Inventory of greenhouse gas emissions

2023

bradesco

Document history

Document name	Date	Nature of Review
Bradesco - GHG inventory – base year 2023	03/25/2024	Initial version
Bradesco - GHG inventory – base year 2023	04/03/2024	Mobile combustion emissions review

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SUMMARY

1 Executive summary

The Greenhouse Gas (GHG) Emissions Inventory is the management instrument that allows evaluating an organization's impact on the global climate system. This survey evaluated the GHG emissions of Banco Bradesco S/A in 2023.

In 2023, direct Scope 1 emissions from Banco Bradesco S/A were 16,540.03 tCO_2e, whereas indirect Scope 3 emissions were 122,785.11 tCO_2e. Scope 2 emissions from purchased electric energy were calculated in two different approaches: Location Based – LB which were 13,932.75 tCO_2e (which considers the average of the National Interconnected System as the emission factor) and *Market Based – MB which was 0 Ton CO_2e* (which encompasses the grid emissions factor, as well as the emission factors from purchased renewable energy). The emission difference between the LB and MB approaches was due to Distributed Generation (solar panels) and I-RECs (hydroelectric power plants). The Table 1 shows the results:

Table 1 – GHG emissions results by scope and category for 2023 (tCO2e)

SCOPE	EMISSION SOURCES		Emission (tCO2e)	Representation
Scope 1	Mobile Combustion	Proprietary Air Fleet	1,199.11	0.86%
		Proprietary land fleet	395.97	0.28%
	Runaways	Leakage of coolant gas emissions	14,409.84	10.34%
	Stationary combustion	Electric generators	534.97	0.38%
	Full scope 1	**---**	16,540.03	11.87%
Scope 2	Purchasing of electric energy	Electric energy purchased for own consumption - LB	13,932.75	---
		Electric energy purchased for own consumption - MB	0.00	---
Scope 3	Transport and Distribution (upstream)	Express mail transportation	4,670.56	3.35%
		Cargo transportation (equipment, furniture and graphic materials).	2,288.36	1.64%
		Value Transportation	9,436.68	6.77%
		Relief Transport	31,601.87	22.68%
		Mail Transport	24.60	0.02%
	Waste generated in operations	Solid Waste	4,532.26	3.25%
	Business Travel	Taxi	1,452.40	1.04%
		Airline tickets	7,698.14	5.53%
		Km reimbursement	2,802.47	2.01%
	Employee Commute (home-work)	Public transport for employees	427.08	0.31%

SCOPE	EMISSION SOURCES		Emission (tCO2e)	Representation
		Work commute distance	57,682.81	41.40%
		Home Office	167.88	0.12%
	Full scope 3	---	**122,785.11**	**88.13%**
		Total - LB	**139,325.1**	---
		Total - MB	**153,257.9**	---

In addition, 285.46 tCO_2 of renewable origin referring to Scope 1 was emitted, and 23,825.95 tCO_2 referring to Scope 3.

In 2021, Banco Bradesco S/A committed to use 100% of electricity from renewable sources at a national level through the Free Contracting Environment (ACL), via I-RECs and Distributed Generation, thus being able to account for Scope 2 emissions in Market Based - MB approach, so in 2023 the emission was 0 Ton CO_2e.

According to the Brazilian GHG Protocol Program, the LB approach quantifies scope 2 GHG emissions from the purchase of electric energy using the average energy generation from the National Interconnected System as the emission factor, and reporting is mandatory. The MB approach quantifies scope 2 GHG emissions from the purchase of electric energy using the specific emission factor of each electric power generation source that the organization in charge of inventory chose to purchase or use, reporting voluntarily.

In an analysis by operational unit, Banco Bradesco is responsible for most Scope 1, 2 and 3 emissions. This representation is expected due to the dimension of the Bank's operations before Bradesco Seguros, as shown in Table 2.

Table 2 – Results of GHG emissions per company for 2023 (tCO2e).

	Operating Unit		Total
Scope	Bradesco	B. Seguros	
Scope 1	16,408.53	131.50	16,540.03
Scope 2 - location	13,431.85	500.90	13,932.75
Scope 2 - market	0.00	0.00	0.00
Scope 3	83,416.66	39,368.45	122,785.11
Total - location	113,256.89	40,000.85	153,257.89
% - location	73.9%	26.1%	100.0%
Total - market	99,825.04	39,499.95	139,325.14
% - marketplace	71.6%	28.4%	100.0%

1.1 Introduction

The issues arising from global warming and climate change place the issue of a low-carbon economy as a central issue for sustainable development. Therefore, compatibility between economic development and protection of the climate system is increasingly required.

The Paris Agreement, signed by several countries in 2015 at the annual event of the United Nations Framework Convention on Climate Change, intends to limit global warming to 2 °C, ideally 1.5 °C. To achieve this, all government levels, as well as the private sector, must commit to creating bold short and long-term goals, in line with a future of net-zero emission. To achieve this goal, all emissions from human activity must be reduced as close to zero as possible – such as from vehicles and factories powered by fossil fuels, for example.

In this context, quantifying and managing greenhouse gas (GHG) emissions at corporate level becomes very relevant. This can be done through the Greenhouse Gas Emissions Inventory, which is a management tool that enables quantification of GHG emissions of a given organization.

Based on the definition of scope, identification of GHG sources and sinks, and accounting of respective emissions or removals, the Inventory enables understanding the profile of emissions sourced from the organization's activities.

The information generated from the creation of a Greenhouse Gas Emissions Inventory is able to fulfill the following objectives:

- **Monitoring of GHG emissions**: monitor and record the evolution of emissions over time. Identify opportunities for operational efficiency gains and cost reduction;
- **Benchmarking**: compare emissions of each operational unit or each sector of an organization;
- **Risk and Opportunity Assessment**: identify and mitigate regulatory risks and those associated with future duties regarding GHG emission rates or restrictions, as well as evaluate potential cost-effective opportunities for emission reductions;
- **Setting goals**: support setting of GHG emissions reduction targets and the planning of mitigation strategies;
- **Monitoring results of mitigation actions**: quantify progress and improvements resulting from strategic initiatives related to the theme of Climate Change;
- **Participation in climate information disclosure programs**: enables disclosure of information about the organization's climate performance (e.g. GHG Protocol, CDP, ISE, ICO2).

Among the protocols and standards available for compiling corporate GHG inventories, the following references were adopted in this study:

- NBR ISO 14064; Brazilian Association of Technical Standards, 2007 (ABNT, 2007);

- Specifications of the Brazilian GHG Protocol Program; Verification Specifications of the Brazilian GHG Protocol Program; GHG Corporate Protocol - Brazilian GHG Protocol Program (PBGHGP) - Fundação Getúlio Vargas; World Resources Institute (FGv/GVces; WRI, 2011);

The aforementioned protocols are internationally accredited. The main purpose of adopting them is to obtain a comparable report at national and global levels.

It should be noted that this inventory may be verified within the scope of the protocols listed above. The purpose of third-party inventory checking is obtaining an independent statement about inventory quality and the consistency of information contained therein, in order to ensure users have an accurate assessment of the emissions pattern of the organization's value chain.

1.2 Banco Bradesco

Banco Bradesco S/A is one of the largest financial groups in Brazil, with a solid performance focused on contributing towards customer accomplishment, through a diversified business model that operates in both banking and insurance activities. Since its creation in 1943, Banco Bradesco S/A excels in service provision, always striving for efficiency and technological innovation for better serving is clients.

The mission of Banco Bradesco S/A is contributing to sustainable development, which drives the Organization's alignment with the best sustainability practices available on the market.

Eco-efficiency is part of Banco Bradesco S/A's strategic management, linking environmental and financial performance through process optimization, recycling, technological innovations and savings in the use of natural resources and inputs. The goal is to reduce environmental impact and contribute to operational efficiency.

The Organization integrally considers environmental issues in the development of its activities and, through the Eco-Efficiency Management Program, invests in initiatives with specific goals for reducing consumption of water, power, printing paper and other indicators that contribute to the reduction of greenhouse gas emissions. The program is developed by the Corporate Sustainability area and involves several departments and related companies, which are responsible for initiatives and monitoring data and indicators. The Program is monitored by the Sustainability Commission and the Sustainability and Diversity Commission.

In 2019, Banco Bradesco S/A started purchasing subsidized electric energy in the Free Contracting Environment (ACL), generated from renewable sources such as solar, wind, biomass or small hydroelectric power plants – PCHs. From 2021 onwards, the Organization hastened the transition to the Free Market and expanding solar plants to several locations. As a consequence, Banco Bradesco S/A further strengthened its role as a leading company in transitioning to a low-carbon economy.

According to the methodology of the Brazilian GHG Protocol Program, the purchase of renewable energy can be accounted for in the inventory of the Market Based – MB

approach, in order to increase visibility of sustainable actions. Still, the Location Based (LB) approach regarding energy purchased from the National Integrated System must be kept in the inventory, given that the company is connected to the Brazilian power grid.

2 Method used

Bradesco's emissions inventory was prepared following the premises of the Brazilian GHG Protocol Program using the emission factors from the 2023 GHG spreadsheet, which makes comparing emissions with other institutions and the third-party verification process easier.

2.1 Principles of inventory accounting and preparation

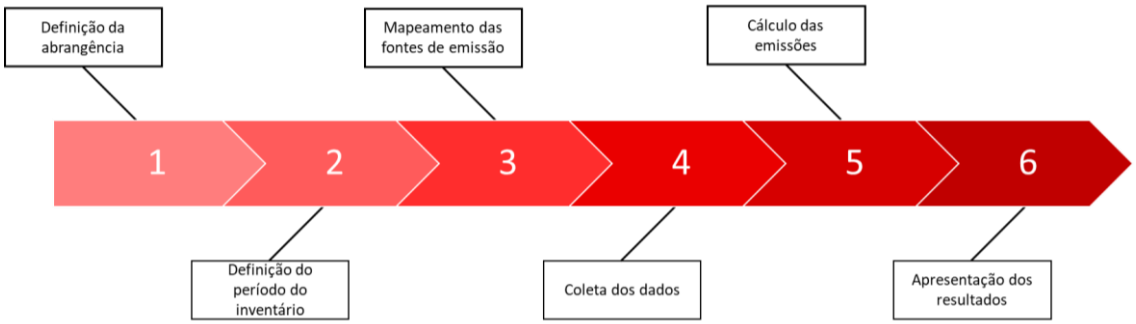
The following principles guided the preparation of this study, as per the guidelines of the Brazilian GHG Protocol Program (FGV/GVces; WRI, 2011):

- **Relevance:** Ensure that the GHG Inventory adequately reflects the emissions of the current process and meets the decision-making needs of its users.
- **Completeness**: Record all GHG-emitting sources and activities within the selected inventory limits. Document and substantiate any specific exclusions.
- **Consistency**: Use recognized and technically substantiated methodologies that enable emission comparisons with those from other similar processes. Clearly document any changes to data, inventory limits, methods employed, or any other relevant factors over the given time period.
- **Transparency** Treat all relevant matters in a coherent and factual manner, based on objective evidence. Disclose any relevant assumptions, as well as make appropriate reference to the calculation and recording methodologies and data sources used.
- **Accuracy:** Through application of appropriate data, emission factors or estimates, ensure that the quantification of GHG emissions is not underestimated or overestimated. Reduce bias and uncertainty as low as possible and obtain a determination level that brings security in decision making.

