

2018 Annual Report



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Message from the Board of Directors

Strengthening for a journey of change is a mission only for few – the bold and tough ones – and CBA rose to such challenge **steadily and vigorously** in 2018. Only a company with an over 60-year history of ethical, sustainable and grounded businesses could deal with acute changes in its culture, long-term strategy and governance, while reaching an stimulating 81% score in the work-environment survey based on the employees' assessment, winning a market award, being acclaimed by the community as a benchmarking partner to development, and further attaining the best results over the past three years.

How come we have achieved something so remarkable? I could name many reasons, but I will focus on both **leadership's example and togetherness**. Throughout this process, CBA's leadership has evolved as a stronger team, which all the employees could clearly see and feel even more inspired as an example of conduct, performance and accountable action. Hence, our cultural change turned words into an embellished real-life experience. We started to acknowledge good ideas, and it became even clearer that such change came from and was meant for everyone. Both the **sense of ownership** and willingness to join the "CBA of the Future" were ecstatic in the last few years. Everyone was convinced that such a change in both culture and operational performance could come out, knowing how important their role in it was.

A major milestone in this process was launching the **new CBA brand** that stands for everything we have dreamt of: an enjoyable company that not only is ever well-timed, yielding and versatile in keeping up with market volatility and global changes, but also cherishes its people and history, boosts priceless partnerships, and holds the "Votorantim" values and beliefs in its DNA. The new brand has motivated everyone even further.

Summing up, CBA has changed itself through **people**. Let's then move forward aspiring to become the best aluminium producer in Brazil, and build a heritage of huge prosperity, ethics and respect for people, the environment and surrounding communities.

Luís Ermírio de Moraes

Chairman of the Board of Directors for Companhia Brasileira de Alumínio (CBA)

Message from the Chief Executive Officer

Ricardo Carvalho
Chief Executive Officer
for Companhia Brasileira
de Alumínio (CBA)

Our journey to build and strengthen the “CBA of the Future”, a company that strives to be more competitive and deliver breakthrough solutions to its customers, went on and stepped forward boldly in 2018. The **process of change** we have launched for mapping out opportunities and speed up value capture has substantially boosted cost management and efficiency and, as a result, raised our competitiveness in the aluminium market.

We have moved forward in **strengthening our culture** by focusing on the four cultural axes that make our working way even better and more effective: Teamwork, Constructive Divergence, Sense of Ownership and Ambition for Competitiveness. By engaging and empowering actions for leaders and walking through our values daily, we committed ourselves to spreading over and praising our new culture at every single administrative and operational areas. Our accomplishments in corporate governance practices and compliance initiatives have also helped us ensure to run our businesses in harmony with both the Votorantim DNA and the best market practices.

That was a tough cultural process requiring dedication of our leadership and engagement of the entire company, but it has already yielded tangible results with clear signs that we are on the right track. The work environment survey which we did last year with our employees showed that we were placed in the group that gathers the companies with the best achievements, according to the Korn Ferry-Hay Group methodology. We reached the P90 (percentile 90) at an **81% acceptability index**, as reported by 96% of our employees who willingly took part in the survey.

All these changes have made our **commitment to sustainability stronger**, something that has often been present in our way of producing aluminium: from an unconditional look at people's safety – a non-negotiable value – to partnerships for helping communities to thrive, conservation of biodiversity in the mining areas, and efficient environmental management.

In 2018, we kicked off an action to have all these practices accredited by an international certification entity: the **Aluminium Stewardship Initiative (ASI)** focused on the aluminium industry. In addition to attesting our responsible way of working to our customers and other stakeholders, ASI will also allow us to find opportunities to be more efficient and sustainable in everything we do. Last year, we dedicated to carry out an in-house assessment of our stage of maturity. In 2019, we will work on an action plan to earn the ASI certification for our products, with investments bonded to the CBA of the Future vision of becoming even more sustainable company. Installing **filter presses** in the waste dam in the city of Aluminio is an example: this project will optimize the reservoir's operating life cycle, and allow the caustic soda residue to be recovered and then reused in the bauxite refining process.

The **Green Soderberg project**, a technology undergoing tests in our Smelters, is another remarkable advance in our production model. The solutions for automatic feeding of electrolytic pots and the change in the anode paste composition will help deplete air emissions and water used for gas treatment, thus making our aluminium far more competitive, environment-wise. Another noteworthy initiative started last year is the **biomass steam boiler project**, which will lead to lower greenhouse gas emissions and broaden our energy matrix.

In 2018, our pursuit of an increasingly sustainable operation ended up in outlining our **Strategic Sus-**

tainability Dialogue, which is comprised of key eight themes towards our future, and finding out the chief megatrends impacting on our company. By engaging leadership and keeping a cross-cutting vision of our activities, we have set goals, initiatives and milestones for several fronts from then until 2025.

In the downstream production, we have evolved in our position as partners of our customers by seeking aluminium-use related solutions and novelties. The improvements made to the service model that uses **key account management (KAM)** tools helped sharpen our way of interacting with customers. That model, combined with new products devised in cooperation with our customers, has given us awards acknowledging our quality differential as a supplier.

Carrying on projects and investments in **social actions** that aid the communities of the regions where we operate has helped us round off the CBA's sustainable business model. Our working strategy has contributed to better education and public management at those locations, fostered leading social standing through programs boosting local productive chains and generated employment and income opportunities for local inhabitants.

Producing aluminium responsibly and sustainably, by creating and sharing value with all our stakeholders, is how we have provided for development in Brazil. By being ethical and transparent in our businesses, our industry adds technology and in-

The **CBA of the Future** is more and more tangible in how we make aluminium

novation to the country. We have boosted other production chains like the automotive and packaging sectors, generating quality products for consumers.

The **CBA of the Future** is more and more tangible in how we make aluminium, not to mention its impact on our 22% growth in revenue and 91% in EBITDA last year. Proudly, in 2018 we carried out the process of change for the CBA of the Future and today we can undoubtedly see the company we have aspired to and built together rise for real – one that treasures the past, looking ahead – #ourCBA.

I invite you all to learn a bit more about CBA. Enjoy your reading!

Ricardo Carvalho
Chief Executive Officer for Companhia Brasileira de Alumínio (CBA)



Click here and watch the video of the Chief Executive Officer for the 2018 Annual Report

#ourCBA



Launch of the new CBA
brand in the corporate
office in São Paulo (SP)

2018 in brief



2.07 million
tons of bauxite
processed



351,000
tons
of smelting
production



449,000
tons
of aluminium production*
* CBA + Metalex plant



96%
of self-generated
energy consumption



4,800
employees



We are among
**the best
10%**
in the market as per
the employees' work-
environment survey (P90)



R\$ 5.4 billion
in net revenue



**R\$ 832
million**
in adjusted EBITDA



WE INVESTED:

R\$ 32.8 million
in innovation
and technology

R\$ 20.3 million
in the "Legado das Águas"
and "Legado Verdes
do Cerrado"
natural reserves

R\$ 19.5 million
in environment

R\$ 16.6 million
in safety

R\$ 5.0 million
in social
initiatives

From the city of Alumínio to the aluminium in every city

City of Alumínio (SP)

Our verticalized business model enables **responsible socio-environmental performance** throughout the aluminium chain

Companhia Brasileira de Alumínio (CBA) owns a broad portfolio of primary and processed aluminium products, being responsible for all stages of their manufacturing, from mining and processing of bauxite to the end product finishing. This **verticalized business model** enables responsible socio-environmental performance throughout the aluminium chain and helps have our products acknowledged for their high quality, thus supplying the domestic and international markets and serving several end-markets such as the automotive, transport, packaging and civil construction ones. Other unique traits in our performance are the **co-creation with customers** processes, which add value to the solutions provided and contribute to sustainability in the whole value chain.

CBA's core industrial production starts at our plant in the city of Alumínio, in the countryside of São Paulo, where we have been present since our foundation in 1955. There, we carry out the bauxite processing into aluminium oxide and then into aluminium itself, from which **primary products** such as ingots, billets, rebars, caster rolls and plate sheets derive by means of our casting process. At our plant, we have devised tailor-made solutions and services using **processed products** such as sheets, foils, extruded profiles (natural, anodized and painted) intended for strategic markets and customers.

Our bauxite mines located in the states of Minas Gerais and Goiás supply the ore to our aluminium production process. The bauxite is conveyed in trucks towards the railroad yards and then goes by train to our plant, where the full installed capacity reaches **440,000 tons of primary aluminium** annually. Our production process is further boosted from recycling our aluminium scrap.

The **energy** consumed used in our production process is predominantly renewable, mostly provided by the hydropower plants that are directly connected to our plant and it is supplemented with the energy supplied by out other hydropower plants integrating the “Sistema Interligado Nacional – SIN” (National Interconnected System). Our role in hydropower generation takes place by means of our controlling interest in some plants and shares in others that account for another differential for our products as it strengthens our commitment to a clean and renewable energy matrix. In 2018, 96% of our power consumption stemmed from those hydropower plants.

Aside from processing bauxite into aluminium, we also process internal and external **aluminium scrap** that does help cut down energy consumption and raw material use. Recycling aluminium is carried out both at our CBA plants and in the city of Araçariçama (São Paulo state) at Metalex, our facility that is tailored for processing industrial scrap and has an installed capacity for making 75,000 tons of aluminium billets a year.

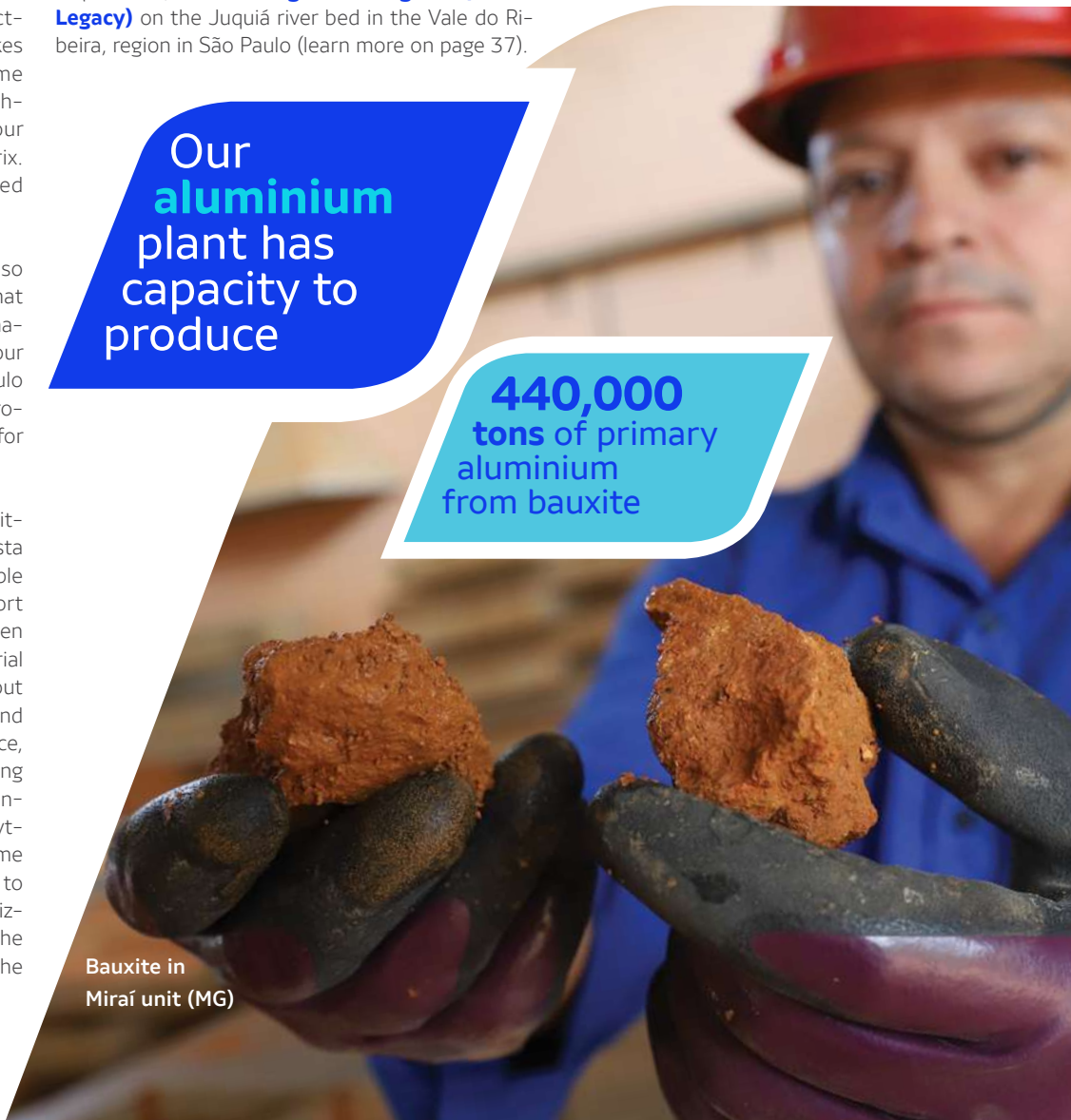
CBA also owns **Nickel Business** operations in the cities of Niquelândia (Goiás state) and São Miguel Paulista (São Paulo state). Nevertheless, given the unfavorable macroeconomic and market conditions in the short and medium term, since 2016 mining works have been temporarily halted, with reasonably curtailed industrial activities as well. Over this period, we have carried out maintenance of our assets and invested in social and environmental actions in the communities of influence, while looking into the potential for resuming mining works, yet it has not happened so far. From the remaining nickel ore, we produced only 97 tons of electrolytic nickel and eight tons of cobalt in 2018. In the same period, we invested R\$ 1.8 million in projects linked to improving the public education systems, modernizing public management and income generation in the Niquelândia city, plus sports–encouraging projects in the São Miguel Paulista district.

In addition to the operating units, CBA holds a private environmental conservation reserve, with a stake in another one: the “**Legado Verdes do Cerrado**” (**Green Cerrado Legacy**), near the city of Niquelândia, and the “**Legado das Águas**” (**Water Legacy**) on the Juquiá river bed in the Vale do Ribeira, region in São Paulo (learn more on page 37).

Our **aluminium** plant has capacity to produce

440,000 tons of primary aluminium from bauxite

Bauxite in Miraí unit (MG)



Our facilities and operations

Administrative units

- **Corporate office**
São Paulo (SP)
- **Distribution center**
Rio de Janeiro (RJ)
Caxias do Sul (RS)

Legacies

- **Legado das Águas**
Miracatu (SP)
- **Legado Verdes do Cerrado**
Niquelândia (GO)

Mining

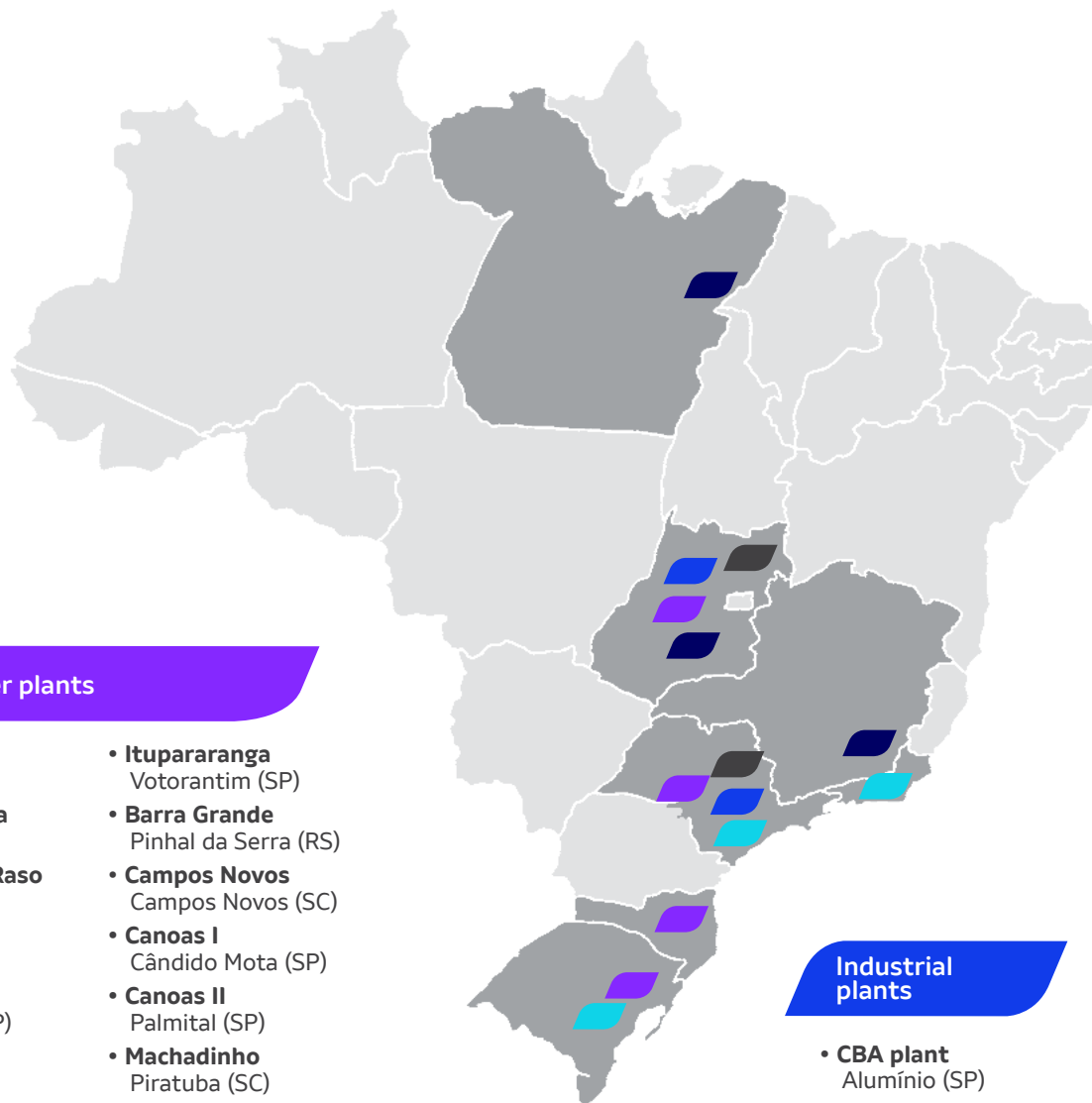
- **Mining Itamarati de Minas**
Itamarati de Minas (MG)
- **Mining Mirai**
Mirai (MG)
- **Mining Poços de Caldas**
Poços de Caldas (MG)
- **Mining Barro Alto***
Barro Alto (GO)
- **Alumina Rondon**
Rondon (PA)

Hydropower plants

- **Iporanga**
Juquiã (SP)
- **SHP Serraria**
Juquiã (SP)
- **SHP Porto Raso**
Tapiraí (SP)
- **Barra**
Tapiraí (SP)
- **Alecrim**
Miracatu (SP)
- **Fumaça**
Ibiúna (SP)
- **SHP França**
Juitiba (SP)
- **SHP Jurupará**
Piedade (SP)
- **SHP Santa Helena**
Votorantim (SP)
- **SHP Votorantim**
Votorantim (SP)
- **Itupararanga**
Votorantim (SP)
- **Barra Grande**
Pinhal da Serra (RS)
- **Campos Novos**
Campos Novos (SC)
- **Canoas I**
Cândido Mota (SP)
- **Canoas II**
Palmital (SP)
- **Machadinho**
Piratuba (SC)
- **Piraju**
Piraju (SP)
- **Salto Pilão**
Apiúna (SC)
- **Salto do Rio Verdinho**
Caçu (GO)
- **Ourinhos**
Ourinhos (SP)

Industrial plants

- **CBA plant**
Alumínio (SP)
- **Branch Sorocaba**
Sorocaba (SP)
- **Metalex**
Araçatuba (SP)
- **Niquelândia**
Niquelândia (GO)
- **São Miguel Paulista**
São Paulo (SP)



* In licensing

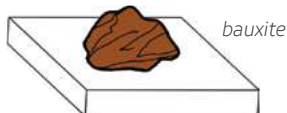
Our aluminium production

Sustainable mining

In our mines, bauxite is extracted following the best handling practices, securing that the soil is restored under similar or better conditions than those it had before, for use in agricultural and livestock activities after mining.

