(18,958)	(254,251)	(262,964)	(279,371)
Other expenses	(15,295)	(31,050)	(18,368)	(64,713)	(86,432)	(86,015)
	<u>(1,944,683)</u>	<u>(216,511)</u>	<u>(112,984)</u>	<u>(2,274,178)</u>	<u>(2,174,825)</u>	<u>(2,000,017)</u>

8 Mineral exploration and Project development

Accounting policy

The Company incurs mineral exploration costs such as exploratory drilling, geological and geophysical studies in order to determine the mineral potential of a given area, which are expensed as incurred.

The Company uses the front-end loading (“FEL”) methodology for project and development management. Development scoping costs and pre-feasibility studies for greenfield and brownfield projects are expensed during FEL 1 and FEL 2 phases, together with research and development costs for the smelting segment, until the project has demonstrated technical feasibility and economic viability.

Development costs are capitalized when the FEL 3 phase starts and the mineral potential and commercial viability of the project can be assessed reliably. Such costs include researching and analyzing existing exploration data, conducting geological studies, exploratory drilling and sampling, examining and testing extraction and treatment methods, and feasibility studies. Capitalized development costs are presented as property, plant and equipment.

Capitalized development costs are assessed for impairment at least annually or whenever evidences indicate that the assets may be impaired. For purposes of impairment assessment, the development costs are allocated to cash generating units.

(a) Composition of mineral exploration and project development

	<u>2019</u>	<u>2018</u>	<u>2017</u>
Mineral exploration	(73,759)	(83,182)	(76,161)
Project development (FEL 1 and FEL 2)	(39,225)	(43,096)	(16,537)
	<u>(112,984)</u>	<u>(126,278)</u>	<u>(92,698)</u>

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9 Other income and expenses, net

	2019	2018	2017
Tax credits (i)	4,721	37,582	57
Remeasurement of environmental obligations (ii)	2,477	12,078	433
Commodities derivative financial instruments	(833)	17,528	(18,785)
Gain (loss) on sale of property, plant and equipment (ii)	(857)	(9,884)	(694)
Gain on sale of investments	-	348	4,588
Contribution to communities	(5,205)	(13,445)	(12,947)
(Provision) reversal of legal claims	(4,424)	(3,671)	258
Mining obligations	(14,012)	(12,637)	(11,498)
Other operating income (expenses), net	(8,888)	(6,440)	(9,299)
	(27,021)	21,459	(47,887)

(i) On October 2018, a final decision by the Regional Federal Court (TRF) granted NEXA BR the right to recover federal tax credits recognized as “Other assets” in the amount of USD 59,686, being USD 33,653 principal amount and recognized at “Other income and expenses, net” and USD 26,033 corresponding to interest and recognized as “Financial income”. The credits recognized will be used to reduce future federal tax payments.

(ii) On May 21, 2018, the Company entered into an agreement to sell assets and transfer certain liabilities of the Fortaleza de Minas facility. The transaction resulted in the recognition of a loss of USD 9,615 on the sale of property, plant and equipment and intangible assets and a gain of USD 13,009 related to the reversal of the related asset retirement obligation.

10 Net financial results

	2019	2018	2017
Financial income			
Gains on financial investments	20,909	26,062	21,388
Derivative financial instruments - Note 17 (b)	5,951	-	-
Interest on tax credits – Note 9	5,498	26,033	-
Other financial income	5,271	15,414	8,480
	37,629	67,509	29,868
Financial expense			
Interest on loans and financing	(74,635)	(77,647)	(56,434)
Interest on contractual liabilities	(6,526)	(7,294)	(8,184)
Interest on other liabilities	(10,864)	(4,763)	(9,478)
Derivative financial instruments - Note 17 (b)	(4,927)	(2,538)	-
Interest on lease liabilities	(3,418)	-	-
Other financial expenses	(29,221)	(29,420)	(32,073)
	(129,591)	(121,662)	(106,169)
Foreign exchange effects	(12,892)	(148,501)	(53,880)
Net financial results	(104,854)	(202,654)	(130,181)

11 Current and deferred income taxes

Accounting policy

The current and deferred taxes on income are calculated based on the tax laws enacted or substantively enacted up to balance sheet date in the countries where the entities operate and generate taxable income. Management periodically evaluates positions taken by the Company in the taxes on income returns with respect to situations in which the applicable tax regulations are subject to interpretation. It establishes provisions where appropriate considering amounts expected to be paid to the tax authorities.

The current income tax is presented net, separated by taxpaying entity, in liabilities when there are amounts payable, or in assets when the amounts prepaid exceed the total amount due on the reporting date.

Deferred tax assets are recognized only to the extent it is probable that future taxable income will be available against which the temporary differences and/or tax losses can be utilized. Deferred tax assets and liabilities are offset when there is a legally enforceable right and an intention to offset them in the calculation of current taxes, generally when they are related to the same legal entity and the same tax authority. Accordingly, deferred tax assets and liabilities in different entities or in different countries are generally presented separately, and not on a net basis.

Deferred tax liabilities and assets are not recognized for temporary differences between the carrying amounts and tax bases of investments in foreign operations where the Company is able to control the timing of the reversal of the temporary differences and it is probable that the differences will not be reversed in the near future.

Deferred income tax is provided in full, using the liability method, on temporary differences arising between the tax bases of assets and liabilities and their carrying amounts in the consolidated financial statements. However, deferred tax liabilities are not recognized if they arise from the initial recognition of goodwill. Deferred income tax is also not accounted for if it arises from the initial recognition of an asset or liability in a transaction other than a business combination that, at the time of the transaction affects neither the accounting nor the taxable income or loss. Deferred income tax is determined using tax rates (and laws) that have been enacted or substantially enacted by the end of the reporting period and are expected to apply when the related deferred income taxes asset is realized or the deferred income tax liability is settled.

Critical accounting estimates and judgments

The Company is subject to income tax in all countries in which it operates. Significant judgment is required in determining the income tax provision. There are many transactions and calculations for which the ultimate tax determination is uncertain. The Company also recognizes liabilities for anticipated tax audit issues based on estimates of whether additional taxes will be due and if it is more likely than not that a tax authority will not accept the income tax treatments adopted by the Company, in the cases that there is an uncertainty over the income tax treatments or if the Company have a present legal or constructive obligation as a result of past events. Where the final tax outcome of these matters is different from the amounts that were initially recorded, such differences will impact the current and deferred tax assets and liabilities in the period in which such determination is made.

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(a) Reconciliation of income tax benefit (expense)

	2019	2018	2017
(Loss) income before income tax	(215,880)	131,899	271,459
Standard rate (i)	24.94%	26.01%	27.08%
Income tax benefit (expense) at standard rate	53,840	(34,307)	(73,511)
Difference in tax rate of subsidiaries outside Luxembourg	24,698	(11,227)	(19,912)
Special mining levy and special mining tax	(7,431)	(14,565)	(22,766)
Withholding tax on dividends paid by subsidiaries	(9,764)	-	(8,299)
Other permanent tax differences	(4,470)	19,176	18,294
Income tax benefit (expense)	56,873	(40,923)	(106,194)
Current	(46,382)	(71,787)	(125,691)
Deferred	103,255	30,864	19,497
Income tax benefit (expense)	56,873	(40,923)	(106,194)

(i) On April 25, 2019 the Luxembourg Parliament approved the 2019 Budget Law, including a reduction of the corporate income tax rate from 26.01% to 24.94%, effective for year 2019. As NEXA's tax credits on net operating losses resulting from its standalone activities do not meet the recognition criteria, no deferred tax assets are recognized. As a result, the change did not impact the consolidated income statement, consolidated balance sheet, or the consolidated statement of cash flows.

(b) Analysis of deferred income tax assets and liabilities

	2019	2018
Tax credits on net operating losses	160,905	106,817
Uncertain income tax treatments - note 5(b)	(9,779)	-
Tax credits on temporary differences		
Foreign exchange losses	31,027	50,766
Environmental liabilities	24,293	28,808
Asset retirement obligation	18,751	19,879
Tax, civil and labor provisions	6,962	9,389
Other provisions	7,933	6,443
Provision for obsolete and slow-moving inventory	5,734	5,308
Provision for employee benefits	7,270	5,409
Other	14,381	12,094
Tax debits on temporary differences		
Capitalized interest	(28,505)	(11,725)
Depreciation, amortization and asset impairment	(247,552)	(328,834)
Other	(1,757)	(1,798)
	(10,337)	(97,444)
Deferred income tax assets	262,941	201,154
Deferred income tax liabilities	(273,278)	(298,598)
	(10,337)	(97,444)

(c) Summary of contingent liabilities on income taxes

There are uncertainties and legal proceedings for which it is unlikely that an outflow of resources will be required. In such cases, a provision is not recognized. As of December 31, 2019, the main legal proceedings are related to carryforward calculation of net

operating losses, deductibility of foreign exchange losses and expenses. The estimated financial effect of these contingent liabilities is USD 182,380.

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(d) Effects of deferred tax on income statement and other comprehensive income

	2019	2018	2017
Balance at beginning of the year	(97,444)	(100,418)	(107,304)
Effect on income for the year	103,255	30,864	19,497
Effect on other comprehensive income	453	(126)	(4,119)
Impact of the adoption of IFRIC 23	(10,070)	-	-
Foreign exchange gain	(6,531)	(27,764)	(8,492)
Balance at end of the year	(10,337)	(97,444)	(100,418)

12 Financial risk management

Financial risk factors

The Company's activities expose it to a variety of financial risks: a) market risk (including currency risk, interest rate risk and commodities risk); b) credit risk; and c) liquidity risk.

A significant portion of the products sold by the Company are commodities, with prices pegged to international indices and denominated in USD. Part of the costs of production, however, is denominated in Brazilian Reais ("BRL") and Peruvian Soles ("PEN"), and therefore, there is a mismatch of currencies between revenues and costs. Additionally, the Company has debts linked to different indices and currencies, which may impact its cash flows.

In order to mitigate the potential adverse effects of each financial risk factor, the Company follows a Financial Risk Management Policy that establishes governance and guidelines for the financial risk management process, as well as metrics for measurement and monitoring. This policy establishes guidelines and rules for: (i) Commodities Exposure Management, (ii) Foreign Exchange Exposure Management, (iii) Interest Rate Exposure Management, (iv) Issuers and Counterparties Risk Management, and (v) Liquidity and Financial Indebtedness Management. All strategies and proposals must comply with the Financial Risk Management Policy guidelines and rules, be presented to and discussed with the Finance Committee of the board of directors, and, when applicable, submitted for the approval of the Board of Directors, under the governance structure described in the Financial Risk Management Policy.

(a) Market risk

The purpose of the market risk management process is to protect the Company's cash flow against adverse events, such as changes in foreign exchange rates, commodity prices and interest rates.

(i) Foreign exchange risk

Foreign exchange risk is managed through the Company's Financial Risk Management Policy, which states that the objectives of derivative transactions are to reduce cash flow volatility, hedge against foreign exchange exposure and minimize currency mismatches.

All actions related to the market risk management process are intended to protect cash flows in USD, to maintain the ability to pay financial obligations, and comply with liquidity and indebtedness levels defined by management.

Presented below are the financial assets and liabilities in foreign currencies at December 31, 2019. These mainly result from the foreign operations of NEXA BR for which the functional currency is the BRL.

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Intercompany loans balances are fully eliminated in the consolidated financial statements. However, the related foreign exchange gain or loss is not, and is presented as foreign exchange effects at note 10.

USD amounts of foreign currency balances	2019	2018
Assets		
Cash, cash equivalents and financial investments	350,772	320,069
Derivative financial instruments	19,524	11,205
Trade accounts receivable	27,005	39,000
	397,301	370,274
Liabilities		
Loans and financing	119,095	123,471
Derivative financial instruments	21,818	14,222
Trade payables	323	4,689
Lease liabilities	22,020	-
	163,256	142,382
Net exposure	234,045	227,892

(ii) Interest rate risk

The Company's interest rate risk arises mainly from long-term loans. Loans at variable rates expose the Company to cash flow interest rate risk. Loans at fixed rates expose the Company to fair value risk associated with interest rates. For further information related to interest rates, refer to Note 25.

The Company's Financial Risk Management Policy establishes guidelines and rules to hedge against changes in interest rates that impact the cash flows of the Company. Exposure to each interest rate is projected until the maturity of the assets and liabilities exposed to this index. Occasionally the Company enters into floating to fixed interest rate swaps to manage its cash flow interest rate risk.

(iii) Commodity price risk

This risk is related to the volatility in the prices of the Company's commodities. Prices fluctuate depending on demand, production capacity, producers' inventory levels, the commercial strategies adopted by large producers, and the availability of substitutes for these products in the global market.

The Company's Financial Risk Management Policy establishes guidelines to mitigate the risk of fluctuations in commodity prices that could impact the cash flows of the Company. The exposure to the price of each commodity considers the monthly projections of production, purchases of inputs and the maturity flows of hedges associated with them.

Commodity prices hedge transactions are classified into the following hedging strategies:

Hedges for sales of zinc at a fixed price (Customer Hedge)

The objective is to convert fixed prices sales to floating prices, observed on the London Metal Exchange (LME). The purpose of the strategy is to maintain the revenues of a business unit linked to the LME prices. These transactions usually relate to purchases of zinc for future settlement on the over-the-counter market.

Hedges for mismatches of quotational periods (Book Hedges)

The objective is to hedge quotational periods mismatches arising between the purchases of metal concentrate or processed metal and the sale of the processed metal. These transactions usually relate to purchases and sales of zinc and silver for future trading on the over-the-counter market.

Hedges for the operating margin of metals (Strategic Hedges)

The objective is to reduce the volatility of the cash flow from LME prices for zinc, copper and silver and ensure a more predicable operating margin. This strategy is carried out through the sale of zinc forward contracts. For NEXA BR, the transaction also involves the sale of USD forward contracts in order to hedge the operating margin in BRL.

