



INVENTORY OF GREENHOUSE GASES 2020

Corporate inventory of Cielo's GHG emissions in 2020

CIELO
VERSION 2.0
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PROJECT

CIELO19A

DELIVERABLE

CIELO's GHG INVENTORY IN 2020

AUTHORS

TEAM

Renata Pimenta; renata.pimenta@waycarbon.com

EMPLOYEES

CIELO

Felipe Sudré; fsudre@cielo.com.br

Gilson Alves de Azevedo Ferreira; gilson.ferreira@cielo.com.br

Gabriel Mariana Picca

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1. INTRODUCTION

The problems arising from global warming and climate change place the theme of low carbon economy as a central issue for sustainable development and means are increasingly being sought to make economic development compatible with the protection of the climate system. In this context, it is very important to quantify and manage greenhouse gas (GHG) emissions at the corporate level.

The Inventory of Greenhouse Gas Emissions is the management tool that makes it possible to quantify the GHG emissions of a given corporation. From the definition of its scope, the identification of GHG sources and sinks, and the accounting of their respective emissions or removals, the Inventory makes it possible to know the profile of emissions resulting from the corporation's activities.

The information generated from the preparation of an Inventory of Greenhouse Gas Emissions can fulfill the following goals:

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

When applied to a corporation's value chain, the inventory also allows for the assessment of the climate sustainability of external processes; e.g. production of raw materials, use and disposal of products and distribution logistics.

Among the protocols and standards available for the compilation of corporate GHG inventories, the following references were used in this study:

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

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

The protocols listed above have international credibility. The main purpose in adopting them is to obtain a report that can be compared nationally and globally.

It is worth noting that this inventory is subject to verification under the protocols listed above. The purpose of third-party verification of this inventory is to obtain an independent statement on the quality of the inventory and the consistency of the information contained therein, in order to ensure its users an accurate assessment of the corporation's value chain emissions standard.

1.1.CIELO

Cielo S.A. is a technology and services company for retail, with a leading role in the electronic payments segment in Latin America and one of the ten largest Brazilia corporations in terms of market value. The Company has a structure that keeps its clients' businesses moving. The activities include accreditation, transmission, processing and financial settlement of transactions and capture of the main national and international credit and debit card brands. In addition, it offers products and services for all business profiles.

Cielo's business structure is divided into nine Operating Units:

- Cielo S.A.,
- Servinet Serviços Ltda;
- Cateno Gestão de Contas de Pagamentos S.A.;
- Aliança Pagamentos e Participações Ltda;
- Braspag Tecnologia em Pagamentos Ltda;
- Merchant e – Solutions
- Multidisplay Com. e Serviços Tecnológicos S.A.;
- M4 Produtos e Serviços S.A.;
- Stelo S.A.

At Climas, the Cielo S.A. unit; Servinet Services Ltd; Aliança Pagamentos e Participações Ltda and Stelo S.A. are grouped under the same operating unit: CIELO S.A., Servinet, Aliança, Stelo, Multidisplay Com. e Serviços Tecnológicos S.A. and M4 Produtos e Serviços S.A. are grouped in M4U.

In 2020, Cielo carries out its GHG emissions inventory for the 8th consecutive year. Emissions¹ of Cielo's scope 1 were 1,748.18 tCO₂e, of scope 2, 605.95 tCO₂e, and of scope 3, 43,630.99 tCO₂e. In 2020, the corporation's main emissions remained in the transport and distribution category (*upstream*), as well as in 2019, with more than 90% representativeness of total emissions. Table 1 shows Cielo's GHG emissions regulated by the Kyoto Protocol in 2020 divided by scope, category and their representativeness.

Table 1. Cielo's Kyoto GHG emissions in 2020 by scope and category (tCO₂e).

Scope/Category	Emissions (tCO ₂ e)	Emissions (%)
Scope 1	1,748.18	3.80%
Stationary combustion	4.75	0.01%
Mobile combustion	1,743.27	3.79%
Fugitive	0.16	0.00%
Scope 2	605.95	1.32%
Procurement of Power	588.92	1.28%
Procurement of thermal energy	17.03	0.04%
Scope 3	43,630.99	94.88%
Employee commuting (home to work)	1,143.35	2.49%
Waste generated in operations	110.44	0.24%
Transportation and distribution (downstream)	4.36	0.01%
Transportation and distribution (upstream)	41,840.24	90.99%
Use of goods and services sold	251.55	0.55%
Business travel	281.04	0.61%
Total	45,985.12	100.00%

2. METHODOLOGY

2.1 ACCOUNTING PRINCIPLES AND INVENTORY PREPARATION

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

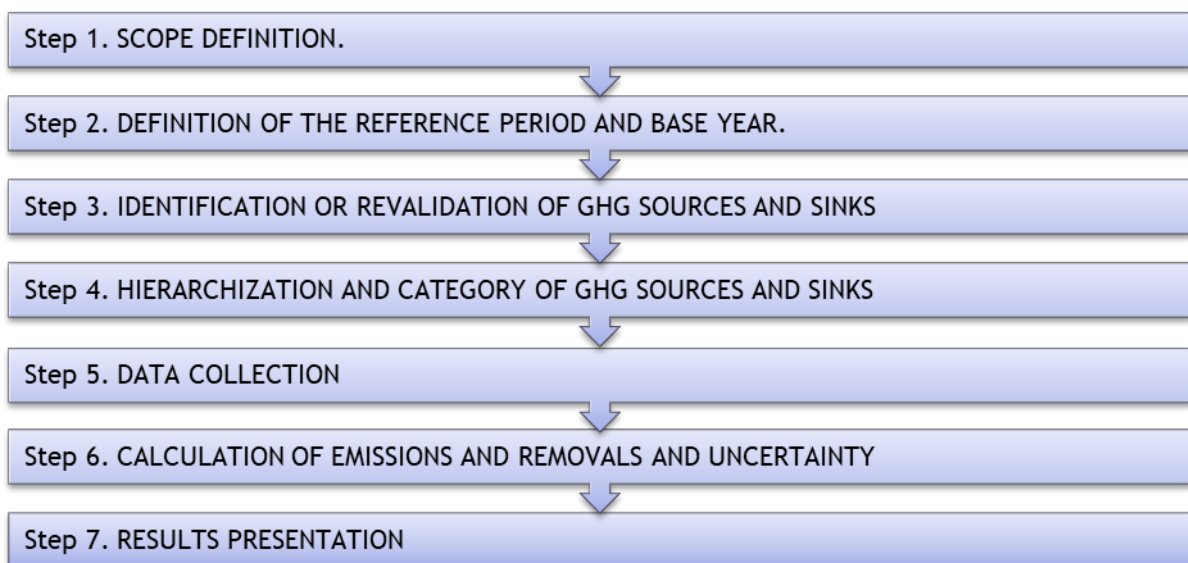
¹GHG emissions regulated by the Kyoto Protocol (carbon dioxide - CO₂, methane - CH₄, nitrous oxide - N₂O, sulfur hexafluoride - SF₆, perfluorocarbons - PFCs and hydrofluorocarbons - HFCs).

- **Relevance:** Ensure that the GHG Inventory properly reflects the emissions of the process in focus and that it meets the decision-making needs of its users.
- **Completeness** : Record all GHG emitting sources and activities within selected inventory boundaries. Document and justify any specific exclusions.
- **Consistency** : Use recognized and technically substantiated methodologies that allow comparisons of emissions with those of other similar processes. Clearly document any data changes, inventory limits, methods used or any other relevant factors within the given period of time.
- **Transparence:** Address all relevant matters in a coherent and factual manner, based on objective evidence. Disclose any relevant assumptions, as well as appropriately reference the calculation and recording methodologies and data sources used.
- **Accuracy:** Through the application of appropriate data, emission factors or estimates, ensure that the quantification of GHG emissions is not underestimated or overestimated. Reduce bias and uncertainties to a minimum and obtain a level of determination that allows for 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 below (Figure 1):

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



First, the scope of the inventory is defined (Step 1), that is, it is necessary to determine which facilities and activities of the corporation will be covered by the inventory, thus establishing its corporational limit. Next, the reference period and base year of the inventory are defined (Step 2).