56

hectares recovered or aimed for recovery through 2018



Receiving bauxite

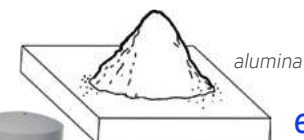
After going through washing and crushing at the mining facilities, the bauxite is conveyed in trucks to the railroad and from there, by rail, it reaches the Alumínio plant. There, the railcars are unloaded into a car dumper and the bauxite is separated according to its physical and chemical properties.

2.07 million

tons of bauxite processed annually

Alumina Refinery

At the Refinery, we extract the aluminium oxide (alumina) from the bauxite by means of the Bayer chemical process, which involves having bauxite react with caustic soda at both high temperature and pressure.



694,000 tons of aluminium oxide produced in 2018

Aluminium Smelters

An electrolytic process for smelting the aluminium oxide leads to molten aluminium as output.

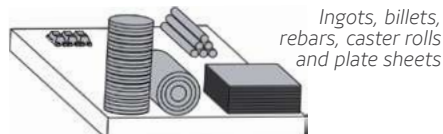
351,000

tons of molten aluminium produced in 2018



Cast House

Alloy and scrap elements are added to the molten aluminium as needed, and then the product is molded into different shapes.



347,000 tons of primary products*

*CBA and Metalex plants

Downstream Business

Primary products undergo cold and hot mill process, extrusion and surface treatment processes. Subsequently, they turn into higher added-value products resulted from our co-creation initiative with customers that then fills up our portfolio.

102,000 tons

of processed products resulted from the downstream business



sheets, foils, coils, extruded profiles and customized solutions that are applied in the automotive and packaging segments, among others



Miraf unit (MG)

Our aspirations

Today's CBA is the fruit of over 60 years of enduring innovation aimed to develop quality products that not only create value for our company, but also for our customers, suppliers, employees and the communities by which we operate both directly and indirectly. This move has helped us to conceive business models tailored to the socioeconomic context of each given time and fitted with the most chief concerns of the society, with positive outcome and public recognition as a result.

However, we are aware that the **challenges ahead** will be even tougher. Environmental issues such as climate change and depleted natural resources have already acted on the everyday life of communities, businesses and governments worldwide. Such impacts have echoed around pivotal issues for the industry at large. Amongst them are the growing stake of renewable sources in the energy matrix and the changes in the production patterns to minimize the consumption of natural resources, set up alternatives for using residues as raw material, and offer products that replace the existing technologies with more cutting-edge ones yielding greater environmental results.

We realize that our corporate strategy must tie up with this arising environment, by answering those questions, in a way to ensure CBA itself becomes far more competitive and creates shared value over the coming decades. That is why, since 2017, the **CBA of the Future** strategy has been in place with a core on advancing and strengthening our culture, looking at talents, training leaders and engaging teams, while encouraging that new business models are devised for bringing CBA closer to strategic clients, particularly in the Downstream Business.

Our aspirations

- Our shareholders earn a **higher-than-expected payback** for invested capital, through a sustainable business, with a strategy that generates value for our suppliers, employees and communities.
- Our customers acknowledge us as a **trustworthy company** that set priceless partnerships and provides diversified products, services and innovative solutions.
- Our employees are **proud of belonging** and **feel acknowledged and praised** by inspiring leaders.

Our drivers

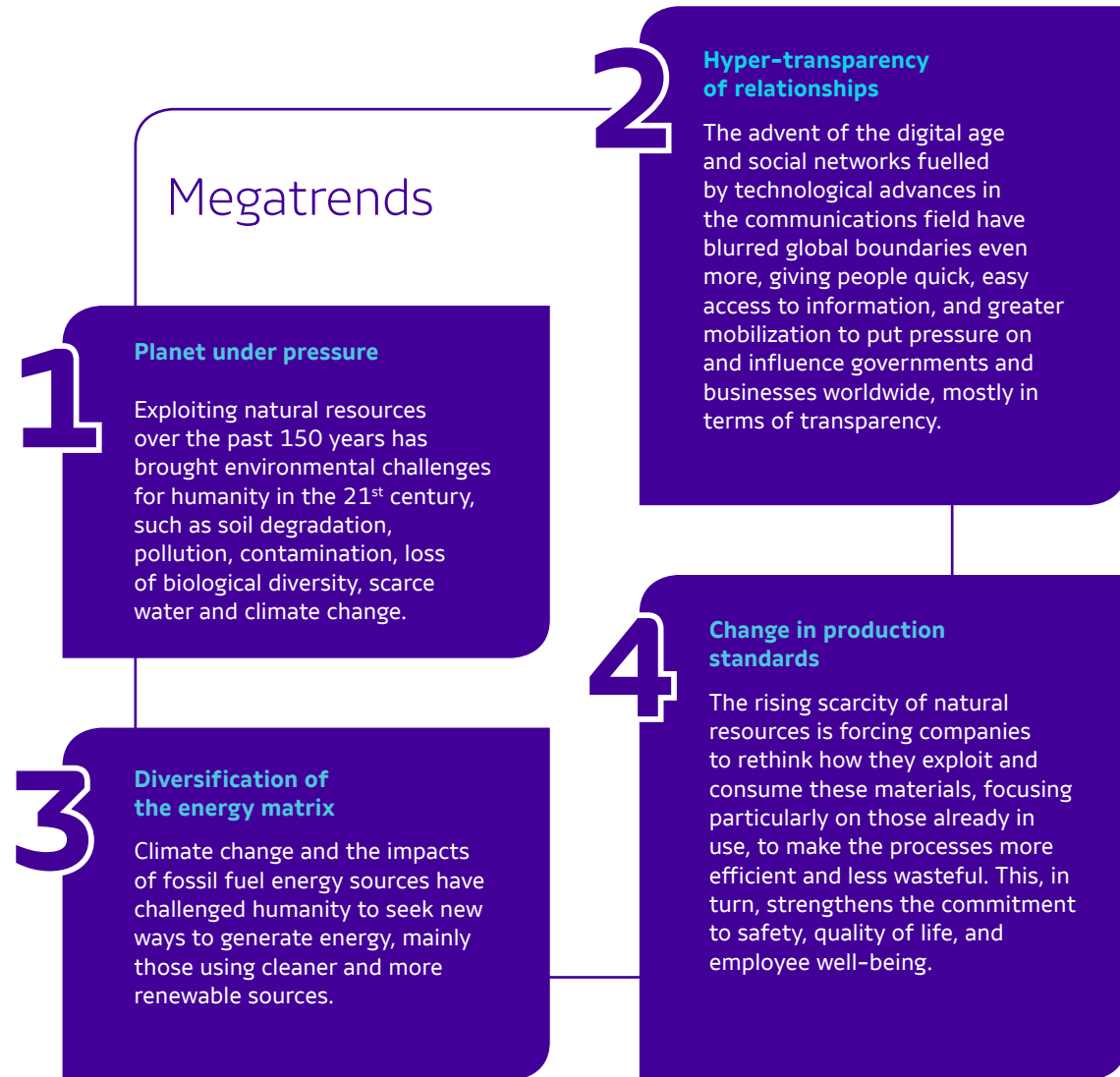
- **Operational excellence and sustainability**
We aspire to be recognized for our health, safety and environment practices, people management and relationship with communities. We also tirelessly seek cost efficiency and productivity.
- **Innovation and growth**
We wish to enhance co-creating solutions with our clients, reach benchmarking standards of profitability in the field and build sustainable solution alternatives for processed products.

A dialogue about sustainability

At CBA, we understand that our future depends on a corporate strategy that secures the conditions for our business today and the coming decades. That is why sustainability is the foundation for the **CBA of the Future**, the starting point that drives and shapes our actions and projects for boosting our competitiveness and generating greater value for our shareholders, customers, suppliers, employees and the society at large.

In 2018, we succeeded in building a **sustainability strategy** for CBA that stemmed from both the engagement and talks with our leaders. It is a strategy arising from four megatrends greatly influencing corporations over the next years, which are further substantial challenges that will help thrust our company and business forward in the decades to come.

Stemming from those megatrends, we carried out in-house initiatives including a sustainability workshop with CBA's top leadership aimed to cascade down the challenges and opportunities that outlook may lead to and assess the involved issues in the light of our **materiality matrix** (see page 60) put in place last year. We henceforth set out eight themes that spread through our operations and are strategic for our future along with their concerned megatrends, and outlined long-term goals, initiatives and milestones throughout 2025, further to benchmarks intended to monitor CBA's progress over time and, consequently, accomplish those targets.



Click here and learn more about our sustainability strategy

CBA's sustainability strategy



Strengthening governance practices and ethical conduct

We are part of Votorantim S.A., a holding company with a century-long history that stood out for seeking new ways of building value, such as diversifying its areas of expertise or business models, and being often driven by Solidity, Ethics, Respect, Entrepreneurship and Bonding values. The Votorantim DNA is powerfully ingrained in our administrative structure. We adhere to the highest standards of corporate governance for securing that the company runs smoothly, its operations are sustainable, and its businesses are profitable.

We rely on our **Board of Directors**, elected by the General Shareholders' Meeting, who oversees our company's performance and draw up the strategic and high-impact business issues. Consisting of five members, two of them being independent ones, the board meets six times a year to address strategic issues for CBA.

The Audit Committee backs up the Board of Directors' roles by assisting them in overseeing matters around the integrity of financial statements, inter-

CBA governance structure

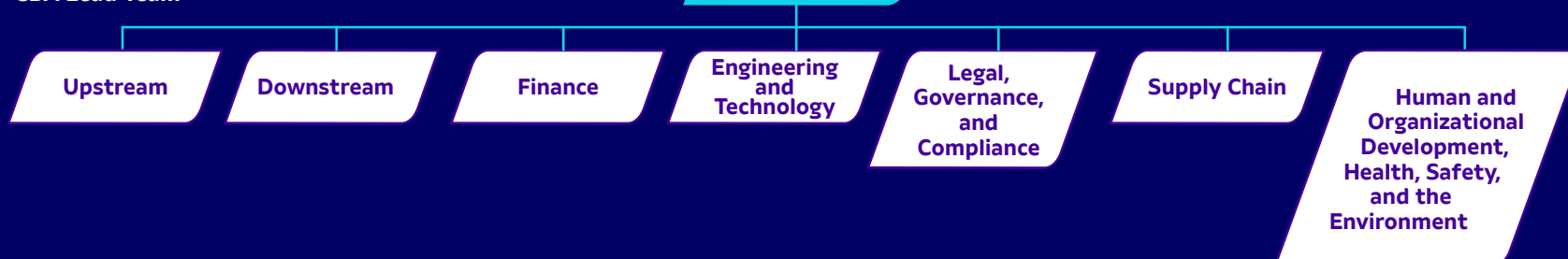


nal control systems, risk and compliance program management, and the Compensation and Personnel Committee that decides upon people-management related affairs across the company. Both Committees are comprised of independent members.

For monitoring the company's performance and making strategic decisions around key projects and investments, we count on the **Lead team**, who meets weekly and is comprised of the CEO and seven executives, acting on behalf of the company's key areas (learn more in the organization chart). Four of those executives are directors.

The responsibilities assigned to each body of the CBA's management structure are defined by the CBA's Articles of Incorporation and published in the **Governance Manual**, which was updated in 2018 to reinforce the transparency standards in our business and fit the governance practices into our corporate strategy. The latest version of the manual was forwarded to the Board of Director members, executive officers and general managers.

CBA Lead Team



Compliance

For CBA, ethical and responsible conduct is the cornerstone leading us towards satisfying results in our businesses. Since 2013, our **Compliance Program** has stood as a foundation for CBA facilities in their synergy with in-company public, customers, suppliers, competitors, creditors, the press, citizens and public bodies, ever grounded on the highest ethical standards.

In 2018, CBA continued working on cascading down the Votorantim's **Code of Conduct** through e-learn-

ing training available to all employees. Moreover, we tirelessly dedicated to spread each element addressed in the Code of Conduct across our in-company communication channels, more so on the CBA Magazine that is widely sent out to all employees on a monthly basis. Every month a theme of our Code of Conduct was selected to feature in the newsletter, showing formats that ranged from crosswords to employees' statements and cases.

In the year, we further devised the **Competitors' Compliance Manual**, which delineates recommendations and rules for an ethical and responsible conduct from those acting on behalf of the company regarding the customers, competitors and suppliers. While publishing the manual, we provided training to the executive officers, legal, supply and commercial department's leaders and all those employees representing of our company before professional class associations and invested enterprises.

Another campaigning mechanism for in-house engagement is the **Compliance Day**, a day devoted to a dialogue on major issues such as corruption, integrity and ethics that gathers all CBA's employees, including the leaders, and demonstrates how crucial this matter is. Such initiative is an integral part of the **Compliance Week**, a series of events Votorantim S.A. has sponsored to raise awareness around a culture of legal compliance among the people across the Group's companies.

The Ethics Line is another tool in place to manage ethical conduct affairs at CBA. It is a communication channel open to employees, service providers and the public at large for collecting claims, complaints and reporting on violations to the standards related to the Code of Conduct. An external company independently manages the channel and is committed to recording all reporting received and securing the privacy and confidentiality of whistleblowers, whenever required. The platform further allows users to keep their reporting anonymous. After the reporting is made, the Committee of Conduct comprised of the CEO and representatives of departments such as the Human and Organizational Development, Legal, Compliance and Internal Audit starts to investigate fairly and responsibly, assuring that the involved parties are kept private.

2018 Compliance Day



Our
governance
reinforces
the culture of
compliance

Risk management

In 2018, we carried out a compliance risk assessment intended to check and assess our exposure to legal compliance related risks and then draw up a long-term and forward-looking legal compliance planning. Moreover, a competitors' risk assessment to appraise risks linked to our relationship with potential competitors was performed. Such assessment unlocked an opportunity to revert to our **Competition Law Compliance Policy**, a process consisting of a new survey on risk exposures carried out by an expert consultancy, which listened to directors, general managers and some employees who occupy specific positions at CBA. Following the revision, we wrote down an action plan showing short, medium and long-term measures, with priority on higher-impact risks.

We further carried out an unparalleled CBA study on exposure to digital risks, a compelling matter for companies in Brazil when it comes to data security and confidential information and the new General Data Protection Law (LGPD) that rules personal data processing and storage. Based on that digital risk assessment, we devised an action plan for those risks that covered, for instance, getting special approval from our clients and employees to process and safely store their information. In order to get CBA fully fitting into the new legal requirements, this measure and other similar ones will be implemented by February 2020.

Following the **COSO and ISO 31.000 methodology**, our risk management practice begins with engaging the leaders for mapping the events that could pose risks to CBA. Then the risks are ordered in a relevantly-designed matrix that matches with the likelihood of occurrence and the extent of impact on both the company's operations and strategy. In 2018, we walked on in updating the risk scale and revising 100% of the existing risks jointly with the proper risk owners and area leaders, for help-



Legal team in the corporate office in São Paulo (SP)

ing everyone to understand the risks mapped and the concerned controls put in place.

Another expressive breakthrough was unifying this corporate risk vision with other areas of the company. Working together with the **CBA Crisis Committee** to outline well-built response plans, in case of arising corporate risks, and assess the matrix in the light of the new ISO 14.001:2015 standard to guarantee that processes are matched with a specific standard is an example of this initiative.

This entire process is guided through the **CBA's Business Risk Management Policy** published in 2017 and revised with the risk scale and the latest risk form in 2018. The Internal Controls and Risk Management area leads the coordination of this process, while the Internal Audit monitors the effectiveness of the controls put in place. Annually, we further undergo an external audit performed by an independent company.

Actions to mitigate operational risks

At the end of May 2018, a lengthy truck drivers' strike led to a widespread shortage that was unprecedented in Brazil. For minimizing the effects of that strike, mainly in our Alumina Refinery and Aluminium Smelter operations, we put in place a contingency plan that enabled to supply critical raw materials to the plants and thus avoid the shutdown of the plant in Aluminio city. This preparedness of CBA in handling emergency events has been paramount to ensure our quality and seamless operations and proved to be unquestionably effective in that specific crisis. The lessons learnt from that experience has helped us scale up our operational contingency protocols, revamp our inventory policies, map out transport alternatives, and enhance our management and logistics planning tools.

Laying the ground for a strategy brings out results

The global aluminium market

2018 was impacted by huge volatility and uncertainty in the global aluminium market and overall macroeconomic indicators. Our sector's chief indicators have become more robust throughout the year, mainly owing to a reasonable rise in aluminium deficit caused by a resilient demand with a lower-than-expected supply. Cost-wise, the core raw materials used for aluminium production rose substantially compared to previous years, thus anchoring the rise in aluminium prices seen at the beginning of the year. Conversely, global market's degree of confidence struggled with the compulsory US import tariffs, the trade war between China and the United States, and the fragile world economic growth, which caused aluminium prices to decline mostly in the second semester of the year. Within such scenario, the average aluminium price in the London Metal Exchange (LME)

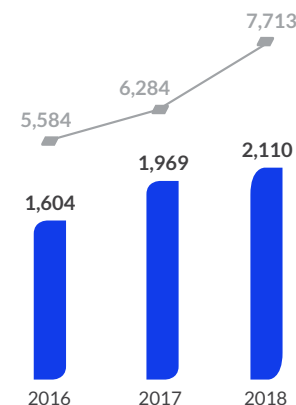
in the year soared respectively 7% compared to 2017 and 32% compared to 2016, rising from US\$ 1.604/ton in 2016 to US\$ 2.110/ton in 2018. The Brazilian Real, however, depreciated 15% against the US dollar compared to 2017 - 5% versus 2016 - leading to a 23% rise in the aluminium prices in local currency.

As for Brazil, the domestic market underwent sluggish recovery in 2018, and helped some industrial

sectors to achieve promising results. As an example, the automotive sector grew considerably this year by reaching respectively 27% and 38% in truck and bus manufacturing, based on the National Association of Automobile Manufacturers (Anfavea) data. That upturn in the market favored a growth in aluminium sales at 10.3%, reaching a total of 1.115 thousand tons (excluding powder and destructive), according to the Brazilian Aluminium Associations (ABAL).

In 2018, the average aluminium price of the London Metal Exchange in Brazilian Reais was **23% higher** than that in the previous year

Price of aluminum (LME)



■ LME US\$ (US\$/ton)
— LME R\$ (R\$/ton)

Corporate office
in São Paulo (SP)

Operating and financial results

Being effective in putting a strategy and an operating model into practice allowed us to boost CBA's chief operational and financial results in the 2018 scenario. Aluminium sales amounted to 405,000 tons, a rise of 11% versus 2017 and 23% against 2016. CBA's net revenue reached R\$ 5.4 billion, an increase of 22% compared to 2017, while the adjusted EBITDA rose to 91% reaching a total of R\$832 million. For the aluminium business, the net revenue totaled R\$ 4.4 billion, accounting for a rise of 33%, while the adjusted EBITDA increased 47% against 2017, reaching a total of R\$ 860 million.