(b) Credit risk

Trade receivables, derivative financial instruments, term deposits, bank deposit certificates ("CDBs") and repurchase transactions backed by debentures and government securities create exposure to credit risk with respect to the counterparties and issuers. The Company has a policy of making deposits in financial institutions that have, at least, a rating from two of the following international rating agencies: Fitch, Moody's or Standard & Poor's. The minimum rating required for counterparties is A+/A1 (local rating scale) or BBB-/Baa3 (global rating scale). In the specific case of financial institutions in Peru where only global rating assessments are available, it will be eligible provided it has a rating of "BBB-" at least by one rating agency.

The pre-settlement risk methodology is used to assess counterparty risks in derivative transactions. This methodology consists of determining the risk associated with the likelihood (via Monte Carlo simulations) of a counterparty defaulting on the financial commitments defined by contract.

The global ratings were obtained from the rating agencies Standard & Poor's, Moody's and Fitch ratings and are related to commitments in foreign or local currency and, in both cases, they assess the capacity to honor these commitments, using a scale applicable on a global basis. Therefore, both ratings in foreign currency and in local currency are internationally comparable ratings.

The ratings used by the Company are always the most conservative ratings of the referred agencies.

In the case of credit risk arising from customer credit exposure, the Company assesses the credit quality of the customer, considering mainly the history of the relationship and financial indicators defining individual credit limits, which are continuously monitored.

The Company performs initial analyses of customer credit and, when deemed necessary, guarantees or letters of credit are obtained to mitigate the credit risk. Additionally, most sales to the United States of America, Europe and Asia are collateralized by letters of credit and credit insurance.

The following table reflects the credit quality of issuers and counterparties for transactions involving cash and cash equivalents, financial investments and derivative financial instruments:

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	2019			2018		
	Local rating	Global rating	Total	Local rating	Global rating	Total
Cash and cash equivalents						
AAA	11,243	-	11,243	1,484	-	1,484
AA+	5,997	-	5,997	861	-	861
AA	18	99,853	99,871	24	78,245	78,269
AA-	1	10,869	10,870	-	20,179	20,179
A+	-	156,032	156,032	-	178,730	178,730
A	-	230,084	230,084	-	361,484	361,484
A-	-	38,824	38,824	-	29,162	29,162
BBB+	-	67,467	67,467	-	181,411	181,411
BBB	-	23,552	23,552	-	20,245	20,245
BBB-	-	31,416	31,416	-	83,919	83,919
No rating	3	23,259	23,262	3	77,191	77,194
	17,262	681,356	698,618	2,372	1,030,566	1,032,938
Financial investments						
AAA	44,985	-	44,985	51,913	-	51,913
AA+	8,170	-	8,170	10,840	-	10,840
AA	352	-	352	24,965	-	24,965
AA-	656	-	656	-	-	-
No rating	4,612	-	4,612	4,515	-	4,515
	58,775	-	58,775	92,233	-	92,233
Derivative financial instruments						
AAA	16,025	-	16,025	3,749	-	3,749
AA	-	1,029	1,029	-	2,164	2,164
A+	-	422	422	-	5,275	5,275
A	-	-	-	-	17	17
A-	-	2,048	2,048	-	-	-
	16,025	3,499	19,524	3,749	7,456	11,205
	92,062	684,855	776,917	98,354	1,038,022	1,136,376

(c) Liquidity risk

This risk is managed through the Company's Financial Risk Management Policy, which aims to ensure the availability of funds to meet the Company's financial commitments. The main liquidity measurement and monitoring instrument is the cash flow projection, using a minimum projection period of 12 months from the benchmark date.

The table below analyzes the Company's financial liabilities to be settled by the Company based on their maturity (the remaining period from the balance sheet up to the contractual maturity date). The amounts below represent the estimated undiscounted future cash flow, which include interest to be incurred and, accordingly, do not reconcile directly with the amounts presented in the consolidated balance sheet.

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	Less than 1 year	Between 1 and 3 years	Between 3 and 5 years	Over 5 years	Total
2019					
Loans and financing	91,511	342,095	610,750	842,222	1,886,578
Lease liabilities	17,903	16,361	120	-	34,384
Derivative financial instruments	8,272	6,918	6,577	51	21,818
Trade payables	414,080	-	-	-	414,080
Confirming payable	82,770	-	-	-	82,770
Salaries and payroll charges	58,919	-	-	-	58,919
Dividends payable	6,662	-	-	-	6,662
Related parties	-	834	-	-	834
Asset Retirement Obligation	15,406	26,275	60,406	235,190	337,277
Use of public assets	1,446	3,177	3,581	30,729	38,933
	696,969	395,660	681,434	1,108,192	2,882,255
2018					
Loans and financing	91,890	261,186	619,958	897,701	1,870,735
Derivative financial instruments	8,663	4,954	605	-	14,222
Trade payables	387,225	-	-	-	387,225
Confirming payable	70,411	-	-	-	70,411
Salaries and payroll charges	58,166	-	-	-	58,166
Dividends payable	663	-	-	-	663
Related parties	63	1,517	-	-	1,580
Asset Retirement Obligation	12,283	40,171	36,561	198,061	287,075
Use of public assets	1,411	3,092	3,485	33,658	41,646
	630,775	310,920	660,609	1,129,420	2,731,723

(d) Capital management

The Company is subject to financial covenants on its loans and financing. The compliance with the financial covenants is verified by using the gearing ratio, calculated as net debt divided by Adjusted EBITDA.

Net debt is defined as (i) loans and financing, less (ii) cash and cash equivalents, less (iii) financial investments, plus or minus (iv) the fair value of derivative financial liabilities or assets, respectively. Adjusted EBITDA for capital management calculation uses the same assumptions described in Note 1 for Adjusted EBITDA by segment.

Net debt and Adjusted EBITDA measures should not be considered in isolation or as a substitute for net income or operating income, as indicators of operating performance, or as alternatives to cash flow as measures of liquidity. Additionally, management's calculation of Adjusted EBITDA may be different from the calculation used by other companies, including competitors in the mining and smelting industry, so these measures may not be comparable to those of other companies.

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The gearing ratio is as follows:

	Note	2019	2018	2017
Loans and financing	26	1,508,557	1,424,867	1,447,299
Cash and cash equivalents	15	(698,618)	(1,032,938)	(1,019,037)
Derivative financial instruments	17	2,294	3,017	3,260
Lease liabilities	25	34,384	-	-
Financial investments	16	(58,775)	(92,233)	(206,547)
Net debt		787,842	302,713	224,975
Net (loss) income for the year		(159,007)	90,976	165,265
Plus (less):				
Share in the results of associates		-	-	(60)
Depreciation and amortization	23, 24 and 25	317,892	267,189	270,454
Net financial results	10	104,854	202,654	130,181
Income tax (benefit) expense	11(a)	(56,873)	40,923	106,194
EBITDA		206,866	601,742	672,034
Exceptional items - note 2		142,133	3,050	(4,515)
Adjusted EBITDA		348,999	604,792	667,519
Gearing ratio (Net debt/Adjusted EBITDA)		2.26	0.50	0.34

13 Financial instruments

Accounting policy

Normal purchases and sales of financial assets are recognized on the trade date – the date on which the Company commits to purchase or sell the asset. Financial assets are initially recognized at fair value plus transaction costs for all financial assets not carried at fair value through profit or loss. Financial assets carried at fair value through profit or loss, if any, are initially recognized at fair value, and transaction costs are expensed in the income statement.

Financial assets are derecognized when the rights to receive cash flow from the investments have expired or the Company has transferred substantially all of the risks and rewards of ownership. Financial assets at fair value through profit or loss and at fair value through other comprehensive income are subsequently carried at fair value. Financial assets at amortized costs are subsequently measured using the effective interest rate method.

(i) Amortized cost

Financial assets measured at amortized cost are assets held within a business model whose objective is to hold financial assets in order to collect contractual cash flows and for which the contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

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(ii) Fair value through profit or loss

Financial assets measured at fair value through profit or loss are assets which an entity manages with the objective of realizing cash flows through the sale of such assets and financial assets that do not give rise to cash flows that are solely payments of principal and interest on the principal amount outstanding.

(iii) Fair value through other comprehensive income

Financial assets measured at fair value through other comprehensive income are held within a business model whose objective is achieved by both collecting contractual cash flows and selling financial assets and for which the contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

(a) Breakdown by category

The Company classifies its financial assets and liabilities under the following categories: amortized cost, fair value through other comprehensive income and fair value through profit or loss.

		2019			
		Amortized cost	Fair value through profit or loss	Fair value through other comprehensive income	Total
Assets per balance sheet	Note				
Cash and cash equivalents	15	-	698,618	-	698,618
Financial investments	16	-	58,775	-	58,775
Derivative financial instruments	17	-	17,249	2,275	19,524
Trade accounts receivable	19	107,995	69,236	-	177,231
Related parties	22	744	-	-	744
		108,739	843,878	2,275	954,892

		2019			
		Amortized cost	Fair value through profit or loss	Fair value through other comprehensive income	Total
Liabilities per balance sheet	Note				
Loans and financing	26	1,508,557	-	-	1,508,557
Lease liabilities	25	34,384	-	-	34,384
Derivative financial instruments	17	-	19,300	2,518	21,818
Trade payables		414,080	-	-	414,080
Confirming payables		82,770	-	-	82,770
Use of public assets (i)		23,279	-	-	23,279
Related parties	22	834	-	-	834
		2,063,904	19,300	2,518	2,085,722

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		2018			
		Amortized cost	Fair value through profit or loss	Fair value through other comprehensive income	Total
Assets per balance sheet	Note				
Cash and cash equivalents	15	-	1,032,938	-	1,032,938
Financial investments	16	-	92,233	-	92,233
Derivative financial instruments	17	-	6,885	4,320	11,205
Trade accounts receivable	19	22,146	151,058	-	173,204
Related parties	22	740	-	-	740
		22,886	1,283,114	4,320	1,310,320

		2018			
		Amortized cost	Fair value through profit or loss	Fair value through other comprehensive income	Total
Liabilities per balance sheet	Note				
Loans and financing	26	1,424,867	-	-	1,424,867
Derivative financial instruments	17	-	10,155	4,068	14,223
Trade payables		387,225	-	-	387,225
Confirming payables		70,411	-	-	70,411
Use of public assets (i)		22,126	-	-	22,126
Related parties	22	1,580	-	-	1,580
		1,906,209	10,155	4,068	1,920,432

(i) Classified as Other liabilities in the consolidated balance sheet.

14 Fair value estimates

Critical accounting estimates and judgments

The fair value of financial instruments that are not traded in an active market is determined using Valuation techniques. The Company uses judgment to select among a variety of methods and makes assumptions that are mainly based on market conditions existing at the end of each reporting period.

(a) Analysis

The carrying amounts of trade accounts receivable, less impairment losses, confirming payables and advances from customers approximate their fair values. The fair value of loans and financing for disclosure purposes are estimated by discounting the future contractual cash flow at the current market interest rate and adjusted for the Company's credit risk.

The main financial instruments and the assumptions made by the Company for their valuation are described below:

- Cash and cash equivalents, financial investments, trade accounts receivable and other current assets - considering their nature, terms and maturity, the carrying amounts approximate their fair value.
-

Financial liabilities - these instruments are subject to the usual market interest rates. The fair value was based on the present value of expected future cash disbursement, at interest rates currently available for debt with similar maturities and terms and adjusted for the Company's credit risk.

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-
- Derivative financial instruments the fair value of the derivative financial instruments is determined by calculating their present value through yield curves at the closing dates. The curves and prices used in the calculation for each group of instruments are developed based on data from Brazilian Securities, Commodities and Futures Exchange - B3, Central Bank of Brazil, LME and Bloomberg, interpolated between the available maturities.
 - Swap contracts - the present value of both the assets and liabilities are calculated through the discount of forecasted cash flow by the interest rate of the currency in which the swap is denominated. The difference between the present value of the assets and the liabilities generates its fair value.
 - Forward contracts – the present value is estimated by discounting the notional amount multiplied by the difference between the future price at the reference date and the contracted price. The future price is calculated using the convenience yield of the underlying asset. It is common to use Asian non-deliverable forwards for hedging non-ferrous metals positions. Asian contracts are derivatives in which the underlying is the average price of certain asset over a range of days.
 - Option contracts - the present value is estimated based on Black model, with assumptions that include the underlying asset price, strike price, volatility, time to maturity and interest rate. The underlying asset price is the average price of the foreign exchange rate in the fixing month.



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(b) Fair value by hierarchy

	2019		
	Level 1	Level 2	Total
Assets			
Cash and cash equivalents	698,618	-	698,618
Financial investments	28,126	30,649	58,775
Derivative financial instruments	-	19,524	19,524
Trade accounts receivable	-	69,236	69,236
	726,744	119,409	846,153
Liabilities			
Derivative financial instruments	-	21,818	21,818
Loans and financing (i)	1,199,694	377,855	1,577,549
	1,199,694	399,673	1,599,367
	2018		
	Level 1	Level 2	Total
Assets			
Cash and cash equivalents	1,032,938	-	1,032,938
Financial investments	39,167	53,065	92,232
Derivative financial instruments	-	11,205	11,205
Trade accounts receivable	-	151,058	151,058
	1,072,105	215,328	1,287,433
Liabilities			
Derivative financial instruments	-	14,222	14,222
Loans and financing (i)	1,014,974	390,848	1,405,822
	1,014,974	405,070	1,420,044

(i) Loans and financing are measured at amortized cost. Therefore, the amounts presented in this note do not match with the consolidated balance sheet.

The carrying amount of other financial instruments measured at amortized cost do not differ significantly from their fair value.