The sources and sinks of the corporation's GHGs (Step 3) are identified and then categorized and hierarchized (Step 4). Then, the data collection process is carried out (Step 5). To carry out the calculation of emissions (Step 6), the collected emission activity data are used, as well as the emission factors (see below). In this step, inventory uncertainties are also calculated. Finally, the results are compiled into an annual report (Step 7).

The Steps identified above were applied to Cielo's GHG inventory as described in the following report.

2.3 SCOPE DEFINITION

2.3.1 Corporation boundaries

Two approaches are possible for consolidating emissions and removals at the corporational level. Below, each of these approaches is defined and the option used in this inventory is indicated.

Shareholding: the corporation assumes GHG emissions from operations in accordance with its shareholding.

Operational Control: the corporation is liable for 100% of GHG emissions from operations over which it has operational control.

The Corporation Boundary of this inventory covers all operations under Cielo's operational control with operations in Brazilian and American territory, which comprise the nine Cielo S.A. operational units; Servinet Serviços Ltda; Cateno Gestão de Contas de Pagamentos S.A.; Aliança Pagamentos e Participações Ltda; Braspag Tecnologia em Pagamentos Ltda; Merchant e – Solutions; Multidisplay Com. e Serviços Tecnológicos S.A.; M4 Produtos and Serviços S.A.; Stelo S.A.

2.3.2 Operational boundaries

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

- Scope 1: Scope 1: Direct GHG emissions from sources that are owned or controlled by the corporation.
- Scope 2: Scope 2: Indirect GHG emissions from the power acquisition that is consumed by the corporation.
- Scope 3 Scope 3: Optional reporting category, considers all other indirect emissions not included in Scope 2. They are a consequence of the activities of the corporation, but occur in sources that do not belong or are not controlled by it.

2.3.3 Covered Period

This inventory covers emissions from activities carried out by Cielo in 2020 (January 1, 2020 to December 31, 2020).

2.3.4 Base year

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

Recalculation retroactive to the base year must be carried out whenever there are changes that lead to both an increase and a decrease in emissions, that is, whenever the change affects the consistency and relevance of the analyzes over time. The following cases may result in the need to recalculate emissions:

- Significant structural changes that change inventory boundaries: (i) mergers, acquisitions and divestitures; (ii) outsourcing and incorporation of emission activities; and (iii) change of broadcasting activity into or out of the geographic boundaries of the Program (*GHG Protocol Brazil*);
- Significant changes to calculation methodology, improvement in the accuracy of emission factors or activity data that result in a significant impact on emissions data or the base year;
- Discovery of significant errors or a certain number of accumulated errors that result in significant changes in results.

Despite the acquisition of Stelo S.A. in 2019, there is no need to recalculate emissions since there is no access to the emissions data of the unit acquired in 2017 and it does not have a significant representation (less than 1%).

2.3.5 Greenhouse Gas

According to the Brazilian Program of *GHG Protocol*, the Inventories must include the 7 types of GHG that are part of the Kyoto Protocol reporting: carbon dioxide (CO₂), methane (CH₄), nitrogen oxide (N₂O), hydrofluorocarbon (HFCs), perfluorocarbon (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃). Additionally, 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. PAG is a relative value that compares the heating potential of a given amount of gas with the same amount of CO₂ which, by standardization, has a PAG equal to 1. PAG is always expressed in terms of equivalence of CO₂ - CO₂e. Table 2 below shows the PAG values used in Cielo's Inventory:

Table 2. PAG of Greenhouse Gas

Gas	Amount
HFC-125	3,500.00
N ₂ O	298.00
HFC-32	675.00
Renewable CO ₂	1.00
CH ₄	25.00

Source: PBGHG Protocol, 2020.

Cielo's Inventory considered CO₂, CH₄, N₂O and HFCs (HFC-32 e HFC-125) emissions according to mapped emission sources and data availability. In addition, the inventory also computed CO₂ emissions from renewable sources.

CO₂, CH₄, N₂O and HFCs gases are generated at Cielo as follows:

- CO₂: generated by burning fossil fuels (such as diesel, natural gas and liquefied petroleum gas) by mobile and stationary sources; acquisition of power and thermal energy and gas exhaust in fire extinguishers
- CH₄: generated in the burning of fuels by mobile and stationary sources and in the decomposition of organic matter in anaerobic solid waste treatment processes;
- N₂O: generated from burning fuels by mobile and stationary sources;
- HFCs: generated in refrigerant gas leaks.

2.4 IDENTIFICATION OR REVALIDATION OF SOURCES AND SINKS

The emission sources were identified and prioritized within the corporation structure of the company. Within the Climate System developed by WayCarbon, a mapping of emission sources of the company were made and each was classified according to the attributes described below:

Table 3. Description of the attributes registered for the database instances of input information.

Attribute	Description
Operational Unit	Indicates the operating unit to the source or sink belongs
Proceeding	Indicates the process to which the source or sink belongs
Activity	Indicates the activity to which the source or sink plays
Monitored item	Field where the details for emission source identification are registered
Precursor	Substance that give rise to GHG emissions
Technology	Technology that associated with the precursor leads to GHG emissions
Operating parameter	Description of data input
Measurement unit	Unit of measurement of consolidated incoming data
Person in charge	Person of the corporation liable for collecting the data.
Data source *	Location, registration, or reference where the data is obtained
Scope	Scope of the emission source, according to the classification of the GHG Protocol.
Category	Category of the emission source, according to the classification of the GHG Protocol

The emission sources included in the inventory, according to the hierarchy and structured corporation in CLIMAS are presented in Table 4:

Table 4. Emission sources included in the inventory according to scope, category and activity (tier 5) structured in the CLIMAS system

Scope	Category	Activity
Scope 1	Stationary combustion	Generation of Power
	Mobile combustion	Administrative fleet
	Fugitive	Fire-fighting system recharge Cooling system recharge
Scope 2	Procurement of Power	Electricity consumption Generation of Power
	Procurement of thermal energy	Generation of Power
Scope 3	Employee commuting (home to work)	Transport of employees from home to work

Waste generated in operations	Disposal of waste
Transportation and distribution (<i>downstream</i>)	Material sale
	Field Service (Carrier)
	Supplies Coil - Field Service
	Disposal in KM (Terminal, Supply and MKT)
Transportation and distribution (<i>upstream</i>)	Manufacturer (Purchase New Terminals)
	Direct and Reverse Logistics
	Milk Run
	Material Transportation
Use of goods and services sold	Use of machines
	ISO
Business travel	Employee business trips
	Customer Travel

As noted in Table 4, the processes defined in CLIMAS for the Cielo inventory can be correlated with the categorization defined by the *GHG Protocol Brazilian Program*². According to the Brazilian GHG Protocol Program, the categories are defined as follows:

- Stationary combustion (Scope 1): GHG emissions from burning fuel, which generates power generally used to produce water vapor or electricity. This power is not used for transportation. Examples: ovens, burners, heaters and generators.
- Mobile combustion (Scope 1): GHG emissions from burning fuel, which generates power used to produce movement and travel along a path. Examples: cars, motorcycles, trucks, buses, tractors, forklifts, planes and trains.
- Fugitive (Scope 1): Generally unintended GHG leaks that occur during the production, processing, transmission, storage or use of the gas. Examples: fire extinguishers (CO₂) and leakage of refrigeration and air conditioning equipment (HFC or PFC).
- Procurement of power (Scope 2): GHG emissions from the generation of power purchased by the inventory company.
- Procurement of thermal energy (Scope 2): emissions related to the consumption of thermal energy generated by third parties.