Throughout 2018, CBA benefited from the international environment, primarily from increased metal prices, favorable exchange rates and export opportunities. Furthermore, the rise in raw material costs, which burdened the

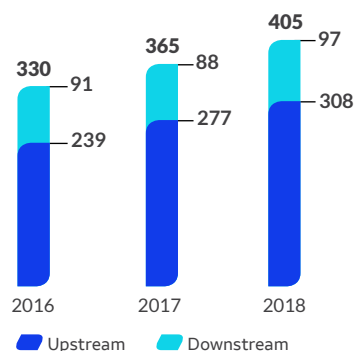
market at large in 2018, had a lower impact on CBA operations. Using a verticalized model, we carried out bauxite mining and alumina refining, while generating a huge part of the energy we consume. Over the year, we managed to increase the volume of aluminium sales, mainly through the trading activity, while focusing on the sale of higher added-value products that enabled boost profitability for CBA.

In the Upstream Business, we focused even harder on cost competitiveness and sales profitability. In the Downstream Business, we kept on investing in co-creating and devising solutions jointly with our strategic clients. We do believe that being close to them has helped us pave new ways, hence boosting our efficiency and optimizing the demand with innovative solutions and services at first-rate added value to our customers.

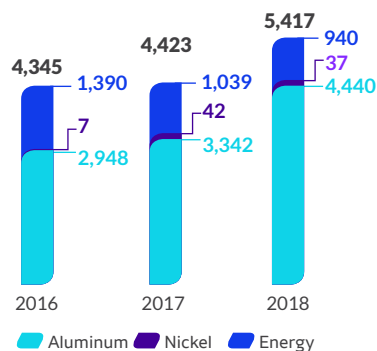
Liquidity and indebtedness

At the end of 2018, CBA's consolidated gross debt totaled R\$ 2.1 billion, accounting for a 27% fall compared to 2017 (22% compared to 2016). Despite the Brazilian Real depreciation against the US dollar last year, the transfer of US\$ 241 million of Eurobonds to Votorantim S.A. reduced the total debt, which along with the higher EBITDA and financial discipline, brought up a lower drop in the Company's leverage (measured by the quotient net debt/adjusted EBITDA) to 1.65x versus 4,54x in December 2017. We have an extended debt maturity profile showing an average 4.8-year debt maturity. As for cash, cash equivalents and financial applications closed 2018 at R\$ 572 million. This cash status is enough to cover over five years of debt obligations.

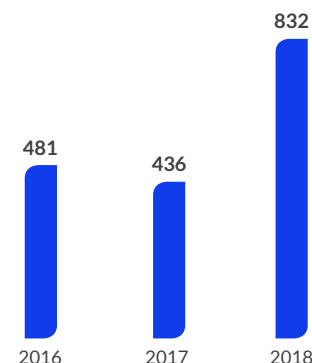
Aluminum sales volume
(thousand tons)



Consolidated net revenue
(R\$ million)



Consolidated adjusted
EBITDA (R\$ million)



High- performance business



Coil surface treatment
at the factory in
Alumínio (SP)

Inspirational leaders and high-performance teams

Corporate office in São Paulo (SP)

145 leaders
attended the
engagement
modules to help
strengthen our
culture

Since the corporate spin-off done in 2016 by which CBA separated from Votorantim Metais, which became Nexa Resources, we have lived a new organizational environment. Over this time, we have undergone a robust process of administrative and operational restructuring that included building and implementing the CBA of the Future strategy and reviewing our employees' competences. This entire process has brought us the opportunity to rethink the way we manage our people and the environment of our company, focusing on the **CBA's cultural rise** stemming from four key pillars: teamwork, constructive divergence, sense of ownership and competitiveness ambition.

For assuring that our culture pillars are strengthened at its best, we understand that **engaging the leadership** is a must. Then, in 2018, this cultural rise reached coordinators by means of two training modules involving 145 leaders among executive officers and coordinators, thereby strengthening their alignment to the CBA of the Future strategy and to the move towards a culture of high performance that the Program 18.18 of Votorantim S.A. has aroused. Started in 2016, this action summarizes a broad process of reflection and review of Votorantim S.A.'s businesses, with a view to the 100th anniversary of the Group celebrated in 2018, that started from five moves - high-performance culture, emerging technologies and new means of consumption, business re-design, knowledgeable change and global mindset. The first step of this move had been done in 2017, at the time engaging the company's top leadership.

This year a distinct focus towards cultural rise was the **constructive divergence** pillar, highlighting its relevance and ways of showing respect in circumstances when different opinions come up in the professional environment, valuing the diversity of ideas, innovation, and an open and straightforward dialogue. For 2019, we intend to offer a similar training to explore other cultural rise pillars.

Skill training and development

We are over 4,800 employees daily engaged in building a **high-performance culture** that is grounded on inspiring leadership and an environment of dialogue, collaboration and trust. Like the other companies of the Votorantim S.A. Group, we hold the Votorantim Development System (SDV) as a management model to speed up skill development for our people, in harmony with the company's strategic objectives. The SDV system employs the Nine Box methodology that sets up a matrix for assessing our talents' performance and potential on an annual basis. Based on that assessment, managers and employees work together to build an Individual Development Plan (PDI) picking up improvement elements, key actions, deadlines and means of enabling professional growth. In 2018, we evolved in this front by getting our leaders to talk over the deployment of corporate milestones into individual goals, and blending those insights coming from distinct areas to ensure we could grab each person's expertise for reaching the desired results.

For encouraging our people to engage in improvement processes for operations and products, CBA has fostered well-designed programs that are open to everyone in the company. One of them is the **IdeAI Program of Ideas** that pushes employees, whether individually or in teams, to come up with ideas for improving and boosting processes and new products. A committee reviews the suggested ideas and selects those with a potential for implementation. The authors of the ideas put into practice are given points that can be exchanged for experiences and, at the end of the year, the three best of the four categories (Environment, Cost Reduction, Operational Excellence and Product and Innovation) attend an event for being acclaimed and awarded.

Seeking to develop our employees, we have also engaged in actions and training activities of the **Votorantim Academy**. One of the actions the Academy carries out is the Potenciar Program that aims to recognize and develop internal talents of the Votorantim Group companies. In 2018, those CBA people attending the **Potenciar Program** started a project together to turn our wastes into a business. That action is underway for being wrapped up in May 2019.



4,816
employees

• **4,458** men

• **358** women

IdeAI 2018

• **127** ideas
registered

• **41** initiatives
approved

• **30** already
implemented

Work environment survey

In 2018, we carried out a **work environment survey** at CBA to assess the progress of both our employees' favorability degree and the corporate environment. Based on a methodology devised by the Korn Ferry - Hay Group consultancy, our survey has placed us in the so-called P90 group i.e. among the 10% best companies in Brazil holding the best results in terms of workplace environment. The survey consisted of 40 questions appraising 12 distinct factors that pointed out strengths and likelihood for improvement. Our favorability rate achieved 81%, showing that 96% of our employees answered the survey voluntarily and anonymously. We then layered the results per individual areas, allowing all teams to debate and devise action plans for boosting engagement. This outcome serves to stress how important a cultural rise project is, while it demonstrates that this change has come true in the everyday life of our working areas.

Factors assessed in the work environment survey

- | | |
|--------------------------|--------------------------------------|
| • Agility and innovation | • Leadership |
| • Alignment | • Quality and focus on customer |
| • Cooperation | • Resources, structure and processes |
| • Engagement | • Compensation/benefits |
| • Performance management | • Workplace safety |
| • Change management | • Organizational support |

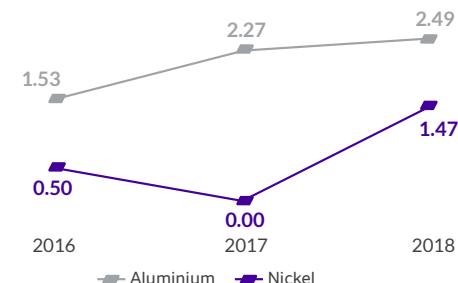
Commitment to safety and well-being

The unfailing care for our employees is a priority in managing the CBA activities. We are committed to ensuring a safe work environment and quality life for our professionals. Therefore, we have devoted ongoing efforts to well-designed programs and protocols already implemented for the physical integrity and health of our employees, thus minimizing the exposure to risks that may occur within our facilities. This is one of the topics drawn up in our sustainability strategy setting up objectives, initiatives and specific goals up to 2025. Within this scenario, the priorities are aimed for progressive decrease in workplace accidents, commitment to zero fatality and consolidation of the **Life Quality program "Por Você" ("For You")**.

In 2018, we had a slight rise in the number of accidents as compared to 2017, which caused the with and without lost work-day frequency rate to jump from 2.27 to 2.49, which is mainly an outcome of failure in risk perception and safe behavior. While our performance is better than the reported national* (7.08) and international* (4.8) accident rates for the aluminium sector, based on data respectively from the Brazilian Aluminium Association (ABAL) and the International Aluminium Institute (IAI), we have relentlessly striven to bring this indicator down.

**Latest published data, base year 2017*

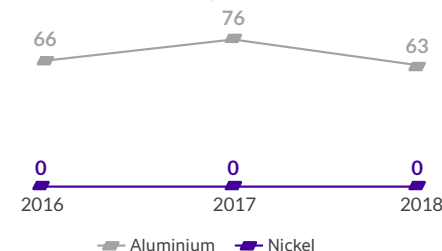
Accident frequency rate*



**This consolidation follows the NBR 14280 standard guidelines and comprises employees' and contractors' accidents with and without lost work-days (Total recordable accident rate – per MHW).*

In 2018, we invested **R\$ 16.6 million** to revamp our facilities and modernize or acquire new and safer equipment

Accident severity rate*



**This consolidation follows the NBR 14280 standard guidelines, comprising employees' and contractors' accidents and the calculation of lost and carried-forward work-days.*



In the year, we spared no efforts to continue investing and starting actions aimed to better the working conditions at our operations and raise workers' awareness about the likely risks of each task and how to control them. In the Upstream Business, we have designed a pilot awareness program that has already delivered rewarding results. It is an action advising employees about the relevance of using safety tools qualitatively, following the pertinent protocols while performing their work. As for the Downstream business, we designed a process named "Leadership Coaching" that develops and engages supervisors in pinpointing and assessing risks in the workplace, in order that they bring such perspective to their everyday work and contribute with the implementing improvements.

Another revamped initiative was the **Programa Padrinho (Godparent Program)** in the Upstream business, whose pilot was put in place at the Aluminium Smelter plant with the aim of helping newcomers to adapt smoothly. The newcomers get guidance and training on the overall area operation and safety rules from senior employees, the "*padrinhos*" ("godparents"), until he/she feels skilled to assess the risks of his/her job and thus prevent them. The SENAI (National Service of Industrial Learning) was our partner in the program, carrying out the training on skills

16,200 WROs done

148,780 records for the "Fale Fácil" (Reach out and Speak) channel, 99% of which already handled

1,959 records for the "Dever de Recusa" (Your Duty to Refuse) channel

Bauxite mat in Mirai (MG)

Firefighting training at the factory in Alumínio (SP)

New Technologies for safety

In 2018, we have begun to use a virtual reality model to train our employees in fighting fire outbreaks in the Rolling Mills and in control of hazardous energy (lockout/tagout) in the Downstream facility at our industrial plant. This technology allows to role play real-life situations and better train workers, by stimulating learning, and boosting their confidence when carrying out the procedures. Another initiative taken was using biometrics to manage Personal Protective Equipment (PPE), which streamlines processes and makes identifying employees easier. In the year, we started to devise a system for anticipating occurrences, called Safety Analytics. It is mainly intended to foresee the risk levels in every single area, showing the primary vulnerabilities and trends, as well as providing data for more assertive preventive actions.

and workplace safety modules to the "*padrinhos*" ("godparents").

The agenda for our **2018 SIPAT (Workplace Accident Prevention Week)** advertised the "safe behavior" headline, with actions taking place throughout the day to ensure that our employees in the three work shifts could attend. For the very first time, our SIPAT was also open to those third-parties who work at our facilities, as an endeavor to make them aware of the value of caring for themselves and others when performing any sort of work. Our SIPAT reached a climax with an ecstatic parody show that impressed everyone attending the event, in such a way that CBA later hired a professional studio to record the music sang there.



Click here and check out the finalists of the parody show at SIPAT

In addition to the novel initiatives shown earlier, we moved the **Safe Behavior Program** forward offering training to our employees throughout the year, making them aware of the relevance of identifying and preventing risk situations. We extended this program to partner companies and trained their leaders in the Work Risk Observation (WRO) methodology that assesses tasks and the potential risks linked to each one of them. Besides WRO, the program is comprised of tools like the **Preliminary Risk Analysis (PRA)** that trains employees to identify risks and take individual and collective control measures in the workplace. Two other tools are the **"Fale Fácil"** (Reach out and Speak) channel, aimed to enable reporting and handling risk conditions and behaviors at CBA, and the **"Dever de Recusa"** (Your

Duty to Refuse) one, which empowers employees to refuse performing a task if the risk control measures either are not fully in place or they do not feel apt to perform it.

Managing employees' health and safety also covers Occupational Health Medical Control Programs (OHMCP), Environmental Risk Prevention (ERPP) and Risk Management programs (RMP), among others, that are ruled under the regulatory standards of the Ministry of Labor, allowing us to have a more satisfactory working environment with decreased risk of accidents and occurrence of occupational diseases. All our facilities rely on Internal Accident Prevention Committees (CIPAs), whose members are elected by the employees and represent 100% of them. Be it on-site and off-site, we

have encouraged our employees to keep a healthy lifestyle and provide them with full support and guidance for working out and eating properly. They can all attend our Life Quality Program **"Por Você"** (For You) that relies on nutritionists and physical education trainers at least twice a week. Activities can be done outdoors either with teachers of the program or accredited gyms. In just over a year, the program could engage 1.350 people from our facilities in São Paulo, Sorocaba, Alumínio, Mirai and Poços de Caldas. On top of that, the employees could also engage in several street-running events throughout the year, as well as in our 2nd "Copa Por Você de Futsal" (Five-a-Side Soccer Cup for You), which gathered teams of employees from the Alumínio plant, who played within a friendly atmosphere.

Highlights of the 2018 Life Quality Program "Por Você" (For You)



11 street-running events for those attending the program, totalling over 900 registrations



34 teams played in the 2nd "Copa Por Você de Futsal" (Five-a-side Soccer Cup For You), with 32 male and 2 female teams



Over 2,650 appointments with skilled nutritionists



Trophy for the largest team participating in the running events – "Sorocaba Tem Running" (101 runners), "Novembro Azul" (217 runners), and "Pink do Bem" (250 runners)

Participation of CBA employees in street races



Everlasting search for operational excellence

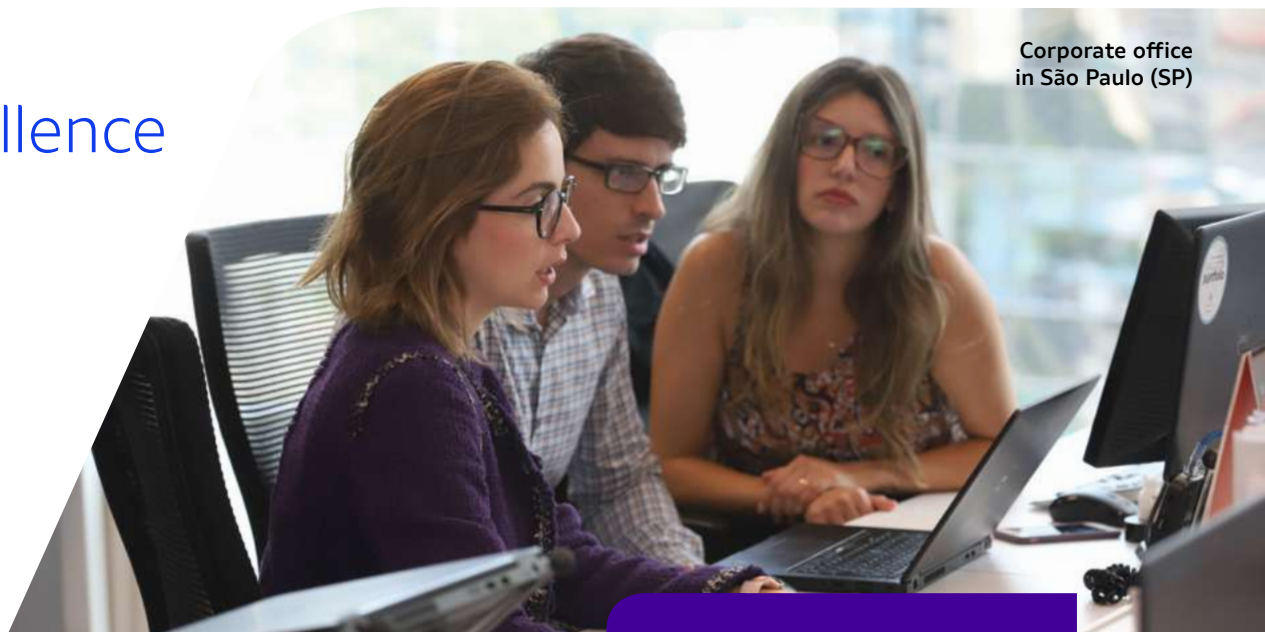
A peculiar feature of our business model is **verticalization** allowing us to keep track of the entire aluminium chain, from extracting bauxite to producing primary aluminium and processing it into higher added-value products. This differential has given us outstanding **competitive advantage** particularly in a scenario of instability in the pricing of production raw material. In contrast, operational excellence becomes far more challenging. Therefore, guided by the CBA of the Future strategy and the cultural rise move, we have sought to implement a series of initiatives and strategic investments to boost our productive process.

In recent years, we have started programs with initiatives and milestones aimed to boost our competitiveness and strengthen the CBA of the Future goals, as well as make strategic investments towards innovation and sustainability. Applying tools and quality management practices (such as PDCA, Lean Manufacturing, Six Sigma, among others) are some examples. Each employee trained in these methodologies is invited to develop an improvement project causing a high impact on the CBA business. In the last year, 78 professionals were trained in this program, generating 106 improvement action in different areas of the company.

Further to operational improvements, we launched a **program of strategic investments**, in excess of R\$ 1 billion, to be rolled out over five years. The program encompasses large-scale projects demanding large amounts of financial resources for becoming feasible like the filter press project for the Alumina Refinery and the Green Soderberg project for the Aluminium Smelter (learn more on pages 33 and 47), to small-scale and lower-cost actions.

Among the investments made in 2018 to leverage our production process is the modernization of the intermediate foil rolling mill (Cosim) in the Downs-stream area. That adjustment brought greater security and reliability to equipment operation, through hardware and software modifications and thickness and flatness controls, thus guaranteeing a superior quality to our customers. Another noteworthy investment was in billet production where we acquired a system of casting pit and tables for billet production, using the best technology seen in the market, which will enable enhancing our productivity and meeting the growing demand. We further worked internally and externally on validating the 5XXX series alloy produced from caster rolls to satisfy the transportation and automotive segment. Over the year, several customers validated the use of this alloy.