The Company discloses fair value measurements based on their level of the following fair value measurement hierarchy:

Level 1:

Quoted prices (unadjusted) in active markets for identical assets and liabilities traded in active markets at the balance sheet date. A market is regarded as active if quoted prices are readily and regularly available from an exchange, dealer, broker, industry group, pricing service, or regulatory agency, and those prices represent actual and regularly occurring market transactions on an arm's length basis. The quoted market price used for financial assets held by the Company is the current bid price.

Level 2:

Financial instruments not traded in an active market for which fair value is determined using valuation techniques, when all of the significant inputs required to identify the fair value of an instrument are observable. Specific valuation techniques used to value financial instruments include:

- Quoted market prices or dealer quotes for similar instruments are used where available

- The fair values of interest rate swaps are calculated at the present value of the estimated future cash flow based on observable yield curves; and
- The fair value of forward foreign exchange contracts is determined using forward exchange rates at the balance sheet date, with the resulting value discounted to present value.

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Other techniques, such as discounted cash flow analysis, are used to determine the fair value for the remaining financial instruments.

Level 3:

Inputs for the asset or liability that are not based on observable market data (that is, unobservable inputs) are classified as Level 3. As of December 31, 2019, there were no financial assets and liabilities carried at fair value classified as Level 3.

15 Cash and cash equivalents

Accounting policy

Cash and cash equivalents includes cash, bank deposits, and highly liquid short-term investments (investments with an original maturity less than 90 days), which are readily convertible into a known amount of cash and subject to an immaterial risk of changes in value. Bank overdrafts are shown within loans and financing in current liabilities in the balance sheet.

(a) Composition

	2019	2018
Cash and banks	299,374	320,069
Term deposits	399,245	712,869
	698,618	1,032,938

The decrease in cash and cash equivalents balance is mainly related to dividends payments in the amount of USD 113,389, and increase in acquisitions of property, plant and equipment.

(b) Changes in operating assets and liabilities

	2019	2018	2017
Decrease (increase) in assets			
Trade accounts receivable	(8,634)	8,537	(63,172)
Inventory	(35,425)	52,472	(15,675)
Other assets	(45,891)	(133,716)	23,143
Increase (decrease) in liabilities			
Trade payables	18,823	57,411	47,573
Confirming payables	12,278	(40,613)	8,737
Contractual liabilities	(25,641)	(29,543)	(36,299)
Other liabilities	12,856	32,412	(49,572)
	(71,634)	(53,040)	(85,265)

(c) Non-cash transactions

The Company has had additions to right-of-use assets and liabilities in the amount of USD 3,114 in 2019. The Company has had non-cash additions to property, plant and equipment in the amount of USD 16,473 in 2019. Non-cash additions to property, plant and equipment were not material in prior years.

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16 Financial investments

Accounting policy

Financial investments are mainly short-term investments that do not meet the definition of cash and cash equivalents. The financial investments are used as part of the cash-management strategy of the Company and are measured at fair value through profit or loss.

(a) Composition

	2019	2018
Investment fund quotas	28,126	38,677
Bank deposit certificate	25,540	44,595
Other	5,109	8,961
	<u>58,775</u>	<u>92,233</u>

17 Derivative financial instruments

Accounting policy

Derivatives are initially recognized at fair value as at the date on which a derivative contract is entered into and are subsequently measured at fair value. Derivatives are only used for risk mitigation purposes and not as speculative investments. When derivatives do not meet the hedge accounting criteria, they are classified as held for trading and accounted for at fair value through profit or loss.

The Company documents at the inception of the hedging transaction the relationship between hedging instruments and hedged items, as well as its risk management objectives and strategy for undertaking the hedge transactions. The Company also documents its assessment, both at hedge inception and on an ongoing basis, whether the derivatives that are used in hedging transactions and accounted for as hedge accounting were, and will continue to be, highly effective in offsetting changes in the fair value or cash flow of hedged items.

(i) Cash flow hedge

Derivatives that are designated for hedge accounting recognition are qualified as cash flow hedges when they are related to a highly probable forecasted transaction. The effective portion of the changes in fair value is recognized in shareholders' equity in "Accumulated other comprehensive income (loss)" and is subsequently reclassified to the income statement in the same period when the hedged expected cash flows affect the income statement.

The reclassification adjustment is recognized in the same income statement line item affected by the highly probable forecasted transaction, while gains or losses related to the non-effective portion are immediately recognized as "Other income and expenses, net".

When a hedging instrument expires, is sold or no longer meets the criteria for hedge accounting, any cumulative gain or loss existing in shareholders' equity at that time remains in shareholders' equity and is recognized when the forecast transaction is ultimately recognized in the income statement. When a forecasted transaction is no longer expected to occur, the cumulative gain or loss that was previously accounted in shareholders' equity is immediately transferred to the income statement within "Other income and expenses, net".

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(ii) Fair value hedge

Derivatives that are designated for hedge accounting are qualified as fair value hedges when they are related to assets or liabilities already recognized in the consolidated balance sheet. Changes in the fair values of derivatives that are designated and qualify as fair value hedges and changes in the fair value of the hedged item are recorded in the income statement in the same period.

(iii) Derivatives not designated as hedging instruments

Changes in the fair value of derivative financial instruments not designated as hedging instruments are recognized immediately in the income statement within "Other income and expenses, net" when related to price risk and within "Net financial results" when related to interest rate or foreign exchange rate risk.

This category includes derivatives contracts entered into in November 2018 by the Company to mitigate its exposure to the foreign currency risk associated with changes in the Brazilian real exchange rate for the majority of the estimated capital expenditures of the Aripuanã project. The transaction involved the purchase of collars in the notional amount of USD 294 million (BRL 1,057 million) which relates to the estimated Aripuanã's disbursements from 2019 to 2021.

(a) Fair value by strategy

Strategy	2019			2018	
	Per Unit	Notional	Fair value	Notional	Fair value
Mismatches of quotational periods					
Zinc forward	ton	258,220	(713)	261,020	(557)
			(713)		(557)
Sales of zinc at a fixed price					
Zinc forward	ton	15,252	(1,043)	10,566	(858)
			(1,043)		(858)
Inflation risk					
Three-month LIBOR vs. Brazilian interbank interest rate swap	USD	90,000	(1,413)	-	-
Brazilian inflation vs. Brazilian interbank interest rate swap	BRL	226,880	1,482	-	-
			69		-
Foreign exchange risk					
Foreign exchange collars (USD)	BRL	653,148	(607)	1,056,922	(1,602)
			(607)		(1,602)
			(2,294)		(3,017)
Current assets			4,835		7,385
Non-current assets			14,689		3,820
Current liabilities			(8,276)		(8,662)
Non-current liabilities			(13,542)		(5,560)



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(b) Changes in fair value

Strategy	Inventory	Cost of sales	Net revenues	Other income and expenses, net	Net financial results	Other comprehensive income	Realized gain (loss)
Mismatches of quotational periods	504	(9,631)	4,791	(231)	-	1,332	(3,079)
Sales of zinc at a fixed price	-	-	-	(602)	-	-	(417)
Inflation risk USD	-	-	-	-	(1,413)	-	-
Inflation risk BRL	-	-	-	-	1,443	-	(40)
Foreign exchange risk	-	-	-	-	994	-	-
	<u>504</u>	<u>(9,631)</u>	<u>4,791</u>	<u>(833)</u>	<u>1,024</u>	<u>1,332</u>	<u>(3,536)</u>

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18 Sensitivity analysis

Presented below is a sensitivity analysis of the main risk factors that affect the pricing of the outstanding financial instruments relating to cash and cash equivalents, financial investments, loans and financing, and derivative financial instruments. The main sensitivities are the exposure to changes of the US Dollar exchange rate, the London Interbank Offered Rate (LIBOR) and Interbank Deposit Certificate (CDI) interest rates, the US Dollar coupon and the commodity prices. The scenarios for these factors are prepared using market sources and other relevant sources, in compliance with the Company's policies. The scenarios at December 31, 2019 are described below:

- Scenario I: considers a change in the market forward yield curves and quotations as of December 31, 2019, according to the base scenario defined by the Company for March 31, 2020.
- Scenario II: considers a change of + or -25% in the market forward yield curves as of December 31, 2019.
- Scenario III: considers a change of + or -50% in the market forward yield curves as of December 31, 2019.

Risk factor	Cash and cash equivalents and financial investments	Loans and financing	Principal of derivative financial instruments	Unit	Impacts on income statement							Impacts on statement of comprehensive income										
					Quotation at December 31, 2019	Changes from 2019	Results of scenario I	Scenario I				Scenarios II and III				Results of scenario I	Scenario I			Scenarios II and III		
								-25%	-50%	+25%	+50%	-25%	-50%	+25%	+50%							
Foreign exchange rates																						
BRL	76,038	119,095	-	BRL	4.0307	2.06%	-	-	-	-	-	887	10,764	21,259	(10,764)							
EUR	179	-	-	EUR	1.1240	(0.36)%	(1)	(45)	(90)	45	90	-	-	-	-							
PEN	34,563	-	-	PEN	3.3253	0.74%	257	(8,641)	(17,281)	8,641	17,281	-	-	-	-							
Interest rates																						
BRL - CDI	75,722	19,989	1,242,791	BRL	4.40%	(16bps)	14	1,034	2,241	(883)	(1,637)	-	-	-	-							
USD - LIBOR	-	90,000	717,071	USD	1.91%	2bps	(17)	388	809	(358)	(689)	-	1	2	(1)							
US Dollar coupon	-	-	271,430	USD	2.41%	(19bps)	(31)	(159)	(323)	156	310	-	-	-	-							
Price - commodities																						
Zinc	-	-	273,472	TON	2,293	4.67%	(5,482)	29,368	58,736	(29,368)	(58,736)	545	(2,917)	(5,835)	2,917							

19 Trade accounts receivable

Accounting policy

Trade accounts receivable are amounts due from customers for goods sold in the ordinary course of the Company's business.

Trade accounts receivable are recognized initially at fair value and subsequently measured at:

(i) Fair value through profit or loss when related to the Company's accounts receivable portfolio that is included in a true sale program whereby the Company, at its discretion, can discount certain outstanding trade accounts receivables and receive payments in advance. The program is used to meet short-term liquidity needs. Trade accounts receivable within this program are derecognized since the contractual rights to receive the cash flows of the assets are transferred to the counterparty.

(ii) Fair value through profit or loss when related to sales that are subsequently adjusted to changes of LME prices. These accounts receivable do not meet the solely payments of principal and interest (SPPI) criteria because there is a component of commodity price risk that modifies the cash flows that otherwise would be required by the sales contract.

(iii) Amortized cost using the effective interest rate method, less impairment, when the receivable does not meet the aforementioned classification.

Credit risk can arise from non-performance by counterparties of their contractual obligations to the Company. To ensure an effective evaluation of credit risk, management applies procedures related to the application for credit granting and approvals, renewal of credit limits, continuous monitoring of credit exposure in relation to established limits and events that trigger requirements for secured payment terms. As part of the Company's process, the credit exposures with all counterparties are regularly monitored and assessed.

The Company applied the IFRS 9 simplified approach to measure the impairment losses for trade accounts receivable. This approach requires the use of the lifetime expected credit losses on its trade accounts receivable measured at amortized cost. To calculate the lifetime expected credit losses the Company used a provision matrix and forward-looking information. The additions to impairment of trade accounts receivable are included in selling expenses. Trade accounts receivable are generally written off when there is no expectation of recovering additional cash.

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(a) Composition

	2019	2018
Trade accounts receivable	175,948	174,931
Related parties	3,620	963
Impairment of trade accounts receivable	(2,337)	(2,690)
	177,231	173,204

(b) Changes in impairment of trade accounts receivable

	2019	2018
Balance at the beginning of the year	(2,690)	(2,146)
Additions	(805)	(1,238)
Reversals	1,085	428
Foreign exchange gains (losses)	73	266
Balance at the end of the year	(2,337)	(2,690)

(c) Analysis by currency

	2019	2018
Brazilian Real	26,817	39,000
US Dollar	149,348	133,689
Other	1,066	515
	177,231	173,204

(d) Aging of trade accounts receivable

	2019	2018
Current	150,134	146,064
Up to 3 months past due	26,810	28,366
From 3 to 6 months past due	135	455
Over 6 months past due	2,489	1,009
	179,568	175,894
Impairment	(2,337)	(2,690)
	177,231	173,204

20 Inventory

Accounting policy

Inventory is stated at the lower of cost and net realizable value. Cost is determined using the weighted average cost method. The cost of finished goods and work in progress comprises raw materials, direct labor, other direct costs and related fixed production overheads (based on normal operating capacity). Variable production overhead costs are included in inventory cost based on actual level of production. The net realizable value is the estimated selling price in the ordinary course of business, less any additional selling expenses. Imports in transit are stated at the accumulated cost of each import. A provision for obsolete inventory - finished products, semi-finished products, raw materials and auxiliary materials - is recognized when items cannot be used in normal production or sold because they are damaged or do not meet the Company's specification. Slow-moving provision is recognized for inventory items that are in excess of the expected normal use or sale. The amount of slow-moving provision recognized is determined on the basis of 20% of the carrying amount for each six-month period without use or sale.

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(a) Composition

	2019	2018
Finished products	106,595	106,245
Semi-finished products	89,239	52,534
Raw materials	50,848	64,582
Auxiliary materials and consumables	76,974	69,781
Inventory provisions	(28,398)	(23,437)
	295,258	269,705

(b) Changes to the provision of the year

	2019	2018
Balance at the beginning of the year	(23,437)	(20,736)
Additions	(16,171)	(12,703)
Reversals	11,077	9,260
Exchange variation gains	133	742
Balance at the end of the year	(28,398)	(23,437)

21 Other assets

	2019	2018
Recoverable taxes (i)	201,522	183,628
Advances to third parties (ii)	19,942	2,472
Prepaid expenses	11,678	8,556
Judicial deposits	7,281	9,230
Other assets	45,288	39,429
	285,711	243,315
Current assets	140,984	122,857
Non-current assets	144,727	120,458

(i) The increase in recoverable taxes is mainly due to a lower level of value added taxes (VAT) payable in the Company's Brazilian operations.