² The definitions of the categories were taken from the documents issued by FGV EAESP: Technical Note: Classification of Scope 1 greenhouse gas (GHG) emissions in the respective emission source categories - version 1.0 (Available at http://mediadrawer.gvces.com.br/ghg/original/ghg-protocol_nota-tecnica_categorias-escope-1_v1.pdf) and Scope 3 Emission Categories Adopted by the Brazilian Ghg Protocol Program (Available at http://mediadrawer.gvces.com.br/ghg/original/ghg_categories_e3_definicoes_curta.pdf) and

- Category 4: *Upstream* Transport and Distribution (Scope 3): emissions from product distribution and transportation purchased by the inventory corporation in vehicles and facilities that are not owned or operated by the corporation, as well as other outsourced transportation and distribution services (including both inbound and outbound logistics).
- Category 5 Waste generated in operations (Scope 3): includes emissions from the treatment and/or final disposal of solid waste and liquid effluents arising from the operations of the inventory corporation controlled by third parties. This category accounts for all future emissions (during the treatment and/or final disposal process) that result from the waste generated in the year inventoried.
- Category 6 Business travel (Scope 3): emissions from transporting employees for activities related to the business of the inventory corporation, carried out in vehicles operated by or owned by third parties, such as aircraft, trains, buses, passenger cars and boats. This category includes all employees of entities and units operated, leased or owned by the inventory corporation. This category may include employees of other relevant entities (e.g. third party service providers), as well as consultants and other individuals who are not employees of the inventory corporation but who travel to its units.
- Category 7: Employee commuting (home to work): Employee displacement (scope 3): Emissions in this category include transporting employees from their homes to their workplace. Transport by cars, buses, trains and other modes of urban transport are included in this category.
- Category 9: *Downstream* Transport and distribution (scope 3): Emissions from the transport and distribution of products sold by the inventory corporation (if not paid for by it) between its operations and the final consumer, including retail and warehousing, in vehicles and third-party facilities.
- Category 11: Use of goods and services sold (scope 3): Emissions arising from the end use of goods and services sold by the inventory corporation in the inventory year. All emissions during their useful life are accounted for in the year inventoried.

2.5 DATA COLLECTION

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

1. Employees who monitor operations verified the best manner to obtain data from the company's management systems;
2. Employees from different areas of the company validated the information and entered it into the Climas system;

- WayCarbon's technical team validated the coherence of operational data in the Climas system.

The governance of operational data was organized within the CLIMAS platform and employees involved in the collection of operation information received a *Login* to directly access and enter the information into the climate management support tool. With this, the company can structure a monthly flow of information and monitor the impact on Climate Change month by month as a form of environmental management.

2.6 CALCULATION OF EMISSIONS AND REMOVALS

Cielo's GHG emissions inventory was prepared via CLIMAS, a calculation software developed by WayCarbon, which has a database with the most current emission factors available for each type of source (for example, the Brazilian Program *GHG Protocol* for Brazil and, when not available, internationally accepted references as *GHG Protocol*, IPCC, EPA and DEFRA).

Generally, GHG emissions and removals are calculated for each source and sink individually according to the following formula:

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

Where:

- i Index denoting an individual source or sink activity;
- g Index that denotes a type of GHG;
- y Report reference year.
- $E_{i,gy}$ GHG g emissions or removals attributable to 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 noted earlier, the consolidated activity data will consist of all recorded attributes from each source/sink.
- $FE_{i,gy}$ GHG emission or removal factor g applicable to source or sink i in the year y , in t GHG g/u ;

- **PAG_g** GHG global warming potential g, in tCO_{2e}/tGEE g;

The choice of the appropriate calculation method was due to the availability of data and specific emission factors, the combustion technologies used in the process, among others.

WayCarbon's technical team is liable for periodically updating the CLIMAS with emission factors in accordance with internationally recognized methodologies for making GHG inventories. Emission factors are mainly based on the following references (Table 5):

Table 5. References to 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/2006gl/
PBGHGP 2021	Brazilian GHG Protocol Program, Calculation Tool, version 2021.1.	http://www.ghgprotocolbrasil.com.br/ferramenta-de-calculo
BEN 2015	National Energetic Balance 2015: Base year 2014 / Energy Research Company. - Rio de Janeiro: EPE, 2015.	http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-127/topico-97/Relat%C3%B3rio%20Final%202015.pdf
MCTIC 2020	MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION AND COMMUNICATION (MCTIC).	http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/arquivos/emissoes_co2/Inventarios_Corporativos.html

The emission factors that were used in the inventory and the calculation memorial³ are available in the CLIMAS system and can be extracted in Excel® spreadsheets.

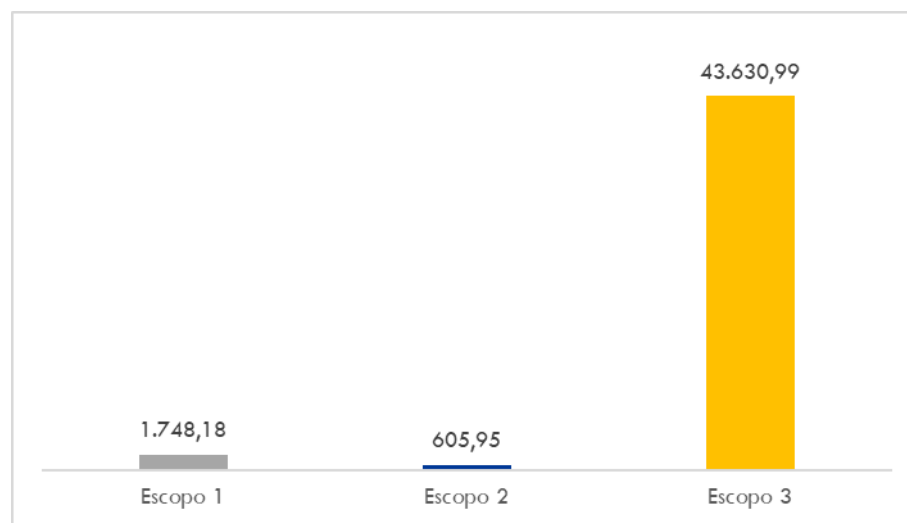
³ Access to the Inventory calculation memorial and emission factors can be accessed via CLIMAS, following the steps below: a) access Climas; b) click on *GHG emissions* in the left corner of the screen; c) click on *Audit - Emission Factors Statement*; d) choose the inventory for the year 2020 and click on *Get Statement*; e) in the last table *Emission factors*, look for the emission source you want to consult in the search field and click on the buttons on the right side with the symbol of an eye; f) click the *Calculation memorial field button*.

3. RESULTS

3.1 DIAGNOSTICS OF THE GHG INVENTORY 2020

Emissions⁴ of scope 1, 2 and 3 of Cielo for the year 2020 were, respectively 1.748,18 tCO_{2e}, 605,95 tCO_{2e} and 43.630,99 tCO_{2e}. In addition, 3,157.31 tons of CO₂ of renewable origin were emitted⁵ (933.41 tCO₂ renewable for scope 1; 0.58 renewable tCO₂ for scope 2 and 2,223.32 tCO₂ renewable for scope 3). Figure 2 illustrates the emissions regulated by Cielo's Kyoto Protocol in 2020 of scope 1, 2 and 3.

Figure 2. GHG emissions regulated by the Kyoto Protocol in 2020 by scope (tCO_{2e})



In an analysis by category, it is noted that Cielo's main emissions come from the transport and distribution category *upstream* (Scope 3) with approximately 91% of representation, followed by the mobile combustion category (Scope 1) with 3.79%. Emissions from employee commuting (scope 3) is the third most relevant source of emissions with 2.49%. Table 6 shows Cielo's GHG emissions regulated by the Kyoto Protocol in 2020 by scope, category and activity.

Table 6. Cielo's Kyoto GHG emissions in 2020 by scope, category and activity (tier 5) (tCO_{2e})

Scope/Category/Activity	Emissions (tCO _{2e})	Emissions (%)
Scope 1	1,748.18	3.80%
Stationary combustion	4.75	0.01%
Generation of Power	4.75	0.01%
B0 Diesel	4.75	0.01%

⁴GHG emissions regulated by the Kyoto Protocol (carbon dioxide - CO₂, methane - CH₄, nitrous oxide - N₂O, sulfur hexafluoride - SF₆, perfluorocarbons - PFCs and hydrofluorocarbons - HFCs) and regulated by the Montreal Protocol (chlorofluorocarbons - CFCs and hydrochlorofluorocarbons - HCFCs).

⁵CO₂ emissions from the energy use of renewable biomass. This study employed the definition of renewable biomass formulated by the CDM Executive Board (CDM EB) of the United Nations Framework Convention on Climate Change (EB 23, Annex 18). Emissions of this nature do not contribute to the long-term increase of CO₂ concentration in the atmosphere.