Corporate office
in São Paulo (SP)



Managing competitiveness

Having over 800 initiatives encompassing all CBA facilities, the Change Program to Speed up Value Capture proved to be effective and allowed us to build a continuous competitiveness management within CBA, including the design of a calendar of initiatives, investments and milestones, and monitoring of the outcome stemmed from these efforts in the production process and financial performance. The initiatives put in place aimed at attaining higher efficiency and cost savings such as working capital optimization, increased metal output and boosted energy efficiency in the Aluminium Smelter.

We further moved in using resources to monitor the production process and conditions of our operations and assets. An example is the use of data technology to monitor our Aluminium Smelter operations i.e. the **advanced analytics** tool that gathers real-time data to optimize the operation and allows faster decision making. Also, we used robotic resources in the Casthouse with three robots installed in the production line to assist in the maintenance servicing, being two handlers for assembling the ingot stacks and one for cleaning slag. This equipment helped make equipment operation safer, thus eradicating the manual operation and making ingot production more competitive.

Supplier development

This is a strategic item when it comes to guarantee operational excellence and the way we manage and connect with our suppliers, from the most strategic ones that deal with large volumes of raw materials and services, to the small-scale ones of a more restricted business presence. Only in 2018, we placed over 350,000 orders for purchases and contracts, totaling nearly R\$ 2.3 billion. At CBA, we believe that the relationship with suppliers must be driven towards the long run. It involves making a partnership and quality relationship with the suppliers, which is not only limited to price and term considerations, but also involves issues that matter to our company, such as,

among others, criteria of financial soundness, safety, environment, compliance and human rights.

In 2018, we started a **supplier management system** that enables a more automated, agile, secure, and transparent authorization process. By applying this chain management and development model, we can monitor operating licenses' validity online, and build mechanisms to appraise and select suppliers following the CBA's applicable requirements, in a robust, straightforward and harmonic fashion with our corporate strategy.

This change in supply chain management was drawn up jointly with the Votorantim Group and involved a direct investment of R\$ 286,000 by CBA. Migrating to the new system has helped rationalize the supplier base that moved from 39,000 to nearly 5,000 registered companies. Besides managing this business partner group, the system also minimizes our exposure to risks and raises our financial, legal and operational security level. For 2019, we aim to expand this new model, pushing the efforts in qualification and monitoring, so that CBA can acknowledge those suppliers who stand out in the requirements that matter to the company.

Manipulator robot
of ingots in the factory
in Alumínio (SP)

We moved
forward in applying
**technological
solutions** in our
productive processes

Number of
suppliers by
region

	2018	2017
Central-West	229	223
Northeast	34	20
North	24	17
Southeast	2,634	3,304
South	221	197
Subtotal Brazil	3,142	3,761
Foreign	138	95
Total	3,280	3,856

Innovation and partnership with customers

Tuned to CBA of the Future strategy, we aspire to be a benchmark in the aluminium sector and come up with sustainable alternatives and solutions for our **customers** through the **co-creation of solution and personalized service** program. We also have sought to set up partnerships enabling a shared space in our Alumínio industrial center, allowing mutual gains and synergies. In the Upstream Business, we closed a partnership with Nexans Brasil S.A. in 2018 to produce rebars at our facility using the molten metal produced in our Aluminium Smelter. We further formalized a partnership with Com-Bio Energia S.A. to install and operate a biomass-powered boiler that will supply steam to our Refinery.

In the Downstream Business, the market development and innovation area together with the commercial area assembled a team endeavored to make new products, broaden the presence of key customers, open markets and innovate. Then, along with the planning, process and production areas they make up the **Innovation Committee**. On a weekly basis, they meet to look at

market trends, prospects, customers' and employees' suggestions, and those ideas under the Product and Innovation category submitted to the IdeAI Program. They consider everything from the simplest solutions to co-creation efforts relying on customers and partners, which are viable for implementation in the short, medium and long term.

Since 2016, we have taken on the key account management (KAM) methodology, a management and customer service model, aligned with their needs and value proposition, which allows us work together to mutually meet current and future needs in those segments that are strategic for CBA (i.e. packaging, automotive, transport and other segments bringing opportunities). We set up this strategy in 2018 putting a focus on improving our services and unceasingly aiming to conceive solutions and services for our customers, both in Brazil and overseas.

One example was when we worked out an aluminium solution in partnership with a customer to build a road equipment for dry-cargo transport trucks. It led to gains in strength and durability and helped lower the equipment's total weight. Consequently, we could attain **greater competitiveness to the chain**, with potentially-decreased fuel consumption. Another example was the development of 5XXX series alloy produced from caster rolls for the transport and automotive segments, which was endorsed by several customers in 2018.

Market recognition of CBA's new positioning, high-performance and innovation culture came in the form of two awards in 2018: the **Bemis Gold Seal** in the aluminium supplier category from Bemis, one of the leading packaging producers in the world, and the **Randon Supplier Awards** in the Innovation, Technology and Development category. We also attended some events such as the "Frotas e Fretes Verdes" (Green Fleets and Freights), SAE Brasil, Techdays at the customers' and vendors' site and Hackathon in an academic environment, among others.



CBA stand at ExpoAlumínio

CBA at the ExpoAlumínio 2018

CBA sealed presence at the seventh edition of ExpoAlumínio, the prime exhibition for the sector in Latin America, held in September 2018 in São Paulo. Besides sponsoring the event, we had an institutional stand showcasing twelve technical projects, debated at both the CEO discussion and the Mining Tailing Management, presented a safety lecture, and assigned three employees to represent ABAL and coordinate panel discussions on packaging, automotive and transport applications, bauxite, alumina, and primary aluminium.

For the ExpoAlumínio itself, we aided two initiatives of the Brazilian Aluminium Association (ABAL). At the Cluster Startup Space, an interactive environment encouraged innovative ecosystems with projects, experiences and solutions in areas such as artificial intelligence, 3D printing, the internet of things, and big data. The House of Aluminium, an experience in architecture, art and design, featured diverse forms of using the metal in our everyday, from residence's windows to food packaging and mobile phone components.

Investment in exportation and logistics

Especially in the Downstream Business, we understand that CBA can play a leading market role in the Americas, by leveraging our competitive advantages to offer tailor-made innovative solutions to clients. To this end, we have built our structure with a **team dedicated to the export market** (KAM, customer service, after-sales and logistics). A significant move towards fulfilling this aim was to design logistic systems and processes capable of conveying our products to customers present in other countries efficiently, safely and expeditiously. That was how we exported over 30,000 tons of aluminium in 2018

Another major achievement in 2018 was implementing **the cargo scheduling portal**, through which carriers and FOB (free on board) customers can schedule collecting CBA-supplied products at our facility. Through the system we could devise a logistic planning in advance and thus reduce loading standby time at our plant by 30%. On top of that, we significantly improved our customer service standards by making acquainted with the exact date and time their orders will be loaded, and when they will leave our plant.

Completing the set of service standard improvements, we also implemented a **GPS-based cargo monitoring system** allowing customers to track their orders via mobile app, right when leave our plant until they reach their destination. This initiative has enabled us to thoroughly keep a visual track of our deliveries and reduced cargo theft rate.

We implemented
improvements
for the **loading
and transport**
of our products

Integrated
GPS
monitoring

**30% drop
in average
loading
standby time**



Environmental conservation

4

Recovering areas
at Miraf unit (MG)

Sustainable aluminium production

Aluminium is a unique product that blends strength and geometric flexibility with low weight and **infinite recyclability** preserving its properties. Thus, it is recognized as a solution to develop less extractive and more circular productive chains, which might reuse resources and lessen waste and the industrial impact on the environment.

In the quest for sustainability, CBA stands out in the aluminium market for devising quality solutions with multiple applications and low impact on nature. Our products are made from renewable energy sources, which enable depleting greenhouse gas emissions. We continually invest in **technological innovation** to minimize the environmental impacts of our processes and enlarge our aluminium recycling capacity. Hence, our aim is to

produce sustainable aluminium that helps us fight critical environmental issues, such as depleted natural resources and climate changes, while offering convenience and adding value to our clients.

In order to reinforce our commitment to sustainability as set out in our strategy, we seek to match our management and production practices with the standards of the **Aluminium Stewardship Initiative (ASI)**, a global organization standardizing and certifying the aluminium market. ASI defines the global parameters applicable to the performance of sustainability and the custody chain of materials in the aluminium market. As a result, the ASI standards enable the aluminium industry to demonstrate responsibility and earn independent and reliable performance assurance that reinforces

and ensures the trust consumers and stakeholders place in the aluminium production, further curbing the risks to its reputation.

In 2017, we joined ASI and, in 2018, we carried out an internal assessment of our management and production system to identify aspects for improvement. Following that exercise, we drew up an action plan, naming the measures to be taken in different areas, and setting an implementation schedule aiming the **ASI certification**.

We are organizing
our operations
to earn the **ASI
certification**



ASI Training

We do believe that our efforts to earn this certification reinforces CBA's commitment to environmental issues, which our customers, investors, shareholders, employees, and the society at large have praised so strongly. Moreover, such certification will help us strengthen our management, processes and products grounded on the **highest global standards**, in harmony with the CBA of the Future strategy, as well as enable us to play a leading role in sustainability in the aluminium market in Latin America.

Aluminium recycling

Reusing raw materials is a great move to restrain the pressure on the planet's existing supply of natural resources, and it similarly minimizes wasting raw materials that would otherwise be disposed of at the end of the product life cycle. Therefore, aluminium recycling is a crucial activity for CBA. We have processes in place for reusing in-house and outside al-

uminium scrap and recycling post-consumer scrap from our customers. Producing billets from customers' scrap is called processing, a service we provide at our plant in Alumínio (SP) and, on a larger scale, at Metalex, our facility proficient in industrial scrap recycling, located in the city of Araçariçuama (São Paulo state), holding an installed production capacity of up to 75,000 tons of aluminium billets per year.

Aluminium recycling (thousand tons)

	2018	2017
Scrap processed for customers	67.6	58.5
Total raw material consumed (scrap, molten aluminium and ingots)	437.0	440.0
Percentage of customer's scrap processed	15.5%	13.3%

Metalex unit in Araçariçuama (SP)



Green Soderberg project

Launched in 2017, the Green Soderberg project enables CBA's production process to be yet more sustainable, helping to lessen environmental impacts and enabling safer operations and well-being for our workers in the Aluminium Smelter, while adding in quality to our products. It is a project consisting of a two-stage modification in the electrolysis process.

The first modification occurs in the equipment where feeding the raw materials, aluminium oxide (alumina) and electrolytic bath, runs on time at regular quantities and intervals, which allows optimizing the use of the assets, gaining productivity, saving costs, and lowering particulate emissions, fluorine, greenhouse gases, waste and water consumption for treating gases.

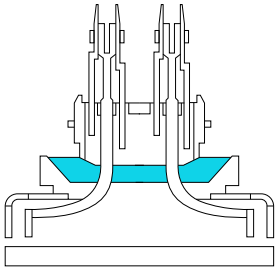
This point-break **feeding system** was launched as a pilot-project implemented at 12 pots at the Aluminium Smelter III in 2017. To that purpose, a project was designed from manufacturing and assembling alumina and fluoride silos, crust breakers and feeders. Monitoring their performance was done throughout the year with promising results, which led us to start the system in another 12 pots, thus reaching 24 in place at the end of 2018.

Due to the minor gas emissions resulted from this technology, when it is wholly implemented in the Aluminium Smelters, it will allow shutting down the wet gas treatment system in place. Those are systems operating at a huge water volume and generating residues that stem from the particulate emissions. Consequently, this project has a potential to bring out a yearly drop in consumption at 2.7 million cubic meters of water and curb the generation of 7.2 thousand tons of waste.

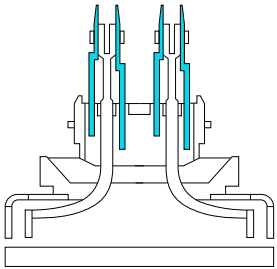
Green Soderberg project

At CBA's production process, we use a technology known in the market as Soderberg that dissolves aluminium oxide in molten aluminium. In this model, the pots are installed inside the buildings (Aluminium Smelters) and fed continuously using special vehicles. Its input system requires breaking the pots' sealing crust, generating fugitive emissions, mainly carbon dioxide. Named as Green Soderberg, this project underway at CBA automates the given feeding process, thus lowering emissions and bringing out additional efficiency and safety benefits.

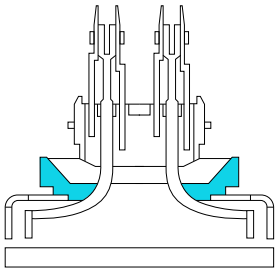
See the inner body of an electrolytic pot to learn how the conventional process of electrolysis occurs:



1. The aluminium oxide or alumina (Al_2O_3) is added to the furnace pot using special vehicles that revamp the crust in the furnace. In this process, the oxide is mixed in an electrolyte where the alumina is solubilized. This process generates greenhouse gas emissions, particulate matter, and fluoride gases.



2. By conveying electrical current through the electrolyte, the solubilized alumina is separated into $2\text{Al} + \text{e} 3\text{O}^-$. Once the electrolytic process occurs, the oxygen is attracted by the **anode** (made up of petroleum coke and coal tar pitch), where a reaction occurs, mainly generating **carbon dioxide (CO_2)**.

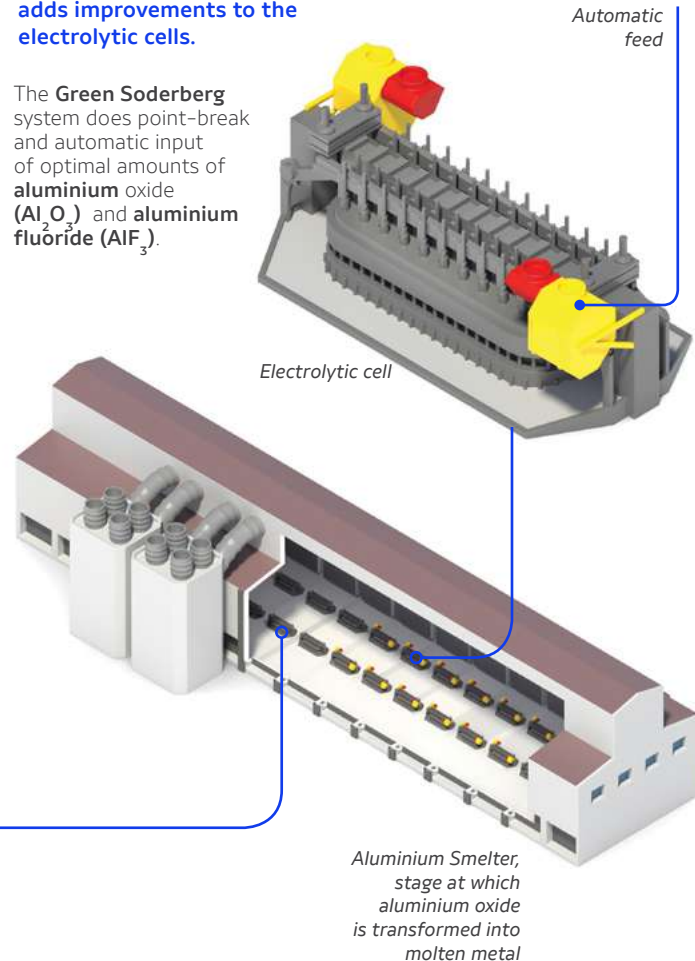


3. Then, the aluminium (Al), attracted by the cathode, is deposited in molten-metal form into pot's bottom. The aluminium produced daily is extracted and conveyed to the Casthouse.

The electrolytic process of electrolysis takes place at nearly 960°C , enabling to produce about 935 kilos of aluminium per day at each pot. Currently, the CBA's Aluminium Smelter is made up of over 1,000 pots in operation.

Understand how the project adds improvements to the electrolytic cells.

The **Green Soderberg** system does point-break and automatic input of optimal amounts of **aluminium oxide (Al_2O_3)** and **aluminium fluoride (AlF_3)**.



Desired benefits from the **Green Soderberg**

- **Less consumption** of raw materials like the paste and fluoride blended with aluminium oxide.
- **A 1% gain** in efficiency of the electrical current in the electrolysis process.
- **Lower CO_2 equivalents**, particulate and fluoride resulted from the process, enabling to shut down the wet gas treatment systems.
- **Improved working** conditions in the Aluminium Smelter.
- Shutting down the wet gas treatment system helps minimize **water** consumption and **waste** generation.

Legacy for society



Upon mining,
we **restore the
land to conditions
that match with
or are even better**
than those
prior to mining
works

Coffee plantation in
recovery area at Miraf unit (MG)

For CBA, yielding shared value suits the business model long before sustainability has become a prominent theme. The entire bauxite extraction process at our mining facilities is exemplary, within a wide and endless process of **relationship and engagement** with rural farmers and universities. We operate three mining facilities located in the state of Minas Gerais and anticipate operating a fourth unit in the city of Barro Alto, state of Goiás, where it will be installed. Together, those facilities entirely meet CBA demand for bauxite.

At all our mines, we operate with **advanced methodologies** for mitigating potential environmental impacts, serving and adding value to the communities where we operate. Land rehabilitation after mining is a must for CBA business, because it is important that landowners get their lands back under conditions that match with or are even better than those prior to the mining works.

Bauxite mining holds traits that differ from other types of operation, because the ore is found on hilltops and slopes, in superficial layers that make extracting it easier, by digging narrow strips with no need for tunnelling. This means that the impact on the land is considerably less intrusive than that in other types of mining. We mine the ore on land owned by third-parties, among which coffee producers, eucalyptus growers and livestock farmers. We take over the entire environmental licensing process prior to operations, and the mining cycle lasts between three and six months. Therefore, it is a precise, **brief and gradual mining cycle**.



Coffee fruits in recovery area in Mirai (MG)

Scientific production

7 academic articles

9 graduation theses

8 papers showcased at academic congresses

4 doctorate theses

After the bauxite extraction is complete, the mined areas undergo environmental rehabilitation, a process that lasts around four years, and creates optimal soil conditions, with restoration of the native vegetation and/or the replanting of agricultural and livestock activities. The quality of this rehabilitation is certified by studies and **scientific research** carried out through a partnership with the Federal University of Viçosa (UFV). Under the same partnership, CBA sponsors experimental areas intended for academic research on soil handling practices in mined-area rehabilitation processes using eucalyptus, coffee crops, native species, and pasture areas. The said partnership also comprises a line of research on water conservation, showing that our mined areas, upon rehabilitation, have boosted water retention levels and reduced runoff in the region, due to the care taken and the continual monitoring throughout the rehabilitation process.

We maintain on-going dialogues with the local communities to address land use and other issues. This mechanism is in harmony with the CBA's **Integrated Management Policy**, and relies on a custom-made procedure for recording external communications.

Total altered or rehabilitated areas (hectares)

Total area mined and not yet rehabilitated by the company at the beginning of the period	32.0	27.7	59.7
New areas mined in the period	14.0	17.7	31.7
Areas where the rehabilitation process was completed in the period	20.5	17.9	38.4
Total area mined and not yet rehabilitated by the company at the end of the period	25.5	27.5	53.0

2018			2017		
Mirai	Poços de Caldas	TOTAL	Mirai	Poços de Caldas	TOTAL
32.0	27.7	59.7	10.1	18.3	28.5
14.0	17.7	31.7	49.4	11.4	60.8
20.5	17.9	38.4	27.5	2.0	29.5
25.5	27.5	53.0	32.0	27.7	59.7

Legado das Águas (SP)

Legado das Águas (Water Legacy)

In 1950, CBA acquired an extensive area of native Atlantic Forest in the Vale do Ribeira region (São Paulo state) to protect the headwaters of the Juquiá River, which serves some of the hydropower plants the company owns. In doing so, **we are conserving over 31 thousand hectares** of native forest, caring for its fauna and flora, in what has become the largest private and native Atlantic Forest reserve in Brazil.