(ii) The increase in advances to third parties is related to advances in the amount of USD 9,408 to service providers in Peru and advances in the amount of USD 8,825 to a third-party ore supplier in Brazil.

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22 Related parties

Assets and liabilities	Trade accounts receivable		Related parties' assets		Trade payables		Dividends payable		Related parties' liabilities	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Parent										
Votorantim S.A. (i)	-	-	3	3	517	478	-	-	-	-
Related parties										
Andrade Gutierrez Engenharia S.A. (ii)	-	-	-	-	1,415	-	-	-	-	-
Companhia Brasileira de Alumínio	1,812	214	-	-	341	-	-	-	11	12
Votorantim Cimentos S.A.	1,518	623	738	737	48	85	-	-	-	-
Votener - Votorantim Comercializadora de Energia Ltda.	290	-	-	-	7,172	2,060	-	-	-	-
Votorantim International CSC S.A.C	-	-	-	-	500	-	-	-	-	-
Other	-	126	3	-	1,352	785	6,662	663	823	1,568
	3,620	963	744	740	11,345	3,408	6,662	663	834	1,580
Current	3,620	963	-	-	11,345	3,408	6,662	663	-	63
Non-current	-	-	744	740	-	-	-	-	834	1,517
	3,620	963	744	740	11,345	3,408	6,662	663	834	1,580
Profit and loss	Sales			Purchases			Financial results			
	2019	2018	2017	2019	2018	2017	2019	2018	2017	
Parent										
Votorantim S.A. (i)	26	-	-	6,176	3,649	3,651	-	-	-	-
Related parties										
Andrade Gutierrez Engenharia S.A. (ii)	-	-	-	5,046	-	-	-	-	-	-
Companhia Brasileira de Alumínio	2,157	39	2,125	1,964	1,626	36,912	-	-	-	1,012
Votener - Votorantim Comercializadora de Energia Ltda.	3,288	2,115	-	9,596	10,054	13,510	-	-	-	-
Votorantim Cimentos S.A.	196	173	138	2,186	365	365	-	-	-	-
Votorantim International CSC S.A.C	-	-	-	5,584	4,136	5,522	-	-	-	-
Other	510	-	-	1,581	784	1,134	-	-	-	-
	6,177	2,327	2,263	32,133	20,614	61,094	-	-	-	1,012

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(i) The Company entered into an agreement with VSA on September 4, 2008, for services provided by the Center of Excellence ("CoE") of VSA related to administrative activities, human resources, back office, accounting, taxes, technical assistance, and training, among others. Under a cost sharing agreement, the Company reimburses VSA for the expenses related to these activities in respect of the Company.

(ii) As part of the execution of the Aripuanã project, the Company entered into a mining development services agreement in the amount of USD 65,944 with Andrade Gutierrez Engenharia S.A., in which one of the Company director's close family member has significant influence. The contract was executed in accordance with customary market terms.

(a) Key management compensation

Key management includes the members of the Company's global executive team and Board of directors. Key management compensation, including all benefits, was as follows:

	2019	2018
Short-term benefits	6,727	7,225
Other long-term benefits	660	1,039
	<u>7,387</u>	<u>8,264</u>

Short-term benefits include fixed compensation, payroll charges and short-term benefits under the Company's variable compensation program. Other long-term benefits relate to the variable compensation program.

23 Property, plant and equipment

Accounting policy

Property, plant and equipment are stated at the historical cost of acquisition or construction less accumulated depreciation and any recognized impairment losses. Historical cost includes expenditures that are directly attributable to the acquisition and construction of the assets.

Subsequent costs are included in the asset's carrying amount, or recognized as a separate asset as appropriate, only when it is probable that future economic benefits associated with the item will flow to the Company and they can be measured reliably. The carrying amount of any component accounted for as a separate asset is derecognized when replaced. All other repairs and maintenance are charged to the income statement during the reporting period in which they are incurred.

Replacement costs are included in the carrying amount of the asset when it is probable that the Company will realize future economic benefits in excess of the benefits expected from the asset in its current condition. Replacement costs are depreciated over the remaining useful life of the related asset.

Land is not depreciated. Depreciation of other assets is calculated using the straight-line method to reduce their costs to their residual values over their estimated useful lives.

The assets' residual values and useful lives are reviewed annually and adjusted if appropriate.

An asset's carrying amount is reduced to its recoverable amount when it is greater than the estimated recoverable amount, in accordance with the criteria adopted by the Company in order to determine the recoverable amount.

Gains and losses on disposals are determined by comparing the proceeds with the carrying amount and are recognized within "Other income and expenses, net" in the income statement.

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Loans and financing costs directly related to the acquisition, construction or production of a qualifying asset that requires a substantial period of time to prepare for its intended use or sale are capitalized as part of the cost of that asset when it is probable that future economic benefits associated with the item will flow to the Company and costs can be measured reliably.

Stripping costs

In its surface mining operations, the Company must remove overburden and other waste to gain access to mineral ore deposits. The removal process is referred to as stripping. During the development of a mine, before production commences, when the stripping activity improves access to the ore body, the component of the ore body for which access has been improved can be identified and the costs can be measured reliably, a stripping activity asset is capitalized as part of the investment in the construction of the mine, accounted for as part of property, plant and equipment, and subsequently depreciated over the life of the mine on a units of production basis.

Stripping costs incurred during the production phase of operations are treated as a production cost that forms part of the cost of inventory.

Exploration and development costs

Refer to note 8 for the Company's accounting policy related to exploration and development costs for mining projects.

Asset retirement obligation

An asset retirement obligation is an obligation related to the permanent removal from service of a tangible long-lived asset that results from the acquisition, construction or development, or the normal operations of a tangible long-lived asset. At the initial recognition of an asset retirement obligation and at the periodical revisions of the expected disbursements and the discount rate, the changes in the liability are charged to property, plant and equipment.

The capitalized amount recognized in property, plant and equipment is depreciated based on the useful life of the underlying asset. Any reduction in the provision that exceeds the carrying amount of the asset, is immediately recognized in the income statement as "Other income and expenses, net".

Impairment

Refer to note 31 for the Company's accounting policy related to impairment of property, plant and equipment.

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(a) Changes in the year

	2019						
	Dam and buildings	Machinery, equipment, and facilities	Assets and projects under construction	Asset retirement obligation	Mining projects	Other	Total
Balance at the beginning of the year							
Cost	1,002,885	2,357,254	349,069	175,506	243,629	51,142	4,179,485
Accumulated depreciation	(452,560)	(1,554,728)	-	(91,874)	(86,904)	(24,968)	(2,211,034)
Net balance	550,325	802,526	349,069	83,632	156,725	26,174	1,968,451
Additions (i) (ii)	47	508	410,253	776	1,529	32	413,145
Disposals	(569)	(2,388)	(315)	-	(88)	(2,833)	(6,193)
Depreciation	(50,295)	(134,092)	-	(5,971)	(2,297)	(1,418)	(194,073)
Impairment loss - Note 31	(15,225)	(27,458)	-	-	-	-	(42,683)
Foreign exchange effect	(11,169)	(13,431)	(9,801)	(2,115)	-	(718)	(37,234)
Transfers – Note 24 (a)	65,545	129,167	(214,114)	-	12,239	2,381	(4,782)
Reclassification - note 5 (a)	-	(2,278)	-	-	-	-	(2,278)
Remeasurement of asset retirement obligation	-	-	-	28,337	-	-	28,337
Balance at the end of the year	538,659	752,554	535,092	104,659	168,108	23,618	2,122,690
Cost	1,027,045	2,399,957	535,092	201,892	261,117	45,035	4,470,138
Accumulated depreciation	(488,386)	(1,647,403)	-	(97,233)	(93,009)	(21,417)	(2,347,448)
Balance at the end of the year	538,659	752,554	535,092	104,659	168,108	23,618	2,122,690
Average annual depreciation rates %	4	7	-	5	8	-	

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	2018						
	Dam and buildings	Machinery, equipment, and facilities	Assets and projects under construction	Asset retirement obligation	Mining projects	Other	Total
Balance at the beginning of the year							
Cost	1,030,686	2,422,254	235,501	178,662	243,938	59,545	4,170,586
Accumulated depreciation	(453,140)	(1,504,433)	-	(101,527)	(85,455)	(29,517)	(2,174,072)
Net balance	577,546	917,821	235,501	77,135	158,483	30,028	1,996,514
Additions (i)	2,613	2,878	294,229	-	-	53	299,773
Disposals	(3,207)	(6,985)	(1,148)	-	-	(691)	(12,031)
Depreciation	(48,072)	(131,099)	-	(4,592)	(1,931)	(1,771)	(187,465)
Impairment loss	-	-	(3,283)	-	-	-	(3,283)
Foreign exchange effect	(42,117)	(58,574)	(28,827)	(9,688)	-	(2,637)	(141,843)
Transfers – Note 24 (a)	63,562	78,485	(147,403)	-	173	1,192	(3,991)
Remeasurement of asset retirement obligation	-	-	-	20,777	-	-	20,777
Balance at the end of the year	550,325	802,526	349,069	83,632	156,725	26,174	1,968,451
Cost	1,002,885	2,357,254	349,069	175,506	243,629	51,142	4,179,485
Accumulated depreciation	(452,560)	(1,554,728)	-	(91,874)	(86,904)	(24,968)	(2,211,034)
Balance at the end of the year	550,325	802,526	349,069	83,632	156,725	26,174	1,968,451
Average annual depreciation rates %	4	7	-	5	8	-	

(i) Additions include capitalized borrowing costs in the amount of USD 8,719 for the year ended December 31, 2019 (December 31, 2018 – USD 10,037).

(ii) Increase in Assets and projects under construction is mainly due to the execution of Aripuanã project.

24 Intangible assets

Accounting policy

Goodwill

Goodwill arising from business combinations is measured as the excess of the sum of the consideration transferred, the amount of any non-controlling interests in the acquiree, and the fair value of the acquirer's previously held equity interest in the acquiree (if any) over the net assets acquired. Goodwill is not amortized but is tested for impairment annually and whenever circumstances indicate that the carrying amount may not be recovered. Refer to note 31 for the Company's impairment accounting policy.

Rights to use natural resources

Costs for the acquisition of rights to explore and develop mineral properties are capitalized and amortized as a cost of production using the units of production method over their useful lives. Useful lives consider the period of extraction for both mineral reserves and mineral resources, which includes a portion of the Company's inferred resources in the Company's mining operations.

The Company selected the physical unit model to compute amortization expenses under the units of production method. This model consists of amortization being calculated based on actual ore produced during the period compared to the total ore expected to be produced over the life of mine.

For purposes of impairment assessment, rights to use natural resources are allocated to cash generating units. Refer to note 31 for the Company's impairment accounting policy.

Critical accounting estimates and judgments - Quantification of mineral reserves and resources for useful life calculation

The Company classifies measured, indicated and inferred resources based on the definitions of the Canadian Institute of Mining, Metallurgy and Petroleum (or CIM) Definition Standards for Mineral Resources and Mineral Reserves (or the 2014 CIM Definition Standards).

The useful life determination applied to the rights to use natural resources reflect the pattern in which the benefits are expected to be derived by the Company and is based on the estimated life of mine. Any changes to life of mine, based on new information regarding estimates of mineral reserves and mineral resources and mining plan, may affect prospectively the life of mine and amortization rates.

The estimation process of mineral reserves and mineral resources is based on a technical evaluation, which includes geological, geophysics, engineering, environmental, legal and economic estimates and may have relevant impact on the economic viability of the mineral reserves and mineral resources. These estimates are reviewed periodically, and any changes are reflected in the expected life of mine. Management is confident based on testing, continuity of the ore bodies and conversion experience that a part of the inferred resources will be converted into measured and indicated resources, and if they are economically recoverable, and such inferred resources may also be classified as proven and probable mineral reserves. Where the Company can demonstrate the expected economic recovery with a high level of confidence, inferred resources are included in the calculation of amortization.

However, the future conversion of inferred resources is inherently uncertain and involves judgement and estimates that could have a material impact on the Company's results of operations.

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(a) Changes in the year

	2019			
	Goodwill	Rights to use natural resources	Other	Total
Balance at the beginning of the year				
Cost	674,800	1,669,645	56,853	2,401,298
Accumulated amortization	-	(620,600)	(38,237)	(658,837)
Net balance	674,800	1,049,045	18,616	1,742,461
Additions	-	-	56	56
Disposals	-	-	(377)	(377)
Amortization	-	(105,262)	(2,332)	(107,594)
Impairment loss - Note 31	-	(99,450)	-	(99,450)
Transfers – Note 23 (a)	-	-	4,782	4,782
Foreign exchange effect	(155)	(541)	(656)	(1,352)
Balance at the end of the year	674,645	843,792	20,089	1,538,526
Cost	674,645	1,569,504	59,409	2,303,558
Accumulated amortization	-	(725,712)	(39,320)	(765,032)
Net balance at the end of the year	674,645	843,792	20,089	1,538,526
Average annual amortization rates %	-	6	19	
	2018			
	Goodwill	Rights to use natural resources	Other	Total
Balance at the beginning of the year				
Cost	673,287	1,672,931	62,084	2,408,302
Accumulated amortization	-	(543,927)	(41,656)	(585,583)
Net balance	673,287	1,129,004	20,428	1,822,719
Disposals	-	(17)	(11)	(28)
Amortization	-	(77,792)	(1,932)	(79,724)
Transfers – Note 23 (a)	-	1,463	2,528	3,991
Foreign exchange effect	1,513	(3,613)	(2,397)	(4,497)
Balance at the end of the year	674,800	1,049,045	18,616	1,742,461
Cost	674,800	1,669,645	56,853	2,401,298
Accumulated amortization	-	(620,600)	(38,237)	(658,837)
Net balance at the end of the year	674,800	1,049,045	18,616	1,742,461
Average annual amortization rates %	-	6	19	

Accounting policy

Right-of-use assets represents the right to use an underlying asset for the lease term and lease liabilities represents the Company's obligation to make lease payments arising from the lease.