2.2 Inventory compilation steps

The conceptual steps used to prepare this inventory are presented in the flowchart below and explained afterwards (Figure 1):

Figure 1 – Flowchart of methodological steps for carrying out inventories.



First, the scope of the inventory is defined (Step 1), that is, which facilities and activities of the organization shall be covered by the inventory must be defined, thus establishing its organizational limit. Next, the reference period and base year of the inventory are defined (Step 2).

The organization's GHG sources are identified (Step 3), which are then categorized and rated in tiers. Next is the data collection process (Step 4). To carry out the calculation of emissions (Step 5), data collected on emission activities are used, in addition to emission factors. At this stage, inventory uncertainties are also calculated. Lastly, results are compiled into an annual report (Step 6).

The aforementioned Steps were applied to Bradesco's GHG inventory as described in this report below.

2.3 Inventory Coverage

2.3.1 Organizational boundaries

Two approaches are possible for consolidating emissions and removals at the organizational level. Each of these approaches are defined below and the option used in this inventory is indicated.

☐ Shareholding: the organization assumes GHG emissions from operations according to shareholding.

☑ Operational Control: the organization is responsible for all GHG emissions from operations over which it has operational control.

Banco Bradesco S/A is a conglomerate of companies. Its operating model is diversified between financial, insurance, pension and capitalization sectors, among other activities.

Banco Bradesco S/A ended 2023 with 3,756 branches and 28 active commercial buildings in Brazil (in addition to international units) and 89,252 national employees, according to the HR department. The Organizational Boundary of this report covers all operations under operational control of Banco Bradesco S/A, which comprise all its departments, the main physical unit (Cidade de Deus), other

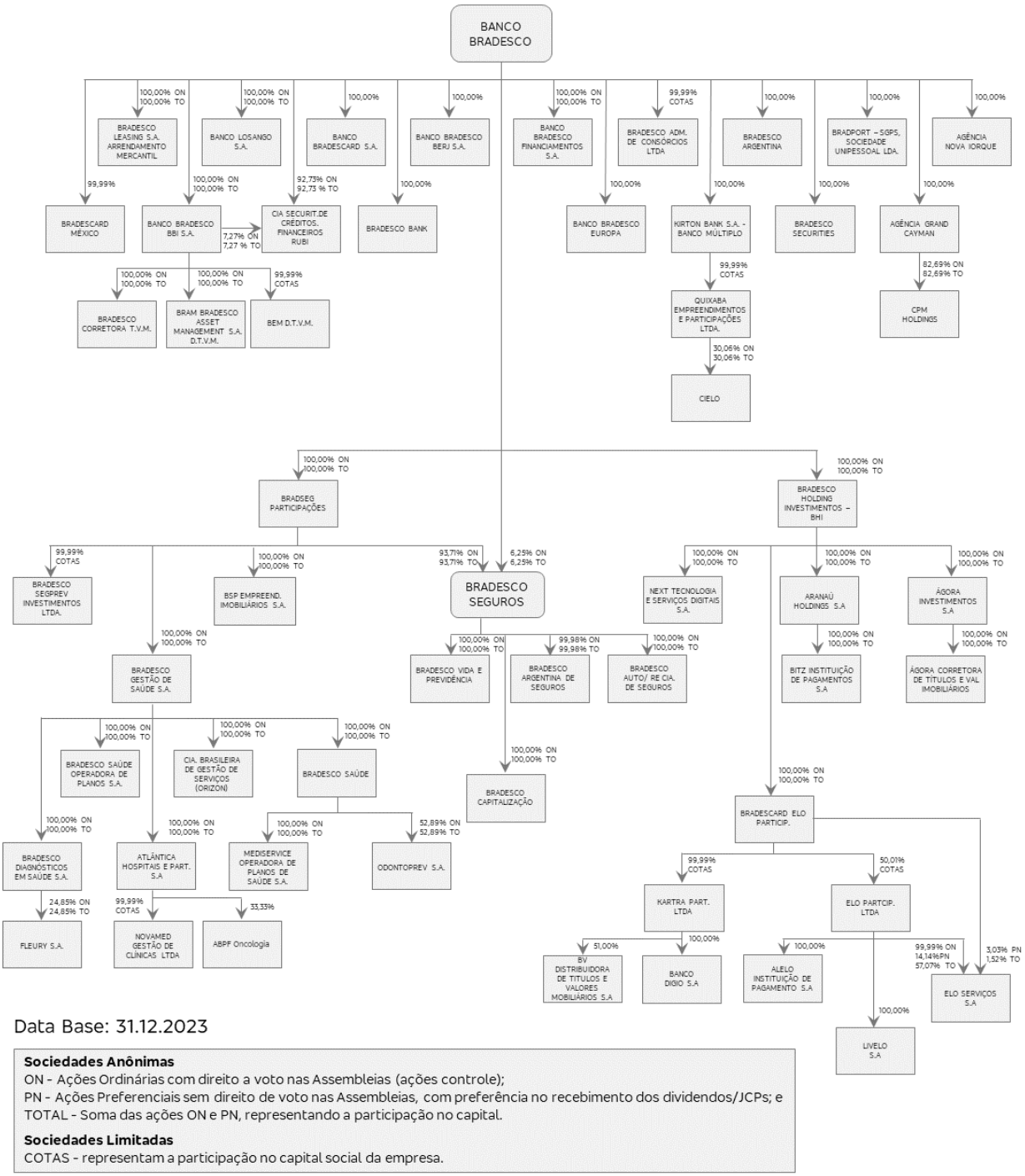
administrative buildings, hubs, branches, related companies and subsidiaries abroad. The Group companies considered in this inventory are presented below (Table 4):

Table 3 – Operational control and shareholding of each company

Operating units	Location	Operational control	Shareholding (%)
Banco Bradesco	Brazil	Yes	100%
Bradesco Seguros	Brazil	Yes	100%

The corporate organization chart of the **Banco Bradesco S/A** and the operational units that were included in this report are shown below (Figure 2):

Figure 2 – Corporate organization chart of Banco Bradesco S/A



Source: https://www.bradescori.com.br/wp-content/uploads/sites/541/2024/02/Principais-Controladas-e-Coligadas-PT-4T23.png

2.3.2 Operational boundaries

The definition of operational boundaries considers the identification of GHG sources and sinks associated with operations through categorization into direct or indirect emissions, using the concept of scope. Each of the three categories adopted by the GHG Protocol are defined below and the options included in this inventory are indicated.

☑ Scope 1: Direct GHG emissions from sources owned or controlled by the organization.

☑ Scope 2: Indirect GHG emissions from purchasing of electric energy used by the organization.

☑ Scope 3: Optional reporting category, accounts for all other indirect emissions not comprised in Scope 2. These are a consequence of the organization's activities, but derive from sources not owned or not controlled by it.**Erro! Indicador não definido.**

2.3.3 Period covered

This inventory covers emissions from activities carried out by the Bradesco Organization in 2023 (January 1st to December 31st).

2.3.4 Base year

The base year is a reference point in the past against which current air emissions can be consistently compared.

Retroactive recalculation to the base year must be carried out whenever there are changes that lead to both increase and decrease in emissions, that is, whenever the change affects analysis consistency and relevance over time. The following cases may require recalculation of emissions:

- Significant structural changes that alter inventory boundaries: (i) mergers, acquisitions and divestments; (ii) outsourcing and incorporation of issuing activities; and (iii) change of emission activity inside or outside the geographic limits of the Program (GHG Protocol Brazil);
- Significant changes to the calculation methodology, improvement in accuracy of emission factors or activity data that leads to significant impact on emissions data or the base year;
- Discovery of significant errors or a certain number of accumulated errors that led to significant changes in results.

Up to the 2015 inventory, the base year 2011 was used in Banco Bradesco S/A's corporate emissions reports. However, due to the acquisition of HSBC in 2016, the company decided to change its base year to 2015. In 2023, a Strategic Operational Eco-Efficiency Plan – PDEO was established, defining annual Eco-efficiency targets with reduction based on 2019, the last year of normal activities before the pandemic. Therefore, 2019 is considered as the base year for this inventory. The company believes that this is in line with the emission reduction objectives and strategies that are most suited to Banco Bradesco S/A's organizational and development profile.

2.3.5 Greenhouse Gases

According to the Brazilian GHG Protocol Program, Inventories must include the 7 GHG types that are part of the Kyoto Protocol report: carbon dioxide (CO_2), methane (CH_4), nitrogen oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3). In addition, the Montreal Protocol includes ozone-depleting gases such as hydrochlorofluorocarbons (HCFCs), which also contribute to global warming.

Each GHG has an associated Global Warming Potential (GWP), which is a measure of how much each gas contributes to global warming. The GWP is a relative value that compares the heating potential of a given amount of gas with the same amount of CO_2 which, by default, has a GWP value of 1. GWP is always expressed in terms of CO2 - CO_2e. Table 4 below shows the GWP values used in the Bradesco Inventory:

Table 4 – Global Warming Potential of Greenhouse Gases

Gas	GWP
Carbon dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous oxide (N_2O)	265
Sulfur hexafluoride (SF_6)	23,500
Nitrogen trifluoride (NF_3)	16,100
PFCs	7,390 - 17,700
HFCs	12 - 14,800
HCFCs	5 - 14,400

The Banco Bradesco S/A Inventory considered emissions of CO_2, CH_4, N_2O, HFCs (HFC-32, HFC-125, HFC-134a, HFC143a and HFC-152a) and HCFCs (HCFC-22, HCFC-124 and HCFC-

141b) according to mapped emission sources and data availability. Additionally, the inventory also computed CO_2 emissions of renewable origin[1].

CO_2, CH_4, N_2O, HFC and HCFC gases are generated at Banco Bradesco S/A as follows:

- CO_2: generated by burning fossil fuels (such as diesel, natural gas and liquefied petroleum gas) by mobile and stationary sources;
- CH_4: generated in the burning of fuels by mobile and stationary sources and in the decomposition of organic matter in anaerobic treatment processes of solid waste;
- N_2O: generated when fuel is burned by mobile and stationary sources; and
- HFC and HCFC: generated by coolant gas leaks.

2.3.6 Inventory exclusions

Due to low representation, some emission sources are excluded from the inventory, as their values are lower than the uncertainty of the GHG inventory emission calculation. In 2023, the following sources were excluded: consumption of LPG and natural gas, fugitive emissions from recharging fire extinguishers, emissions from composting process of organic waste at Cidade de Deus, the international units Bradesco Argentina, Bradesco Europe, Bradesco Grand Cayman, Bradesco New York and Bradesco BAC Florida, which together would represent 0.30% of total emissions.

2.4 Identification and ranking of sources and sinks

Emission sources were identified and ranked within the company's organizational structure. Within the GHG methodology, a mapping of the company's emission sources was carried out, and each one was ranked according to the attributes described. The map of emission sources included in the inventory, according to the structured organization, is presented in

, as follows:

[1] Renewable GHG Inventory Emissions - CO_2 emissions arising from the energy use of biomass from renewable sources. In this survey, the definition of renewable biomass formulated by the Executive Committee of the Clean Development Mechanism of the United Nations Framework Convention on Climate Change (EB 23, Annex 18) was adopted. Emissions of this nature do not contribute to long-term increase in CO_2 concentration in the atmosphere, as they are part of the natural carbon cycle.