Since 2012, Votorantim S.A. has endeavoured to build a business model for this reserve that reconciles environmental protection with the sustainable use of its natural resources. Out of this effort, the **Legado das Águas** came to be: an innovative initiative that uses our natural capital to conceive products and services with the potential to spawn shared value, and ensure conditions for preserving this territory to last.

To this end, **three production chains** were devised to leverage the potential of the area: legal reserve compensation, production of native species of the Atlantic Forest and ecotourism. From 2018 onwards, the three chains began to fully work at the Legado das Águas, encouraging entrepreneurship, professional training and local income generation, and giving rise to productive activities that did not exist before in the Vale do Ribeira region ranked with the lowest Human Development Index (HDI) in the State of São Paulo.



For more information,
visit the Legado
das Águas website.





Legado Verdes do Cerrado
in Niquelândia (GO)

Legado Verdes do Cerrado (The Cerrado Green Legacy)

More recently, CBA drew up an initiative similar to Legado das Águas, in the region of Niquelândia, state of Goiás, where it operates the Nickel business (currently under temporary shutdown). Since 1940, the company has owned nearly **32 thousand hectares of Cerrado**, ("Cerrado" is a Brazilian ecoregion of wooded savannah) in the area surrounding the facility, which was initially acquired to cultivate eucalyptus for use in the Nickel production. However, with the advent of a renewed production process, the demand for eucalyptus has decreased over the years, such that only five thousand hectares were exploited for cultivation, the rest remaining untouchable for decades.

In 2017, after building the strategy for environmental conservation in the Legado das Águas, we opened **Legado Verdes do Cerrado**, a private Sustainable Development Reserve, in partnership with the Votorantim Institute, Votorantim Reserves and the public bodies of the state of Goiás. Five thousand hectares within the area are destined for conventional economic activities, such as cultivation of soya and maize, and the other 27 thousand hectares consist of preserved native Cerrado, where activities of the new economy are carried out, generating income for the local community and for CBA, while backing up efforts to protect the environment in the reserve's territory. CBA manages all investments for the Legado Verdes do Cerrado.

Of the 32
thousand
hectares of the
Legado Verdes do
Cerrado reserve,
**27 thousand
have retained the
native biome
of the region**

As in the Vale do Ribeira, for this one we devised three sustainable production chains – compensation for legal reserve, production of Cerrado native plants for reforestation, and ecotourism. And although it has been active for a very short period, the Legado Verdes do Cerrado has already brought out positive results. In 2018, producing Cerrado species helped us **increase our greenhouse capacity more than five-fold**, from 40,000 to 220,000 plants, to meet the growing demand of rural producers for rehabilitating Permanent Preservation Areas (PPAs). We further closed an agreement with the “Federação de Agricultura e Pecuária de Goiás” (Agriculture and Livestock Federation of Goiás) (Faeg) to aid small rural producers to expand the PPAs they own. As for ecotourism, we have set up a partnership with

the “Universidade Estadual de Goiás” (The State University of Goiás) (UEG) to arrange for the junior company that integrates their Tourism course to assist in creating activities connected to the reserve.

Another fellowship closed in 2018 came from the “Fundação de Amparo à Pesquisa do Estado de Goiás” (Research Support Foundation of the Goiás State) (FAPEG) to sponsor **nature conservation basic and applied studies** to be carried out within the Legado Verdes do Cerrado reserve. Three projects were granted with resources from that fund for implementation in the Legado Verdes do Cerrado reserve: the first one on biodiversity and conservation, the second on biomonitoring of the reserve’s aquatic ecosystem, and the third on soil quality at regions facing shortage of surface water.

Partnerships are an underlying aspect of the Legado Verdes do Cerrado and fit into our commitment to **boosting production chains** that are aimed to minimize local economic dependence on our operations. In the city of Niquelândia, we carried out a project jointly with the “Instituto Educacional Tiradentes” (Tiradentes Educational Institute) that provides technical courses and uses three hectares of the reserve’s farming portion to try out a syntrophic agricultural system by farming the land in different ways, mixing different species of plants to optimize soil use and climate cycles. We are aimed to look into new ways of **sustainable cultivation** that can be spread over the farms of the region, leveraging rural production performance and boosting families’ incomes.

Legado Verdes do Cerrado
in Niquelândia (GO)

Partnerships
foster
studies for
the reserve’s
**sustainable
economic
use**



Click here to watch the
video about the Legado
Verdes do Cerrado.

Managing environmental issues

An efficient operation can produce more, and better, with fewer resources and impacts. For CBA, the search for efficiency aligns with the greatest commitment to sustainability, so that our products may sustain quality for which we have been acknowledged for over six decades by the market, keeping an **optimized process and low environmental impacts**. In this regard, we have continuously put in place measures for lowering new water consumption, cutting down waste generation, leveraging material recycling and depleting greenhouse gas (GHG) emissions in our operations. When it comes to the CBA's sustainability strate-

gy, these aspects are addressed together with milestones, actions and specific targets set up from now until 2025. Within this scenario, the priorities are to earn the Aluminium Stewardship Initiative (ASI) certification and minimize environmental impacts by 2025, at 22% less water consumption, a drop of 35% in waste disposal, and a 16% decrease in GHG emissions.

Reducing water consumption

Water is a key input for various processes surrounding aluminium manufacturing. At CBA, it is

mostly used in the initial bauxite treatment at the Refinery, in wet gas treatment systems and cooling processes in the Upstream and Downstream operations. A water collection system coming from surface and underground water sources located around the plant is in place to supply the water demand for our Aluminium plant. After use, the effluent is channelled to a designated storage pond with capacity of 75 thousand cubic meters, and then conveyed to our Industrial Water Treatment Station, where it is circulated back into the system, then forming a **closed system**.

In 2018, we carried out various initiatives aimed at lowering the demand for water from local sources, **reducing the consumption** of industrial water, and rising the water recovery rate from the Palmital Dam. Those initiatives were successful and brought out additional gains in efficiency and safety for employees.

Our Alumina Refinery was the major focus of those initiatives. One of them was aimed at decreasing water loss by using thermal shock in the condensate circulation and distribution system, leading to a dropped demand for water. Another action was modernizing some pumps' cooling system, replacing the equipment using water to prevent overheating. We further invested in a technological solution to boost the **water recovery rate** in the Palmital Dam, which, only on the first year, has already generated significant improvements, more than doubling the recovery rate from 43 cubic meters per hour to 90 cubic meters per hour.

Water Treatment Station at the factory in Aluminio (SP)

Milestones up until 2025 have driven our efforts to minimize environmental impacts

The volume of water collected in 2018 at our facilities reached a level of 3.3 million cubic meters. Particularly at the plant, the **lower water collection** comes from the outcome of the above initiatives started in the Alumina Refinery. Overall, putting CBA facilities together, we largely decreased the volume of water collected, in consequence of the temporary shutdown of Nickel production facilities.

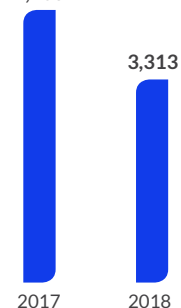
Water efficiency at our facilities remained reasonably stable in terms of annual comparison. Such efficiency reflects the volume of **water recirculated and reused** at our distinct production processes, and at the Metalex and Aluminium plant it is even better. The Alumínio plant treats all the effluent for reuse in the process and, like Metalex, also reuses the water in the production processes, by means of cooling towers.

Initiatives on **water efficiency and awareness on water use** are spread over all facilities

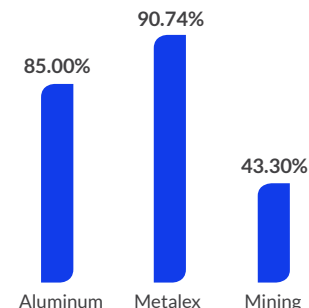
Honourable Mention at 13th FIESP Award for Conservation and Water Reuse

Between 2016 and 2017, CBA kicked off actions to improve the efficiency in industrial water treatment, among which reaching a consensus between the areas for enhancing the quality of the effluent generated in the plant, inhibiting inappropriate discharges and avoiding the excessive use of chemical products, combined with changes in effluent chemical processing. Altogether, those measures triggered a 39% drop in new water collection for use as industrial water, between 2015 and 2017, equivalent to 658.6 thousand cubic meters. An honourable mention was given to those projects in 2018, at the 13th FIESP (Industries' Federation of the São Paulo State) Award for Conservation and Reuse of Water.

Total water collected
(thousand m³)



Water efficiency in 2018
(percentage of water recirculated into the process)



Improvements in waste disposal

Generating and disposing of wastes properly form the bedrock of our environmental management. Besides disposing of the waste that stems from the bauxite processing and refining process (learn more on page 46), CBA keeps in place specific policies aimed at reducing and managing other categories of wastes at the whole of its facilities.

In 2018, we made great strides in this matter when carrying out a comprehensive survey of the wastes resulting from the production process at our facilities, and identifying those that could likely be used as by-products. We then laid out 72 types of waste prone to become by-products, for which we outlined action plans for application throughout the year along with the pertinent areas causing their generation.

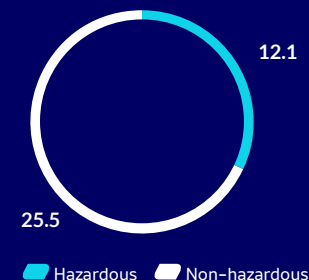
This initiative brought promising results indeed. We boosted the way we manage a variety of wastes, by turning a then-costly issue into a material that is now more properly handled and an income source. As an example, in the Refinery area we began to recover the waste left over from sweeping that was once disposed of into the dam. Similarly, in the Aluminium Smelter the cathode blocks then meant for co-processing are now a source of energy recovery, which enabled us to turn a then cost of R\$120 per ton of waste into an average revenue at R\$300 per ton. Another move forward was putting a composting process in place by using a processed organic waste as a compost on vegetation and gardening at the Aluminium plant, a practice long employed in the mining areas where compost is a resource used for land rehabilitation.

Waste sent to dams (thousand tons)	2018		2017	
	Plant	Mining	TOTAL	TOTAL
Mud	581	913	1,494	1,532
Sand	100	0	100	103
Other Alumina Refinery wastes	13	0	13	8
Total	694	913	1,607	1,643

Dealing with the Spent Pot Lining (SPL) former waste was another breakthrough in this matter as it was disposed of at inappropriate area. SPL is the waste material generated in our Aluminium Smelters, which, since 2016, has been properly stored at an environmentally-suitable location. In 2018, we managed to fully eradicate this waste existing from earlier periods. Thus, disposing of it accounted for 87% of the volume of hazardous waste we transported in the year, totalling 96,800 tons, then assigned to companies who specialize in properly treating it only in the national territory.

In 2018, we allocated 37.6 thousand tons of waste and stored 1.61 million tons in dams. Keeping a focus on identifying economically and environmentally better options for waste disposal led to a rise of 33.2% in the volume of waste sent for reuse and recycling. We further achieved a 31% decrease in the volume of hazardous waste generated in 2018, totalling 12.2 thousand tons.

Waste disposed of per type in 2018 (thousand tons)



Honorable mention at 24th FIESP Award for Environmental Merit 2018

Over the past years, our Downstream Business area has carried out diversified projects for enhancing natural resources and lowering waste generation. As a result, we managed to open a Utilities Engineering area to manage natural resource consumption, reduce generation of filtering waste in the Rolling Mill area, wipe out and replace chemicals in the surface treatment of extruded profiles. These actions were added to the project named Preventive Management for Better Environmental, Social and Economic Performance of the Downstream Business, then granted with an honourable mention at the 24th FIESP (Industries' Federation of the São Paulo State) Award for Environmental Merit.

Energy efficiency and management of atmospheric emissions

Like all industrial process, the production of aluminium emits **greenhouse gases**, resulting from the burning of fossil fuel and specific processes, such as electrolysis. At CBA, most of these emissions occur in the aluminium oxide and primary aluminium production stages.

CBA has been working hard to reduce its emissions even further. In 2018, in the context of the GHG Protocol Brazilian Program, we published our first public inventory of greenhouse gas emissions. This document lists all the emissions resulting from its own activities (Scope 1) and electrical energy consumption (Scope 2), with data verified by a third party accredited by Inmetro (National

Institute of Metrology, Quality and Technology). Our first public inventory has already been recognised by the Program, receiving the Gold Seal. Brazilian aluminium has an important differential in this area, as the country's electricity matrix is composed mostly of hydropower sources, which means that the equivalent carbon emission of the national product is approximately 60% lower than the world average. At CBA, this emission is even lower, since we rely on **our own hydropower plants and those of consortia** that supply much of the energy demand in Aluminium Plant. In the last year, 96% of the energy consumed in production processes of the plant came from these sources. Compared to the previous year, we had an increase in greenhouse gas emissions in scope 2, due to the need to purchase electricity from untraceable renewable sources. This result is due to the lower rainfall in the region of our hydropower plants.

Energy consumption (thousand GJ)*

	2018
Generated from fossil fuel	12,107.89
Self-generated electricity	20,466.72
Electricity acquired from third parties	870.83
Total	33,445.44

*Historical data re-presented.

Energy intensity (GJ/tonne produced)

	2018
Mining (bauxite)	0.037
Integrated plant (primary aluminium)	94.016
Metalex (aluminium)	4.831
São Miguel Paulista (electrolytic nickel)	133.544

CBA
transmission
line in
Alumínio (SP)

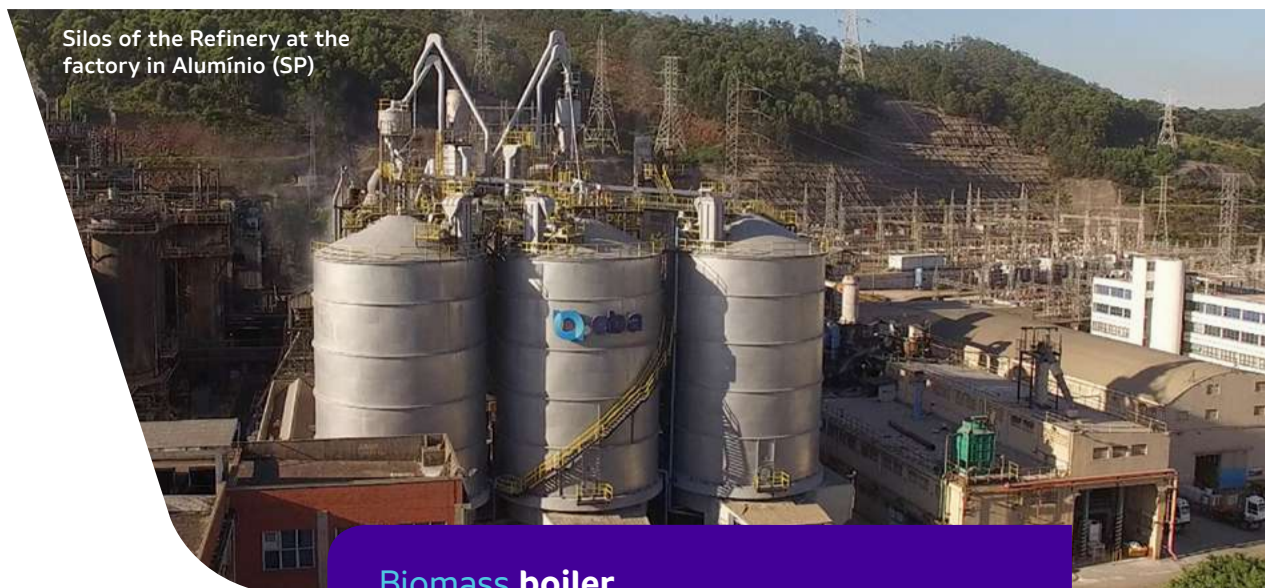
The total energy consumption, considering fuel consumption **was 33.4 million GJ**. We are developing initiatives to reduce this consumption and, consequently, greenhouse gas emissions, in the coming years. The main initiative in this area is the installation of a biomass boiler, scheduled to start operations in 2019 (see box for more information). Biomass is a renewable energy source that will replace the fossil fuels (a non-renewable resource) currently used in the boilers of the Alumina Refinery.

In addition to greenhouse gases emissions, our production process can also generate atmospheric emissions of **particulates and other gases**, such as fluoride and sulphur and nitrogen oxides. We maintain effective controls and practice performance improvements, to ensure that these emissions are within the established limits. We have seen a significant reduction in our nitrogen, sulphur and particulate matter emissions due to the temporary suspension of Nickel Business. The total fluoride emissions from our chimneys remain within the legal limits, despite the increase identified, which reflects the higher number of processes in operation in the Aluminium Smelters during the period. To further reduce our emissions, we highlight the development of the Green Soderberg project, which will bring significant environmental gains (see page 33 for more information).

Other atmospheric emissions (tons)

	2018	2017
NOx	104	649
SOx	8	99
Volatile Organic Compounds (VOC)	1	1
Particulate Material (PM)	1,059	1,376
Total fluoride	160	113

Silos of the Refinery at the factory in Alumínio (SP)



Biomass boiler

In 2018, we signed a partnership with ComBio for installation of a biomass-fired Steam Production Unit (SPU) at the Alumina Refinery. Today, the steam used in the boilers is generated by burning natural gas or fuel oil. This technological solution will reduce emissions associated with the burning of fossil fuel, and provide greater control and predictability in the cost of biomass-fired steam production, which will reduce the total cost of alumina and of the entire primary aluminium production chain. The partnership will also allow us to apply for carbon credits in the scope of market carbon mechanisms defined by the Paris Agreement on climate change. The building works have already started, and the project will be implemented in 2019.

Greenhouse gas emissions (tCO₂e)

	2018
Scope 1	1,336.6
Scope 2*	17.9
Scope 3 (concerning to bauxite transportation)	29.2

* Approach used to calculate Scope 2 was the Purchase Choice of GHG Protocol Brazil.

Dam safety

5

Palmital Dam
in Alumínio (SP)

Continuous monitoring



Design,
installation
and ongoing
management
ensure the
**safety of
the CBA
dams**

**+ 200
verification
instruments**

Security inspection
at Palmital Dam (SP)

CBA has six dams, two for water storage and four for waste, distributed in cities of Alumínio (SP), Itamarati de Minas (MG), Miraf (MG) and Niquelândia (GO). Four dams, including the two for water storage, were built in a single stage, i.e. they were never uplifted. At Alumínio facility, the waste dam went through two uplift works downstream, until its final and current configuration. The waste dam in the city of Niquelândia has had uplift works, built mostly by a centerline.

We have a robust system for monitoring the safety condition of our dams, composed by more than **200 verification instruments** and regular daily inspections by a trained operation team, as well as fortnightly inspections by specialised professionals. We also have the support of an independent company specialized in geotechnical, with professionals of international repute, who assess the safety situation of the dams on a monthly basis, carry out inspections every six months, and provide regular theoretical and practical training for our employees and third parties who perform activities at the dam. All these actions strictly follow the guidelines of the **Integrated Dam Safety Management System (SIGBAR)**, which ensures the physical integrity of the dams. All CBA's dams have a Dam Safety Plan, as established by law, and an Emergency Response Plan. In our sustainability strategy, there are goals, initiatives and long-term targets in this area, focused on: maintaining the excellence of the management system (SIGBAR); registering, engaging and educating the community involved; installing sirens in the dams; and performing emergency simulations with the community.

