



Inventory of Greenhouse Gas Emissions

Nexa Resources



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Trade name: Nexa Resources

CNPJ (Corporate Taxpayer Registry): 42.416651/0016-93

Economic sector: Extractive Industries

Subsector: Extraction of non-ferrous metallic minerals

Address (administrative office): Engenheiro Luiz Carlos Berrini, 105 – 6th floor – São Paulo – Cidade Monções – SP - 04571-900

Person responsible for publishing the inventory: Elaine Notoya
(elaine.notoya@nexaresources.com)

Institutional Information:

We are a global, integrated, and cost-effective zinc, copper, and lead mining company with more than 60 years of experience in the development and operation of mining and metallurgy assets in Latin America. We are part of the conglomerate of companies invested in by Votorantim S.A., our main shareholder (64.7%). Nexa Resources S.A. was established almost four years ago, based on the integration of Brazilian and Peruvian operations.

Currently, we own and operate five long-life polymetallic mines, three located in the central region of the Andes, in Peru (Cerro Lindo, El Porvenir and Atacocha), and two in the state of Minas Gerais, in Brazil (Vazante and Morro Agudo). We are continuing the process of implementing a new polymetallic mine in Aripuanã, Mato Grosso, Brazil.

Our mines produced 313,000 tonnes of zinc in 2020. Cerro Lindo and Vazante are among the 15 largest zinc mines in the world and, coupled with other mining operations, place us among the five largest zinc producers in the world, according to Wood Mackenzie.

As part of the production chain, we have three zinc *smelters*: one in Peru (Cajamarquilla) and two in Brazil (Três Marias and Juiz de Fora), which produce metallic zinc, zinc oxide, and



secondary products. Cajamarquilla is the only zinc *smelter* operation in Peru and is among the seven largest in the world by volume produced, according to a survey by Wood Mackenzie using 2020 data. In the year, our *smelters* sold 585,000 tonnes, corresponding to 550,000 tonnes of metallic zinc and 35,000 tonnes of zinc oxide.

Our zinc is applied in agricultural plantations and aircraft manufacturing, and copper is an integral part of the production of automobiles and cell phones, among many other applications.



Inventory Data

Person responsible for preparing the inventory:

Elaine Notoya

Email of the person responsible:

elaine.notoya@nexaresources.com

Year of the inventory: 2020

Verification

The inventory has been verified by a third party: Yes

Verifying body: PwC – PricewaterhouseCoopers Brasil

Person responsible for verification: Ana Matzenbacher (ana.matzenbacher@pwc.com)

Inventory Type: Complete

1.0 Inventory Limits

Organizational Limits

Below is a list of the organization's units and subsidiaries included in this inventory. It is mandatory to report the disaggregated emissions of units that have emissions of scope 1 equal to or greater than 10,000 tCO₂e per year. The reporting of emissions from other units, as well as from subsidiaries, is optional. Emissions disaggregated by units can be found in Section 2.7 - Emissions by units of operation.

Reference:

Parent Company

Subsidiary

Unit

[Does the parent company have operational control? | % of equity interest of the Parent company]

Nexa Resources

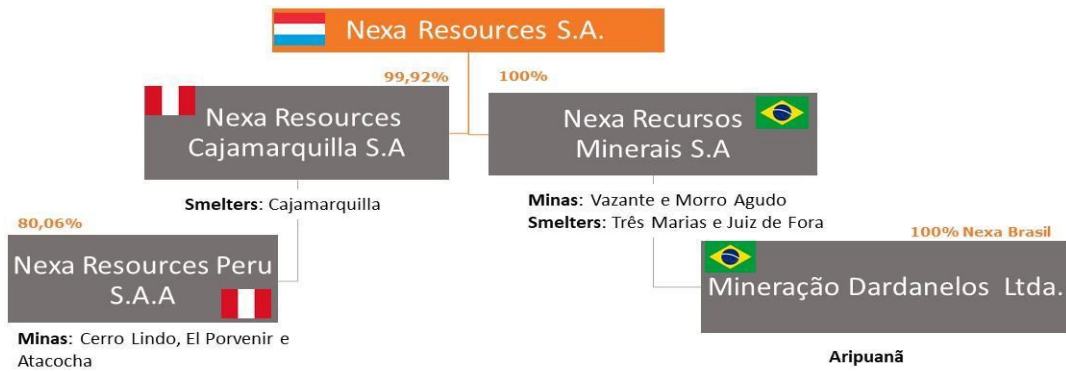
Morro Agudo – Mining - Brazil	[Yes 100%]
Vazante – Mining – Brazil	[Yes 100%]
Juiz de Fora – Metallurgy – Brazil	[Yes 100%]
Três Marias – Metallurgy – Brazil	[Yes 100%]
Aripuanã – Mining Project - Brazil	[Yes 100%]
Atacocha - Mining - Peru	[Yes 80.06%]
Cerro Lindo – Mining - Peru	[Yes 80.06%]
El Porvenir – Mining - Peru	[Yes 80.06%]
Cajamarquilla – Metallurgy - Peru	[Yes 99.92%]