Table 5 – Emission sources covered, according to scope and category

Scope	Category	Process
Scope 1	Stationary combustion	Electricity Generators
	Mobile combustion	Air
		Land
	Runaways	Cooling system
Scope 2	Purchasing of electric energy	Electricity consumption
		Biomass consumption (MB approach)
Scope 3	Category 3: Activities related to fuel and energy not included in Scopes 1 and 2	Home Office
	Category 4: Upstream Transport and Distribution	Cargo transport
		Express mail transportation
		Emergency transport
		Value Transportation
	Category 5: Waste generated in operations:	Landfill
	Category 6: Business Travel:	Km reimbursement
		Taxi
		Air travel
	Category 7: Employee commute	Home-work commute
		Public transport for employees - chartered vehicles

As noted in **Erro! Fonte de referência não encontrada.**, the processes defined for Bradesco's inventory can be correlated with the categorization defined by the Brazilian GHG Protocol Program. According to the Brazilian GHG Protocol Program, the categories are defined as follows:

- **Stationary combustion (scope 1):** GHG emissions from the burning of fuel, where oxidization occurs. Energy generated by combustion is generally used to produce water vapor or electric energy. The emission source is stationary, that is, not used as a means of transport. The consumption of diesel oil used in generators was considered in Bradesco's inventory.
- **Mobile combustion (scope 1):** GHG emissions from the burning of fuel, where oxidization occurs. The energy generated by combustion is used to produce

movement and displacement. Emissions from the land fleet and the air fleet were considered in Bradesco's inventory.

- **Exhausts (scope 1):** Generally unintentional GHG releases that do not pass through chimneys, drains, exhaust pipes or other functionally equivalent openings. The release (exhaust) takes place during the production, processing, transmission, storage or use of the gas. Emissions from recharging air conditioning equipment were considered in Bradesco's inventory.
- **Purchasing of electric energy (scope 2):** GHG emissions from the generation of electric energy acquired by the inventory company. Emissions from energy consumption described in the accounts were considered.
- **Category 4: Upstream Transport and Distribution:** Emissions from transportation and distribution of purchased or acquired energy by the inventory organization in the inventory year from vehicles and facilities not owned or operated by the organization, as well as other third-party transportation and distribution services (including both inbound and outbound logistics). Emissions from transport of cargo, bags, valuables and aid were considered in this category, the latter being carried out by Bradesco Seguros.
- **Category 5: Waste generated in operations (scope 3):** includes emissions from the treatment and/or final disposal of solid waste and liquid effluents resulting from the inventory organization's operations controlled by third parties. This category accounts for all future emissions (throughout the treatment and/or final disposal process) from waste generated in the inventory year. Emissions related to waste sent to landfills were considered in Bradesco's inventory.
- **Category 6: Business travel (scope 3):** emissions from the transportation of employees for business-related activities of the inventory organization, carried out in vehicles operated by or owned by third parties, such as aircraft, trains, buses, passenger cars and vessels. All employees of entities and units operated, rented or owned by the inventory organization are considered in this category. Emissions from airline tickets, mileage reimbursement, and the use of transport apps and/or taxis were considered in Bradesco's inventory.
- **Category 7: Employee commute (scope 3):** Emissions in this category include the transport of employees between their homes and their workplace. The commutes of all employees to their respective work unit were considered in Bradesco's inventory, accounting for the home office model, which reduced the number of employees traveling to work. Emissions related to energy consumption from employees' Home Offices were also considered.

Item 2.6 of this report shows applicable sources and applicable considerations for each emission source considered in the calculation of Bradesco's emissions inventory.

2.5 Inventory Preparation

The flow of information for inventory generation occurred with the following sequence of activities:

1. Corporate managers identified the employees who manage required information for creation of the GHG inventory;

2. For each emission source there is a data collection form, and information management is performed by the Equity Department;

3. Employees who monitor operations obtain data from the company's management systems and send them every quarter to Equity;

4. Information collected is then consolidated by Equity

5. With the consolidated information, emissions are accounted for, according to the GHG Protocol.

Banco Bradesco S/A collects data related to GHG emitting activities following operational flows, implemented in each Management Branch within the established organizational and operational limits.

The way in which collected data is recorded, referring to GHG emission sources and the respective Departments in charge of these activities are defined below (Table 8).

Table 6 – Responsibilities for data collection activities.

Scope	Emission Sources		Department in charge	Frequency
Scope 1	Mobile Combustion	Proprietary Air Fleet	EQUITY	Quarterly
		Proprietary land fleet	EQUITY	Quarterly
	Runaways	Leakage of coolant gas emissions	EQUITY	Quarterly
	Stationary combustion	Electric generators	EQUITY	Quarterly
Scope 2	Purchasing of electric energy	Electric energy purchased for own consumption	EQUITY	Quarterly
Scope 3	Transport and Distribution (upstream)	Transport of express mail (correspondence and documents)	EQUITY	Quarterly
		Cargo transportation (equipment, furniture and graphic materials).	EQUITY	Quarterly
		Value Transportation	EQUITY	Quarterly
		Relief Transport	BRADESCO SEGUROS	Quarterly

Scope	Emission Sources		Department in charge	Frequency
	Waste generated in operations	Solid Waste	EQUITY	Quarterly
	Business Travel	Taxi	MOBILITY	Quarterly
		Airline tickets	DRH	Quarterly
		Km reimbursement	ACCOUNTING	Quarterly
	Employee Commute (home-work)	Public transport for employees (buses and vans)	DRH	Quarterly
		Destination and origin zip codes	DRH	Annual
		Home Office	DRH	Annual

The Eco-efficiency sector of the Equity Department is in charge of implementing and maintaining the ABNT NBR ISO 14064-1 standard and is responsible for managing and maintaining controls linked to the Organization's GHG inventory.

Eco-efficiency receives the respective completed forms from those responsible, which are analyzed, compiled, grouped and subsequently processed to calculate annual GHG emissions.

According to data types managed and existing emission factors, information was processed to be included in the GHG Protocol spreadsheets, according to the Organizational Unit, as shown in the following table:

Table 7 – Data managed by Banco Bradesco S/A for use in inventory.

Data type	Source	Calculation Description
Passenger*distance	Bus	Home-work distance (obtained from the HR database), multiplied by the percentage of employees for the transport mode (conservatively, urban bus was used).
	Air travel	Distance between airport (based on World Airport Codes) by Defra methodology rating into short, medium and long distance.
Distance	Employee-owned vehicles	Home-work distance (obtained from the HR database), multiplied by the percentage of employees for the transport mode (flex-fuel gasoline vehicles were used).
	Chartered Vehicles	Distance traveled by chartered vehicles for transportation of employees.
	Transport and Distribution	Data provided by third parties.
	Reimbursement	Refunded amount divided by reimbursement per km.
Energy	Electric energy	Data obtained directly from Banco Bradesco's control.
	Electric energy – home office	Energy consumption of employees working from home (obtained from the HR database)

Data type	Source	Calculation Description
Mass	Waste and coolant gases	Data obtained directly from Banco Bradesco's control.
Brazilian Real	Transportation of express mail	Fuel costs (exclusive) for the service provided.
	Transport and Distribution	Fuel costs (exclusive) for the service provided.
	Taxi / apps	Fuel cost divided by the average price per km in Brazil
Volume	Generators, owned and rented fleet	Data obtained directly from Banco Bradesco's control.

2.6 Calculation of emissions and removals

All inventory calculations were carried out via the GHG Protocol spreadsheet. GHG emissions and removals are calculated for each source and sink individually according to the following formula:

$$E_{i,g,y} = DA_{i,y} \cdot FE_{i,g,y} \cdot PAG_g$$

Where:

- i Index denoting an individual source or sink activity;
- g Index denoting a type of GHG;
- y Reference year of the report.
- $E_{i,g,y}$ GHG emissions or removals *g* attributable to the source or sink *i* during the year *y*, in tCO_2e;
- $DA_{i,y}$ Consolidated activity data referring to the source or sink *i* for the year *y*, in the unit *u*. As previously highlighted, the consolidated activity data shall consist of all recorded attributes of each source/sink.
- $FE_{i,g,y}$ GHG emission or removal factor *g* applicable to the source or sink *i* in the year *y*, in t GHG *g*/*u*[2];
- PAG_g GHG global warming potential g, in tCO_2e/t GHG*g* [3];

[2] The GHG emission factors available in reference and in recognized and reviewed databases were adopted. Local and recent emission factors that reflected the type of technology used in the organization's value chain activities were prioritized.

[3] The Global Warming Potential (GWP) is a factor that describes the impact of radiative force of a unit based on the mass of a given GHG related to a unit of equivalent carbon dioxide during a given period.

The adoption of the GHG Protocol emission factors enables updating of inventory emission sources in the following years, since the GHG spreadsheet is periodically updated with the emission factors applicable to Brazil.

Table 8 - References for emission factors.

Reference	Description	Link
IPCC 2006	IPCC *Guidelines for National Greenhouse Gas Inventories, Prepared by the National Greenhouse Gas Inventories Programme*, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). *Published: IGES, Japan.*	http://www.ipcc-nggip.iges.or.jp/public/2006 gl/
PBGHGP 2023	Brazilian GHG Protocol Program, Calculation Tool, version 2023.0.1.	http://www.ghgprotocolbrasil.com.br/ferramenta-decalculo
GHG Emission Factors Hub	Emission Factors for Greenhouse Gas Inventories	https://www.epa.gov/climateleadership/ghg-emission-factors-hub

3 Release

3.1 General CO_2 emissions

The emissions[4] of scopes 1 and 3 of Banco Bradesco S/A for 2023 were respectively 16,540.03 tCO_2e and 122,785.11 tCO_2e. Scope 2 was calculated using two different approaches: Location Based – LB, with emissions of 13,932.875 tCO_2e, and Market Based - MB with 0 tCO_2e emissions. In addition, 285.46 tCO_2 of renewable origin referring to Scope 1, and 23,825.9 tCO_2 referring to Scope 3 were emitted. 11,694.3 tCO_2e of non-Kyoto gases were also emitted.

The emissions[5] of Banco Bradesco S/A of Scope 1, 2 and 3 for 2023 are shown in Figure 3:

[4] GHG emissions regulated by the Kyoto Protocol (carbon dioxide - CO_2, methane - CH_4, nitrous oxide - N_2O and regulated by the Montreal Protocol (chlorofluorocarbons - CFC and hydrochlorofluorocarbons - HCFC).
[5] GHGs regulated by the Kyoto Protocol (carbon dioxide - CO_2, methane - CH_4, nitrous oxide - N_2O and hydrofluorocarbons – HCFC) are considered herein.

Figure 3 – GHG emissions of Banco Bradesco S/A in 2023 by scope (Kyoto-tCO2e).