In the mining units, the wastewater from the bauxite washing is deposited in our own dams, where they are transported by dedicated piping and released in a uniform way, complying with the operational guidelines to ensure the stability of the structure and the safety of the dam and its surrounding area. The water from these dams is treated, then reused in tanker trucks that damp down the tracks, to control the dust produced by the transit of trucks and equipment.

In Alumínio (SP), non-hazardous waste from the process of converting bauxite into aluminium oxide is disposed of in the same way at Palmital Dam. In the last three years, around **R\$20 million** has been invested in **Research and Development** projects related to this dam. Initiatives have been deployed like the project High-Causticisation, which enables

a large volume of water to be removed from the Palmital Dam and returned to the industrial process. This project was implemented in 2017 and so far, more than 50% of the volume of surface water in the dam has been reduced.

To enhance the safety system for the CBA dams, we began a communication project in Mirai and Itamarati de Minas (MG) in the end of 2018, focused on communication in the context of the **Emergency Response Plan**. This project involved meetings with the public authorities and community leaders to promote open dialogue with stakeholders and the local community. These same actions will be carried out for the facilities in Alumínio (SP) and Niquelândia (GO). We will also promote the installation of sirens and emergency simulations with the communities in all the dams' operations.

Filter press

Since 2012, we have been conducting engineering studies for the implementation of a new dry waste disposal system for the Palmital Dam in the city of Alumínio (SP), which receives waste from the Alumina Refinery. This project aims to increase the useful life of the waste disposal system, ensuring continuity of operations. As the Alumina Refinery produces approximately 1.6 thousand tons per day of waste, with 45% concentration of solids, it is estimated that at the current pace, the operating life of the dam would expire in 2023. This would require a new disposal area, which would result in major environmental impacts.

To extend the operating life of the Palmital Dam, we opted to **change the form of waste disposal**, from wet disposal (with low concentration of solids) to dry disposal (with 75% concentration of solids), using filter presses. This innovation will allow the recovery of caustic soda present in the filtered liquid fraction, which will reduce the volume of purchases of this important input in the production process and increase the operating life of the dam by at least two decades, avoiding the environmental impacts of building a new dam.

After obtaining a Preliminary License from the regulatory authorities of São Paulo in 2017, we conducted engineering studies last year, and advanced in detailing the parameters for stacking the dry waste on the mud in the dam. We use the filtered waste that is produced by the pilot equipment installed in 2016 to carry out various geotechnical testing and experimental landfills inside the dam. Around R\$ 300 million will be invested in the project, and the filters are expected to be fully operational, in real scale, from the first half of 2022.

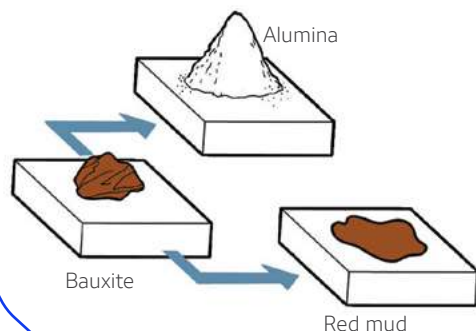


Filter press technology
will extend the
operating time
of the dam

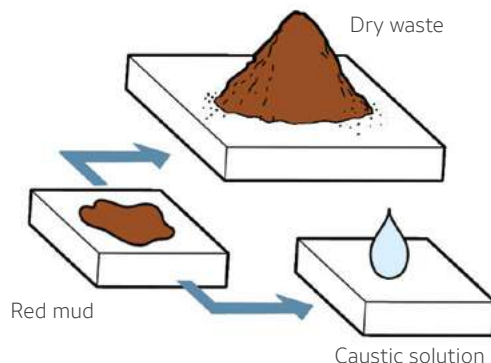
Palmital Dam (view of the auxiliary dam) in Alumínio (SP)

How the filter press works

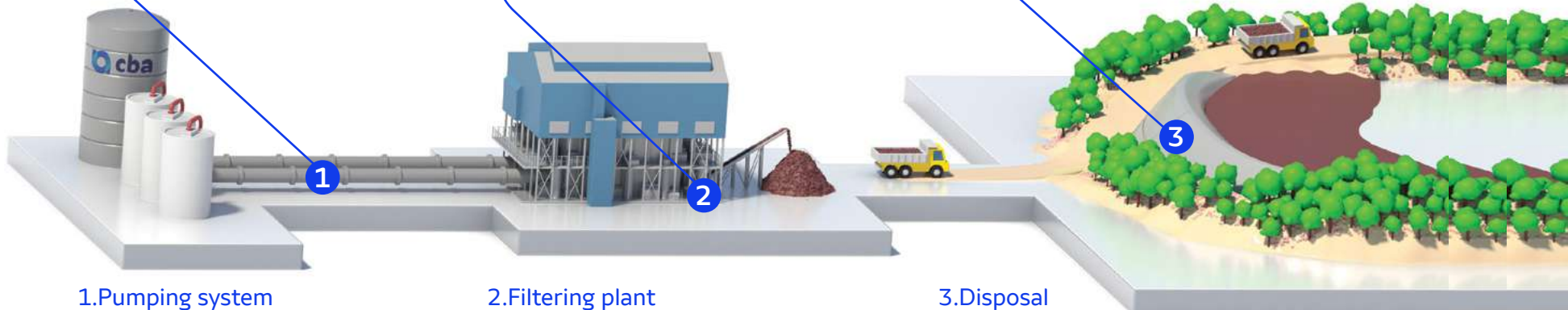
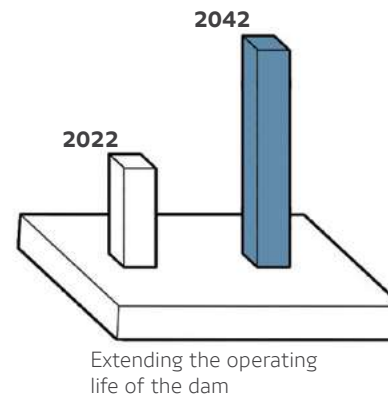
The CBA Alumina Refinery produces around 1.6 thousand tons of mud residue per day, composed of the waste material from the bauxite and a caustic solution, among other types of waste from the production process. This material has a concentration of 45% solids.



The filter press technology increases the concentration of solids in the waste from 45% to 75%, allowing the recovery of 889 liters of caustic solution per ton of dry residue.



The implementation of filter presses is planned for between 2019 and 2022 and, when completed, will increase the operating life of the waste disposal system by twenty years.



1. Pumping system

A network of pipes will carry the red mud from the Alumina Refinery to the filtering facilities

2. Filtering plant

Using pressing technologies, the mud will be filtered to recover caustic solution. The solid waste from the filtering will be carried by conveyor belts to a temporary storage yard.

3. Disposal

Using excavators and trucks, the waste will be taken to the Palmital Dam where it will be deposited. CBA is also looking into the commercial feasibility of using these materials in cement production.

Local development

6

Joint effort in the
Alumínio city (SP)

Social action



Delivery of books in
Araçariçama (SP)

Since 2016, our new **Social Action Strategy** has guided how we interact with the communities in the regions where we operate, considering the local characteristics and the type of activity that CBA carries out in each region, in a structured way that is aligned with global social impact trends. In the Upstream Business, our focus is on the autonomy of the territories, with local recognition of CBA and endorsement of our operations by the local communities. In the Downstream Business, we have been developing a study to extend the generation of value through improvements in the new production chains.

The Social Action Strategy is aligned with the CBA' key themes of sustainability management, and with its long-term objectives, initiatives and goals. Our practice initiatives are aligned with Sustainable Development Goals (SDG) of the United Nations and are organised around **three priority pillars**.

Our long-term goals in this area aim to implement a management system for social responsibility that supports the partnerships that have been established in the cities in which we operate. In this sense, we will seek to align our management model with the guidelines of **ISO 26000**, and continuously improve the projects and dialogue initiatives with local communities.



Development of Education

Focusing on the improvement of public education through the social mobilisation of communities and the qualification of practices of educational and school management, so that children and young people can have a better-quality education and, consequently, more professional opportunities in the future.



Public Management Support

Through partnerships with government institutions, CBA aims to contribute to the modernization of public management, with fiscal balance and territorial planning, through the creation of sector plans, such as the urban master plan, sanitation, housing, and others.



Economic Dynamism

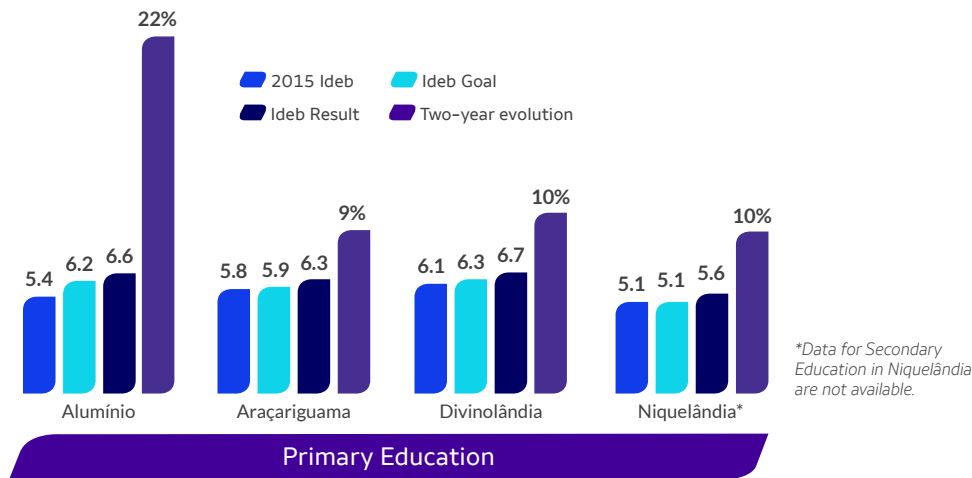
Promoting structured mechanisms that enable inclusive business models based on the productive vocation of each city, allowing other sources of income generation that will help reduce local dependency in relation to the business of CBA.

Fostering education

In the context of education, CBA conducts the PVE (**Votorantim Partnership for Education**), a methodology that aims to promote improvements in public education in the cities. In 2018, the PVP benefited six locations in which CBA operates. The central theme of the initiative was "management with a focus on learning", so that public managers could better understand the factors impacting on the main educational index in Brazil – the Ideb (Index of Basic Education Development). In February, we co-ordinated a workshop with the attendance of education secretaries from Alumínio, Araçariçuama and Divinolândia (SP), Muriaé, São Sebastião da Vargem Alegre (MG) and Niquelândia (GO), to align the actions and agree on the goals of the PVE, with the aim of enabling better allocation of resources both inside and outside the classroom, as well as focusing on the development of competences in all four cycles and intercycles throughout 2018.

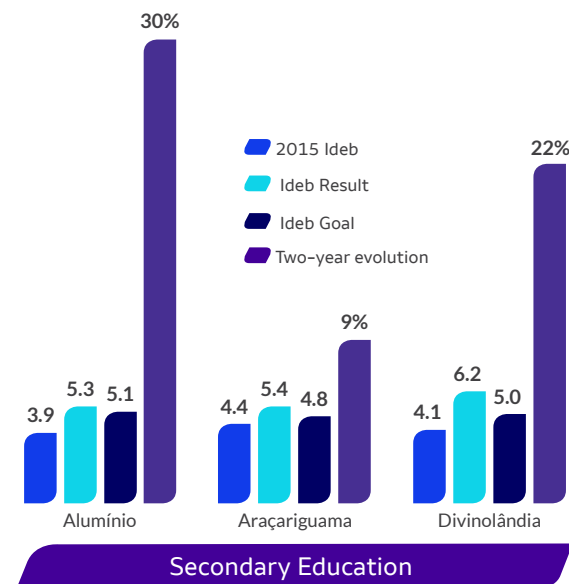
Various activities were conducted during the year, such as the **"Encontrei um Livro"** (I've found a book) initiative, in which we distributed fifty books in different points of the city of Alumínio (SP) and encouraged students to find them. Those who found them received a surprise message and an invitation to chat with the authors at an event where the authors spoke a little about their works and their lives, and reinforced the importance of reading for the professional and personal training of each individual.

Another highlight was the **"Plantando Conhecimento"** (Planting Knowledge) project implemented in Uruaçu (GO) together with the Legado Verdes do Cerrado reserve and the municipal departments of education and the environment. Based on lectures and activities, such as the planting of seedlings of native species, we raised awareness among primary



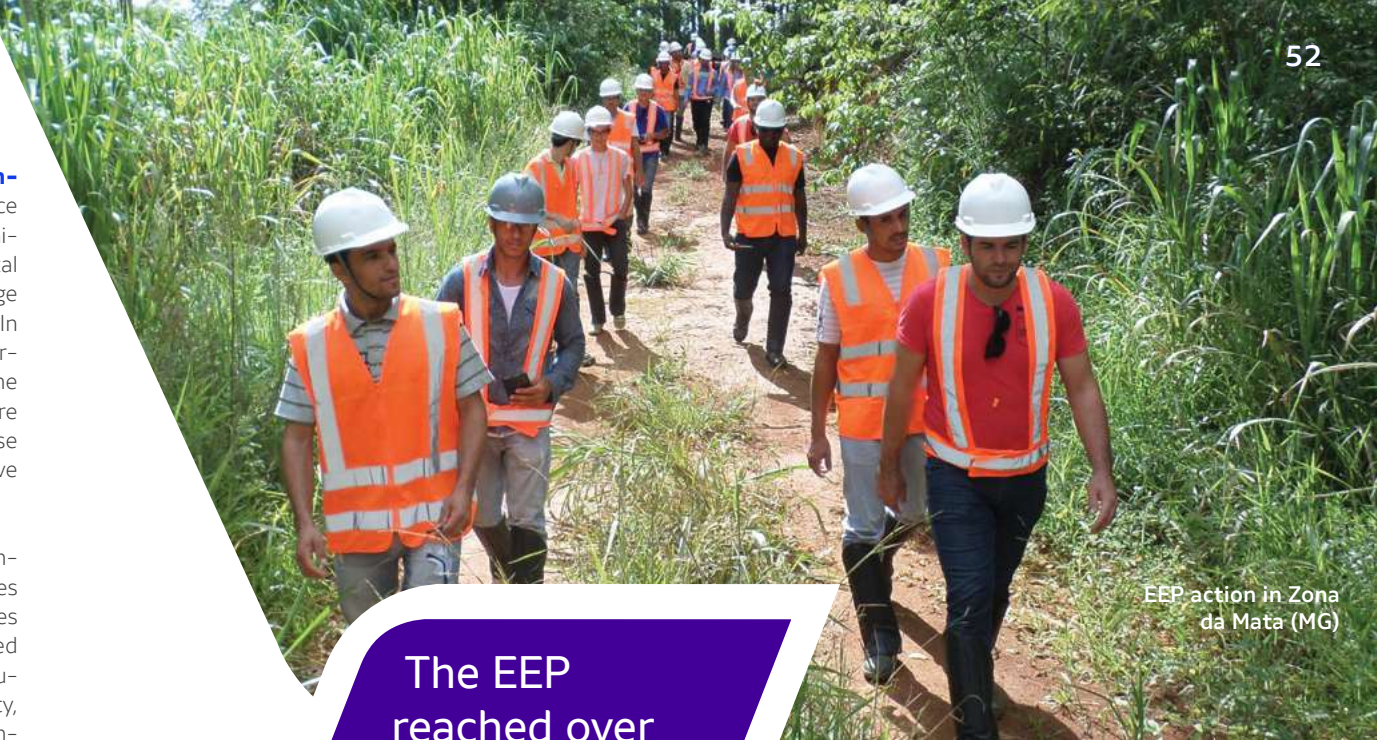
school students of the city on the importance of care of the fauna and the flora for environmental conservation. Regarding the cities of Divinolândia, Muriaé and São Sebastião da Vargem Alegre, we held cultural evenings, walk, poetry processions, and lectures with book authors, all aimed at encouraging reading.

The results of the PVE are evident and reinforce the importance of this initiative for improving the conditions of public education. In the period between 2008 and 2015, the PVE helped **enhance the Ideb**, in the cities where the program was implemented, by 38% in Primary Education and 45% in Secondary Education, as indicated in a study commissioned by the Votorantim Institute. Of the six cities where CBA conducts the project, four have been included for at least two years, showing a significant growth in their indices.



Besides the PVE, we have also promoted the **Environmental Education Program (EEP)** since 2001, with educational and training activities aimed at raising awareness about the environmental feasibility of mining activity, through knowledge about the environment and its conservation. In 2018, we conducted, once again, updating courses in environmental education for teachers of the municipal education networks in the cities where we operate. The central theme of the year's course was "Environmental education using cooperative games and active methodologies".

In the mining facilities, the EEP had eight environmental education projects, engaging employees and the local communities. Two new initiatives were added to the six that we have already carried out (a Refresher Course in Environmental Education, Knowing CBA, CBA with the Community, Environment Week, Come Closer, Family!, and Environmental Education for Employees), as a result of the **Participatory Environmental Diagnosis** conducted in 2018.



EEP action in Zona da Mata (MG)

The EEP
reached over
4 thousand
people in 2018

New initiatives of the EEP in mines



Chega mais Comunidade! (Come closer Community!)

We propose to present, to the external public, our production process and the planned environmental compensation actions. The goal is to increase ecological awareness and make the participants aware of the importance of practicing new sustainable behaviours and attitudes. It also clarifies, to the community, the importance of mining for local development and for the quality of life and well-being of the population.



Environmental education in rural areas

We aim to bring environmental education to rural communities, seeking to identify and respond to demands for information that has a direct relationship with the rural producers way of life. Through lectures, courses, playful actions and direct approaches, it promotes proper environmental education for the public.

The EEP also promoted, with the school community, various workshops, lectures, games and dynamics around important themes of sustainability, such as food wastage, separation of waste for disposal, saving water, air pollution, and careful energy consumption. As in previous years, we opened the doors of the business to the external public. The participants could visit the CBA's facilities and learn more about the process of bauxite mining and practices for the rehabilitation of mining areas. At the plant in Alumínio (SP), employees' children were involved in making drawings about ways to save water, and all of them were presented with booklets showing the participants' drawings and photographs.

Care of young people at risk

Social action in
Niquelândia (GO)



VIA Initiatives
are highlighted in
Niquelândia (GO)

Local diagnostic,
engaging **39**
local government
representatives

Theatre, dance
and visual arts
workshops in the
Foco In Cena project

In 2018, we took the **VIA- Local Support** (Votorantim Program for Childhood and Adolescence)–to Alumínio (SP) and Niquelândia (GO). The program combats the violation of the child and adolescent rights by strengthening and improving the qualification of the Social Protection Network and the System of Guarantee of the Child and Adolescent Rights. In Niquelândia we relied on the support of Instituto Aliança (Alliance Institute) to start a project with 39 professionals in the areas of education, healthcare and social welfare, including representatives of the Centro de Atenção Psicossocial (Psychosocial Health Centre), the Centro de Referência de Assistência Social (Reference Centre for Social Welfare) and the Centro de Referência Especializado de Assistência Social (Specialized Reference Centre for Social Welfare) (CREAS), as well as the Conselho Municipal de Direitos da Criança e do Adolescente (Municipal Council for the Child and Adolescent Rights), the Guardianship Council, and organizations of civil society. The first stage of the VIA was to draw up a diagnosis of the local situation. Based on this survey, professionals were trained to build an integrated action plan, focused on the main opportunities and weaknesses, and to develop a project to reduce and prevent cases of rights violations.