Lease terms are negotiated on an individual asset basis and contractual provisions contain a wide range of different terms and conditions. The lease agreements do not impose any covenants, but leased assets may not be used as security for borrowing purposes.

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The Company accounts for non-lease components such as service costs separately, whenever applicable. The Company's lease terms may include options to extend or terminate the lease and

when it is reasonably certain that we will exercise that option, the financial effect is included in the measurement of the contract.

Measurement

Liabilities arising from a lease contract are initially measured on a present value basis, using the incremental borrowing rate approach. The incremental borrowing rate is determined by the Company based on equivalent financial costs that would be charged by a counterparty for a transaction with the same currency and a similar amount, term and risk of the lease contract. The finance cost charged to the income statement produces a constant periodic rate of interest over the lease term. At December 31, 2019, interest rates were between 6.67% to 11.39% for Brazil and 3.98% to 5.49% for Peru.

Lease contracts are recognized as a liability with a corresponding right-of-use asset at the date at which the leased asset is available for use by the Company. The right-of-use asset also includes any lease payments made and it is amortized over the shorter of the asset's useful life and the lease term on a straight-line basis. Amortization expenses are classified either in cost of sales or administrative expenses based on the designation of the related assets.

(a) Right-of-use assets - Changes in the year

	2019				
	Buildings	Machinery, equipment, and facilities	IT equipment	Vehicles	Total
At January 1	4,312	8,536	5,846	22,827	41,521
New contracts	2,525	181	-	811	3,517
Amortization	(1,569)	(2,878)	(3,675)	(8,103)	(16,225)
Reclassification – Note 5 (a)	-	2,278	-	-	2,278
Foreign exchange effect	(1)	(715)	-	(828)	(1,544)
At the end of the year	5,267	7,402	2,171	14,707	29,547
Average annual amortization rates %	24	35	63	36	

(b) Lease liabilities - Changes in the year

	2019
At January 1	41,450
New contracts	3,517
Payments of lease liabilities	(13,280)
Interest paid	(3,259)
Interest accrued	3,418
Reclassification – Note 5 (a)	3,087
Foreign exchange effect	(549)
At the end of the year	34,384
Current liabilities	16,474
Non-current liabilities	17,910

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(c) Maturity profile

	2019					Total
	2020	2021	2022	2023	As from 2024	
U.S. Dollar	12,436	6,697	6,338	866	83	26,420
Real	5,467	1,412	550	498	37	7,964
	17,903	8,109	6,888	1,364	120	34,384

26 Loans and financings

Accounting policy

Loans and financings are recognized initially at fair value, net of transaction costs incurred, and are subsequently measured at amortized cost. Any difference between the proceeds (net of transaction costs) and the total amount payable is recognized in the income statement as interest expense over the period of the loans using the effective interest rate method.

Loans and financings are classified as current liabilities unless the Company has the unconditional right to defer repayment of the liability for at least 12 months after the reporting period.

Fees paid on the establishment of loan facilities are recognized as transaction costs of the loan to the extent that it is probable that some or all of the facility will be drawn down. In this case, the fee is deferred until the drawdown occurs.

To the extent that there is no evidence that it is probable that some or all of the facility will be drawn down, the fee is capitalized as a prepayment for liquidity services and amortized over the period of the facility to which it relates.

(a) Composition

Type	Average interest rate			2019	2018
		Current	Non-current	Total	Total
Eurobonds - USD	Fixed + 5.13%	8,680	1,035,068	1,043,748	1,042,571
Debt with banks	LIBOR + 1.27%	-	197,926	197,926	197,292
BNDES	TJLP + 2.82%				
	SELIC + 3.10%				
	TLP - IPCA + 5.22%	7,454	87,841	95,295	89,925
Debentures	107.50% CDI	6,952	13,313	20,265	28,188
Export credit note	LIBOR + 1.54%	811	96,567	97,378	-
Other		9,252	44,693	53,945	66,891
		33,149	1,475,408	1,508,557	1,424,867
Current portion of long-term loans and financing (principal)		21,196			
Interest on loans and financings		11,953			

(b) Maturity profile

	2019					Total
	2020	2021	2022	2023	2024	
					As from 2025	

Eurobonds - USD	8,680	-	-	341,828	-	693,240	1,043,748
Debt with banks	-	79,195	79,254	39,477	-	-	197,926
BNDES	7,454	9,035	14,353	14,353	14,006	36,094	95,295
Debentures	6,952	6,656	6,657	-	-	-	20,265
Export credit note	811	198	197	199	95,973	-	97,378
Other	9,252	9,184	8,033	8,023	7,737	11,716	53,945
	33,149	104,268	108,494	403,880	117,716	741,050	1,508,557

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(c) Changes in the year

	2019	2018
Balance at the beginning of the year	1,424,867	1,447,299
New loans and financing	105,974	292,901
Payments of loans and financings	(19,437)	(295,104)
Foreign exchange effect	(1,114)	(5,777)
Gain on debt modification	-	(3,428)
Reclassification - note 5(a)	(3,490)	-
Interest accrual	73,561	61,385
Interest paid	(71,804)	(72,409)
Balance at the end of the year	1,508,557	1,424,867

(d) Analysis by currency

	Current	Non-current	2019 Total	2018 Total
USD	17,125	1,372,337	1,389,462	1,301,395
BRL	16,024	103,071	119,095	123,472
	33,149	1,475,408	1,508,557	1,424,867

(e) Analysis by index

	Current	Non-current	2019 Total	2018 Total
Fixed rate	8,989	1,035,575	1,044,564	1,047,245
LIBOR	8,333	337,268	345,601	255,333
TLP	6,063	47,649	53,712	58,486
BNDES SELIC	867	25,103	25,970	19,447
CDI	6,952	13,313	20,265	28,188
TJLP	1,833	16,500	18,333	16,168
Other	112	-	112	-
	33,149	1,475,408	1,508,557	1,424,867

(f) Bonds

On May 4, 2017, NEXA issued an aggregate principal amount of USD 700,000 in unsecured bonds set to mature in 2027 at an interest rate of 5.375% per year. The proceeds from this offering were used to repay a portion of existing consolidated debt with banks, thereby extending the maturity of outstanding debt. These securities are guaranteed by NEXA BR, NEXA PERU and NEXA CJM.

On March 28, 2013, NEXA PERU conducted a bond offering in the international market for USD 350,000, at an annual fixed interest rate of 4.625% to be paid semi-annually. These financial instruments have a term of ten years and will be redeemed on March 28, 2023.

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(g) Loans

On May 22, 2018, the Company entered into a term loan agreement in the principal amount of USD 100,000, maturing in May 2023 and with a cost of six-month LIBOR plus 1.27% p.a. Proceeds from this transaction were used to prepay a term loan with interest rate of three-month Libor plus 2.55% p.a. No gain or loss were recognized on the early payment of the debt. This loan is guaranteed by NEXA CJM and NEXA BR.

On June 27, 2018, the Company entered into an export credit agency (ECA) facility, amounting to USD 62,500. The proceeds of this facility were used to finance the purchase of machinery and equipment. The facility matures in June 2026 and has an interest rate of six-month LIBOR plus 1.10% p.a.

(h) Renegotiation of debt in prior years

On May 22, 2018, the Company renegotiated a term loan with principal amount of USD 100,000, maturity of November 2021 and cost of six-month LIBOR plus 2.50% p.a. The renegotiated debt with the same counterparty has a maturity of May 2023 and a cost of six-month LIBOR plus 1.27% p.a.

This transaction was accounted for as debt modification due to non-substantial modifications made to the original debt and a gain of USD 3,428 was recognized in Net financial results. This loan is guaranteed by NEXA CJM and NEXA BR.

On December 27, 2018, NEXA BR renegotiated contractual terms with BNDES comprising loans of a total principal amount of USD 58,990 (equivalent to BRL 228,573), original maturity dates from 2019 until 2023 and subjected to interest rates of TJLP plus spread (between 2.36% and 2.48% p.a.) or SELIC plus spread (between 2.48% to 2.72% p.a.). The renegotiated debts with the same counterparty have the final maturity in December 2028 and are subjected to a cost of TLP plus spread (between 2.09% to 2.29% p.a.) and replaces the guarantor from VSA to NEXA. This transaction was accounted for as a debt extinguishment due to the substantial modifications made to the original debt and no gain or loss was recognized in the income statement.

(i) Interest rate swap

On January 2019, the Company entered into a ten-year interest rate swap in the notional amount of USD 58,233 (equivalent to BRL 226,880) to change the Brazilian inflation component ("IPC-A") of financing arrangements with BNDES to 53.04% of the Brazilian interbank rate ("CDI"). In accordance with the Company's accounting policy, the fair value adjustment of this derivative financial instrument is accounted for in "Net financial results".

(j) Revolving credit facility

The Company has a revolving credit facility with a syndicate of lenders that was issued on October 25, 2019, which allows the Company to borrow up to USD 300,000. The revolving credit facility is to be used for general corporate purposes and provides the Company with increased liquidity and additional flexibility. The revolving credit facility has a term of five years and the amounts drawn are subject to an interest rate of 1.0% + LIBOR 3M. The transaction costs were capitalized and amortized over the contractual term impacting the financial results. At December 31, 2019, the Company has not used this revolving credit facility.

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(k) Export credit note

On October 23, 2019, in order to expand short-term liquidity in Brazil, the Company entered into an Export Credit Note agreement in the principal amount of USD 90,000 and cost of three-month Libor + 1.5% p.a., with a maturity of 5 years. Simultaneously, the Company contracted a swap to exchange the interest index to CDI rate + 1.30% p.a., as well as the currency of debt service repayments from USD to BRL. The Company accounted for the Export Credit Note under the fair value option to eliminate the accounting mismatch that would arise if amortized cost were used.

(l) Guarantees and covenants

At December 31, 2019, NEXA is the guarantor of NEXA BR's loans with BNDES in the amount of USD 95,925.

The Company has borrowings that are subject to financial covenants at the consolidated level, such as: (i) the gearing ratio (net debt/adjusted EBITDA); (ii) the capitalization ratio (total debt/total debt + shareholders' equity or shareholders' equity/total assets); and (iii) interest coverage ratio (cash + adjusted EBITDA/interest + short-term debt). When applicable, these compliance obligations are standardized for all borrowing agreements. No changes to the contractual guarantees or to the financial covenants occurred in year ended December 31, 2019. At December 31, 2019, the Company was in compliance with all applicable covenants.

27 Asset retirement and environmental obligations

Accounting policy

Provision is made for asset retirement obligation, restoration and environmental costs when the liability arises due to the development or mineral production of an operating asset, based on the net present value of estimated closure costs. Management uses its judgment and previous experience to determine the potential scope of rehabilitation work required and the related costs associated with that work.

The cash flows are discounted to present value using a credit risk-adjusted rate that reflects current market assessments of the time value of the money and the specific risks for the asset to be restored. The interest rate charges relating to the liability are recognized as an accretion expense in net financial results. Difference in the settlement amount of the liability are recognized in the income statement.

Critical accounting estimates and judgments - Asset retirement obligations

The initial recognition and the subsequent revisions of the asset retirement obligation considers critical future closure costs estimates and several assumptions such as interest rates, inflation and useful lives of the assets. These estimates are reviewed quarterly by the Company.

Cost estimates can vary in response to many factors of each site that include timing, expected life of mine, changes to the relevant legal or government requirements and commitments with stakeholders, review of remediation and relinquishment options, emergence of new restoration techniques, among others.

External experts support the cost estimation process where appropriate. These factors either isolated or consolidated could significantly affect the future financial results and balance sheet position. At December 31, 2019, the credit risk-adjusted rate used for Peru was between 5.2% to 7.8% (2018: 3.4% to 9.5%) and for Brazil was between 3.5% to 5.3% (2018: 3% to 5.4%).

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(a) Changes in the year

			2019	2018
	Asset retirement obligation	Environmental Obligations	Total	Total
Balance at the beginning of the year	185,553	84,730	270,282	283,280
Addition	777	-	776	
Payments	(2,893)	(11,657)	(14,550)	(4,678)
Foreign exchange effect	(1,258)	(3,043)	(4,299)	(27,396)
Interest accrual	9,528	3,897	13,425	20,703
Remeasurement discount rate	(1,158)	(2,477)	(3,635)	13,492
Changes in amount and time of cash flows (i)	31,828	-	31,828	-
Reversals	-	-	-	(15,119)
Balance at the end of the year	222,377	71,450	293,827	270,282
Current liabilities	-	19,001	19,001	20,357
Non-current liabilities	222,377	52,449	274,826	249,925

(i) As part of its annual asset retirement obligation review, the Company increased its expectation of disbursements on decommissioning obligations in certain operations. Property, plant and equipment has been increased by the same amount.

28 Provisions

Accounting policy

Provisions for legal claims and judicial deposits

Provisions for legal claims are recognized when: (i) the Company has a present legal or constructive obligation as a result of past events; (ii) it is probable that an outflow of resources will be required to settle the obligation; and (iii) the amount can be reliably estimated. The provisions are periodically estimated, and the likelihood of losses is supported by the Company's legal counsel.

Provisions are measured at the present value of the expenditure expected to be required to settle the obligation using a discount rate that reflects current market assessments of the time value of money and the risks specific to the obligation. The increase in the provision due to the passage of time is recognized as "Financial expenses".

When a claim is secured by a judicial deposit, the Company offsets the provision with the judicial deposit amount in the consolidated balance sheet. However, the Company also has judicial deposits for claims for which the likelihood of loss is possible or remote and for which no provision is recognized. In such cases, these amounts are recognized as outstanding judicial deposits in the Company's assets.