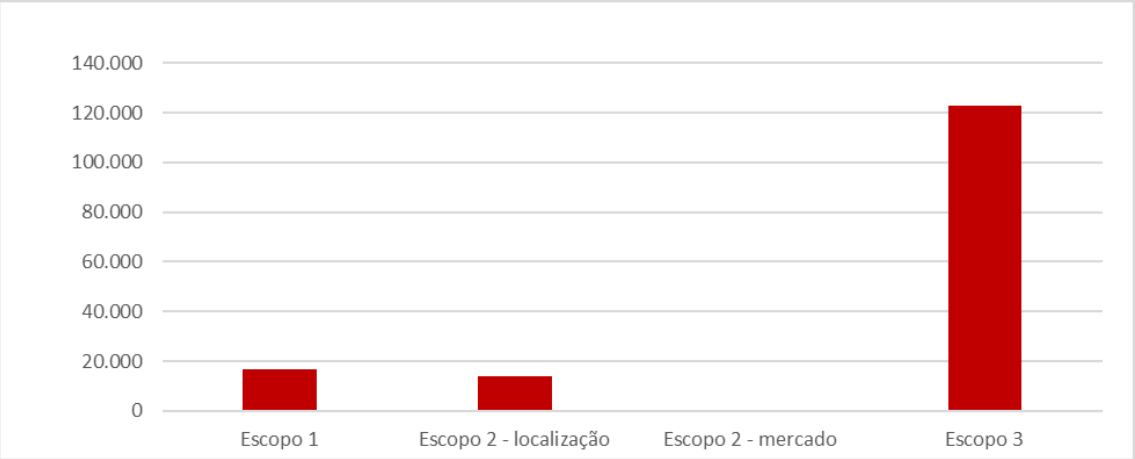


Table 09 shows the results of GHG emissions divided by scope and category. In scope 1, the category with the highest contribution is Fugitive Emissions with 87.1% (14,409.84 tCO_2e).

Scope 2 emissions were 13,932.75 tCO_2e in the LB approach and 0.0 tCO_2e in the MB approach, in both cases only for the Electric Energy Acquisition category.

In scope 3, the employee commute category was responsible for 47.5% of Scope 3 emissions (58,277.8 tCO_2e). Then, emissions from upstream transport and distribution (involving the transport of cargo, express mail, relief, valuables and correspondence), accounting for 39.1% of Scope 3 emissions (48,022.1 tCO_2e).

Table 9 – Emission sources and their representation

SCOPE	EMISSION SOURCES		Ton CO2e	Representation
Scope 1	Mobile Combustion	Proprietary Air Fleet	1,199.11	0.86%
		Proprietary land fleet	395.97	0.28%
	Runaways	Leakage of coolant gas emissions	14,409.84	10.34%
	Stationary combustion	Electric generators	534.97	0.38%
	Full scope 1	---	16,540.03	11.87%
Scope 2	Purchasing of electric energy	Electric energy purchased for own consumption - LB	13,932.75	---
		Electric energy purchased for own consumption - MB	0.00	---
Scope 3	Transport and Distribution (upstream)	Transport of express mail (correspondence and documents)	4,670.56	3.35%
		Cargo transportation (equipment, furniture and graphic materials).	2,288.36	1.64%
		Value Transportation	9,436.68	6.77%
		Relief Transport	31,601.87	22.68%
		Mail Transport	24.60	0.02%
	Waste generated in operations	Solid Waste	4,532.26	3.25%

SCOPE	EMISSION SOURCES		Ton CO2e	Representation
	Business Travel	Taxi	1,452.40	1.04%
		Airline tickets	7,698.14	5.53%
		Km reimbursement	2,802.47	2.01%
	Employee Commute (home-work)	Public transport for employees	427.08	0.31%
		Destination and origin zip codes	57,682.81	41.40%
		Home Office	167.88	0.12%
	Full scope 3	---	**122,785.11**	**88.13%**
		Total - LB	**139,325.1**	**---**
		Total - MB	**153,257.9**	**---**

Figure 4 presents GHG emissions segmented by company and scope in the LB approach, while Figure 5 presents the MB approach. Compared to other companies in the Organization, Banco Bradesco has superior issuance in all scopes.

Figure 4 – GHG emissions per company - LB approach (Kyoto - tCO2e)

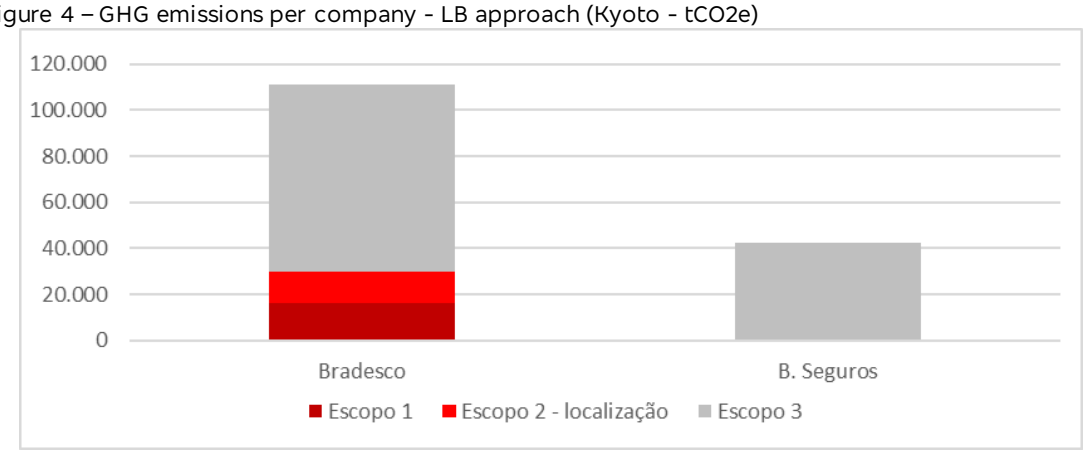


Table 10 – GHG emissions per company - LB approach (Kyoto - tCO2e).

Scope	Bradesco	B. Seguros	Total
Scope 1	16,408.53	131.50	16,540.03
Scope 2 - LB	13,431.85	500.90	13,932.75
Scope 3	83,416.66	39,368.45	122,785.11
Total	113,256.89	40,000.85	153,257.89
Representation	73.9%	26.1%	100.0%

Figure 5 – GHG emissions per company - LB approach (Kyoto - tCO2e)

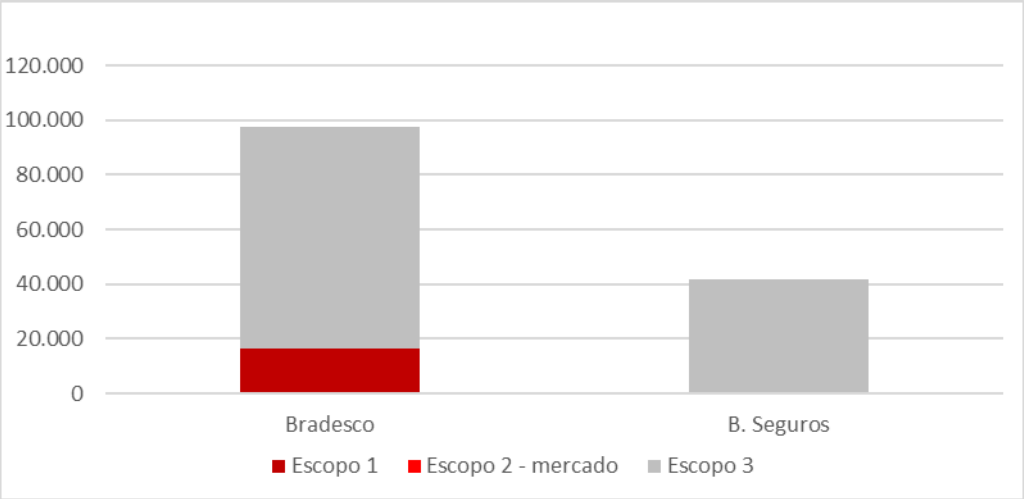


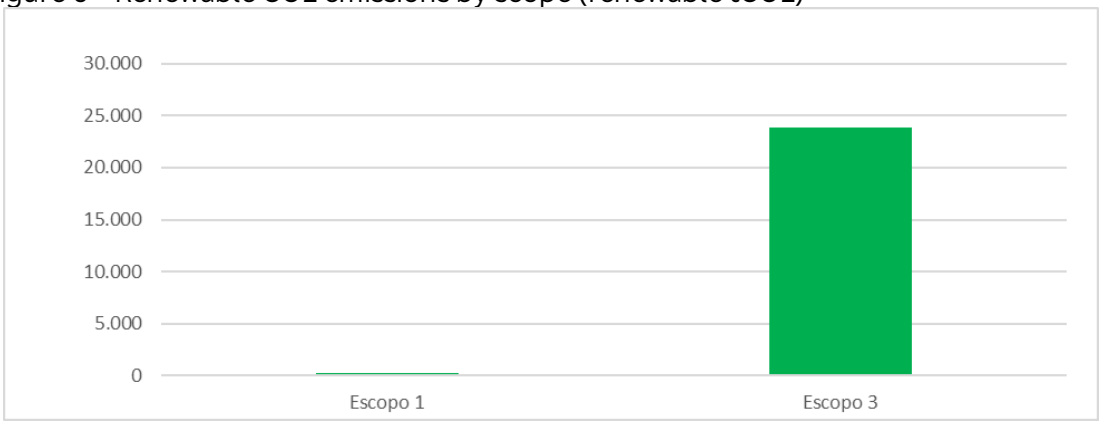
Table 11 – GHG emissions per company - MB approach (Kyoto - tCO2e).

Scope	Bradesco	B. Seguros	Total
Scope 1	16,408.53	131.50	16,540.03
Scope 2 - MB	0	0	0.00
Scope 3	83,416.66	39,368.45	122,785.11
Total	99,825.04	39,499.95	139,325.14
Representation	71.6%	28.4%	100.0%

3.2 General CO_2 renewable emissions

When burning renewable fuels, such as ethanol or biodiesel, CO_2 emitted has a renewable origin (because at some point in its life cycle CO_2 was captured by biomass). In 2023, the Organization's emissions were 285.46 tCO_2 renewable for scope 1 and 23,825.95 tCO_2 renewable for scope 3. Such emissions are shown in Figure 6.

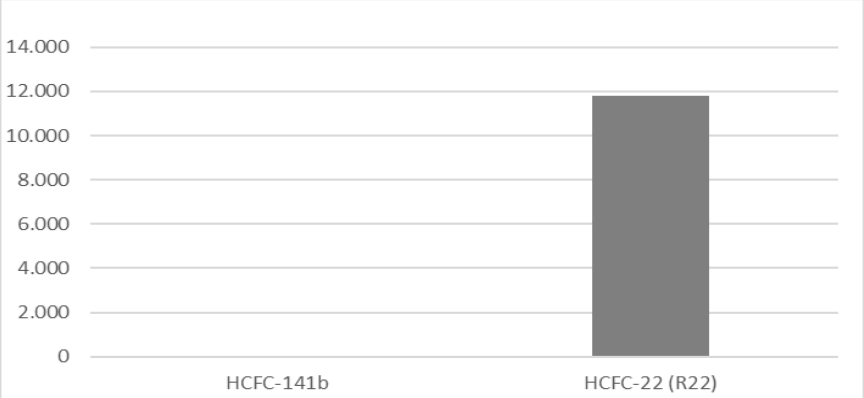
Figure 6 – Renewable CO2 emissions by scope (renewable tCO2)



3.3 General non-Kyoto gas emissions

Greenhouse gas emissions not contained in the Kyoto Protocol of Banco Bradesco S/A are shown in Figure 7. In 2023, a total of 11,820.4 tCO_2e were emitted (with 19.0 tCO_2e of HCFC-141b and 11,801.4 tCO_2e of HCFC-22) referring to the consumption and replenishment of coolant gases due to leaks in cooling systems of the organization's buildings and branches.