Scope/Category/Activity	Emissions (tCO ₂ e)	Emissions (%)
Mobile combustion	1,743.27	3.79%
Administrative fleet	1,743.27	3.79%
Hydrous ethanol	4.81	0.01%
Gasoline	4.10	0.01%
Gasoline / Brazil	1,734.35	3.77%
Fugitive	0.16	0.00%
Fire-fighting system recharge	0.16	0.00%
CO ₂	0.16	0.00%
Scope 2	605.95	1.32%
Procurement of Power	588.92	1.28%
Electricity consumption	588.92	1.28%
Diesel / Brazil	4.74	0.01%
Power / Brazil	265.70	0.58%
Power / USA / SERC South	209.70	0.46%
Power / EUA / WECC Northwest	108.79	0.24%
Procurement of thermal energy	17.03	0.04%
Generation of Power	17.03	0.04%
Natural gas	17.03	0.04%
Scope 3	43,630.99	94.88%
Employee commuting (home to work)	1,143.35	2.49%
Transport of employees from home to work	1,143.35	2.49%
Diesel / Brazil	142.08	0.31%
Hydrous ethanol	3.50	0.01%
Natural gas (CNG)	9.46	0.02%
Gasoline	456.06	0.99%
Gasoline / Brazil	527.79	1.15%
São Paulo Subway	4.46	0.01%
Not applicable	0.00	0.00%
Waste generated in operations	110.44	0.24%
Disposal of waste	110.44	0.24%
Urban solid waste / Paper and cardboard	87.18	0.19%
Urban solid waste / Non-separated waste / South	23.26	0.05%
America		
Transportation and distribution (downstream)	4.36	0.01%
Material sale	4.36	0.01%
Diesel / Brazil	4.36	0.01%
Transportation and distribution (upstream)	41,840.24	90.99%
Field Service (Currier)	5,892.93	12.81%
Gasoline / Brazil	5,892.93	12.81%
Supplies Coil - Field Service	1,026.48	2.23%
Gasoline / Brazil	1,026.48	2.23%
Disposal in KM (Terminal, Supply and MKT)	2.65	0.01%
Diesel / Brazil	2.65	0.01%
Manufacturer (Purchase New Terminals)	924.37	2.01%
Diesel / Brazil	42.72	0.09%
Aviation kerosene	881.66	1.92%
Direct and Reverse Logistics	33,953.90	73.84%
Diesel / Brazil	184.40	0.40%

Scope/Category/Activity	Emissions (tCO ₂ e)	Emissions (%)
B0 Diesel	0.48	0.00%
Aviation kerosene	33,738.69	73.37%
Fuel oil	30.33	0.07%
Milk Run	37.87	0.08%
Diesel / Brazil	37.87	0.08%
Material Transportation	2.04	0.00%
Gasoline / Brazil	2.04	0.00%
Use of goods and services sold	251.55	0.55%
Use of machines	251.55	0.55%
Power / Brazil	251.55	0.55%
Not applicable	0.00	0.00%
Business travel	281.04	0.61%
Employee business trips	281.04	0.61%
Gasoline / Brazil	2.29	0.00%
Aviation kerosene	278.74	0.61%
Total	45,985.12	100.00%

In an operational unit analysis, Cielo S.A., Servinet, Aliança and Stelo are the main liable for the corporation's emissions, with 96.36% of emissions representativeness, followed by Merchant e-Solutions with 1.88%. Figure 3 shows the GHG emissions regulated by the Kyoto Protocol in 2020 by operating unit.

Figure 3. Cielo's Kyoto GHG emissions by scope and operating unit (tCO₂e)

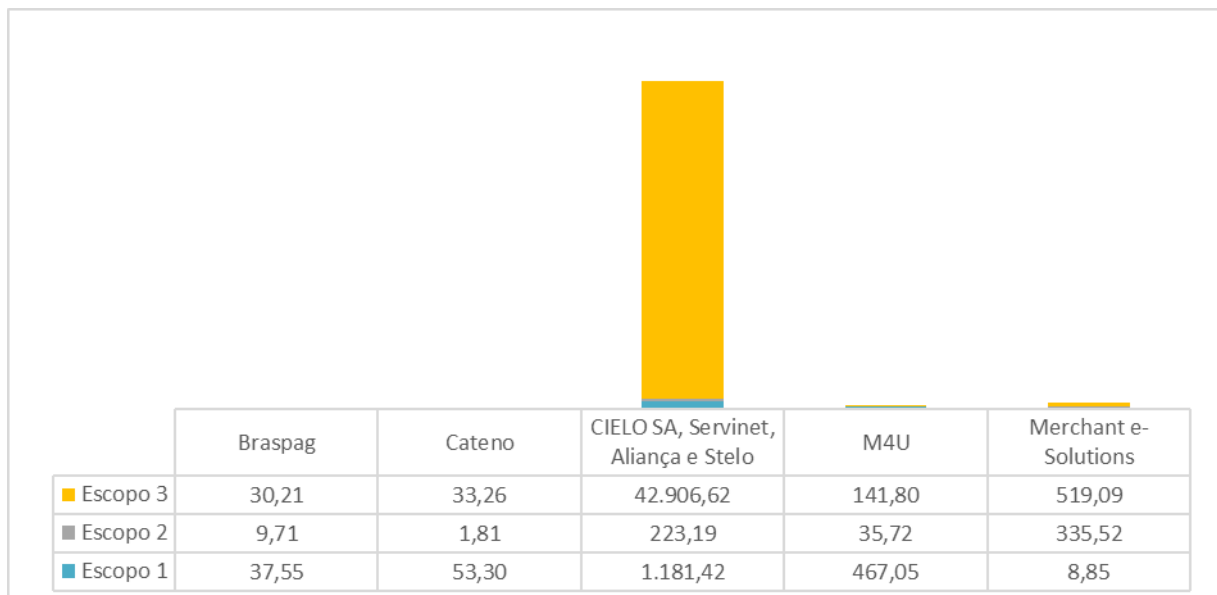


Table 7 shows the CO₂ emissions from renewable sources of Cielo in 2020 by scope and category.

Table 7. CO₂ emissions from renewable sources of Cielo in 2020 by scope and category (renewable tCO₂)

Scope/Category	Emissions (tCO ₂ e)	Emissions (%)
Scope 1	933.41	29.56%

Mobile combustion	933.41	29.56%
Scope 2	0.58	0.02%
Procurement of Power	0.58	0.02%
Scope 3	2,223.32	70.42%
Employee commuting (home to work)	522.12	16.54%
Waste generated in operations	29.51	0.93%
Transportation and distribution (downstream)	0.48	0.02%
Transportation and distribution (upstream)	1,670.66	52.91%
Business travel	0.54	0.02%
Total	3,157.31	100.00%

Regarding the type of activity performed by Cielo, emissions from the burning of aviation kerosene in aircraft for the direct and reverse logistics processes are the highest in the inventory, with 73.37% of the total inventory. Emissions from Field Service (Carrier) also stand out in the transport and distribution category (*upstream*). These two activities represent more than 86% of the inventory's emissions. Table 8 presents the emissions regulated by Cielo's Kyoto Protocol in 2020 by process (tier 4), activity (tier 5) and precursor.

Table 8. Kyoto GHG emissions in 2020 by process, activity and precursor (tCO_{2e})