In Niquelândia, we also launched the **Foco In Cena (Focus On the Scene)** project, in partnership with the company Cena Empresarial, which offers workshops in theater, dance and visual arts for children and adolescents in risk situations, as well as vocational activities for parents, such as workshops on fabric cutting and sewing, cooking, and planting seedlings. This project is conducted from three platforms: arts; health, environment and sustainability, and a creative and mutually supportive economy. Its goal is to use art as a tool for education, encouraging the participants to reflect on and talk about the challenges of human relations, mobilizing them to build a better life for the community.

Public management support

Another commitment of CBA in the context of the local communities is working alongside the public authorities to enable gains in management, which are reflected in better social, fiscal and economic indicators.

One of our focuses is the development of **fiscal balance projects** aimed at helping local governments to balance their public accounts and avoid

critical situations of debt and lack of resources for public investment. In 2018, we performed fiscal balance projects in the cities of Alumínio (SP) and Muriaé (MG). In the case of the first city, we carried out actions in the areas of school transportation, public prices and active debt that resulted in savings of \$2.4 million. In the second city, our actions were focused on tax revenues, current transfers and expenditures, which contributed to savings of

R\$490 thousand. We will continue these initiatives in 2019 and expect even better results.

In addition to the fiscal balance projects, CBA also participated in initiatives in other fields in those two cities in 2018. In Alumínio, we supported the development of the **municipal sanitation plan**, an important public policy to improve the quality of life of the inhabitants. The plan was filed in the Town Hall at the end of 2018, and should be evaluated by the local councillors during the course of 2019. Once approved, it will allow the Executive Authorities of Alumínio to access federal resources to facilitate its implementation in the coming years. In Muriaé, meanwhile, we collaborated in the formulation of the urban master plan, conducted from a participatory process and open to the citizens. The **master plan of Muriaé** was also submitted to the local Legislative, which will evaluate it in 2019.

City of Alumínio (SP)



Gains of R\$2.9
million in projects
to support the public
administration of
Alumínio (SP) and
Muriaé (MG)

Income generation and productive groups

To encourage the local sustainable development where we operate, we rely on the **ReDes Program**, a partnership between CBA and the Votorantim Institute, the National Bank for Economic and Social Development (BNDES) and the Inter-American Development Bank (IDB). Created in 2011, this Program aims to provide technical and financial support for strengthening the production chains, including being able to generate income for the local community. The program has already fulfilled its initiatives in 34 cities located in 12 Brazilian States and the Federal District.

Since 2017, CBA has developed ReDes Program in two cities – Niquelândia and Mirai. In 2018, besides the effort in the qualification and acceleration of selected projects in the “ReDes entrada” phase (start phase), we also started alternative actions geared towards meeting specific demands in these cities, to

stimulate economic dynamism and not lose the local social capital identified in the selection process.

In Alumínio, for example, CBA and the Votorantim Institute understood that the profile of the organizations in the city was not in accordance with the proposal and rule of maturity model of the ReDes program. We therefore looked to a solution of social investment tailored for the city, and structured the **“Empreende Alumínio”** (Undertake Alumínio) project, which stimulates the development of individual entrepreneurs.

Approximately 140 people, residents of Alumínio over 17 years of age, applied for the program, and of these, 40 were selected to receive free training for five months, with classes on project design, marketing, and financial management, among other topics. At the end of the training, 17 business plans were submitted to

an examination panel, who evaluated criteria such as innovation and value proposition, market focus, economic feasibility, relevance to the region, implementation capacity, and clarity of presentation. The four approved entrepreneurs will receive a sum as seed capital, and consultation assistance to implement their projects from 2019. In addition, eight projects will receive technical assistance and follow-up to enable their continuity.

In Niquelândia, two alternatives were developed to enable the continuation of **productive groups** not selected in the ReDes. One of the initiatives, which focuses on the production of sugar cane derivatives, has gone through an incubation process aimed at its development for possible inclusion in the new selection phase in 2019. In addition, two productive groups that had already received support at the start of the ReDes are now receiving support from CBA to strengthen aspects such as marketing and management, with technical assistance offered by Sebrae (Brazilian Micro and Small Business Support Service).

Another specific initiative in the context of the ReDes was a partnership between CBA and an association of clothing manufacturers in Mirai, which was chosen in the selection process of the Program as having good potential. The 17 association members are in development and in 2018, they conducted a market survey, hired an internal manager, and began reformation works on a warehouse. The next stages will be to support the acquisition of new machines, the construction of a second floor in the warehouse, and the purchase of a vehicle to fetch and deliver goods. All this was done with the support of a consultancy, to better prepare them for the market, increasing the chances of success of the business and consequently, boosting the members’ income.

Lecture of “Empreende Alumínio” in Alumínio city (SP)

40 entrepreneurs were trained by the “Empreende Alumínio” action, resulting in the creation of **17 business plans**

Community empowerment and volunteering

We've mobilized our employees, outsourced workers, and their respective families in voluntary initiatives in the area of education, in order to strengthen ties with the communities in which we operate and create synergies that will promote positive changes in those communities. For this, we rely on a Volunteering Policy, which establishes guidelines and parameters for the activities of our volunteers, and a **Volunteer Program**, which in 2019, will be restructured in order to better organise the initiatives in line with the SGD.

Another area where volunteering is encouraged at CBA is the **Volunteer Challenge**, promoted by the Votorantim Institute to stimulate the integration of professionals of investee companies of Votorantim and third parties, with the local community, through a series of activities that contribute to the development of non-profit institutions and public schools. In 2018, the theme of the Challenge was "Education and citizenship", and CBA's employees were involved in structural actions, mobilization groups through education, on-line volunteering (such as translating and typing documents, creating profiles in social networks, and communication and fundraising campaigns) and interactive actions as cultural and artistic interventions, and sports, educational and entertainment activities, as well as consultancy.

Community engagement

In partnership with the Votorantim Institute and the Elos Institute, CBA promoted, in 2018, a project that allied the engagement of communities with volunteering and enhancement of the public space. This initiative identifies community leaders and enables them to use the Vivência Oasis (Oasis Experience) technology to resolve collective issues. The project was run in Alumínio (SP), Campestrinho (SP) and Rosário da Limeira (MG). The main highlights of the year, in each location, were as follows:

Alumínio

Strengthening community groups and the holding of three communal efforts – two for the construction of leisure areas and one for the revitalization of a public space

Campestrinho

Strengthening community groups, forming closer ties with the public authorities, and re-establishing the Associação de Moradores do Bairro Campestrinho (Resident's Association of Bairro Campestrinho) – AMBC

Rosário de Limeira

Engagement with the school network, teacher training and completion of two communal efforts



Joint effort in the Alumínio city (SP)

Outlook



Factory in
Alumínio (SP)



Outlook

In 2018, we continued the process of organizational transformation aimed at keeping CBA among the market leaders in aluminium, with higher competitiveness and profitability and greater capacity to generate value for our customers, shareholders, employees, suppliers, local communities and other publics with whom we relate. The fruits of this process have already materialized, demonstrating the relevance of the **CBA of the Future** strategy for the CBA of the present, but we continue to evolve constantly.

The initiatives in the area of **cultural rise** brought benefits for the working environment, as evidenced by the results of our work environment survey, which placed us among the best companies in terms of employee satisfaction. This performance reinforces the importance of the areas of cultural rise for strengthening CBA, especially in the context of the **megatrends** that will affect society at large in the coming decades.

The megatrends identified in our sustainability strategy – a planet under pressure, hyper transparency in relations, diversification of the energy matrix, and changes in the pattern of production – point to challenges that could threaten the existence of many organizations in the medium and long terms. Many of these challenges are already part of the daily reality of companies around the world, such as the scarcity of water and raw materials, reduction and appropriate management of waste, and public attention to anti-corruption practices. For CBA, these megatrends bring not only challenges, but also opportunities for improvement in our management, operation and products, based on a comprehensive sustainability strategy, with **clearly-defined goals and action plans**, mobilizing all areas.

Caster rolls at the factory in Aluminio (SP)

We are building a **nimble, versatile, and sustainable** company that is even closer to its stakeholders.

We are investing in **continuous improvements in the production process**, which bring benefits that go beyond gains in operation to include the reduction of greenhouse gas and atmospheric emissions, conservation of biodiversity in mining areas, and a reduction in the generation and management of waste from our operations. We are also seeking new ways of **supporting the local communities** in which we operate, promoting new production chains for income generation, as well as management policies and public education that will improve the lives of citizens and ensure more opportunities for young people. In addition to **being more productive and efficient, we add value** to our products and share the results with all the stakeholders, by multiplying the gains for the entire society.

All this is part of the evolution that we are promoting in our business, with **co-creation solutions**

and **personalized service** to our customers, an understanding of the world market and its trends, and the development of a large portfolio of products with high added value. These products broaden the options of using aluminium in strategic segments for CBA, such as transport, automotive and packaging. In the Upstream Business, we want to build loyalty among our customers, providing solutions for their processes, and in the Downstream Business, we want to be a reference in the development of new solutions for the automotive market, with lighter, more resistant parts made from aluminium, and become consolidated as the main supplier in the packaging sector. We will increase the use of **industry 4.0** to assist us in this movement. We have already leapt into the CBA of the Future, and hope to continue advancing towards a company that is even more innovative and sustainable in 2019.

About this **report**



Corporate office
in São Paulo (SP)

About this report



Corporate office
in São Paulo (SP)

This report presents the performance of CBA in 2018, as well as the actions carried out during this period and the prospects for our business. For the second year running, we have developed this publication in accordance with **GRI Standards** and with external cross-checking of the information. The data included is for the period 1st January to 31st December 2018 and was collected from the various divisions of company and approved by the executive officers, just as in the previous report, published in April 2018, which covers the operations in 2017.

For the second
year in a row, our
report **is aligned**
with the GRI
Standards

In this cycle, the GRI indicators reflect the performance of all operations of CBA. This differs from the last year's report, in which some indicators were limited to the activities of the Aluminium Business. New restatements of the data are indicated throughout the text, where appropriate. In case of doubts, suggestions or comments about the publication, our team responsible for the report can be contacted at the following email address: comunicacaocorpcba@cba.com.br.

The collection of information for this report followed the subject areas defined in a materiality study conducted in 2017, which also served as a reference for the last report. The content was also structured based on **Strategic Sustainability Dialogue**, a management tool developed by CBA in 2018 to develop a strategy for sustainability and evaluation of the economic, social and environmental risks and impacts of the company's business model (see page 14 for more information).

The materiality study, conducted in 2017, involved the engagement of leaders and employees and external public critics from among the stakeholders of CBA, such as customers, financial institutions, and members of local communities. These consultations were consolidated considering sector studies, benchmarking of other aluminium industries in Brazil and abroad, and the newly-launched, at that time, CBA of the Future Strategy. The prioritization of themes, and their respective limits, was done by the area of Health, Safety and Environment, with the support of a specialized consultancy, and approved by the Executive Officers of CBA.

Our material themes

Environment

Sustainable mining: monitoring and mapping the impacts of bauxite extraction on the biodiversity; rehabilitation of mining areas; and relationship with owners of the land where we operate.

Dam safety and waste management: management and treatment of waste, as well as mechanisms for monitoring the safety of CBA's dams.

Eco efficiency in production: processes and investments to reduce the consumption of water and energy in the production process, and minimizing greenhouse gas and other atmospheric emissions.

People

Business ethics, compliance and soundness: corporate governance and financial performance that ensure the continuity of business and the generation of value for the stakeholders.

Integrity and well-being of employees: efforts to guarantee the physical integrity of our employees, as well as initiatives to promote improvement in quality of life.

Social license of the operation: engagement of communities close to our operations and contribution to regional development, and generation of reputational value for CBA.

Future

Strengthening of the aluminium industry: relationship with sector associations and civil society, in order to contribute to the growth, getting the sector even stronger and efforts to expand the reverse logistics and recycling capacity in the aluminium chain.

Innovation and customer satisfaction: processes and innovative products for the offer of sustainable value and co-creation with our customers.

Supplement to the GRI indicators and ASI information

102-8 e 102-41

Number of employees by employment contract*	2018		2017	
	Permanent	Temporary	Permanent	Temporary
By gender				
Men	4,328	130	4,406	116
Women	335	23	292	19
Total	4,663	153	4,698	135
By Region				
Midwest	182	0	192	28
East	4,466	153	4,491	107
South	15	0	15	0
Total	4,663	153	4,698	135

*All employees work full-time and are covered by collective agreements or conventions.

102-10 | There were no significant changes in the size, shareholder composition or supply chain of CBA in 2018.

102-11 | We have an Operational Risk Matrix at Strategic level, and we conduct various rounds of updating with the heads and risk owners, to ensure that all the strategic risks for the business and plans of action have been taken on board and are being effectively implemented. These risks are evaluated from the following perspectives: value (financial impact), health and safety, social, environmental, legal, and reputational. The final risk classification considers the risk classifications from all these perspectives. These strategic risks are validated, monitored on a quarterly basis, and presented to the leaders of the company and the Audit Committee.

102-12 | CBA aligns its social actions to the Sustainable Development Goals (SDG) and participates in the Niquelândia Development Pact, which engages entrepreneurs, traders, community associations, cooperatives and trade unions in local development initiatives.

102-13 | We participate actively in several entities of the sectors and regions in which we operate, in order to strengthen the discussion on key themes of the aluminium chain and combine efforts with other stakeholders for the sustainable development of territories. The main entity in our segment is the Brazilian Aluminium Association (ABAL), in which we have representatives on the Board of Directors and in various committees, subcommittees and working groups. In order to promote

sustainability in the aluminium chain, we are also part of the Aluminium Stewardship Initiative (ASI), the Sedex Information Exchange, and the Brazilian Programme GHG Protocol. In addition, we are actively involved in the Associação das Empresas Mineradoras de Poços de Caldas (Association of Mining Companies of Poços de Caldas) (ASMP), the Conselho Consultivo do Parque Estadual Serra do Brigadeiro (Consultation Committee of the Parque Estadual Serra do Brigadeiro), the Comitê das Bacias Hidrográficas dos Afluentes Mineiros dos Rios Pomba e Muriaé (Committee of River Basins of the Minas Gerais Tributaries of the Pomba and Muriaé Rivers) (Compe) and the Comitê de Integração da Bacia Hidrográfica do Rio Paraíba do Sul (Committee for the Integration of the Rio Paraíba do Sul River Basin) (CEIVAP), all of which discuss relevant topics to our mining activities and promote efforts for environmental conservation. We are also a member of the Associação Brasileira de Comunicação Empresarial (Brazilian Association of Corporate Communication) (Aberje), in which we exchange practices and take part in training in the areas of communication and engagement of employees.

102-54 | This report has been prepared in accordance with the GRI Standards: Core option

202-1 | There is no gender distinction in the wages provided by CBA. In all locations, we have adopted salary grades defined by categories. In 2018, the lowest starting salary of the company was 7% higher than the national minimum wage.

201-2 | In 2018, an Environmental Risks and Opportunities Procedure Plan was drawn up, which separates the mapping of risks at operational, tactical and strategic levels. In this document, two risks were considered, both at the tactical level, that relate to climate change:

- Scarcity of water for use in the plant due to the water crisis caused by climate changes: could affect the continuity of production, leading to financial impacts and affecting the availability of water in the reservoirs, jeopardizing other uses of water. To prevent this risk, there is daily monitoring of the level of water in the reservoirs and the rainfall, as well as fortnightly meetings with a multidisciplinary team to monitor indicators of water use. If it is found that the reserves have decreased, the meetings are switched to weekly, and a crisis management plan is drawn up.
- Overflowing of the wastewater pond due to extreme storms: could cause environmental impacts due to non-standard wastewater deposits in the water body. This risk is managed by monitoring the level of the wastewater lagoon, and by procedures to divert rainwater, when necessary. The team of the Industrial Water Treatment Plant team works round-the-clock to ensure that rapid and effective actions are taken.

205-3 | There were no cases of corruption committed by the company in 2018.

303-1

Volume of water abstracted (thousand m³)	2018	2017	2016
Surface water	3,110.1	4,022.8	3,859.1
Groundwater	72.4	64.4	50.9
Rainwater collected directly	119.7	307.0	301.6
Public supply or specialized companies	11.2	13.7	10.5
Total	3,313.4	4,407.8	4,222.0

303-3 | The total volume of water recirculated in our operations was 22.4 million cubic meters in 2018, with 90% of this total being used in the activities of the plant in Alumínio (SP).

304-2 | The main impacts on the biodiversity relate to the mining activities, in which the vegetation and soil removed in the mining cycle are restored, returning the areas in equal or better conditions than the original (see page 35 for more information). We may also have other environmental impacts related to unforeseen environmental occurrences. All these impacts are registered and prioritized by a methodology of criticality, in which significant occurrences are those categorized from level IV upwards. In 2018, there were only two significant occurrences, which related to forest fires within CBA's areas, one in Alumínio (SP) and the other in Miraf (MG). These fires were caused by factors unrelated to the company, and both were notified to the competent authorities of each region.

304-3 | In 2018, we ensured the environmental protection of 33 thousand hectares, 89% of which correspond to the Legados Verdes do Cerrado. The other areas, distributed among Legal Reserves, Permanent Preservation Areas, and Private Reserves

of the Natural Heritage in our facilities and other company assets, consist of Atlantic Forest biome. Throughout the year, we also restored another 56 hectares, almost all related to the mining facilities. Of the restored areas, 18 hectares were rehabilitated with native Atlantic Forest and 38 hectares were restored for grazing, planting of eucalyptus trees, and agricultural activities.

305-1 e 305-2

Greenhouse gas emissions (tCO ₂ e)	2018
Scope 1	
Direct emissions	1,336,580.22
Biogenic Emissions	1,386.00
Scope 2	
Indirect emissions from energy consumption	17,896.44

306-1

Discharge of effluents by quality and destination in 2018 (1,000 m³)

Urban sewage network	255.0
Wastewater Treatment Stations	1,017.4
Mining	811.3
Niquelândia	178.5
São Miguel Paulista	27.6
Total	1,272.4

306-2

Waste by type and method of allocation (tons)

	2018	2017
Non-hazardous		
Reuse	22,635	12,445
Recycling	21,038	20,214
Composting	20	17
Rehabilitation (including energy)	3,620	81
Landfill	819	514
On-site storage	14	51
Others	1,612,774	1,642,997
Total	1,660,920	1,676,319
Hazardous		
Reuse	26	1,171
Recycling	1,646	202
Rehabilitation (including energy)	8,976	14,794
Landfill	15	0
On-site storage	7	0
Incineration (mass burning)	1	2
Others	1,497	1,435
Total	12,168	17,604

403-2

Aluminium business | Health and safety Indicators*

	2018		2017		2016	
	Employees	Outsourced workers	Employees	Outsourced workers	Employees	Outsourced workers
Accident frequency rate	2.62	2.11	2.57	1.48	1.95	0.58
Accident severity rate	31	150	107	3	93	0
Occupational diseases rate	0	0	0	nd	4	nd
Absenteeism rate	0.82	nd	0.91	nd	1.01	nd

Nickel business | Health and safety Indicators*

	2018		2017		2016	
	Employees	Outsourced workers	Employees	Outsourced workers	Employees	Outsourced workers
Accident frequency rate	0	2.84	0.00	0.00	0.86	0.00
Accident severity rate	0	0	0	0	22	0
Absenteeism rate	0.15	nd	0.12	0.0	0.24	0.00

306-3 | There were no leaks classified as significant in 2018. CBA maintains a tool for reporting environmental incidents, including leaks, which grades cases on a scale of severity from I to VI. We consider events with a level of severity of IV or higher to be significant, because in these cases, there may be damage to the environment or impacts on areas outside the plant, or they may require remediation techniques. The company has plans of action defined for each type of occurrence, and specific procedures for the management of chemicals, in order to avoid leaks.