Critical accounting estimates – Provisions for legal claims

The Company is part of ongoing labor, civil, tax and environmental lawsuits which are pending at different court levels. The provisions for potentially unfavorable outcomes of litigation in progress are established and updated based on management evaluation, as supported by the positions of external legal counsel, and require a high level of judgment regarding the matters involved. Income taxes claims are discussed at the current and deferred income taxes section (Note 10).

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Contingent liabilities

Legal claims that have a possible likelihood that an obligation will arise are disclosed in the Company's financial statement. The Company does not recognize a liability because it is unlikely that an outflow of resources will be required or because the amount of the liability cannot be reliably calculated.

(a) Breakdown of legal claims provisions

The provisions and the corresponding judicial deposits are as follows:

	2019			2018		
	Judicial deposits	Provisions	Carrying amount	Judicial deposits	Provisions	Carrying amount
Tax	(2,449)	10,197	7,748	(2,048)	14,116	12,068
Labor	(3,071)	16,850	13,779	(4,258)	16,446	12,188
Civil	(832)	1,893	1,061	(746)	2,117	1,371
Environmental	-	3,483	3,483	-	5,014	5,014
	(6,352)	32,423	26,071	(7,052)	37,693	30,641

The outstanding judicial deposits of the Company as of December 31, 2019 are USD 7,281 (2018: USD 9,230).

(b) Changes in the year

	Tax	Labor	Civil	Environmental	2019	2018
					Total	Total
Balance at beginning of the year	12,068	12,188	1,371	5,014	30,641	57,881
Additions	4,218	6,016	404	1,374	12,012	21,902
Reversals	(1,311)	(4,546)	(383)	(2,593)	(8,833)	(46,993)
Interest accrual	522	1,454	91	(19)	2,048	2,499
Payments	(2,723)	(2,030)	(240)	(270)	(5,263)	-
Foreign exchange effect	1,489	(310)	(52)	(23)	1,104	(4,514)
Adoption of IFRIC 23 – Note 5(b)	(6,047)	-	-	-	(6,047)	-
Other	(468)	1,007	(130)	-	409	(134)
Balance at the end of the year	7,748	13,779	1,061	3,483	26,071	30,641

(c) Summary of contingent liabilities

The Company is a party to other litigation involving a risk of possible loss, for which no provision has been recognized, as detailed below:

	2019	2018
Tax	196,031	137,170
Labor	39,918	39,079
Civil	21,549	20,130
Environmental	112,920	119,747
	370,418	316,126

(i) Comments on contingent tax liabilities

The main contingent liabilities relating to tax lawsuits are discussed below.

Income tax over transfers of shares in Peru

Relates to assessments issued by the Peruvian internal revenue services, where the Company was jointly and severally liable for the payment of income tax by a foreign investor, in a supposed capital gain on transfer of shares. The estimated financial effect of this contingent liability is USD 97,020.

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Compensation for exploration for mineral resources

Relates to assessments issued by the Brazilian National Department of Mineral Production for the alleged failure to pay or underpayment of financial compensation for the exploration of mineral resources ("CFEM"). The estimated financial effect of this contingent liability is USD 17,932.

Indirect taxes on sales

Relates to assessments issued by the Brazilian Internal Revenue Service concerning certain credits taken by the Company when calculating those indirect taxes on sales. The estimated financial effect of this contingent liability is USD 5,589.

Value-added tax on sales

Relates to assessments issued by the tax authorities of the State of Minas Gerais concerning the following:

- Incidence of value-added tax on sales of certain energy contracts. The estimated financial effect of this contingent liability is USD 29,098.
- The tax rate applied to interstate sales for manufactured goods with imported content. The estimated financial effect of this contingent liability is USD 4,055.
- The Company was challenged by the tax authorities regarding certain credits to the purchases of property, plant and equipment. The estimated financial effect of this contingent liability is USD 7,830.

(ii) Comments on contingent labor liabilities

Include several claims filed by former employees, third parties and labor unions, mostly claiming the payment of indemnities on dismissals, health hazard premiums and hazardous duty premiums, overtime and commuting hours, as well as indemnity claims by former employees and third parties based on alleged occupational illnesses and work accidents. The individual amount of the claims are not material.

(iii) Comments on contingent civil liabilities

The main contingent civil liability is related to indemnity lawsuits against the Company alleging property damage, pain and suffering. The estimated financial effect of this contingent liability is USD 10,294.

(iv) Comments on contingent environmental liabilities

The main contingent environmental liabilities were filed by fishermen communities against the Company for indemnification, compensation for material and moral damages due to alleged pollution of the São Francisco River near the Company's Três Marias operation in Brazil. The estimated financial effect of these contingent liabilities is USD 95,664.

29 Contractual liabilities

In 2016, the Company entered into a silver streaming arrangement, which consisted of an upfront payment of USD 250,000 for the anticipated sale of a portion of the silver contained in the ore concentrates produced by the Cerro Lindo mining unit. The prepaid amount was recognized as a contractual liability and the corresponding revenue is recognized as the silver is delivered, which is the time that the contractual performance obligations are satisfied.

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The changes in the contractual liabilities are shown below:

	2019	2018
Balance at the beginning of the year	199,637	221,885
Revenue recognition upon ore delivery	(25,660)	(29,543)
Accretion for year	6,545	7,295
Balance at the end of year	180,522	199,637
Current	26,351	31,992
Non-current	154,171	167,645

30 Shareholders' equity

Accounting policy

Common shares are classified in shareholders' equity. Each time a share premium is paid to the Company for an issued share, the respective share premium is allocated to the share premium account. Each time the repayment of a share premium is decided, such repayment shall be done pro-rata to the existing shareholders.

The distribution of dividends to the Company's shareholders is recognized as a liability in the Company's consolidated financial statements in the period in which the dividends are approved by the Company's shareholders.

Shares repurchased under the Company's buyback program and that are not cancelled, are reported as treasury shares and are deducted from shareholders' equity. These shares are also deducted in earnings per share calculation.

(a) Capital

As of December 31, 2019, the outstanding capital of USD 133,320 (2018: 133,320) is comprised of 133,320 thousand subscribed and issued common shares (2018: 133,320 thousand), with par value of US\$ 1.00 per share. In addition to the subscribed and issued common shares, NEXA also has an authorized, but unissued and unsubscribed share capital set at USD 231,925.

(b) Treasury shares

On September 20, 2018, the Company's Board of Directors approved a share buyback program to repurchase up to USD 30,000 of its outstanding common shares, over the 12-month period beginning on November 6, 2018 and ending on November 6, 2019. The repurchased shares will not be cancelled but held in treasury at this time. As of December 31, 2019, the Company had repurchased USD 9,435, corresponding to 881,902 shares.

(c) Share premium

The share premium, if any, may be distributed to the shareholders in accordance with Luxembourg Commercial Companies Act by a resolution of the Board of Directors.

(d) Additional paid in capital

Additional paid in capital arises from transactions recognized in equity that do not qualify as capital or share premium in accordance with Luxembourg Commercial Companies Act and, therefore, cannot be distributed to the shareholders of the Company.

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(e) Accumulated other comprehensive income (loss)

The changes in the accumulated other comprehensive income (loss) are as follows:

	Cumulative translation adjustment	Remeasurements of retirement benefits	Hedge accounting	Total
At January 01, 2017	(89,087)	3,327	(9,980)	(95,740)
Translation adjustment on foreign investments	(10,742)	-	-	(10,742)
Cash flow hedge accounting	-	-	12,556	12,556
Remeasurements of retirement benefits	-	(3,327)	-	(3,327)
At December 31, 2017	(99,829)	-	2,576	(97,253)
Translation adjustment on foreign investments	(9,959)	-	-	(9,959)
Cash flow hedge accounting	-	-	(2,192)	(2,192)
At December 31, 2018	(109,788)	-	384	(109,404)
Translation adjustment on foreign investments	(54,765)	-	-	(54,765)
Cash flow hedge accounting	-	-	879	879
At December 31, 2019	(164,553)	-	1,263	(163,290)
Attributable to non-controlling interests				(23,034)
Attributable to NEXA's shareholders				(140,256)

(f) Earnings per share

Basic earnings per share are computed by dividing the net income attributable to the NEXA's shareholders by the average number of outstanding shares for the year. Diluted earnings per share is computed in a similar way, but with the adjustment in the denominator when assuming the conversion of all shares that may be dilutive. The Company does not have any dilutive shares and consequently the basic and diluted earnings per share are the same.

	2019	2018	2017
Net income(loss) for the year attributable to NEXA's shareholders	(146,626)	74,860	126,885
Weighted average number of outstanding common shares (thousands)	132,622	133,313	116,527
Earnings per share in US Dollars	(1.11)	0.56	1.09

(g) Karmin acquisition agreement

The Company, through its subsidiary Votorantim Metals Canada Inc., acquired Karmin Exploration Inc. ("Karmin"), a public company listed on the TSX Venture Exchange (Canada) and the Lima Stock Exchange (Peru), for an aggregate acquisition price of USD 70,000. Karmin indirectly held the minority 30.0% interest of Mineração Dardanelos Ltda. ("Dardanelos"), owner of the Aripuanã project, not otherwise owned by the Company. On October 16, 2019, the transaction was approved by Karmin's shareholders and it closed on October 30, 2019, when the articles of arrangement were filed and the aggregate consideration was paid.

The acquisition price contemplated (i) the acquisition of 89,945,479 common shares, representing 100% of the issued and outstanding shares of Karmin, for an aggregate consideration of USD 69,300 paid at closing date to the shareholders of Karmin, and (ii) a USD 700 loan from the Company to Karmin for general corporate purposes.

On November 1 and 4, 2019, Karmin delisted its shares from the TSX Venture Exchange and the Lima Stock Exchange, respectively. At the date of the delisting, the Company owned 100% of the outstanding Karmin shares. On November 5, 2019 Votorantim Metals Canada Inc. and Karmin were amalgamated and Karmin ceased to exist.

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The transaction was accounted for as a transaction with non-controlling interests, as the Company already controlled Dardanelos at the acquisition date. An amount of USD 37,404 related to the difference between the transaction's acquisition price and the carrying amount of the non-controlling interest held prior to the acquisition was recognized in equity attributable to the NEXA's shareholders.

(h) Dividend distribution

On February 15, 2019, the Board of Directors approved a dividend distribution to the Company's shareholders of record on March 14, 2019 in the amount of USD 0.53 cents per common share, for a total amount of USD 69,832. Dividends were paid in cash on March 28, 2019.

The Company's subsidiary, NEXA PERU, also declared dividends in the three-month period ended March 31, 2019 in the amount of USD 200,001, including USD 32,880 to non-controlling interests and USD 2,256 to holders of investments shares (acciones de inversión). These shares give the holders the right to receive dividends but are not entitled to voting rights or the residual value of NEXA PERU's equity.

(i) Non-controlling interests

Summarized balance sheet	NEXA PERU		Pollarix S.A.	
	2019	2018	2019	2018
Current assets	725,103	957,821	24,365	10,280
Current liabilities	23,736	248,938	15,058	3,459
Current net assets	701,367	708,883	9,307	6,821
Non-current assets	695,712	642,007	125,335	91,702
Non-current liabilities	602,357	581,172	35,872	21,478
Non-current net assets	93,355	60,835	89,463	70,224
Net assets	794,722	769,718	98,770	77,045
Accumulated non-controlling interests	313,818	373,838	65,846	51,363

Summarized income statement	NEXA PERU		Pollarix S.A.	
	2019	2018	2019	2018
Net revenues	745,181	827,537	83,597	11,916
Net income for the year	11,370	142,082	50,350	3,742
Other comprehensive income	-	-	1,552	(15,322)
Total comprehensive income for the year	11,370	142,082	51,902	(11,580)
Comprehensive income (loss) attributable to non-controlling interests	(6,918)	13,621	1,619	(7,724)
Dividends paid to non-controlling interests	30,427	-	10,867	2,137

Summarized statement of cash flows	NEXA PERU		Pollarix S.A.	
	2019	2018	2019	2018
Net cash provided by (used in) operating activities	43,341	232,391	(55,426)	7,201
Net cash (used in) provided by investing activities	(111,268)	(76,695)	36,152	(762)
Net cash provided by (used in) financing activities	(200,248)	-	9,564	(6,441)
Increase (decrease) in cash and cash equivalents	(268,175)	155,696	(9,710)	(2)

31 Impairment of non-current assets

Accounting policy

Impairment of goodwill

As part of the impairment testing procedures, the goodwill arising from business combination is allocated to a CGU or groups of CGUs that are expected to benefit from the related business combination and is tested at the lowest level that goodwill is monitored by management. Goodwill is tested annually for impairment as at September 30, regardless of whether there has been an impairment indicator or, more frequently, if circumstances indicate that the carrying amount may not be recovered.

Impairment of non-financial assets

The Company assesses, at each reporting date, whether there are indicators that the carrying amount of an asset or CGU may not be recovered. If any indicator exists, such as change in forecasted commodity prices, significant increase in operational costs, significant decrease in production volumes, reduction in life of mine, cancelation or significant reduction in scope of a project, market conditions or unusual events that can affect the business, the Company estimates the asset's or CGU's recoverable amount.

The recoverable amount is estimated by reference to the higher of an asset's or CGU's fair value less cost of disposal and its value in use (being the net present value of expected future cash flows of an asset or CGU in its current condition). The recoverable amount is determined for an individual asset, unless the asset does not generate cash inflows that are largely independent of those from other assets or groups of assets, in which case, the asset is tested as part of a larger CGU to which it belongs.