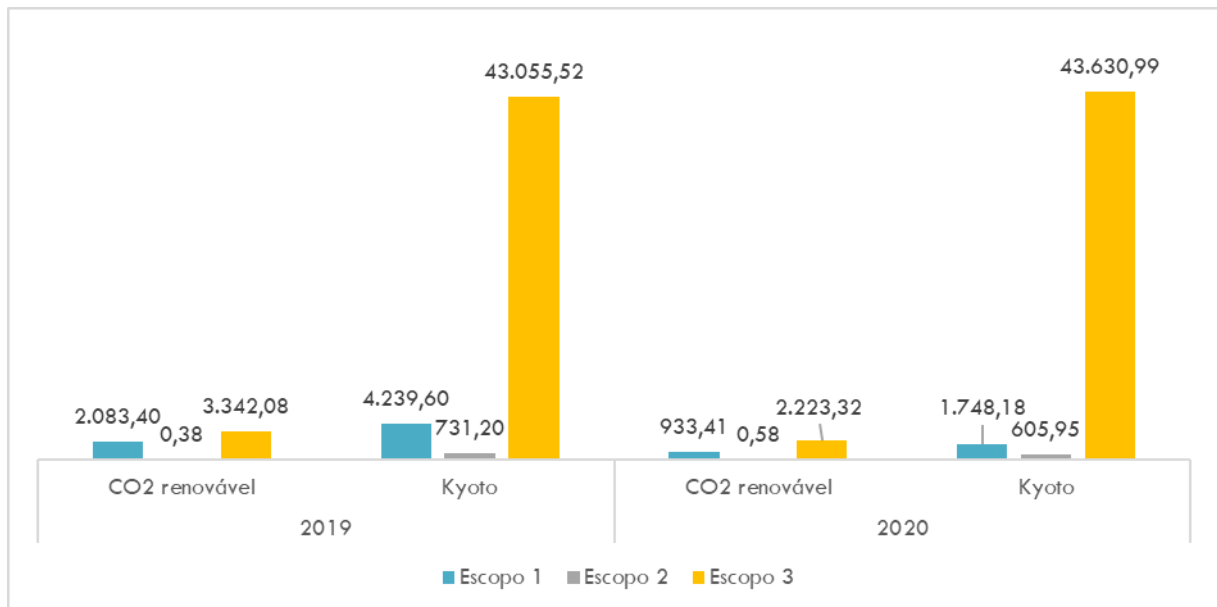
Process/Activity/Precursor	Emissions (tCO _{2e})	Emissions (%)
Administrative	3,891.00	8.46%
Electricity consumption	588.92	1.28%
Diesel / Brazil	4.74	0.01%
Power / Brazil	265.70	0.58%
Power / USA / SERC South	209.70	0.46%
Power / EUA / WECC Northwest	108.79	0.24%
Disposal of waste	110.44	0.24%
Urban solid waste / Paper and cardboard	87.18	0.19%
Urban solid waste / Non-separated waste / South America	23.26	0.05%
Administrative fleet	1,743.27	3.79%
Hydrous ethanol	4.81	0.01%
Gasoline	4.10	0.01%
Gasoline / Brazil	1,734.35	3.77%
Generation of Power	21.78	0.05%
BO Diesel	4.75	0.01%
Natural gas	17.03	0.04%
Fire-fighting system recharge	0.16	0.00%
CO ₂	0.16	0.00%
Transport of employees from home to work	1,143.35	2.49%
Diesel / Brazil	142.08	0.31%
Hydrous ethanol	3.50	0.01%
Natural gas (CNG)	9.46	0.02%
Gasoline	456.06	0.99%
Gasoline / Brazil	527.79	1.15%
São Paulo Subway	4.46	0.01%
Not applicable	0.00	0.00%
Material Transportation	2.04	0.00%
Gasoline / Brazil	2.04	0.00%
Employee business trips	281.04	0.61%
Gasoline / Brazil	2.29	0.00%
Aviation kerosene	278.74	0.61%
Logistics	41,842.57	90.99%
Field Service (Currier)	5,892.93	12.81%
Gasoline / Brazil	5,892.93	12.81%
Supplies Coil - Field Service	1,026.48	2.23%
Gasoline / Brazil	1,026.48	2.23%
Disposal in KM (Terminal, Supply and MKT)	2.65	0.01%
Diesel / Brazil	2.65	0.01%
Manufacturer (Purchase New Terminals)	924.37	2.01%
Diesel / Brazil	42.72	0.09%
Aviation kerosene	881.66	1.92%
Direct and Reverse Logistics	33,953.90	73.84%
Diesel / Brazil	184.40	0.40%
BO Diesel	0.48	0.00%
Aviation kerosene	33,738.69	73.37%
Fuel oil	30.33	0.07%
Milk Run	37.87	0.08%

Process/Activity/Precursor	Emissions (tCO ₂ e)	Emissions (%)
Diesel / Brazil	37.87	0.08%
Material sale	4.36	0.01%
Diesel / Brazil	4.36	0.01%
Products sold	251.55	0.55%
Use of machines	251.55	0.55%
Power / Brazil	251.55	0.55%
Not applicable	0.00	0.00%
Total	45,985.12	100.00%

3.2 COMPARISON OF 2019 AND 2020 INVENTORIES

GHG emissions included in the Kyoto Protocol and renewable CO₂ of scope 1, 2 and 3 of Cielo for the years 2019 and 2020 are shown in Figure 4.

Figure 4. Comparison of Kyoto GHG and renewable CO₂ emissions in 2019 and 2020.



Compared to the emissions of the year 2019, it is observed that the Kyoto Protocol regulated scope 3 emissions were the only ones that increased in 2020, with a small variation of 1.34%, especially due to the increase in emissions in the category of transport and distribution (*upstream*). Scope 1 emissions reduced by 58.77% as a result of the substitution of gasoline for ethanol in the administrative fleet, which is a fuel with lower emissions and due to the reduction in Cielo's activities caused by the Coronavirus pandemic in months of greater incentive to isolation. The reduction in scope 2 emission from 2019 to 2020 is reflected due to the reduction in power consumption at Cielo's branches and offices, as shown in Table 9, in addition to the 17.7% reduction in the average annual emission factor of the national grid.

Table 9. Comparison of electricity consumption at Cielo in 2019 and 2020 by operating unit and category (MWh).

Scope/Category/Unit Operational	2019	2020	Variance (%)
Scope 2	7,816,891.49	6,375,012.57	-18.45%
Procurement of Power	7,816,891.49	6,375,012.57	-18.45%
Braspag	183,433.43	155,077.79	-15.46%
Cateno	107,823.87	28,557.60	-73.51%
CIELO SA, Servinet, Aliança and Stelo	4,315,334.51	3,445,786.53	-20.15%
M4U	576,407.68	322,124.20	-44.12%
Merchant e-Solutions*	2,633,892.00	2,423,466.45	-7.99%
Total	7,816,891.49	6,375,012.57	-18.45%

*The thermal energy obtained by the consumption of natural gas by Merchant e-Solutions was disregarded

Tables 10, 11 and 12 show a comparison of Cielo's emissions regulated by the Kyoto Protocol in 2019 and 2020. Emissions from the transport and distribution category (*upstream*) were those that had the greatest absolute variation between years, in particular due to, respectively, direct and reverse logistics activities, field service (*currier*) and field service (supply coil). It is worth noting that there was no accounting of emissions from the acquisition of electricity by Cielo's service companies in the category "Goods and services bought" in 2020.

Table 10: Comparison of Cielo's Kyoto emissions in 2019 and 2020 by scope and category (tCO_{2e}).

Scope/Category	2019	2020	Variance (%)
Scope 1	4,239.60	1,748.18	-58.77%
Stationary combustion	0.23	4.75	1947.75%
Mobile combustion	4,239.21	1,743.27	-58.88%
Fugitive	0.15	0.16	5.33%
Scope 2	731.20	605.95	-17.13%
Procurement of Power	718.51	588.92	-18.04%
Procurement of thermal energy	12.69	17.03	34.22%
Scope 3	43,055.52	43,630.99	1.34%
Goods and services purchased	253.55		-100.00%
Employee commuting (home to work)	3,338.09	1,143.35	-65.75%
Waste generated in operations	431.52	110.44	-74.41%
Transportation and distribution (downstream)	1.96	4.36	122.90%
Transportation and distribution (upstream)	37,492.22	41,840.24	11.60%

Use of goods and services sold	238.15	251.55	5.63%
Business travel	1,300.02	281.04	-78.38%
Total	48,026.32	45,985.12	-4.25%

Table 11: Comparison of Cielo's Kyoto emissions in 2019 and 2020 by scope, category and activity (tCO_{2e}).