Figure 7 – Emissions of gases not covered by the Kyoto Protocol (tCO2e)



3.4 Scope 1

During the inventory period, Bradesco has shown the following sources of direct GHG emissions according to the GHG Protocol categories:

Table 12 – GHG emissions results – scope 1 (tCO2e).

EMISSION SOURCES		Ton CO_2e 2023	Representation
Mobile Combustion	Proprietary Air Fleet	1,199.11	7.2%
	Proprietary land fleet	395.97	2.4%
Runaways	Leakage of coolant gas emissions	14,409.84	87.1%
Stationary combustion	Electric generators	534.97	3.2%
Full scope 1	**---**	**16,540.03**	**100.0%**

In 2023, fugitive emissions characteristic of coolant gas exchange in air conditioning units were the most prevalent, accounting for approximately 87.1% of Scope 1, as shown in Table 12. In second place are emissions from fuel consumption by the Organization's mobile fleet (land and air), which represented 9.6% of direct emissions. Diesel oil consumption in electricity generators represented 3.2% of the total.

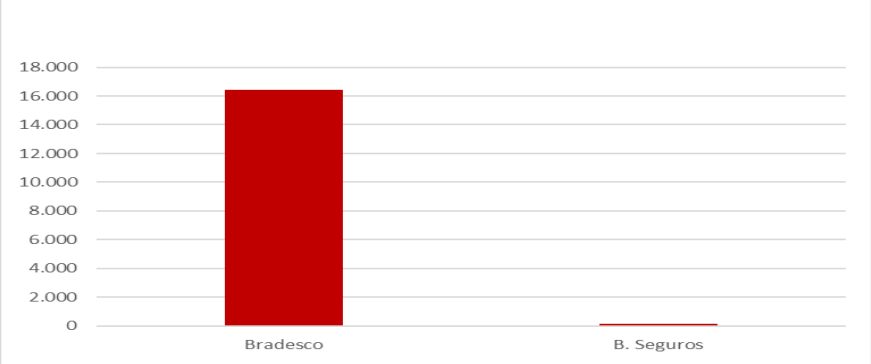
Table 13 – Comparison of scope 1 emissions (tCO2e).

EMISSION SOURCES		Ton CO_2e			Variation	
		Base year	2022	2023	Base year	Last year
Mobile Combustion	Proprietary Air Fleet	511.41	1,252.29	1,199.11	134.5%	-4.2%
	Proprietary land fleet	461.99	440.44	395.97	-14.3%	-10.1%
Runaways	Leakage of coolant gas emissions	8,594.39	11,986.58	14,409.84	67.7%	20.2%
Stationary combustion	Electric generators	765.97	546.75	534.97	-30.2%	-2.2%
Full scope 1		10,333.76	14,226.06	16,540.03	60.1%	16.3%

Emissions in the Fugitive category increased 20.2% compared to the previous year, due to increased use of coolant gas R410A, instead of R22, unaccounted for and used in outdated equipment. Mobile Combustion emissions in 2023 decreased when compared to the previous year, due to the resumption of business. Stationary Combustion emissions in 2023 barely changed compared to the previous year.

The figure below shows the 2023 scope 1 GHG emissions of Banco Bradesco S/A per company.

Figure 8 – Scope 1 emissions per company (tCO2e).



Data is represented in the following table:

Table 14 – Scope 1 emissions per company (tCO2e).

	Emissions - TonCO2e	
Scope	Bradesco	B. Seguros
Scope 1	16,408.4	131.5
Representation	99.2%	0.8%

As shown in the chart above, Banco Bradesco was responsible for 99.1% of the Organization's Scope 1 emissions in 2023. This representation is expected due to the size of Banco Bradesco's operations compared to other companies.

3.5 Scope 2

3.5.1 Scope 2 – Location based approach

The Location Based approach, a model traditionally adopted by the PBGHGP, quantifies scope 2 GHG emissions using the average emissions for generating electricity from the National Interconnected System (SIN) as an emission factor.

In the Location Based - LB, Banco Bradesco S/A's Scope 2 emissions in 2023 amounted 13,932.8 tCO_2e, a 14.1% decrease compared to the previous year.

The reduction in emissions is due to the 9.6% decrease in the grid's average emission factor compared to the previous year (0.0426 tCO_2e/MWh in 2022 vs 0.0385 tCO_2e/MWh in 2023).

The graph below shows the 2023 GHG emissions of Banco Bradesco S/A placing the company in the Location approach (Figure 10). As expected, Banco Bradesco was responsible for 96.45% of Scope 2 emissions.

Figure 9 – Scope 2 emissions - LB per company (tCO2e).

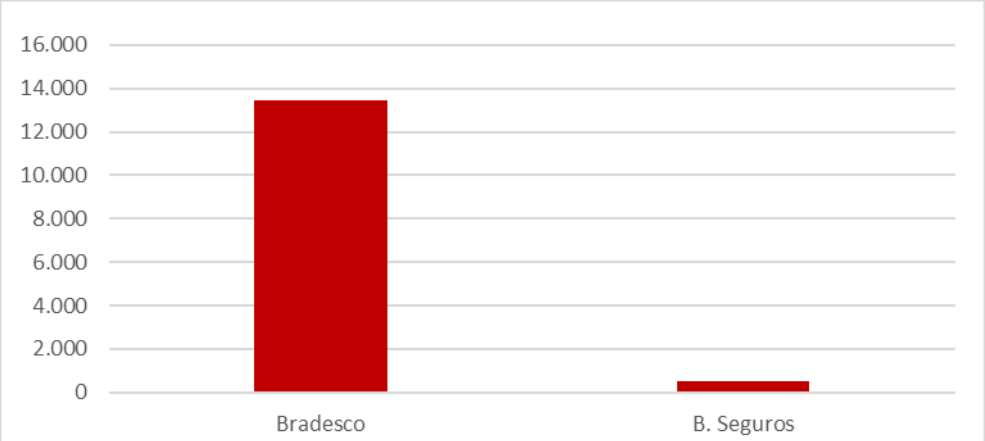


Table 15 – GHG emissions results – scope 2 – LB (tCO2e).

	Emissions - TonCO2e	
Scope	Bradesco	B. Seguros
Scope 2 - LB	13,431.8	500.9
Representation	96.4%	3.6%

3.5.2 Scope 2 – market approach

The MB approach quantifies scope 2 GHG emissions using the specific emission factor of each electric power generation source that the organization in charge of inventory chose to purchase or use. In this sense, the emission factor is directly associated with the origin of electricity generation, making it required to prove and track it. According to the PBGHGP, the reporting of emissions from purchasing electricity following the purchase choice-based approach is voluntary, additional and exclusive to organizations that can meet all required quality criteria.

In 2019, Banco Bradesco S/A set a goal of making 100% of its energy matrix from renewable sources by the end of 2020 through 4 main pillars: Free Market, Distributed Generation, PPAs (Power Purchase Agreements) and I-RECs (Renewable Energy Certificates).

For the calculation of Market Base (MB) approach, the total energy consumption was initially considered (identical value to LB approach). Then, this consumption was deducted according to the renewable energy sources consumed and their respective emission factors. For international units, the MB approach maintained the same emission factors as the LB approach, since during the preparation of the GHG Inventory, the verification and tracking of renewable energy sources were still ongoing.

In 2023, Banco Bradesco S/A committed to use all energy from renewable sources at a national level through the Free Contracting Environment (ACL), via I-RECs and Distributed Generation, thus being able to account for Scope 2 emissions in Market Based - MB approach. In this approach, Banco Bradesco's Scope 2 emissions were 0.00 tCO_2e.

3.6 Scope 3

During the inventory period, Bradesco has shown the following sources of indirect Scope 3 GHG emissions according to the GHG Protocol categories:

Table 16 – Scope 3 emissions by emission source (tCO2e).

EMISSION SOURCES		Ton CO_2e 2023	Scope 3 representation
Transport and Distribution (upstream)	Express mail transportation	4,670.56	3.8%
	Cargo transportation (equipment, furniture and graphic materials).	2,288.36	1.9%
	Value Transportation	9,436.68	7.7%
	Relief Transport	31,601.87	25.7%
	Mail Transport	24.60	0.0%
Waste generated in operations	Solid Waste	4,532.26	3.7%
Business Travel	Taxi	1,452.40	1.2%
	Airline tickets	7,698.14	6.3%
	Km reimbursement	2,802.47	2.3%
Employee Commute (home-work)	Public transport for employees	427.08	0.3%
	Destination and origin zip codes	57,682.81	47.0%
	Home Office	167.88	0.1%

EMISSION SOURCES		Ton CO_2e 2023	Scope 3 representation
Full scope 3	---	**122,785.11**	**100.0%**

Category 7 emissions - Employee commute (home-work) corresponds to a total of 47.5% of Scope 3 emissions (or 58,277.9 tCO2e), being made up of public transport for employees, commuting with own resources and emissions regarding remote work. There was an 8.1% increase compared to the previous year due to the resumption of face-to-face activities by the organization, however compared to the base year the reduction was 41.4%.

Category 4 emissions - Upstream transport and distribution with a total of 48,022.06 tCO2e, corresponding to 39.1% of total emissions. In this category, the sources Relief Transportation and Valuables Transportation were the two main emission sources, respectively at 31,601.9 tCO2e and 9,436.7 tCO_2e (or 25.7% and 7.7% of Scope 3 emissions). When compared to the 2019 base year, there was a 32.9% decrease, due to sector restructuring, large decreases in transport of cargo (-65.1%), express mail (-51.9%) and valuables (-41.4%), due to restructuring and reduction in the number of branches.

Category 6 emissions - Business Travel correspondto a total of 9.7% of Scope 3 emissions; decreased 44.0% compared to the base year and increased 96.0% compared to 2022.

Category 5 - Waste generated in operations corresponds to 3.7% of Scope 3 emissions and decreased 7.9% compared to the previous year, and 13.4% compared to the base year, due to implementation of zero landfill initiatives in office buildings and branches in Greater São Paulo.

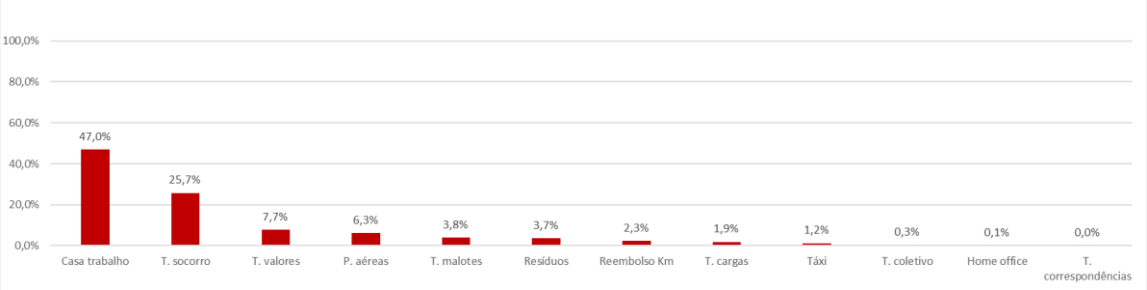
Table 17 – GHG emissions results – scope 3 (tCO2e).