If the carrying amount of an asset or CGU exceeds its recoverable amount, the asset or CGU is considered impaired and is reduced to its recoverable amount. Non-financial assets other than goodwill that were adjusted due to impairment are subsequently reviewed for possible reversal of the impairment at each reporting date. Generally, the opposite of indicators that gave rise to an impairment loss would be considered indicators that impairment losses might have reversed. If the underlying reasons for the original impairment have been removed or the service potential of the asset or CGU has increased, assessment of impairment reversals is performed by the Company. Reversals of impairment losses that arise simply from the passage of time are not recognized.

Impairment of exploration assets and development projects

Exploration assets representing mineral rights acquired in business combinations included in intangible assets and development projects at the FEL 3 stage included in property, plant and equipment are tested for impairment in aggregation with CGU or groups of CGUs that include producing assets. The allocation of exploration assets and development projects to CGUs or group of CGUs is based on 1) expected synergies or share of producing assets infrastructure, 2) legal entity level and 3) country level. When testing a CGU or a group of CGUs that include exploration assets and development projects, the Company performs the impairment test in two steps. In the first step, producing assets our group of producing assets are tested for impairment on an individual basis. In the second step, exploration assets and development projects are allocated to a CGU or a group of CGUs and tested for impairment on a combined basis.

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Valuation methods and assumptions for recoverable amount

Fair value less cost of disposal (FVLCD)

FVLCD is an estimate of the price that the Company would receive to sell an asset, CGU or group of CGUs in an orderly transaction between market participants at the measurement date, less the cost of disposal. FVLCD is not an entity-specific measurement but is focused on market participants' assumptions for a particular asset. FVLCD is estimated by the Company using discounted cash flows techniques and, although the Company considers observable inputs, a substantial portion of the assumptions used in the calculations are unobservable. These cash flows are classified as level 3 in the fair value hierarchy. No CGUs are currently assessed for impairment by reference to a recoverable amount based on FVLCD classified as level 1 or level 2.

Value in use (VIU)

VIU is determined as the present value of the estimated future cash flows expected to arise from the continued use of the asset in its current condition and its residual value. VIU is determined by applying assumptions specific to the Company's continued use and does not consider enhancements or future developments. These assumptions are different to those used in calculating FVLCD and consequently the VIU calculation is likely to give a different result (usually lower) than a FVLCD calculation.

Forecast assumptions

The cash flow forecasts are based on management's best estimates of expected future revenues and costs, including the future cash costs of production, capital expenditure, and closure, restoration and environmental costs. The resulting estimates are based on detailed life-of-mine and/or long-term production plans. When calculating FVLCD, these forecasts may include anticipated expansions which are at the evaluation stage of study.

The cash flow forecasts may include net cash flows expected to be realized from the extraction, processing and sale of material that does not currently qualify for inclusion in ore reserves. Such non-reserve material is only included when the Company has confidence it will be converted to reserve. This expectation is usually based on preliminary drilling and sampling of areas of mineralization that are contiguous with existing ore reserves. Typically, the additional evaluation required to conversion to reserves for such material has not yet been done because this would involve incurring evaluation costs earlier than is required for the efficient planning and operation of the producing mine.

For the purposes of determining FVLCD from a market participant's perspective, the cash flows incorporate management's price forecast. The price forecasts used for ore reserve estimation and the Company's strategic planning are generally consistent with those used for impairment testing.

Cost levels incorporated in the cash flow forecasts are based on the current life-of-mine plan or long-term production plan for the CGU, which are based on detailed research, analysis and iterative modelling to optimize the level of return from investment, output and sequence of extraction. The mine plan takes account of all relevant characteristics of the orebody, including waste-to-ore ratios, ore grades, haul distances, chemical and metallurgical properties of the ore impacting process recoveries and capacities of processing equipment that can be used. The life-of-mine plan and/or long-term production plans are, therefore, the basis for forecasting production output and production costs in each future year.

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The discount rates applied to the future cash flow forecasts represent the Company's estimate of the rate that a market participant would apply having regard to the time value of money and the risks specific to the asset for which the future cash flow estimates have not been adjusted. The Company's weighted average cost of capital is generally used for determining the discount rates, with appropriate adjustments for the risk profile of the countries in which the individual CGUs operate. With respect to the estimated future cash flows of capitalized exploration assets and development projects in FEL 3 stage, the Company applies a price to net assets value ratio discount in order to reflect the inherent risk of such projects and that are neither adjusted in the discount rate nor in the future cash flows. The discount is based on the stage of the project and type of metal.

Critical accounting estimates and judgments - Impairment of non-current assets

Impairment is assessed at the CGU level. A CGU is the smallest identifiable asset or group of assets that generates independent cash inflows. Judgment is applied to identify the Company's CGUs, particularly when assets belong to integrated operations, and changes in CGUs could impact impairment charges and reversals. When applying its judgment in grouping CGUs, the Company concluded that its mining operations in Vazante and Morro Agudo should be grouped with its Três Marias smelter operation, as these two mines are vertically integrated operations. Also, the Company concluded that Shalipayco greenfield project should be grouped with the Cerro Pasco CGU as the current plan, as determined in the scoping study of the project, is to integrate Shalipayco to the Cerro Pasco complex.

External and internal factors are monitored for impairment indicators and include quarterly internal review of impairment indicators. Judgment is required to determine whether the impact of adverse spot commodity price movements is significant and structural in nature. Also, the Company's assessment whether internal factors such as increase in production costs and delay in projects result in impairment indicators requires significant judgment.

The process of estimating the recoverable amount involves the use of assumptions, judgment and projections for future cash flows. These calculations use cash flow projections, based on approved financial and operational budgets for a five-year period. After the five-year period, the cash flows are extended until the end of the useful life of mine or indefinitely for the smelters. The smelters cash flows do not use growth rates in the cash flow projections of the terminal value. Management's assumptions and estimates of future cash flow used for the Company's impairment testing of goodwill and non-financial assets are subject to risk and uncertainties, including metal prices and macroeconomic conditions, which are particularly volatile and partially or totally outside the Company's control. Future changes in these variables may differ from management's expectations and may materially change the recoverable amounts of the CGUs.

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Impairment analysis

When performing its annual impairment assessments, the Company identified the following impairment indicators:

- A reduction in the life of mine of Cerro Pasco Complex operations due to a decrease in mineral reserves and resources estimates;
- The spot average zinc LME prices declined substantially in comparison with prior year;
- The carrying amount of the net assets of the Company is persistently above the Company's market value.

The Company concluded that the combination of these indicators could result in the recoverable amount of its cash-generating units being lower than the carrying amount. An impairment test of all the Company's CGUs was performed. Below is a summary of the CGUs' carrying amounts tested for impairment as at September 30, 2019:

	Goodwill	Fair value of identifiable assets (iv)	Other net assets carrying amount	Total carrying amount
Cerro Lindo (i)	-	386,255	185,697	571,952
Cerro Pasco (i)	-	318,218	204,045	522,263
Mining Peru (ii)	578,280	704,473	389,742	1,672,495
Cajamarquilla	92,494	-	719,698	812,192
Três Marias system (iii)	-	-	571,277	571,277
Aripuanã	-	-	67,337	67,337
Juiz de Fora	-	-	177,445	177,445
	670,774	704,473	1,925,499	3,300,746

(i) Includes exploration assets and development projects with capitalized mining rights and development costs allocated.

(ii) Represents the lowest level within the Company at which the goodwill generated in the acquisition of NEXA PERU is monitored by the Company's management.

(iii) Currently Três Marias smelter is integrated with the mining operations of Vazante and Morro Agudo and, therefore, are considered as a single CGU.

(iv) Corresponds to the fair value of the identifiable intangible assets in the acquisition of NEXA PERU, which are recognized at the consolidated level.

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(a) Key assumptions used in impairment test

The recoverable amount of each CGUs was determined based on FVLCD method, which was higher than the value in use.

The Company identified long-term metal prices, discount rate and life of mine (“LOM”) as key assumptions for the recoverable amount determination, due to the material impact that such assumptions may cause on the recoverable value. These assumptions are summarized below:

	September 30, 2019	September 30, 2018
Long-term zinc (USD/t)	2,571	2,517
Discount rate (Brazil)	7.10%	7.13%
Discount rate (Peru)	6.38%	6.30%
Brownfield projects - LOM (years)	from 8 to 13	from 9 to 21
Greenfield projects - LOM (years)	from 12 to 24	from 12 to 24

(b) Impairment test process

Following the determination of the recoverable amount of the CGUs, the Company compared the carrying amount of each CGU with its respective recoverable amount. At this step, the Company identified an impairment loss at the CGU Cerro Pasco (refer to note 31(c)).

The second step was to test whether the goodwill allocated to a CGU or a group of CGUs was recoverable. In performing this analysis, the recoverable amount of Cerro Lindo and Cerro Pasco were aggregated in a group of CGUs called Mining Peru, which represents the lowest level within the Company at which goodwill of the acquisition of NEXA PERU is monitored by management. This aggregated recoverable amount is compared with the aggregated carrying amount of the CGUs. No impairment loss was verified at this level.

(c) Impairment loss – Cerro Pasco CGU

The reduction in the mineral reserves and resources estimates that led to a shortening of the life of mine of Cerro Pasco CGU from 21 to 13 years was determinant for the recognition of an impairment loss of USD 142,133.

As the impairment loss was identified at the CGU level and was not directly related to a single asset, the loss was allocated on a pro rata basis to the following assets:

	Carrying amount prior to impairment loss	Impairment loss	Carrying amount after impairment loss
Property, plant and equipment	192,719	(42,683)	150,036
Intangible assets	333,427	(99,450)	233,977
Other net assets	(3,883)	-	(3,883)
	522,263	(142,133)	380,130
Fair value of identifiable assets	318,218	(97,308)	220,910
Other net assets carrying amount	204,045	(44,825)	159,220
	522,263	(142,133)	380,130

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The Company performed a stress test on the key assumptions used for the calculation of the recoverable amount of the CGU Cerro Pasco. A decrease of 5% in the long-term LME zinc price to USD 2,442 per ton compared to management's estimation as at September 30, 2019 would have had resulted in the recognition of an additional impairment loss of USD 56,633. Also, an increase of 5% in discount rate compared to management's estimation as at September 30, 2019 would have had resulted in an additional impairment loss of USD 10,670.

(d) Impairment results – Other CGUs

The impairment indicators listed above led to a decrease in the recoverable amount of all our CGUs. However, the effects were less prominent than in the CGU Cerro Pasco and no impairment loss were identified in other CGUs.

The Company has reviewed impairment indicators as at December 31, 2019 and concluded that no impairment indicators exist at the reporting date. Therefore, no additional impairment test was performed.

The Company also estimated the amount by which the value assigned to each of these key assumptions must change in order for the CGUs recoverable amount to be equal to its carrying amount:

Cash generating unit	Excess over carrying amount	Decrease in long term zinc (USD/t)		Increase in discount rate	
		Change	Price	Change	Rate
Cerro Lindo	625,998	(17%)	2,143	116%	13.80%
Cajamarquilla	341,815	(9%)	2,343	31%	8.40%
Três Marias system	248,869	(8%)	2,730	65%	11.70%
Juiz de fora	381,076	(25%)	1,920	142%	17.20%
Aripuanã	515,807	(32%)	1,748	167%	19.00%
Goodwill – Mining Peru	47,709	(1%)	2,538	6%	6.80%

32 Long-term commitments

(a) Capital commitments – Aripuanã project

At December 31, 2019, the Company had contracted for USD 211,259 of capital expenditures related to the Aripuanã project that have not yet been incurred for the purchase of property, plant and equipment.

(b) Purchase of raw materials

The Company has forward purchase commitments in the amount of USD 24,473 for raw materials, which are used as part of the Company's operations. These contracts contain monthly fixed prices and expire in 2026.

(c) Projects development

As part of its development activities in certain greenfield projects, the Company has agreed to minimum levels of investments that would require disbursements up to the amount of USD 102,900 after September 2024 in case the Company does not meet such specified minimum investments for these projects.

33 Events after the reporting period

Dividends distribution

On February 13, 2020, the Company's Board of Directors approved, subject to ratification by the Company's shareholders at the 2021 annual shareholders' meeting in accordance with Luxembourg laws, a cash dividend distribution to the Company's shareholders of record on March 16, 2020 of approximately USD 50,000 to be paid on March 30, 2020.

* * *

DESCRIPTION OF THE REGISTRANT'S SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

As of December 31, 2019, Nexa Resources S.A. ("Nexa Resources," "we," "us," and "our") had one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended: our common shares.

Description of Common Shares

The following description of our common shares is a summary and does not purport to be complete. It is subject to and qualified in its entirety by reference to our amended and restated articles of association, which is incorporated as an exhibit to our most recent Annual Report on Form 20-F, the Luxembourg law of August 10, 1915 on commercial companies, as amended (the "1915 Law"), and by any other applicable Luxembourg corporate law. We encourage you to read our articles of association, the 1915 Law, and applicable provisions of Luxembourg law for additional information.

Share capital

As of December 31, 2019, our issued share capital was US\$133,320,513 represented by 133,320,513 common shares fully paid, with par value of US\$1.00 per share. In addition to our issued share capital, we have an authorized share capital of US\$231,924,819, represented by 231,924,819 common shares. Our common shares are publicly traded in the United States on the New York Stock Exchange (or NYSE), under the ticker symbol NEXA. Our common shares also trade on the Toronto Stock Exchange (or TSX), under the ticker symbol NEXA.

Changes to our share capital are decided by our shareholders or, pursuant to our articles of association, by our board of directors within the limits of the authorized share capital. Our shareholders may at any time at a shareholders' meeting decide to increase or decrease our share capital. Such resolution must satisfy the quorum and majority requirements that apply to an amendment of the articles of association, as described below. No shareholder is liable to make any further contribution to our share capital other than with respect to shares held by such shareholder that are not fully paid-up.