1.1 Which consolidation approach was used in the inventory?

Reporting of emissions under the Operational Control approach.

1.2 Organization Chart



Operational Limits

1.3 Operational limits reported in the inventory

Scope 1

- Mobile Combustion
- Stationary Combustion
- Fugitives
- Industrial Processes
- Agricultural Activities
- Solid Waste and Liquid Effluents

Scope 2

- Electrical Energy Acquisition – Location Approach
- Electrical Energy Acquisition – Purchase Choice Approach

Scope 3

- Transportation and Distribution (upstream)
- Waste Generated in Operations
- Effluents Generated
- Business Trips
- Employee Commute (home-work)
- Transportation and Distribution (downstream)

2. Emissions

Operational Control

2.1 Summary of Total Emissions (tonnes)

GHG	Total Emissions of Each Gas			Emissions in CO ₂ e		
	Scope 1	Scope 2	Scope 3	Scope 1	Scope 2	Scope 3
CO ₂	237,892.010	434,465.936	84,653.399	237,892.010	434,465.936	84,653.399
CH ₄	135.224	0.000	32.464	3,380.600	0.000	811.600
N ₂ O	37.389	0.000	2.722	11,141.922	0.000	811.156
HFCs	0.106	0.000	0.000	234.531	0.000	0.000

2.2 Scope 1 Emissions Disaggregated by Category (tonnes)

Category	Emissions of CO ₂ e	Biogenic CO ₂ Emissions	Biogenic CO ₂ Emissions
Agricultural Activities	25,079.550	0.000	0.000
Stationary Combustion	131,920.356	161,218.130	0.000
Mobile Combustion	92,832.584	7,142.721	0.000
Fugitives	239.185	0.000	0.000
Industrial Processes	900.653	0.000	0.000
Solid Waste and Liquid Effluents	1,676.734	0.000	0.000
Overall Total	252,649.062	168,360.851	0.000

2.3 Scope 2 Emissions - Location-Based Approach (tonnes)

Category	Emissions of CO ₂ e	Biogenic CO ₂ Emissions	Biogenic CO ₂ Removals
Electrical Energy Acquisition	443,465.936	0.000	0.000
Total	443,465.936	0.000	0.000

2.4 Scope 3 Emissions Disaggregated by Category (tonnes)

Category	Emissions of CO ₂ e	Biogenic CO ₂ Emissions	Biogenic CO ₂ Removals
Transportation and Distribution (upstream)	65,795.908	2,813.898	0.000
Waste Generated in Operations	611.6	0.000	0.000
Business Trips	661.385	91.052	0.000
Employee Commute	1,492.92	184.417	0.000
Transportation and Distribution (downstream)	17,714.342	2,047.069	0.000
Total	86,276.155	5,136.436	0.000

2.5. Other greenhouse gases not covered by the Kyoto Protocol

Emission of 10.860 tCO₂e in the Cajamarquilla Unit, as a result of the emission of HCFC-22 gas.

2.6 Emissions Outside of Brazil

The reported data consolidate the emissions from the operations carried out in Peru.

In tonnes of CO ₂ equivalent					
Scope 1	Scope 2	Scope 3	Biogenic Scope 1	Biogenic Scope 2	Biogenic Scope 3
71,965.830	339,739.671	12,976.002	3,389.677	0.000	350.086



2.7 Emissions per Unit

The data below include all of Nexa Resources' mining and *smelter* units located in Brazil and Peru.