EMISSION SOURCES		Ton CO2e			Variation	
		Base year	2022	2023	Base year	Last year
Transport and Distribution (upstream)	Transport of express mail (correspondence and documents)	9,710.22	4,855.6	4,670.6	-51.9%	-3.8%
	Cargo transportation (equipment, furniture and graphic materials).	6,551.67	1,596.6	2,288.4	-65.1%	43.3%
	Value Transportation	16,093.72	9,633.8	9,436.7	-41.4%	-2.0%
	Relief Transport	30,733.18	70,033.3	31,601.9	2.8%	-54.9%
	Mail Transport	30,733.18	70,033.3	24.6	---	---
Waste generated in operations	Solid Waste	5,234.02	4,923.4	4,532.3	-13.4%	-7.9%

EMISSION SOURCES		Ton CO2e			Variation	
Business Travel	Taxi	3,368.53	1,281.8	1,452.4	-56.9%	13.3%
	Airline tickets	13,794.43	3,151.3	7,698.1	-44.2%	144.3%
	Km reimbursement	4,167.59	1,664.4	2,802.5	-32.8%	68.4%
Employee Commute (home-work)	Public transport for employees	1,880.03	1,439.5	427.1	-77.3%	-70.3%
	Destination and origin zip codes	97,624.58	52,048.0	57,682.8	-40.9%	10.8%
	Home Office	---	430.2	167.9	---	-61.0%
Full scope 3		189,157.97	151,057.8	122,785.1	-35.1%	-18.7%

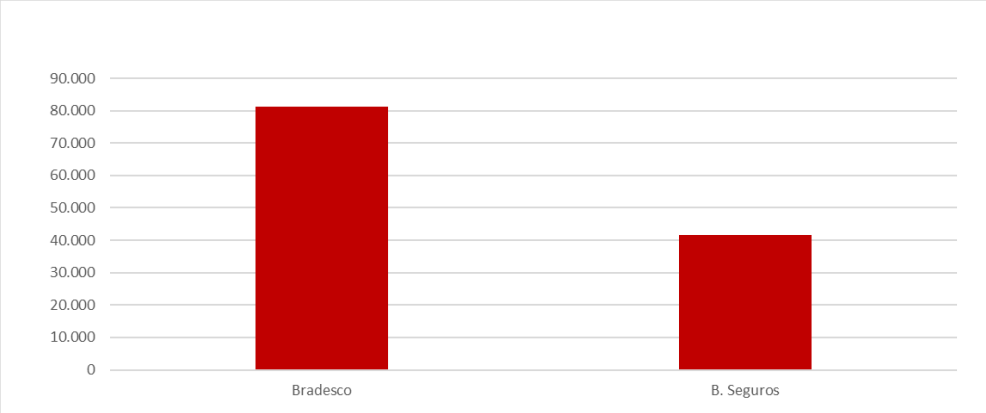
Banco Bradesco S/A's scope 3 emissions in 2023 totaled 122,785.1 tCO2e, representing a 35.1% decrease compared to the base year (2019 = 189,157.97 tCO2e), and 18.7% compared to the previous year (151,057.8 tCO2e). Table 14 shows the results of 2023 GHG emissions divided by scope and source.

Figure 10 – Scope 3 emissions by emission source (tCO2e).



The figure below shows the 2023 GHG scope 3 emissions of Banco Bradesco S/A per company.

Figure 11 – Scope 3 emissions per company (tCO2e).



Data is represented in the following table:

Table 18 - Scope 3 emissions per company (tCO2e).

	Emissions - TonCO2e	
Scope	Bradesco	B. Seguros
Scope 3	81,294.6	41,490.5
Representation	66.2%	33.8%

As shown in the chart above, Banco Bradesco was responsible for nearly 66.2% of the Organization's Scope 1 emissions in 2023. Due to relief transport, emissions related to Bradesco Seguros are a significant 33.8% of the total.

4 Uncertainty analysis

Preparing an emissions inventory involves the use of several calculation tools including forecasts, parameters and standard emission factors. The use of these tools generates certain levels of uncertainty in inventory calculations.

To minimize such uncertainties, whenever possible, values based on official sources were used, such as the methodologies queried or market standards, always taking into account the principles of conservatism, accuracy and transparency.

The uncertainties associated with inventories can be classified according to two criteria:

- **Scientific uncertainty**: Science of the actual emission and/or removal process is not fully understood. An example is the significant involvement of scientific uncertainty in the use of direct and indirect factors associated with global warming to estimate emissions of various GHGs. Most of the factors covered in this work are from IPCC.
- **Estimated uncertainty**: uncertainty that arises whenever GHG emissions are quantified. These are still classified as uncertainty models, when associated with the mathematical equations used to characterize relationships between various parameters and emission processes; and parameter uncertainties introduced in estimation models used as input data in the estimated models.

According to the recommendations of the IPCC Good Practice Guidance, inventories must not reveal emissions with biases that could be identified and eliminated, and uncertainties must be minimized considering all existing scientific knowledge and available resources.

These recommendations were followed at all stages of the inventory construction, as there was great concern in using the most recent calculation methodologies and emission factors from organizations with great credibility regarding emission calculations. In relation to the data used, special attention was given to their truthfulness (checking of

company records and analysis of data received), and the search for data in measurement units that would reduce the uncertainties associated with emissions.

The procedures used to calculate uncertainties are presented in ANNEX C – Calculation of Uncertainties. For the 2023 Banco Bradesco S/A GHG inventory, uncertainties were also calculated and the results are presented below, where:

Table 19 – Results of uncertainties in the Banco Bradesco S/A Inventory.

Scope	Category	Lower uncertainty	Higher uncertainty
Scope 1	Stationary combustion	2.15%	0.58%
	Mobile combustion	1.32%	1.06%
	Runaways	1.56%	0.31%
	Total - Scope 1	**1.50%**	**0.30%**
Scope 2 - LB	Purchasing of electric energy	**1.65%**	**0.33%**
Scope 2 - LB	Purchasing of electric energy	**1.65%**	**0.33%**
Scope 3	Upstream Transport and Distribution	5.20%	5.23%
	Waste generated in operations	16.90%	17.38%
	Business Travel	5.32%	4.42%
	Employee commute (home-workplace)	8.60%	5.35%
	Total - Scope 3	**4.77%**	**3.52%**
TOTAL - LB		**3.36%**	**2.47%**
TOTAL - MB		**3.36%**	**2.47%**

5 Recommendations

A virtuous cycle of analysis and process improvements must be developed for companies to adapt to the low-carbon economy. This set of activities, when detailed and organized, comprises the corporate plan for managing Greenhouse Gas (GHG) emissions.

The GHG inventory is the first stage of diagnosis and must be continually improved. Recommendations for improvement are:

- Expansion of monitored emission sources, calculating emissions from other scope 3 categories such as investments (financed emissions), treatment of effluents sent to the municipal waste network, emissions related to goods and services purchased by the organization

- The company may structure a quarterly flow of information and monitor the monthly impact on Climate Change as a form of environmental management.

6 References:

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GHG Protocol. GHG Protocol guidance on uncertainty assessment in GHG inventories and calculating statistical parameter uncertainty. Annex E

EPA. United States Environmental Protection Agency, Centro EPA para liderança climática corporativa, Centro de Fatores de Emissão, disponível em < https://www.epa.gov/climateleadership/ghg-emission-factors-hub>.

1. GLOSSARY

Base year: historical period specified for the purpose of comparison of GHG removals and emissions, in addition to other related information.

Equivalent carbon dioxide (CO_2e): comparison unit for radiative force (global warming potential) of a given GHG to CO_2.

GHG emissions: total mass of a GHG released into the atmosphere in a specific period of time.

Direct GHG emissions: GHG emissions from sources owned or controlled by the organization. To establish the organization's operational boundaries, the concepts of financial control and operational control are used.

Indirect GHG emissions related to energy consumption: GHG emissions from the generation of electric energy, heat or steam, imported/consumed by the organization.

Scope: the concept of scope was introduced by the GHG Protocol with the purpose of assisting companies in defining their operational limits. The scopes are distinguished into 3 categories, separated into direct emissions and indirect emissions.

Scope 1: It covers the category of the organization's direct GHG emissions, in other words, those that originate from sources owned or controlled by the company within the defined limits. As an example, emissions from the burning of fossil fuels and manufacturing processes may be mentioned.

Scope 2: Covers the category of indirect GHG emissions related to external energy acquisition. An example of this is the consumption of electrical energy generated by concessionaires supplying the National Interconnected System (SIN) and purchased thermal energy.

Scope 3: It covers the category of indirect GHG emissions from other sources, that is, emissions that occur as a result of the organization's activities, but which originate from sources not owned or controlled by the organization. Some examples of scope 3 sources are: transporting products in vehicles now owned the company, using third-party vehicles, transporting employees and business trips.

Emission factor or **GHG Removal Factor**: factor that correlates activity data and GHG emissions and removals.

GHG Source: physical unit or process that releases GHG into the atmosphere.

Greenhouse Gas (GHG): atmospheric component, of natural or anthropogenic origin, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, atmosphere and clouds. Among GHGs, there are Carbon Dioxide (CO2), Methane (CH4), Nitrous Oxide (N2O), Hydrofluorocarbons (HFC), Perfluorocarbons (PFC) and Sulfur Hexafluoride (SF6).

GHG emissions inventory: document in which GHG sources and sinks are detailed and GHG emissions and removals are quantified during a given period.

Offset: GHG emissions offset credits.

Organization: company, corporation, enterprise, authority, institution - or part or combination thereof -, whether incorporated or not, public or private, that has its own functions and administration.

Other indirect GHG emissions: GHG emissions other than those indirect emissions related to energy consumption. They are a consequence of the organization's activities, but come from sources owned or controlled by other organizations.

Global Warming Potential: factor that describes the impact of radiative force of a unit based on the mass of a given GHG related to a unit of equivalent carbon dioxide (CO2) during a given period.

GHG Removals: total mass of a GHG removed from the atmosphere in a specific period of time.

GHG reservoir: physical unit or component of the biosphere, geosphere or hydrosphere with the capacity to store or accumulate GHGs removed from the atmosphere by a sink or GHGs captured from a source. The total carbon mass contained in a GHG reservoir over a specific period of time can be referred to as the reservoir's carbon stock. A GHG reservoir can transfer its gases to another GHG reservoir. Collecting a GHG from a source before that GHG enters the atmosphere and storing it in a reservoir can be referred to as GHG capture and storage.

GHG sink: physical unit or process that removes GHG from the atmosphere.