307-1 | No fines related to environmental aspects were applied in 2018. However, at the strategic decision of the company, we made an agreement to terminate a process related to differences in the environmental licensing documents in Mirai, as a result of assessments carried out in 2015. CBA opted for payment, solely to reduce its liabilities, without any assumption of blame or responsibility. The agreement made was for payments in 36 instalments, with a total amount paid in 2018 of R\$102,240.92.

**The consolidation follows the NBR 14280 guidelines, considering accidents of level II to V on the frequency rate and the number of consecutive days in the severity rate. Information by gender is not available, as the indicators are not analysed with this segmentation. No deaths were recorded in the three-year period.*

**The consolidation follows the NBR 14280 guidelines, considering accidents of level II to V on the frequency rate and the number of consecutive days in the severity rate. Information by gender is not available, as the indicators are not analysed with this segmentation. No deaths were recorded in the three-year period.*

403-3 | All risks to the health and safety of our employees are mapped out in the Environmental Risk Prevention Program (a program established by the Brazilian Law named PPRA) and Occupational Health Medical Control Program (a program established by the Brazilian Law named PCMSO) and are properly managed. Our employees can sometimes be exposed to noise in different stages of the production process. For all areas where there are high noise levels, we maintain a rigorous plan for predictive and preventive maintenance of the equipment and collective protection measures (silencers, sound-absorbing treatment, shielding and barriers). There are also administrative control measures in place (training, safety inspections, audits, preventive and corrective maintenance) and where necessary, the company uses Personal Protective Equipment (PPE). Specifically, in the Aluminium Smelter and Casting, in Alumínio (SP), the production processes can generate exposure to heat in some of the activities, some of which are considered unhealthy according to the parameters of the Brazilian legislation. In these areas, CBA maintains strict access control, and the activities adhere to operational standards that include, in addition to task planning, compulsory hourly breaks. These breaks take place in rest rooms that are specially designed to help workers cool off, with suitable furniture, air-conditioning and drinking water. All the vehicles and mobile equipment used in the operations have air conditioners, and the operators should always exercise their Duty to Refuse, if the air conditioner is not in proper working conditions.

412-1 and 412-2 | During 2019, CBA will study the area of human rights in relation to its operations, in order to assess the scope of any actions to be taken. The company currently has some clauses relating to the topic in its Code of Conduct, and the training required for all employees. There is no structured system of risk evaluation in place yet, in relation to human rights.

412-3 | In the last year, 58% of the significant contracts included specific clauses in the standard draft of CBA regarding the prohibition of child, forced or slave labor. Significant contracts are those lasting more than six months and/or with a value of more than R\$1 million.

413-1 | We have mechanisms for local engagement, mapping of impacts and the development of territories in seven operational facilities of CBA, which represent 54% of the 13 facilities (operational, administrative, logistics and in the process of licensing) reported in the indicator 102-4.

413-2 | In the mining units, the main negative impacts are related to the change of soil for the mining activities, and the emission of dust by the traffic of machines and trucks. The first aspect is fully compensated for by the practices of soil recuperation, which return the soil in better conditions than the original, for agricultural activities, livestock or reforestation. In relation to the second aspect, we have equipment near the operational areas to monitor the levels of dust emissions, and we use trucks to damp down the tracks. In the plant in Alumínio (SP), the main negative impact on the community is the risk of economic dependence of the city. To mitigate this, we continually invest in projects to support the public management and the development of local productive chains.

419-1 | The company follows all the legal processes using a computerised management system. Payment of fines, violations and judicial decisions related to socioeconomic aspects totalled R\$39.4 million in 2018, with 99.8% of this amount relating to agreements and severance payments for labor litigation. Of this total, 48.6% was associated with the Fortaleza de Minas and Atlas facilities, which were part of the former Votorantim Metals, and had their operations closed in the past, through agreements made for closure of the processes in 2018.

MM2 | In this indicator, the three mining facilities of Mirai, Itamarati de Minas and Poços de Caldas were considered, covering the beneficiation plant and the mines as a single operating facility, since the management of these impacts is done in a uniform way. For this management, we have various Management Standards, such as the "PG-VM-AL-MIN-HSMQ-130 – Management of Preserved Areas", and Operating Procedures, as well as an Environmental Education Program (EEP) geared towards the internal and external publics. All the facilities have ISO 14001:2015 certification.

MM7 | The company has a procedure for registering external complaints. In 2018, we did not receive any contacts relating to land use, rights of communities, or indigenous peoples. We registered twenty complaints associated with other subjects, such as dust, noise, and incidents involving vehicles. All these complaints were responded to and forwarded to the relevant person to be dealt with.

ASI 3.3b | In 2018 the company paid the government \$3.87 million in mining taxes to the Agência Nacional de Mineração (National Mining Agency), the former "Departamento Nacional de Produção Mineral" (National Department of Mineral Production).

GRI content index



GRI Standard	Disclosure	Page	Omissions	External assurance
GRI 101 Foundation 2016				
General disclosures				
GRI 102 General disclosures 2016	Organizational profile			
	102-1 Name of the organization	8	-	-
	102-2 Activities, brands, products, and services	8 and 9	-	-
	102-3 Location of headquarters	10	-	-
	102-4 Location of operations	10	-	-
	102-5 Ownership and legal form	16	-	-
	102-6 Markets served	8 and 9	-	-
	102-7 Scale of the organization	7	-	-
	102-8 Information on employees and other workers	23 and 62	-	-
	102-9 Supply chain	28	-	Yes, page 70
	102-10 Significant changes to the organization and its supply chain	62	-	-
	102-11 Precautionary Principle or approach	18, 46, 47 and 62	-	Yes, page 70
	102-12 External initiatives	62	-	-
	102-13 Membership of associations	62	-	-
	Strategy			
	102-14 Statement from senior decision-maker	4 and 5	-	-
	Ethics and integrity			
	102-16 Values, principles, standards, and norms of behavior	17	-	-
	Governance			
	102-18 Governance structure	16	-	-
	Stakeholder engagement			
	102-40 List of stakeholder groups	60	-	-
	102-41 Collective bargaining agreements	62	-	-
	102-42 Identifying and selecting stakeholders	60	-	-
	102-43 Approach to stakeholder engagement	60	-	-
	102-44 Key topics and concerns raised	61	-	-

For the Materiality Disclosures Service, GRI Services reviewed that the GRI content index of the Portuguese report is clearly presented and the references for Disclosures 102-40 to 102-49 align with appropriate sections in the body of the report.

GRI Standard	Disclosure	Page	Omissions	External assurance
General disclosures				
GRI 102 General disclosures 2016	Reporting practice			
	102-45 Entities included in the consolidated financial statements	60	-	-
	102-46 Defining report content and topic Boundaries	60	-	-
	102-47 List of material topics	61	-	-
	102-48 Restatements of information	60	-	-
	102-49 Changes in reporting	60	-	-
	102-50 Reporting period	60	-	-
	102-51 Date of most recent report	60	-	-
	102-52 Reporting cycle	60	-	-
	102-53 Contact point for questions regarding the report	60	-	-
	102-54 Claims of reporting in accordance with the GRI Standards	62	-	-
	102-55 GRI content index	66, 67, 68 and 69	-	-
	102-56 External assurance	70 and 71	-	-
Material topic Sustainable mining				
GRI 103 Management approach 2016¹	103-1 Explanation of the material topic and its Boundary	35, 36 and 61	-	-
	103-2 The management approach and its components	35 and 36	-	-
	103-3 Evaluation of the management approach	35 and 36	-	-
GRI 304 Biodiversity 2016	304-2 Significant impacts of activities, products, and services on biodiversity	35, 36, 37, 38, 39 and 63	-	Yes, page 70
	304-3 Habitats protected or restored	38 and 63	-	-
GRI mining and metals sector supplement 2013	MM1 Amount of land (owned or leased, and managed for production activities or extractive use) disturbed or rehabilitated	36	-	Yes, page 70
	MM2 The number and percentage of total sites identified as requiring biodiversity management plans according to stated criteria, and the number (percentage) of those sites with plans in place	35, 36 and 65	-	Yes, page 70
Material topic Dam safety and waste management				
GRI 103 Management approach 2016²	103-1 Explanation of the material topic and its Boundary	40, 42, 46, 47 and 61	-	Yes, page 70
	103-2 The management approach and its components	40, 42, 46 and 47	-	Yes, page 70
	103-3 Evaluation of the management approach	40, 42, 46 and 47	-	Yes, page 70
GRI 306 Effluents and waste 2016	306-1 Significant impacts of activities, products, and services on biodiversity	63	-	Yes, page 70
	306-2 Waste by type and disposal method	42 and 64	-	Yes, page 70
	306-3 Significant spills	64	-	Yes, page 70
	306-4 Habitats protected or restored	42	-	Yes, page 70
GRI mining and metals sector supplement 2013	MM3 Total amounts of overburden, rock, tailings, and sludges and their associated risks	42	-	Yes, page 70
				Yes, page 70

¹ The management approach refers to all the GRI topics and sector supplement listed within the material topic "Sustainable mining".

² The management approach refers to all the GRI topics and sector supplement listed within the material topic "Dam safety and waste management".

GRI Standard	Disclosure	Page	Omissions	External assurance
Material topic Eco efficiency in production				
GRI 103 Management approach 2016³	103-1 Explanation of the material topic and its Boundary	32, 33, 40, 41, 43, 44 and 61	-	-
	103-2 The management approach and its components	32, 33, 40, 41, 43 and 44	-	-
	103-3 Evaluation of the management approach	32, 33, 40, 41, 43 and 44	-	-
GRI 302 Energy 2016	302-1 Energy consumption within the organization	43	-	Yes, page 70
	302-3 Energy intensity	43	-	-
GRI 303 Water 2016	303-1 Water withdrawal by source	41 and 63	-	Yes, page 70
	303-3 Water recycled and reused	41 and 63	-	Yes, page 70
GRI 305 Emissions 2016	305-1 Direct (Scope 1) GHG emissions	44 and 63	-	Yes, page 70
	305-2 Energy indirect (Scope 2) GHG emissions	44 and 63	-	Yes, page 70
	305-7 Nitrogen oxides (NOX), sulfur oxides (SOX), and other significant air emissions	44	-	Yes, page 70
Material topic Business ethics, compliance and soundness				
GRI 103 Management approach 2016⁴	103-1 Explanation of the material topic and its Boundary	16, 17, 18, 19, 20 and 61	-	-
	103-2 The management approach and its components	16, 17, 18, 19 and 20	-	-
	103-3 Evaluation of the management approach	16, 17, 18, 19 and 20	-	-
GRI 201 Economic performance 2016	201-2 Financial implications and other risks and opportunities due to climate change	14 and 63	-	Yes, page 70
GRI 205 Anti-corruption 2016	205-3 Confirmed incidents of corruption and actions taken	63	-	Yes, page 70
GRI 307 Environmental compliance 2016	307-1 Non-compliance with environmental laws and regulations	64	-	Yes, page 70
GRI 412 Human rights assessment 2016	412-1 Operations that have been subject to human rights reviews or impact assessments	65	-	Yes, page 70
	412-2 Employee training on human rights policies or procedures	65	-	-
	412-3 Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	65	-	-
GRI 419 Socioeconomic compliance 2016	419-1 Non-compliance with laws and regulations in the social and economic area	65	-	Yes, page 70
Material topic Integrity and well-being of employees				
GRI 103 Management approach 2016	103-1 Explanation of the material topic and its Boundary	24, 25, 26 and 61	-	-
	103-2 The management approach and its components	24, 25 and 26	-	-
	103-3 Evaluation of the management approach	24, 25 and 26	-	-
GRI 403 Occupational health and safety 2016	403-1 Workers representation in formal joint management-worker health and safety committees	26	-	-
	403-2 Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	24 and 64	-	Yes, page 70
	403-3 Workers with high incidence or high risk of diseases related to their occupation	65	-	Yes, page 70

³ The management approach refers to all the GRI topics listed within the material topic "Eco efficiency in production".

⁴ The management approach refers to all the GRI topics listed within the material topic "Business ethics, compliance and soundness".

GRI Standard	Disclosure	Page	Omissions	External assurance
Material topic Social license of the operation				
GRI 103 Management approach 2016⁵	103-1 Explanation of the material topic and its Boundary	50, 51, 52, 53, 54, 55, 56 and 61	-	-
	103-2 The management approach and its components	50, 51, 52, 53, 54, 55 and 56	-	-
	103-3 Evaluation of the management approach	50, 51, 52, 53, 54, 55 and 56	-	-
GRI 202 Market presence 2016	202-1 Ratios of standard entry level wage by gender compared to local minimum wage	62	-	-
GRI 203 Indirect economic impacts 2016	203-1 Infrastructure investments and services supported	51 and 54	-	-
	203-2 Significant indirect economic impacts	54 and 55	-	-
GRI 413 Local communities 2016	413-1 Operations with local community engagement, impact assessments, and development programs	65	-	Yes, page 70
	413-2 Operations with significant actual and potential negative impacts on local communities	65	-	Yes, page 70
GRI mining and metals sector supplement 2013	MM7 The extent to which grievance mechanisms were used to resolve disputes relating to land use, customary rights of local communities and indigenous peoples, and the outcomes	36, 52 and 65	-	Yes, page 70
Material topic Strengthening of the aluminium industry				
GRI 103 Management approach 2016	103-1 Explanation of the material topic and its Boundary	32, 33 and 61	-	-
	103-2 The management approach and its components	32 and 33	-	-
	103-3 Evaluation of the management approach	32 and 33	-	-
GRI 301 Materials 2016	301-2 Recycled input materials used	33	-	Yes, page 70
Tema material Inovação e satisfação dos clientes				
GRI 103 Management approach 2016	103-1 Explanation of the material topic and its Boundary	29, 30 and 61	-	-
	103-2 The management approach and its components	29 and 30	-	-
	103-3 Evaluation of the management approach	29 and 30	-	-

⁵ The management approach refers to all the GRI topics and sector supplement listed within the material topic "Social license of the operation".

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GRI disclosures external verification
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We appreciate the support and cooperation of the managers and other colleagues involved in the corporate and industrial areas of CBA, Votorantim and partners in gathering information and preparing this report.

Independent auditor's limited assurance report on information related to sustainability included in the Annual Report for 2018

To the Board of Directors and Stockholders
Companhia Brasileira de Alumínio
São Paulo - SP

Introduction

We have been engaged by Companhia Brasileira de Alumínio ("CBA" or "Company") to present our limited assurance report on the compilation of the sustainability information included in CBA's 2018 Annual Report for the year ended December 31, 2018.

Responsibilities of the Company's management

The management of CBA is responsible for the preparation and fair presentation of the information included in the Annual Report for 2018, in accordance with the Global Reporting Initiative (GRI Standards) and for such internal control as it determines is necessary to enable the preparation of information free from material misstatement, whether due to fraud or error.

Independent auditor's responsibility

Our responsibility is to express a conclusion on the information included in the 2018 Annual Report based on our limited assurance engagement carried out in accordance with the Technical Communication CTO 01 - "Issuance of an Assurance Report related to Sustainability and Social Responsibility", issued

by the Federal Accounting Council (CFC), based on the Brazilian standard NBC TO 3000 - "Assurance Engagements Other than Audit and Review", also issued by the CFC, which is equivalent to the international standard ISAE 3000 - "Assurance engagements other than audits or reviews of historical financial information", issued by the International Auditing and Assurance Standards Board (IAASB). Those standards require that we comply with ethical and independence requirements and other responsibilities in accordance with those standards, including the application of the Brazilian Quality Control Standard (NBC PA 01) and, therefore, the maintenance of a comprehensive quality control system, including policies documented and procedures on compliance with applicable ethical requirements, professional standards and legal and regulatory requirements.

Additionally, those standards require that the engagement be planned and performed to obtain limited assurance that the information included in the Annual Report for 2018, taken as a whole, is free from material misstatements.

A limited assurance engagement conducted in accordance with the Brazilian standard NBC TO 3000 and ISAE 3000 mainly consists of making inquiries

of management and other professionals of the entity involved in the preparation of the sustainability information, as well as applying analytical procedures to obtain evidence that enables the issue of a limited assurance conclusion on the information taken as a whole. A limited assurance engagement also requires the performance of additional procedures when the independent auditor becomes aware of matters that lead him to believe that the information taken as a whole might present significant misstatements.

The procedures selected are based on our understanding of the compilation and presentation of the sustainability information included in CBA's 2018 Annual Report, other aspects affecting the engagement and our analysis of areas which might potentially present significant misstatements. The following procedures were adopted:

- planning the work, taking into consideration the materiality and the volume of quantitative and qualitative information and the operating and internal control systems that were used to prepare the information included in CBA's 2018 Annual Report;
- understanding the calculation methodology and the procedures adopted for the compilation of indi-

cators through interviews with the managers responsible for the preparation of the information;

- applying analytical procedures to quantitative information and making inquiries regarding the qualitative information and its correlation with the indicators disclosed in the information included in the 2018 Annual Report; and
- comparing the financial indicators with the financial statements and/or accounting records.

The limited assurance engagement also included procedures to assess compliance with the guidelines and criteria of the Global Reporting Initiative (GRI Standards) applied in the compilation of the sustainability information in the 2018 Annual Report.

We believe that the evidence we obtained is sufficient and appropriate to provide a basis for our limited assurance conclusion.

Scope and limitations

The procedures applied in a limited assurance engagement are substantially less detailed than those applied in a reasonable assurance engagement, the objective of which is the issuance of an opinion on the sustainability information included in the Annual Report for 2018. Consequently, we are not able to obtain reasonable assurance that we would become aware of all significant matters that might be identified in an assurance engagement, the objective of which is the issue of an opinion. If we had performed an engagement with the objective of issuing an opinion, we might have identified other

matters and possible misstatements in the sustainability information included in the Annual Report for 2018. Accordingly, we do not express an opinion on this information.

Non-financial data is subject to more inherent limitations than financial data, due to the nature and diversity of the methods used to determine, calculate and estimate this data. Qualitative interpretations of the relevance, materiality, and accuracy of the data are subject to individual assumptions and judgments. Furthermore, we did not consider in our engagement the data reported for prior periods, nor future projections and goals.

The preparation and presentation of sustainability indicators followed the criteria of the GRI Standards and, therefore, were not designed to assure compliance with laws and social, economic, environmental or engineering regulations. However, those standards require the presentation and disclosure of possible cases of non-compliance with regulations to avoid sanctions or significant fines. Our assurance report should be read and considered in this respect, in the context to the selected criteria (GRI Standards).

Conclusion

Based on the procedures performed, described herein, no matter has come to our attention that causes us to believe that the information included in the Annual Report for 2018 of Companhia Brasileira de Alumínio has not been compiled, in all material respects, in accordance with the Global Reporting Initiative (GRI – Standards).

São Paulo, April 2, 2019

PricewaterhouseCoopers
Contadores Públicos Ltda.
CRC 2SP023.173/O-4

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