Unit	In tonnes of CO ₂ equivalent					
	Scope 1	Scope 2	Scope 3	Biogenic Scope 1	Biogenic Scope 2	Biogenic Scope 3
Juiz de Fora	78,191.994	24,738.702	28,097.912	289.447	0.000	296.016
Morro Agudo	9,578.439	4,262.733	9,163.746	1,085.379	0.000	1,047.181
Três Marias	67,476.080	47,855.948	22,129.259	160,986.678	0.000	1,802.193
Vazante	14,706.075	16,594.301	13,381.686	1,548.259	0.000	1,639.393
Aripuanã	10,220.717	1,274.581	0.000	1,001.768	0.000	0.000
Corporate Brazil	509.928	0.000	527.550	59.643	0.000	1.567
Cerro Lindo	22,739.642	48,007.461	2,447.485	1,119.467	0.000	121.450
Cajamarquilla	34,692.311	266,292.129	9,093.740	1,568.754	0.000	160.226
El Porvenir	7,637.614	18,131.131	1,129.184	367.955	0.000	55.700
Atacocha	6,491.616	7,308.950	252.612	313.819	0.000	12.430
Corporate Peru	404.647	0.000	52.981	19.682	0.000	0.280

3. Methods

3.1 Intersectoral Methods and/or Tools

Was any intersectoral method and/or tool used in addition to those provided by the Brazilian GHG Protocol Program?

No, only the tool provided by the Brazilian GHG Protocol Program

3.2 Methods and/or Tools for Specific Sectors

Was any method and/or tool used for specific sectors?

It wasn't used.



3.3 Emission Factors

Was any emission factor other than those suggested by the Brazilian GHG Protocol Program used?

Yes, for the calculations of emissions by operations located in Peru, we used the country-specific emission factors, officially made available by the Peruvian government's Ministry of the Environment through the Reporte Anual de Gases de Efecto Invernadero (2014).

4. Other Elements

4.1 Information on the performance of the organization, compared to internal benchmarks (e.g. other units) or external benchmarks (e.g. organizations in the same sector).

Our Greenhouse Gas (GHG) emissions totaled 773,391.154 tCO₂e, which translates to a reduction of 24% compared to the previous year (1,017,744.42 tCO₂e). This reduction is mainly due to the temporary suspension of mining activities in Peru, for two months, due to the declaration of a state of national emergency in response to the COVID-19 pandemic. Emissions from electrical energy consumption (Scope 2) corresponded to 56% of the total, and direct emissions (Scope 1) totaled 252,649.06 tCO₂e, or 33% of the total. The intensity of emissions in 2020 was of 1.32 tCO₂e per tonne of zinc and zinc oxide sold. Direct biogenic emissions (Scope 1) totaled 168,360.85 tCO₂e.

4.2 Description of GHG emission indicators for the organization's activities. For example, tCO₂e/manufactured products.

Nexa Resources has set the goal of reducing specific GHG emissions (tonnes of CO₂e / tonnes of products) by 5% by 2025, considering the emissions of 2014 as the base.



4.3 Description of strategies and projects for the management of GHG emissions.

Nexa Resources maintains as part of its management system several practices for continuous improvement of performance and competitiveness to maximize the value of existing operations through operational stability, increased capacity utilization, constant improvement of costs, productivity, and rationalization of collaborating capital. One of the company's strategies is associated with investment in technology, innovation, and automation to improve productivity and competitiveness, expand its safety culture, and support the main sustainability objectives, such as increasing water recycling, reducing CO₂ emissions, waste generation, and energy flexibility.

In 2017, we implemented an energy flexibility project through a new Biomass boiler in the Três Marias *smelter* unit. With this project, we obtained a reduction of approximately 81% of the direct emission of greenhouse gases when compared to the use of the boiler powered by petroleum-derived oil

In 2020, we started a contract with a new electrical energy supplier in Peru, and 100% of the electrical energy acquired by these operations came from hydroelectric generation.

We also maintain Nexa's *open innovation* project, the Mining Lab, allowing for the rapid connection of sustainable *start-up* technologies and innovations from around the world to our environmental strategies. We can also mention some projects that are in the implementation phase:

- Use of residual biomass as fuel in boilers, allowing for the reduction of handling and consumption of fossil fuel through a technology that will replace up to 65% of the volume of natural gas used in the Juiz de Fora operation. The studies to date have validated potential financial gains. In environmental terms, we have a double advantage, not only does it reduce GHG emissions from fossil fuels, but it also reduces the amount of waste to be disposed of in landfills. In addition, the project integrates the operation of Nexa Resources with local communities by generating jobs and local revenue.



- Implementation of a photovoltaic solar plant with silicon plate technology with a power rating of 17,000 kW connected to the main substation of the Vazante unit at 13.8 kV. The solar panels will occupy about 17 hectares of the Aroeira Dam reservoir in a floating system whose design will meet all the necessary safety criteria.