ANNEX A – GHG PROTOCOL TABLES

The purpose of this section is to make data reporting in the public emissions register by Banco Bradesco S/A easier. It should be noted that as the reporting of international units to the GHG Protocol is optional, such emissions are separated from emissions taking place in Brazil. Therefore, the results presented in this section are different from the others presented in the main section of the report.

2. A.1 EMISSIONS IN METRIC TONS, BY GHG TYPE

GHG (t)	Scope 1	Scope 2 (Location based approach)	Scope 2 (purchase choice approach)	Scope 3
CO_2	2,098.764	13,932.752	0.000	115,073.464
CH_4	0.119	0.000	0.000	170.069
N_2O	0.106	0.000	0.000	11.131
HFCs	7.517			0.000
PFCs				
Sulfur trifluoromethyl pentafluoride				
Perfluorocyclopropane				
SF_6				

NF_3				
Total				

3. A.2 EMISSIONS IN METRIC TONS, BY GHG TYPE

GHG (t)	Scope 1	Scope 2 (Location based approach)	Scope 2 (purchase choice approach)	Scope 3
CO_2	2,098.764	13,932.752	0.000	115,073.464
CH_4	3.332	0.000	0.000	4,761.932
N_2O	28.090	0.000	0.000	2,949.715
HFCs	14,409.842			0.000
PFCs				
SF_6				
NF_3				
Total	**16,564.005**	**13,932.752**	**0.000**	**122,785.111**

4. A.3 BIOGENIC CO_2 EMISSIONS

	Scope 1	Scope 2 (Location based approach)	Scope 2 (purchase choice approach)	Scope 3
CO_2 (t)	285.464	0.000	0.000	23,825.949
Biogenic CO_2 emissions (t)	**285.464**	**0.000**	**0.000**	**23,825.949**

5. A.4 SCOPE 1 EMISSIONS

	Stationary combustion	Mobile combustion	Fugitive emissions	Total emissions Scope 1
CO_2e (t)	**535.002**	**1,595.184**	**14,409.842**	**16,540.028**
Biogenic CO_2 emissions (t)	**64.466**	**220.998**		**285.464**

6. A.5 SCOPE 2 EMISSIONS - LOCATION-BASED APPROACH

	Electricity (location-based approach)	Transmission and distribution losses (location-based approach)	Purchase of thermal energy	Total Scope 2 emissions (location-based approach)
CO_2e (t)	**13,932.752**	**0.000**	**0.000**	**13,932.752**
Biogenic CO_2 emissions (t)	**0.000**	**0.000**	**0.000**	**0.000**

7. A.6 SCOPE 2 EMISSIONS - PURCHASE CHOICE APPROACH

	Electricity (location-based approach)	Transmission and distribution losses (location-based approach)	Purchase of thermal energy	Total Scope 2 emissions (location-based approach)
CO_2e (t)	0	-	-	0
Biogenic CO_2 emissions (t)	-	-	-	-

8. A.7 SCOPE 3 EMISSIONS

	Category 4 Upstream Transport and Distribution	Category 5 Waste generated in operations	Category 6 Business Travel	Category 7 Employee commute (home-workplace)	Total
CO_2e (t)	48,021.999	4,532.276	11,952.937	58,277.899	122,785.111
Biogenic CO_2 emissions (t)	8,561.357	45.642	2,693.324	12,525.625	23,825.949

9. A.8 EMISSIONS OF OTHER GHGS NOT REGULATED BY THE KYOTO PROTOCOL

	GHG emissions (t)	CO_2e emissions (t)
HCFC-22 (R22)	6.705	11,801.407
HCFC-141b	0.024	19.018

ANNEX B – CALCULATION OF EMISSIONS AND REMOVALS

B.1 FUEL CONSUMPTION IN MOBILE AND STATIONARY EQUIPMENT

The calculation of GHG emissions from the burning of fossil fuels was prepared based on the consumption in fuel volume or traveled distance, by fuel and vehicle type, in 2023. GHG emissions for this source when data is provided in fuel consumption are calculated according to the following formula:

$$E_{i,g,y} = C_{i,y} \cdot PCI_{i,y} \cdot FE_{i,g,y} \cdot PAG_g$$

Where:

- i Index denoting the type of fuel;
- g Index denoting a GHG type;
- y Reference year of the report;
- $E_{i,g,y}$ GHG emissions or removals *g* attributable to the source *i* during the year *y*, in tCO_2e;
- $C_{i,y}$ Fuel consumption *i* for the year *y*, in the unit of measurement *u*, *u* being m^3 or *kg*;
- $PCI_{i,y}$ Internal Calorific Value of the fuel *i* for the year *y*, in the unit of measurement *TJ/u*;
- $FE_{i,g,y}$ GHG emission factor *g* applicable to fuel *i* in the year *y*, in tGHGg/*T.J.*;
- PAG_g GHG global warming potential g, in tCO_2e/tGHGg.

In cases where the input data refers to the distance traveled, the calculation of emissions is carried out according to the following formula:

$$E_{i,g,y} = \frac{D_{i,j,y}}{FC_{i,j,y}} \cdot PCI_{i,y} \cdot FE_{i,g,y} \cdot PAG_g$$

Where:

- i Index denoting the type of fuel;
- j Index denoting the type of vehicle;
- g Index denoting a GHG type;

- y Reference year of the report;
- $E_{i,g,y}$ GHG emissions or removals *g* attributable to the source *i* during the year *y*, in tCO_2e;
- $D_{i,j,y}$ Distance traveled by vehicle j using fuel *i* during the year *y*, in km;
- $FC_{i,j,y}$ Autonomy of vehicle j, in the unit of measurement *u/km,* u being m^3 or *kg*;
- $PCI_{i,y}$ Internal Calorific Value of the fuel *i* for the year *y*, in the unit of measurement *TJ/u*;
- $FE_{i,g,y}$ GHG emission factor *g* applicable to fuel *i* in the year *y*, in tGHG g/*T.J.*;
- PAG_g GHG global warming potential g, in tCO_2e/tGHGg.

The types of GHG emitted when burning fuels are CO_2, CH_4 and N_2O.

Gasoline and diesel consumption requires an additional calculation step, given that in 2021 Brazilian legislation required that these fuels contain biofuels in specific proportions in their compositions. For gasoline, the requirement was 27% anhydrous ethanol. For diesel, ratios were 11% in January and February, 12% from March to August, 10% from September to October and 11% in November and December, according to ANP websites and the GHG Protocol tool. To calculate emissions from the consumption of these fuel types, biofuel percentages were multiplied by the consumption of the fuel mixture prior to using the equation described above.

The categories in this report that were calculated according to the formulas above are: fuel consumption in stationary equipment, fuel consumption in mobile equipment, outsourced transport, commuting to and from work and business trips (taxi only).

B.2 ELECTRIC ENERGY CONSUMPTION

Calculation of GHG emissions from electric energy consumption was carried out based on data on electric energy consumed by operational unit in MWh in 2023. The monthly consumption value is necessary for emission calculation, due to the variation in emission factors of the national network (grid). To calculate emissions related to electricity consumption that occurred in units outside Brazil, annual emission factors provided by the EPA were used. The GHG type considered in energy generation on the Brazilian grid is CO_2 and emissions are calculated according to the following formula:

$$E_{CO2,m,y} = C_{m,y} \cdot FE_{CO2,m,y}$$

Where:

- m Month of consumption referring to electric energy consumption;
- y Reference year of the report;
- $E_{CO2,m,y}$ CO_2 emissions attributable to electric energy consumption from the national grid in the month *m* of the year *y*, in tCO_2e;
- $C_{m,y}$ Electricity consumption from the national grid in the month *m* of the year *y*, in *MWh*;
- $FE_{i,g,y}$ CO_2 emission factor applicable to electricity from the national grid in the month *m* of the year *y*, in t CO_2/*MWh.*

The electricity consumption category in this report was calculated using the formula above.

B.3 CONSUMPTION OF COOLANT GASES

Calculation of GHG emissions from coolant gas consumption was carried out based on data on electric energy consumed by operational unit in MWh in 2023. The mass of gases consumed is multiplied by their respective global warming potential to obtain the amount of CO2e, according to the following equation.

$$E_{CO2e,g,y} = C_{g,y} \cdot PAG_g \cdot 1000$$

Where:

- y Reference year of the report;
- g Index denoting a GHG type;
- $E_{CO2e,g,y}$ CO_2e emissions attributable to the consumption of coolant gas g in the year *y*, in tCO_2e;
- C_y Consumption of coolant gases in the year *y*, in *kg*;
- PAG_g GHG global warming potential g, in tCO_2e/t GHGg.

In the case of coolant gas blends, the calculation is made by multiplying the percentages of each type of coolant gas in the blend in the formula above.

Fugitive emissions category in this report was calculated using the formula above.

B.4 SOLID WASTE INTENDED FOR LANDFILL

To calculate emissions from the disposal of solid waste and WWTP sludge in landfills, the amounts of waste sent to landfills per operational unit of Banco Bradesco S/A were collected.

CH4 is generated in landfills according to the following equations:

$$E_{CH4,y} = QR_y \cdot L_{0,y} \cdot (1 - OX_0)$$

$$L_{0,y} = MCF_0 \cdot DOC_{\text{average}} \cdot DOC_f \cdot F_{CH4} \cdot \frac{16}{12}$$

$$DOC_{\text{average}} = \sum(\%_{i,y} \cdot DOC_i)$$

Where:

- y Reference year of the report;
- i Type of waste;
- $E_{CH4,y}$ CH_4 emissions attributable to the decomposition of waste disposed of in landfills in the year *y*, in tCH_4;
- QR_y Amount of waste sent to landfill in the year *y* in *t*;
- $L_{0,y}$ Potential for methane generation in the year *y* in *t* CH_4/*t residue*;
- OX_0 Oxidization factor, dimensionless;
- MCF_0 Methane correction factor based on landfill quality, dimensionless;
- DOC_{average} Average degradable organic carbon value (value calculated according to the average composition of urban solid waste in Latin America);
- DOC_i Waste degradable organic carbon *i*;
- $\%_{i,y}$ Waste quantity fraction *i* in the year *y*;
- $DOC_{f,y}$ Fraction of waste that decomposes, dimensionless (default value 50%, as IPCC 2006);

- F_{CH4} Fraction of methane in biogas, dimensionless (default value 50%, as per IPCC 2006);

- **16/12** Mass conversion of C in CH_4, 1.33;

The composition of solid waste was calculated based on the amount of paper and organic waste that exists in the organization's waste, considering the following scenario:

Waste composition	Year	Bradesco	Insurance company
A - Paper/cardboard	A / Total [%]	35.0%	35.0%
B - Textile waste	B/Total [%]		
C - Food waste	C/Total [%]	63.0%	63.0%
D - Wood	D/Total [%]		
E - Garden and park waste	E/Total [%]		
F - Diapers	F/Total [%]		
G - Rubber and leather	G/Total [%]		
H - Sewage sludge	H/Total [%]		
Other inert materials	[%]	2.00%	2.00%
DOC - Degradable Organic Carbon in the year	[tC/tMSW]	0.2345	0.2345

In relation to the waste location for Bradesco, the GHG tool was left blank, thus emissions were not maximized by the tool. This option was due to conservatism and difficulty in defining a location, due to the capillarity of Bradesco branches.