Distributions

Pursuant to our articles of association, the general meeting of shareholders may approve dividends and the board of directors may declare interim dividends, in each case to the extent permitted by Luxembourg law. Under Luxembourg law, dividends are determined by a simple majority vote at a general shareholders' meeting based on the recommendation of our board of directors. Pursuant to our articles of association, the board of directors may also declare distributions to our shareholders in the form of reimbursement of share premium or interim dividends to the extent permitted by Luxembourg law.

Each common share entitles the holder to participate equally in any distributions, if and when declared by the general meeting of shareholders or, in the case of interim dividends or reimbursements of share premium, the board of directors, out of funds legally available for such purposes. Dividends and other distributions on our common shares will be declared and paid in U.S. dollars. Dividends and other distributions on common shares listed on the NYSE will be the same as for common shares listed on the TSX. Declared and unpaid distributions held by us for the account of the shareholders shall not bear interest. Under Luxembourg law, claims for unpaid distributions will lapse in our favor five years after the date such distribution has been declared.

We and our subsidiaries are subject to certain legal requirements that may affect our ability to pay dividends or other distributions. Distributions to shareholders (including in the form of dividends or reimbursement of share premium) may only be made from amounts available for distribution in accordance with Luxembourg law, determined based on our standalone statutory accounts prepared under Luxembourg GAAP. Under Luxembourg law, the amount of a distribution paid to shareholders (including in the form of dividends or reimbursement of share premium) may not exceed the amount of the profits at the end of the last financial year plus any profits carried forward and any amounts drawn from reserves that are available for that purpose, less any losses carried forward and sums to be placed in reserve in accordance with Luxembourg law or our articles of association. Furthermore, no distributions (including in the form of dividends or reimbursement of share premium) may be made if at the end of the last financial year the net assets as set out in the standalone statutory accounts prepared under Luxembourg GAAP are, or following such a distribution would become, less than the amount of the subscribed share capital plus the non-distributable reserves. Distributions in the form of dividends may only be made from net profits and profits carried forward, whereas distributions in the form of share premium reimbursements may only be made from available share premium.

Luxembourg law also requires at least 5.0% of our net profits per year to be allocated to the creation of a legal reserve until such reserve has reached an amount equal to 10.0% of our issued share capital. If the legal reserve subsequently falls below the 10.0% threshold, at least 5.0% of net profits again must be allocated toward the reserve. The legal reserve is not available for distribution.

Voting rights

There are no restrictions on the rights of Luxembourg or non-Luxembourg residents to vote our shares. All of our shareholders, including our public shareholders, hold common shares with identical voting rights, preferences and privileges. Each common share entitles the shareholder to attend a general meeting of shareholders in person or by proxy, to address the general meeting of shareholders and to vote. Each common share entitles the holder to one vote at the general meeting of shareholders.

General meeting of shareholders

In accordance with Luxembourg law and our articles of association, any regularly constituted general meeting of our shareholders has the power to order, carry out or ratify acts relating to our operations to the extent that such decisions are the domain of the shareholders and not the board of directors.

Our annual general meeting of shareholders shall be held at our registered office, or at such other place in Luxembourg as may be specified in the notice of the meeting, within six months after the end of the relevant financial year. Except as otherwise specified in our articles of association, resolutions at a general meeting of shareholders are adopted by a simple majority of shares present or represented and voting at such meeting.

A shareholder entitled to vote may act at any general meeting of shareholders by appointing another person (who need not be a shareholder) as his proxy, which proxy shall be in writing and comply with such requirements as determined by our board with respect to the attendance to the general meeting, and proxy forms in order to enable shareholders to exercise their right to vote. All proxies must be received by us (or our agents) no later than the day determined by our board of directors.

The board of directors may also decide to allow shareholders to vote by correspondence by means of a proxy form providing for a positive or negative vote or an abstention on each agenda item. The conditions for voting by correspondence are set out in the articles of association and in the convening notice.

The board of directors may decide to arrange for shareholders to be able to participate in the general meeting by conference call, video conference or similar means of communication, whereby (i) the shareholders attending the meeting can be identified, (ii) all persons participating in the meeting can hear and speak to each other, (iii) the transmission of the meeting is performed on an ongoing basis and (iv) the shareholders can properly deliberate without the need for them to appoint a proxyholder who would be physically present at the meeting.

Appointment and term limits of members of our board of directors

In accordance with our articles of association and the 1915 Law, the members of our board of directors are elected by a resolution of a general meeting of shareholders adopted with a simple majority of the votes validly cast, regardless of the portion of capital represented at such general meeting. Votes are cast for or against each nominee proposed for election to the board and cast votes shall not include votes attaching to shares for which the shareholder has not participated in the vote, has abstained or has returned a blank or invalid vote.

Our directors are appointed for a mandate of a one-year term and may be reelected. Members of our board of directors may be removed at any time, with or without cause, by a resolution adopted at a general meeting of our shareholders. Under Luxembourg law, in the case of a vacancy of the office of a director appointed by the general meeting of shareholders, the remaining directors may, unless the articles of association provide differently, fill the vacancy on a provisional basis. In these circumstances, the following general meeting of shareholders shall make the final appointment of the director.

Issuance of shares and preferential subscription rights

Our shares may be issued pursuant to a resolution of the general meeting of shareholders. The general meeting of shareholders may also delegate the authority to issue shares to the board of directors for a renewable period of five years. The board of directors has been authorized to issue up to 231,924,819 common shares. Such authorization will expire five years after the date of the general meeting of shareholders held on August 11, 2017 (unless amended or extended by the general meeting of shareholders).

Each holder of shares has preferential subscription rights to subscribe for any issue of shares pro rata to the aggregate amount of such holder's existing holding of the shares. Each shareholder shall, however, have no preferential subscription right on shares issued for a contribution in kind.

Preferential subscription rights may be restricted or excluded by a resolution of the general meeting of shareholders, or by the board of directors if the shareholders so delegate. The general meeting of shareholders has delegated to the board of directors the power to cancel or limit the preferential subscription rights of the shareholders when issuing new shares, so long as the issuance of new shares is carried out through a public offering.

If we decide to issue new shares in the future and do not exclude the preferential subscription rights of existing shareholders, we will publish the decision by placing an announcement in the Luxembourg official journal *Recueil Electronique des Sociétés et Associations* and in a newspaper published in Luxembourg. The announcement will specify the period in which the preferential subscription rights may be exercised. Such period may not be shorter than 14 days from the publication of the offer. The announcement will also specify details regarding the procedure for exercise of the preferential subscription rights. Under Luxembourg law preferential subscription rights are transferable and tradable property rights.

Repurchase of shares

Nexa Resources is prohibited by the 1915 Law from subscribing for its own shares. Nexa Resources may, however, repurchase its own shares or have another person repurchase shares on its behalf, subject to certain conditions, including:

- prior authorization of the general meeting of shareholders setting out the terms and conditions of the proposed repurchase, including the maximum number of shares to be repurchased, the duration of the period for which the authorization is given (which may not exceed five years) and the minimum and maximum consideration per share;
- the repurchase may not reduce the net assets of Nexa Resources on a non-consolidated basis to a level below the aggregate of the issued share capital and the reserves that Nexa Resources must maintain pursuant to the 1915 Law or our articles of association;
- only fully paid-up shares may be repurchased; and
- the acquisition offer is made on the same terms and conditions to all the shareholders who are in the same position; however, listed companies may repurchase their own shares on the stock exchange without making an acquisition offer to the shareholders.

On September 13, 2018, our shareholders authorized us to purchase, acquire, receive or hold and sell shares of Nexa Resources in accordance with the 1915 Law and any other applicable laws and regulations. The authorization is effective immediately after the general meeting and valid for a period of three years.

Form and transfer of shares

Our shares are issued in registered form only and are freely transferable. Luxembourg law does not impose any limitations on the rights of Luxembourg or non-Luxembourg residents to hold or vote our shares.

Under Luxembourg law, the ownership of registered shares is generally evidenced by the inscription of the name of the shareholder, the number of shares held by him or her in the shareholders' register, which is maintained at our registered office. Each transfer of shares is made by a written declaration of transfer recorded in our shareholders' register, dated and signed by the transferor and the transferee or by their duly appointed agent. We may accept and enter into its shareholders' register any transfer based on an agreement between the transferor and the transferee provided a true and complete copy of the agreement is provided to us.

Our articles of association provide that, in case our shares are recorded in the register of shareholders on behalf of one or more persons in the name of a securities settlement system or the operator of such a system, or in the name of a professional depository of securities or any other depository or of a sub-depository designated by one or more depositaries, NEXA—subject to a confirmation in proper form received from the depository—will permit those persons to exercise the rights attaching to those shares, including admission to and voting at general meetings of shareholders. The board of directors may determine the requirements with which such confirmations must comply. Shares held in such manner generally have the same rights and obligations as any other shares recorded in our shareholder register(s).

Liquidation rights

The liquidation of Nexa Resources shall be decided by a general meeting of shareholders fulfilling the conditions as to attendance and majority required for the amendments of the articles of association. The method of liquidation shall be determined and the liquidators shall be appointed by the general meeting of shareholders. In accordance with the 1915 Law, the assets that remain after payment of all debts and liabilities are distributed to the shareholders, on a pro rata basis.

Other Provisions

Holders of our common shares have no sinking fund, redemption or conversion rights.

Limitations on the right to own securities

Neither Luxembourg law nor our articles of association impose any general limitation on the right of nonresidents or foreign persons to hold our common shares or exercise voting rights on our common shares other than those limitations that would generally apply to all shareholders.

There is no law, governmental decree or regulation in Luxembourg that would affect the remittance of dividends or other distributions by Nexa Resources to nonresident holders of its common shares, other than withholding tax requirements. In certain limited circumstances, the implementation and administration of international financial sanctions may affect the remittance of dividends or other distributions. There are no specified procedures for nonresident holders to claim dividends or other distributions.

Transfer Agent

Computershare Trust Company, N.A. is the paying agent for shareholders who hold common shares listed on the NYSE and on the TSX.

List of Subsidiaries of Nexa Resources S.A.

Name of Subsidiary	Jurisdiction of Incorporation or Organization
Campos Novos Energia S.A.	Brazil
Compañía Minera Shalipayco S.A.C.	Peru
Compañía Magistral S.A.C.	Peru
Compañía Minera Doña Isabel Ltda.	Chile
Compañía Minera Gaico S.A.	Peru
Consórcio Capim Branco Energia	Brazil
Consórcio UHE Igarapava	Brazil
IncPac Holding Limited	British Virgin Islands
Inversiones Garza Azul S.A.C.	Peru
Karmin Holdings Ltda.	Brazil
L.D.O.S.P.E. Empreendimentos e Participações Ltda.	Brazil
L.D.Q.S.P.E. Empreendimentos e Participações Ltda.	Brazil
L.D.R.S.P.E. Empreendimentos e Participações Ltda.	Brazil
Minera Bongará S.A.	Peru
Minera Cerro Colorado S.A.C.	Peru
Minera Chambará S.A.C.	Peru
Minera Pampa de Cobre S.A.C.	Peru
Mineração Dardanelos Ltda.	Brazil
Mineração Parnamirim Ltda.	Brazil
Mineração Rio Aripuanã Ltda.	Brazil
Mineração Santa Maria Ltda.	Brazil
Mineração Soledade Ltda.	Brazil
Nexa Resources Atacocha S.A.A.	Peru
Nexa Resources Cajamarquilla S.A.	Peru
Nexa Resources El Porvenir S.A.C.	Peru
Nexa Recursos Minerais S.A.	Brazil
Nexa Resources Peru S.A.A.	Peru

Nexa Resources UK Limited	United Kingdom
Nexa Resources US Inc.	United States
Otavi Mining Investments (Proprietary) Ltd.	Namibia
Otjitombo Mining (Proprietary) Ltd.	Namibia
Pollarix S.A.	Brazil
Rayrock Antofagasta S.A.C.	Peru
SMRL Ltda. Pepita 1	Peru
SMRL CMA n° 54	Peru
Votorantim Andina S.A.	Chile
Votorantim Investimento Latino Americano S.A.	Brazil
Votorantim Metals Canada Inc.	Canada
Votorantim Metals Namibia (Proprietary) Ltd.	Namibia

I, Tito Botelho Martins Júnior, certify that:

1. I have reviewed this annual report on Form 20-F of Nexa Resources S.A.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the company as of, and for, the periods presented in this report;
4. The company's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15-d-15(f)) for the company and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the company's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the company's internal control over financial reporting; and
5. The company's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the company's auditors and the audit committee of the company's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the company's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the company's internal control over financial reporting.

/s/ Tito Botelho Martins Júnior

Name: Tito Botelho Martins Júnior

Title: Chief Executive Officer

Date: March 20, 2020

I, Rodrigo Menck, certify that:

1. I have reviewed this annual report on Form 20-F of Nexa Resources S.A.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the company as of, and for, the periods presented in this report;
4. The company's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15-d-15(f)) for the company and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the company's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the company's internal control over financial reporting; and
5. The company's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the company's auditors and the audit committee of the company's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the company's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the company's internal control over financial reporting.

/s/ Rodrigo Menck

Name: Rodrigo Menck

Title: Senior Vice President Finance and Group Chief Financial Officer

Date: March 20, 2020

Certification

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
(Subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code)

Pursuant to section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, chapter 63 of Title 18, United States Code), each of the undersigned officers of Nexa Resources S.A. (the “Company”), does hereby certify, to such officer’s knowledge, that:

The Annual Report on Form 20-F for the year ended December 31, 2019 (the “Form 20-F”) of the Company fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 and information contained in the Form 20-F fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Tito Botelho Martins Júnior

Name: Tito Botelho Martins Júnior

Title: Chief Executive Officer

Date: March 20, 2020

/s/ Rodrigo Menck

Name: Rodrigo Menck

Title: Senior Vice President Finance and Group Chief Financial Officer

Date: March 20, 2020

A signed original of this written statement required by Section 906 of the Sarbanes-Oxley Act of 2002 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.