Regarding emissions from purchased energy, in 2019, Nexa Resources signed a contract with a Peruvian state-owned company for the supply of clean energy, aiming to ensure that a higher percentage of the energy matrix in Peru comes from renewable sources.

Still, we consider 2020 a year of transition for materiality, since we are concluding the previous cycle and starting a new process with a more strategic look, so that the new materiality matrix becomes the main tool for managing the sustainability and ESG aspects of the company. As part of this transition, long-term goals will be shared starting in the next cycle.

4.4 Information on contracts with customers and suppliers that include clauses linked to the preparation of GHG inventories and/or the submission of related information.

Has not been reported.

4.5 Information on uncertainties, exclusions from data sources, and other characteristics of inventory preparation.

As part of its management system, Nexa Resources continuously works to improve the management of GHG emissions. For the coming years, significant improvements are expected in database management routines, information records, collection flow, and emission estimates.



4.6 Description of internal actions to improve the quality of the GHG inventory. For example, systematization of data collection, hiring of external verification, etc.

Nexa Resources has made a public commitment to fight climate change and maintains the issue as the scope of its strategic planning. They've been working year after year on improving the management of the issue. In 2020, they fully incorporated the GHG Protocol methodology for the inventory of emissions in all units and corporate areas, including their main project in Brazil, Aripuanã.

4.7 Information on the purchase of electrical energy from renewable sources.

In 2019, we worked to close a new electrical energy contract for all Nexa operations in Peru. As of 2020, we counted on a partner who provided us with energy coming 100% from renewable sources. In Brazil, the consumption of renewable electrical energy was almost 96.8%, with Nexa's global consumption of renewable electrical energy totaling 98.5% of the total consumed.

We have advanced in solar panel installation projects in Três Marias and Vazante, aiming to maintain a renewable base for the energy matrix. We want to extend this pattern of projects to other units through partnerships with companies specialized in solar energy. In 2020, we consumed 17,874,424.72 GJ of thermal energy in our operations, 12,958,576.06 GJ from renewable sources and 4,915,848.65 GJ from non-renewable sources. Our energy intensity was 30.54 (GJ / tonne of zinc and zinc oxide sold). The increase in thermal energy consumption, compared to 2019, is mainly due to the more refined mapping of raw materials used.

4.8 Information on self-production of energy from renewable sources for self-consumption.

As a result of an energy flexibility project, the Três Marias unit has been operating a steam generation boiler powered by plant biomass since 2017, replacing



fossil fuel. The equipment saves US\$4.3 million per year, 44% in the cost of steam production. In addition, we have a project planned for the implementation in the coming years of a photovoltaic solar plant with silicon plate technology with a power rating of 17,000 kW connected to the main substation of the Vazante unit at 13.8 kV.

4.9 Information on the company's carbon stock, in tonnes, in December 31 of the year ended.

Has not been reported.

5. Compensation and Reductions

5.1 Compensation of Emissions

Does the organization have emission compensation projects?

Has not been reported.

5.2 Emission Reduction

Does the organization have emission reduction projects?

To this end, one of the main actions employed is the operation, since 2017, of a biomass boiler (eucalyptus chip) in the Três Marias unit, replacing the boilers powered by oil derived from petroleum. Considering the operating period (2017 to 2020), the equipment saved US\$4.3 million per year, with 81% reduction in greenhouse gas emissions and 44% in the cost of steam production. At the Cajamarquilla unit, we are implementing a project to replace diesel oil, fuel oil, and LPG with natural gas. In Juiz de Fora, we started in 2020 the implementation of a gasifier that will reuse the energy waste from Nexa and the city of Juiz de Fora as fuel.



We have projects in the implementation stage, with the potential to significantly reduce CO₂e emissions.

- Use of residual biomass to fuel boilers, allowing for a reduction of the handling and consumption of fossil fuel, from a technology that will replace up to 65% of the volume of natural gas used in the Juiz de Fora operation. The studies to date have validated potential financial gains. In environmental terms, we have a double advantage, because not only does it reduce GHG emissions from fossil fuels, but it also reduces the amount of waste to be disposed of in landfills. In addition, the project integrates the operation of Nexa Resources with local communities by generating jobs and local revenue.
- Implementation of a photovoltaic solar plant with silicon plate technology with a power rating of 17,000 kW connected to the main substation of the Vazante unit at 13.8 kV. The solar panels will occupy about 17 hectares of the Aroeira Dam reservoir in a floating system whose design will meet all the necessary safety criteria.