Scope/Category/Activity	2019	2020	Variance (%)
Scope 1	4,239.60	1,748.18	-58.77%
Stationary combustion	0.23	4.75	1947.75%
Generation of Power	0.23	4.75	1947.75%
Mobile combustion	4,239.21	1,743.27	-58.88%
Administrative fleet	4,239.21	1,743.27	-58.88%
Fugitive	0.15	0.16	5.33%
Fire-fighting system recharge	0.15	0.16	5.33%
Scope 2	731.20	605.95	-17.13%
Procurement of Power	718.51	588.92	-18.04%
Electricity consumption	718.46	588.92	-18.03%
Generation of Power	0.05		-100.00%
Procurement of thermal energy	12.69	17.03	34.22%
Generation of Power	12.69	17.03	34.22%
Scope 3	43,055.52	43,630.99	1.34%
Goods and services purchased	253.55		-100.00%
Goods and services purchased	98.73		-100.00%
ISO	154.82		-100.00%
Employee commuting (home to work)	3,338.09	1,143.35	-65.75%
Transport of employees from home to work	3,338.09	1,143.35	-65.75%
Waste generated in operations	431.52	110.44	-74.41%
Disposal of waste	431.52	110.44	-74.41%
Transportation and distribution (downstream)	1.96	4.36	122.90%
Material sale	1.96	4.36	122.90%
Transportation and distribution (upstream)	37,492.22	41,840.24	11.60%
Field Service (Carrier)	3,942.10	5,892.93	49.49%
Supplies Coil - Field Service	745.01	1,026.48	37.78%
Disposal in KM (Terminal, Supply and MKT)	2.87	2.65	-7.77%
Manufacturer (Purchase New Terminals)	6,350.26	924.37	-85.44%
Direct and Reverse Logistics	26,410.31	33,953.90	28.56%
Milk Run	39.68	37.87	-4.57%
Material Transportation	1.99	2.04	2.59%
Use of goods and services sold	238.15	251.55	5.63%
Use of machines	238.15	251.55	5.63%
Business travel	1,300.02	281.04	-78.38%
Employee business trips	1,299.83	281.04	-78.38%
Customer Travel	0.19		-100.00%
Total	48,026.32	45,985.12	-4.25%

In an analysis by operating unit, there is a reduction in emissions in the three scopes of the Braspag, Cateno and M4U units in 2020. In contrast, Merchant e-Solutions' Scope 1 emissions increased sharply in 2020 in percentage but little in absolute terms. At CIELO S.A., Servinet, Aliança and Stelo, scope 1 and 2 emissions decreased while scope 3 emissions increased due to activities within the transport and distribution category (upstream).

Table 12: Comparison of Cielo's Kyoto emissions in 2019 and 2020 by operational unit and scope (tCO₂).

Operational Unit/Scope	2019	2020	Variance (%)
Braspag	223.04	77.48	-65.26%
Scope 1	84.23	37.55	-55.42%
Scope 2	13.58	9.71	-28.46%
Scope 3	125.23	30.21	-75.87%
Cateno	230.02	88.38	-61.58%
Scope 1	53.30	53.30	0.00%
Scope 2	8.87	1.81	-79.57%
Scope 3	167.84	33.26	-80.18%
M4U	1,221.17	644.57	-47.22%
Scope 1	600.11	467.05	-22.17%
Scope 2	52.63	35.72	-32.12%
Scope 3	568.43	141.80	-75.05%
Merchant e-Solutions	1,358.22	863.46	-36.43%
Scope 1	0.23	8.85	3716.27%
Scope 2	335.53	335.52	0.00%
Scope 3	1,022.45	519.09	-49.23%
CIELO SA, Servinet, Aliança and Stelo	44,993.87	44,311.23	-1.52%
Scope 1	3,501.72	1,181.42	-66.26%
Scope 2	320.59	223.19	-30.38%
Scope 3	41,171.56	42,906.62	4.21%
Total	48,026.32	45,985.12	-4.25%

3.3 GREENHOUSE GAS EMISSIONS IN 2020 IN BRAZIL

Tables 13, 14 and 15 present data on gas emissions included by the Kyoto Protocol in 2020 in Brazil and their representation in the inventory. Emissions in the format for reporting to the GHG Protocol Brazil are indicated in Annex I of this report.

Table 13. Cielo's Kyoto GHG emissions in 2020 by scope and category emitted within the Brazilian territory (tCO_{2e})

Scope/Category	Emissions (tCO _{2e})	Emissions (%)
Scope 1	1,739.32	3.85%
Mobile combustion	1,739.16	3.85%
Fugitive	0.16	0.00%
Scope 2	270.44	0.60%

Procurement of Power	270.44	0.60%
Scope 3	43,111.90	95.55%
Employee commuting (home to work)	687.29	1.52%
Waste generated in operations	110.44	0.24%
Transportation and distribution (downstream)	4.36	0.01%
Transportation and distribution (upstream)	41,824.47	92.69%
Use of goods and services sold	251.55	0.56%
Business travel	233.78	0.52%
Total	45,121.66	100.00%

Table 14. CO₂ emissions renewable in 2020 from Cielo by scope and precursor issued within the Brazilian territory (tCO_{2e})

Scope/Precursor	Emissions (tCO _{2e})	Emissions (%)
Scope 1	933.41	29.56%
Hydrous ethanol	522.18	16.54%
Gasoline / Brazil	411.23	13.02%
Scope 2	0.58	0.02%
Diesel / Brazil	0.58	0.02%
Scope 3	2,223.32	70.42%
Diesel / Brazil	46.39	1.47%
Hydrous ethanol	380.59	12.05%
Gasoline / Brazil	1,766.83	55.96%
Urban solid waste / Non-separated waste / South America	29.51	0.93%
Grand Total	3,157.31	100.00%

Table 15. Cielo's Kyoto GHG emissions in 2020 by scope, activity and precursor emitted within the Brazilian territory (tCO_{2e})

Scope/Activity/Precursor	Emissions (tCO _{2e})	Emissions (%)
Scope 1	1,739.32	3.85%
Administrative fleet	1,739.16	3.85%
Hydrous ethanol	4.81	0.01%
Gasoline / Brazil	1,734.35	3.84%
Fire-fighting system recharge	0.16	0.00%
CO ₂	0.16	0.00%
Scope 2	270.44	0.60%
Electricity consumption	270.44	0.60%
Diesel / Brazil	4.74	0.01%
Power / Brazil	265.70	0.59%
Scope 3	43,111.90	95.55%
Field Service (Courier)	5,892.93	13.06%
Gasoline / Brazil	5,892.93	13.06%

Scope/Activity/Precursor	Emissions (tCO ₂ e)	Emissions (%)
Supplies Coil - Field Service	1,026.48	2.27%
Gasoline / Brazil	1,026.48	2.27%
Disposal in KM (Terminal, Supply and MKT)	2.65	0.01%
Diesel / Brazil	2.65	0.01%
Disposal of waste	110.44	0.24%
Urban solid waste / Paper and cardboard	87.18	0.19%
Urban solid waste / Non-separated waste / South America	23.26	0.05%
Manufacturer (Purchase New Terminals)	924.37	2.05%
Diesel / Brazil	42.72	0.09%
Aviation kerosene	881.66	1.95%
Direct and Reverse Logistics	33,938.13	75.21%
Diesel / Brazil	184.40	0.41%
Aviation kerosene	33,723.40	74.74%
Fuel oil	30.33	0.07%
Milk Run	37.87	0.08%
Diesel / Brazil	37.87	0.08%
Transport of employees from home to work	687.29	1.52%
Diesel / Brazil	142.08	0.31%
Hydrous ethanol	3.50	0.01%
Natural gas (CNG)	9.46	0.02%
Gasoline / Brazil	527.79	1.17%
São Paulo Subway	4.46	0.01%
Not applicable	0.00	0.00%
Material Transportation	2.04	0.00%
Gasoline / Brazil	2.04	0.00%
Use of machines	251.55	0.56%
Power / Brazil	251.55	0.56%
Material sale	4.36	0.01%
Diesel / Brazil	4.36	0.01%
Employee business trips	233.78	0.52%
Gasoline / Brazil	2.29	0.01%
Aviation kerosene	231.49	0.51%
Total	45,121.66	100.00%

3.4 EMISSIONS PER UNIT

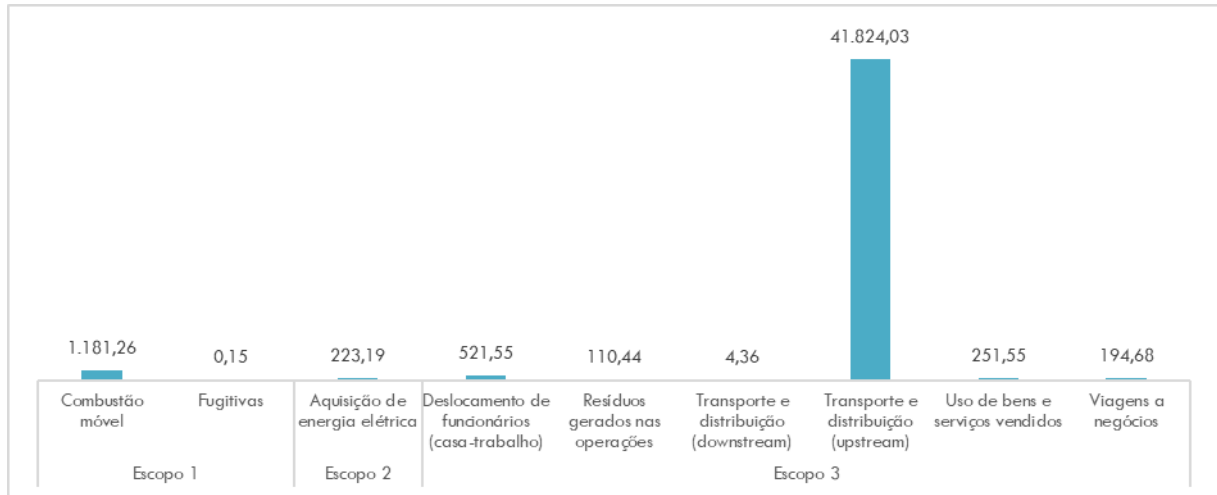
Below, the 2020 emissions will be detailed by Cielo's operational unit: CIELO S.A., Servinet, Aliança and Stelo S.A; Braspag; Cateno, M4U and Merchant e-Solutions.