For Bradesco, the percentage of recycled waste (95% paper) that is discarded by agencies in landfills was calculated, and the composition of paper that is destined for landfills was calculated. The composition of organics was calculated by adding the amount of organic waste generated by agencies and administrative buildings that are not part of the zero landfill project, plus organic waste generated by digital channels. The remainder was considered inert material.

Due to the lack of a landfill rating, this rating was defined for the quality of waste disposal.

In general, there is no recovery of methane in landfills and anaerobic reactors in Brazil, and therefore, this recovery was not considered in Banco Bradesco S/A's inventory.

B.5 AIR TRAVEL

To account for GHG emissions associated with air travel, distances traveled in flights must be accounted beforehand. The flights were broken down into sections, thus allowing the GHG Protocol tool to be used.

GHG emissions from a short, medium or long distance trip are calculated according to the equations below.

$$E_{CO2e,\mathrm{tr},y} = \mathrm{Distance}_{tr} \cdot \boldsymbol{pax} \cdot \boldsymbol{FE}_{CO2,tr,y}$$

$$E_{CH4,\mathrm{tr},y} = \mathrm{Distance}_{tr} \cdot \boldsymbol{pax} \cdot \boldsymbol{FE}_{CH4,tr,y}$$

$$E_{N2O,\mathrm{tr},y} = \mathrm{Distance}_{tr} \cdot \boldsymbol{pax} \cdot \boldsymbol{FE}_{N2O,tr}$$

Where:

- $\boldsymbol{y}$ Reference year of the report;
- $\boldsymbol{tr}$ Classification of flight route (short, medium or long distance);
- $\boldsymbol{E}_{CO2,tr,y}$ CO_2 emissions from the burning of fuel from the plane that traveled the *tr* type route in the year *y*, in tCO_2;
- $\boldsymbol{E}_{CH4,tr,y}$ CH_4 emissions from the burning of fuel from the plane that traveled the *tr* type route in the year *y*, in tCH_4;
- $\boldsymbol{E}_{N2O,tr,y}$ N_2O emissions from the burning of fuel from the plane that traveled the *tr* type route in the year *y*, in tN_2O;
- $\mathrm{Distance}_{tr}$ Distance in a straight line traveled on the *tr* type air route corrected by a factor of 8%, in *km*;
- $\boldsymbol{pax}$ Number of passengers who traveled the *tr* section type;
- $\boldsymbol{FE}_{CO2,tr}$ CO_2 emission factor applicable to the burning of fuel from the plane that traveled the *tr* type route, in $tCO_2/pax.km$.
- $\boldsymbol{FE}_{CH4,tr}$ CH_4 emission factor applicable to the burning of fuel from the plane that traveled the *tr* type route, in $tCH_4/pax.km$.

- $FE_{N20,tr}$ N_2O emission factor applicable to the burning of fuel from the plane that traveled the tr type route, in tN_2O/pax.km.

ANNEX C – UNCERTAINTY CALCULATION

The calculations used in combining uncertainties are presented below, as well as estimates in confidence intervals and their corrections when necessary, in accordance with the IPCC Good Practice Guidance (2006).

- Combination of uncertainty of (uncorrelated) components of a multiplication or division:

$$I_{total} = \sqrt{I_{12} + I_{22} + \cdots I_{n2}}$$

Where:

- I_{total}: Total percentage uncertainty of the product of quantities (half of the 95% confidence interval expressed as a percentage). For asymmetric confidence intervals, the largest percentage difference between the average and the confidence limit was considered;

- I_i: Percentage uncertainty associated with each of the quantities of a multiplication.

- Combination of uncertainty of (uncorrelated) components of adding or subtracting:

$$I_{total} = \frac{\sqrt{(I_1.x_1)^2 + (I_2.x_2)^2 + \ldots + (I_n.x_n)^2}}{|x_1 + x_2 + \ldots + x_n|}$$

Where:

- I_{total}: Total percentage uncertainty of adding or subtracting quantities (half of the 95% confidence interval expressed as a percentage). For asymmetric confidence intervals, the largest percentage difference between the average and the confidence limit was considered;

- x_i and I_i: Quantities and percentage uncertainty associated with each of the quantities of a multiplication.

Through the uncertainty propagation model described above, an estimate of half of the 95% confidence interval will be produced, expressed as a percentage of the inventory result. As inventory uncertainty increases, the propagation approach described above systematically underestimates uncertainty, except in cases where quantification models are purely additive. Therefore, in cases where uncertainty is greater than 100% and less than 230%, it must be corrected using the procedures described below:

$$I_{\text{corrected}} = I.F_c$$

$$F_c = \left[\frac{(-0.720 + 1.0921.U - 1.63{,}10^{-3}.U^2 + 1.11{,}10^{-5}.U^{3\,2}}{I}\right]$$

Where:

- $I_{\text{corrected}}$: Corrected total uncertainty (half of the 95% confidence interval expressed as a percentage);
- I: Total uncorrected uncertainty (half of the 95% confidence interval expressed as a percentage);
- F_c: Uncertainty correction factor.

To calculate confidence intervals for the total result from the model based on the mean and half of the 95% confidence interval of the component quantities, a certain distribution must be assumed. If the model is purely additive and the half of the confidence interval is less than 50%, a normal distribution is an accurate estimate. In this case, a symmetric probability distribution can be assumed. For multiplicative models or in cases where

uncertainty is greater than 50% for variables that are expected to be non-negative, a lognormal distribution is typically an accurate assumption. In these cases, the probability distribution is not symmetrical about the average. For these situations, the following formulas will be applied to calculate the upper and lower limits of the 95% confidence interval:

$$I_{low} = \{\frac{\exp[\ln(\mu_g) - 1.96.\ln(\sigma_g)] - \mu}{\mu}\} . 100$$

$$I_{high} = \{\frac{\exp[\ln(\mu_g) + 1.96.\ln(\sigma_g)] - \mu}{\mu}\} . 100$$

$$\sigma_g = exp.\left\{\sqrt{\ln\left(1 + \left[\frac{I}{100}\right]^2\right)}\right\}$$

$$\mu_g = exp.\left\{\ln(\mu) - \frac{1}{2}.\ln\left(1 + \left[\frac{I}{100}\right]^{-2}\right)\right\}$$

Where:

- I_{low}: Lower limit of the 95% confidence interval, in %;
- I_{high}: Upper limit of the 95% confidence interval, in %;
- μ_g: Geometric mean;
- μ: Arithmetric mean;
- σ_g: Geometric standard deviation;
- I: Symmetric total uncertainty of the 95% confidence interval, in %;

The uncertainties associated with the calculation elements and emission factors were taken from the references from which the emission factors were obtained.

The uncertainties associated with input data were estimated according to the recommendation of the document "GHG Protocol guidance on uncertainty assessment in

GHG inventories and calculating statistical parameter uncertainty". Given the limitations in establishing uncertainty values for input data from the Banco Bradesco Inventory, the method used quantifies uncertainties based on a qualitative analysis of the data, as presented in Table C.1:

Table C.1 Qualitative analysis of input data uncertainties.

Data accuracy	Average Uncertainty Range	Higher uncertainty adopted	Lower uncertainty adopted
High	+/- 5%	1%	5%
Good	+/- 15%	5%	15%
Fair	+/- 30%	15%	30%
Poor	> 30%	30%	50%

The input data from Banco Bradesco was qualified according to the characteristics of the data collected (Table C.2):

Table C.2 Evaluation of input data from the Banco Bradesco 2023 Inventory.

Category	Parameter	Source of information	Data accuracy
Stationary combustion	Diesel consumption	Purchase invoice	High
Mobile combustion	Ethanol consumption from medium-sized vehicle	Purchase invoice	High
	Ethanol consumption from small-sized vehicle	Purchase invoice	High
	Diesel consumption from large vehicle	Purchase invoice	High
	Gasoline consumption from large vehicle	Purchase invoice	High
	Gasoline consumption from medium vehicle	Purchase invoice	High
	Gasoline consumption from small vehicle	Purchase invoice	High
	Aviation kerosene consumption	Purchase invoice	High
	Aviation kerosene consumption (helicopters)	Purchase invoice	High
	Aviation kerosene consumption (jets)	Purchase invoice	High
Electricity	Electric energy consumption	Network measurement (account)	High
	Biomass consumption	Estimated calculation	Poor

Category	Parameter	Source of information	Data accuracy
Fugitive emissions	Gas consumption 39TC (HFC-134a)	Purchase invoice	High
	Gas consumption 39TC (HFC227ea)	Purchase invoice	High
	HCFC-22 gas consumption	Purchase invoice	High
	HFC-134A gas consumption	Purchase invoice	High
	R-407C gas consumption	Purchase invoice	High
	R-410A gas consumption	Purchase invoice	High
	gas mass R141B	Purchase invoice	High
	Use of coolant gases - CO2 (Argentina, Cayman Europe and New York)	Estimated use	Poor
Business travel (air)	Short distance air travel	Compilation of distances of sections flown	Fair
	Long distance air travel	Compilation of distances of sections flown	Fair
	Medium distance air travel	Compilation of distances of sections flown	Fair
Business Travel	Distance traveled - gasoline reimbursement	Measured distances	Fair
	Distance traveled - ethanol reimbursement	Measured distances	Fair
	Gasoline expenses - taxi	Purchase notes Average cost per liter of fuel	Fair
	Gasoline expenses (taxi cooperative company)	Purchase notes Average cost per liter of fuel	Fair
Upstream Transport and Distribution	Distance covered in light winch (diesel)	Estimated distances	Poor
	Distance covered in heavy tow truck (diesel)	Estimated distances	Poor
	Distance traveled on motorcycle (mechanical assistance)	Estimated distances	Poor
	Ethanol consumption from small-sized vehicle	Purchase notes Average monthly cost per liter of fuel	Fair
	Diesel expenses	Purchase notes Average monthly cost per liter of fuel	Fair
	Diesel expenses (armored car)	Purchase notes Average monthly cost per liter of fuel	Fair
	Diesel expenses (FEBRABAN)	Purchase notes Average monthly cost per liter of fuel	Fair

Category	Parameter	Source of information	Data accuracy
	Gasoline expenses for light cars (FEBRABAN)	Purchase notes Average monthly cost per liter of fuel	Fair
	Gasoline expenses on a motorcycle	Purchase notes Average monthly cost per liter of fuel	Fair
	Gasoline consumption from small-sized vehicle	Purchase notes Average monthly cost per liter of fuel	Fair
	Expenses of aviation kerosene (FEBRABAN)	Purchase notes Average monthly cost per liter of fuel	Fair
Employee commute	Distance covered by metro train	Estimated distances	Poor
	Distance covered by chartered minibus	Estimated distances	Poor
	Distance covered by chartered bus	Estimated distances	Poor
	Distance covered by chartered van	Estimated distances	Poor
	Distance traveled in employee vehicle	Estimated distances	Poor
	Passenger transport time	Estimated distances	Poor
Solid Waste	Mass of waste sent for composting	Heavy waste Composition	Fair
	Mass of solid waste generated	Heavy waste = Good	Fair
	Mass of solid waste generated (branches)	Heavy waste = Good	Fair
	Mass of solid waste generated (buildings)	Heavy waste = Good	Fair