3.4.1 CIELO S.A., Servinet, Aliança and Stelo S.A.

Emissions of scope 1, 2 and 3 of Cielo S.A., Servinet e Aliança e Stelo S.A. for 2020 were, respectively 1.181,42 tCO₂e, 223,19 tCO₂e and 42.906,62 tCO₂e. In addition, 2,947.39 tons of CO₂ of renewable origin were emitted (801.13 tons of renewable CO₂ of scope 1 ; 0.57 tons of renewable CO₂ of scope 2 and 2,145.69 tons of renewable CO₂ of scope 3). Figure 5 illustrates the GHG

emissions of Cielo S.A., Servinet, Aliança and Stelo S.A. in 2020 regulated by the Kyoto Protocol by scope 1, 2 and 3 and by category.

Figure 5. Kyoto GHG emissions by Cielo S.A., Servinet e Aliança and Stelo S.A. in 2020 by scope and category (tCO₂e).



Emissions from the transport and distribution category (*upstream*) stand out from the emissions of the other categories of Cielo S.A., Servinet, Aliança and Stelo S.A. in 2020. By analyzing this category separately in Table 16, it is observed that the main emissions come mainly from the burning of aviation kerosene within direct and reverse logistics (80.63%) and from the consumption of gasoline for field service (*currier*) (14.09%), respectively. It is noteworthy that these three activities represent more than 94% of total emissions in this category.

Table 16. Kyoto GHG emissions by Cielo S.A., Servinet, Aliança and Stelo in 2020 by process, activity, supervised item and precursor and its representativeness for the Transport and distribution category (scope 3) (*upstream*)

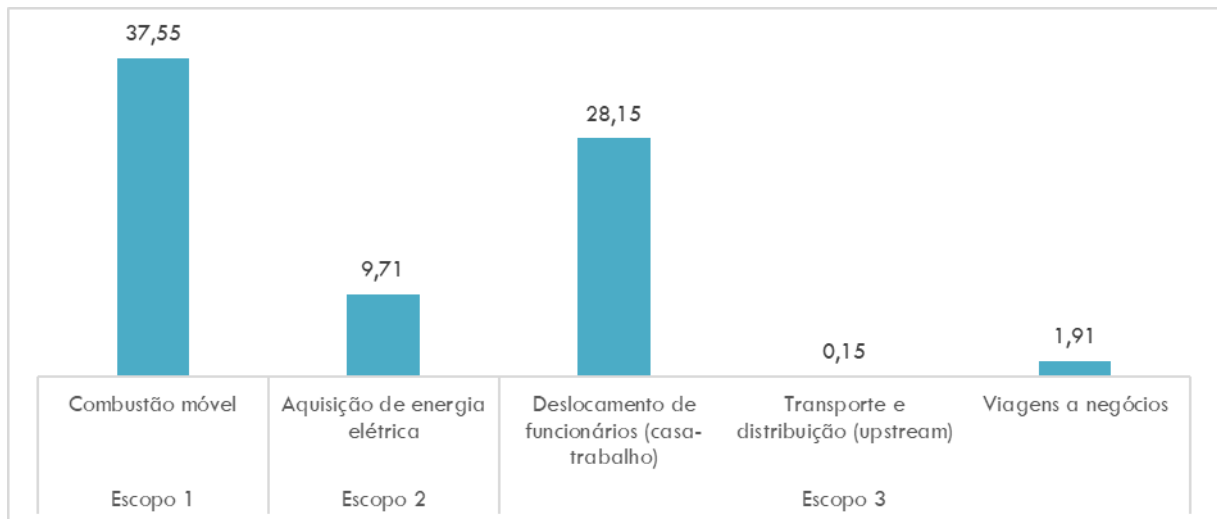
Process/Activity/Supervised item/Precursor	Emissions (tCO ₂ e)	Emissions (%)
Administrative	1.60	0.00%
Material Transportation	1.60	0.00%
Motorcycle shipping (Cielo and Servinet)	1.60	0.00%
Gasoline / Brazil	1.60	0.00%
Logistics	41,822.43	100.00%
Field Service (Currier)	5,892.93	14.09%
Motorcycle	5,892.93	14.09%
Gasoline / Brazil	5,892.93	14.09%
Supplies Coil - Field Service	1,026.48	2.45%
Motorcycle	1,026.48	2.45%
Gasoline / Brazil	1,026.48	2.45%
Disposal in KM (Terminal, Supply and MKT)	2.65	0.01%
Truck	2.65	0.01%
Diesel / Brazil	2.65	0.01%
Manufacturer (Purchase New Terminals)	924.37	2.21%

Process/Activity/Supervi item/Precursor	Emissions (tCO ₂ e)	Emissions (%)
Aircraft	881.66	2.11%
Aviation kerosene	881.66	2.11%
Truck	42.72	0.10%
Diesel / Brazil	42.72	0.10%
Direct and Reverse Logistics	33,938.13	81.15%
Aircraft	33,723.40	80.63%
Aviation kerosene	33,723.40	80.63%
Truck	184.40	0.44%
Diesel / Brazil	184.40	0.44%
Boat	30.33	0.07%
Fuel oil	30.33	0.07%
Milk Run	37.87	0.09%
Truck	37.87	0.09%
Diesel / Brazil	37.87	0.09%
Total	41,824.03	100.00%

3.4.2 Braspag

Braspag's scope 1, 2 and 3 emissions were 37.55 tCO₂e, 9.71 tCO₂e, and 30.21 tCO₂e respectively. In addition, 37.76 tons of CO₂ of renewable origin were emitted (8.90 tCO₂ renewable for scope 1; 0.01 renewable tCO₂ for scope 2 and 28.84 tCO₂ renewable for scope 3). Figure 6 illustrates Braspag's GHG emissions in 2020 regulated by the Kyoto Protocol by scope and category.

Figure 6. Braspag's Kyoto GHG emissions in 2020 by scope and category (tCO₂e)



In an analysis by category and activity, emissions from burning gasoline in the administrative fleet and from transporting employees for their commuting, were the main ones in the inventory in 2020, with 48.47% and 32.34% of representation each, respectively. Table 17 shows GHG emissions regulated by Braspag's Kyoto Protocol in 2020 by process, activity, supervised item and precursor and their representativeness.

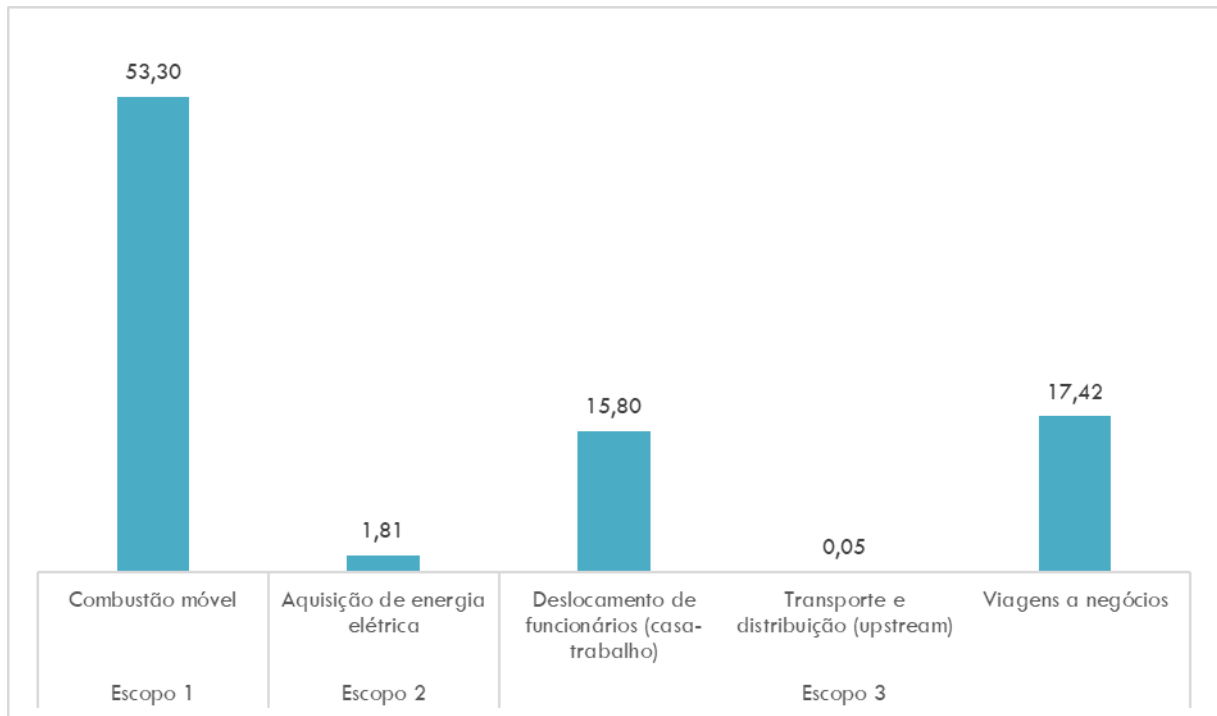
Table 17. Braspag's Kyoto GHG emissions in 2020 by process, activity, supervised item and precursor and their representativeness.

Process/Activity/Supervised Item/Precursor	Emissions (tCO ₂ e)	Emissions (%)
Administrative	77.48	100.00%
Electricity consumption	9.71	12.54%
Electrical Equipment (Alphaville)	3.77	4.87%
Power / Brazil	3.77	4.87%
Electrical equipment (Rio de Janeiro office)	5.84	7.53%
Power / Brazil	5.84	7.53%
Generator	0.10	0.13%
Diesel / Brazil	0.10	0.13%
Administrative fleet	37.55	48.47%
Automobile	37.55	48.47%
Gasoline / Brazil	37.55	48.47%
Transport of employees from home to work	28.15	36.34%
Ethanol car	0.20	0.26%
Hydrous ethanol	0.20	0.26%
Fuel car	25.06	32.34%
Gasoline / Brazil	25.06	32.34%
Bus	2.45	3.16%
Diesel / Brazil	2.45	3.16%
Train/Subway	0.44	0.57%
São Paulo Subway	0.44	0.57%
Material Transportation	0.15	0.19%
Motorcycle shipping	0.15	0.19%
Gasoline / Brazil	0.15	0.19%
Employee business trips	1.91	2.47%
Taxi	1.91	2.47%
Gasoline / Brazil	1.91	2.47%
Total	77.48	100.00%

3.4.3 Cateno

Cateno's scope 1 emissions were 53.30 tCO₂e, 1.81 tCO₂e scope 2, and 33.26 tCO₂e scope 3. In addition, 27.59 tons of CO₂ of renewable origin were emitted (12.64 tCO₂ renewable for scope 1 and 14.93 tCO₂ renewable for scope 3). Figure 7 illustrates Cateno's 2020 GHG emissions regulated by the Kyoto Protocol by scope and category.

Figure 7. Cateno's Kyoto GHG emissions in 2020 by scope and category (tCO₂e)



In an analysis by category, mobile combustion emissions from the administrative fleet (Scope 1) are Cateno's main emissions with 60.33% of the total, followed by emissions from business travel (Scope 3) and employee commuting (scope 3) with 19.71% and 17.87%, respectively. Table 18 presents the GHG emissions regulated by the Kyoto Protocol in 2020 of Cateno by scope, category, activity and precursor and their representativeness.

Table 18. Cateno 2020 GHG emissions by scope, category, activity and precursor and their representativeness.

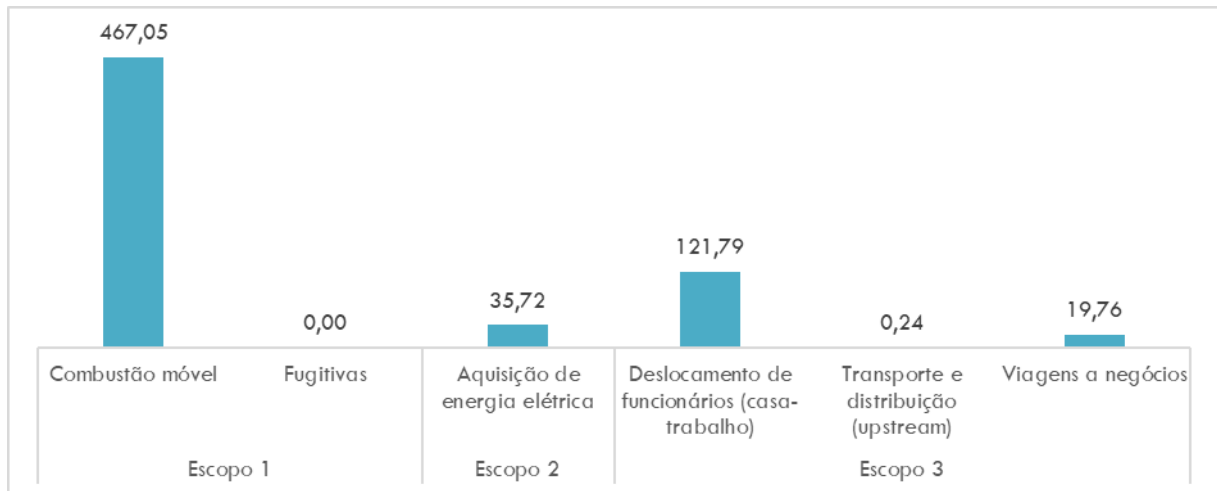
Scope/Category/Activity/Precursor	Emissions (tCO ₂ e)	Emissions (%)
Scope 1	53.30	60.31%
Mobile combustion	53.30	60.31%
Administrative fleet	53.30	60.31%
Gasoline / Brazil	53.30	60.31%
Scope 2	1.81	2.05%
Procurement of Power	1.81	2.05%
Electricity consumption	1.81	2.05%
Power / Brazil	1.81	2.05%
Scope 3	33.26	37.64%
Employee commuting (home to work)	15.80	17.87%
Transport of employees from home to work	15.80	17.87%
Diesel / Brazil	2.02	2.29%
Hydrous ethanol	0.11	0.12%

Gasoline / Brazil	13.48	15.25%
São Paulo Subway	0.19	0.21%
Transportation and distribution (upstream)	0.05	0.05%
Material Transportation	0.05	0.05%
Gasoline / Brazil	0.05	0.05%
Business travel	17.42	19.71%
Employee business trips	17.42	19.71%
Aviation kerosene	17.42	19.71%
Total	88.38	100.00%

3.4.4 M4U

Scope 1, 2 and 3 emissions from Cielo's M4U unit were 467.05 tCO₂e, 35.72 tCO₂e, and 141.80 tCO₂e, respectively. In addition, 144.59 tons of CO₂ of renewable origin were emitted (110.74 tCO₂ renewable for scope 1 and 33.85 tCO₂ renewable for scope 3). Figure 8 illustrates the GHG emissions of M4U in 2020 regulated by the Kyoto Protocol by scope and by category.

Figure 8. M4U's Kyoto GHG emissions in 2020 by scope and category (tCO₂e)



Emissions from the burning of gasoline in the administrative fleet (scope 1) and employee commuting (scope 3) are the main emissions from M4U with 72.46% and 18.90%, respectively. These emissions represent approximately 91% of the total emissions from M4U's 2020 inventory. Table 18 presents the GHG emissions regulated by the Kyoto Protocol in 2020 of M4U by scope, category, activity and precursor and their representativeness.

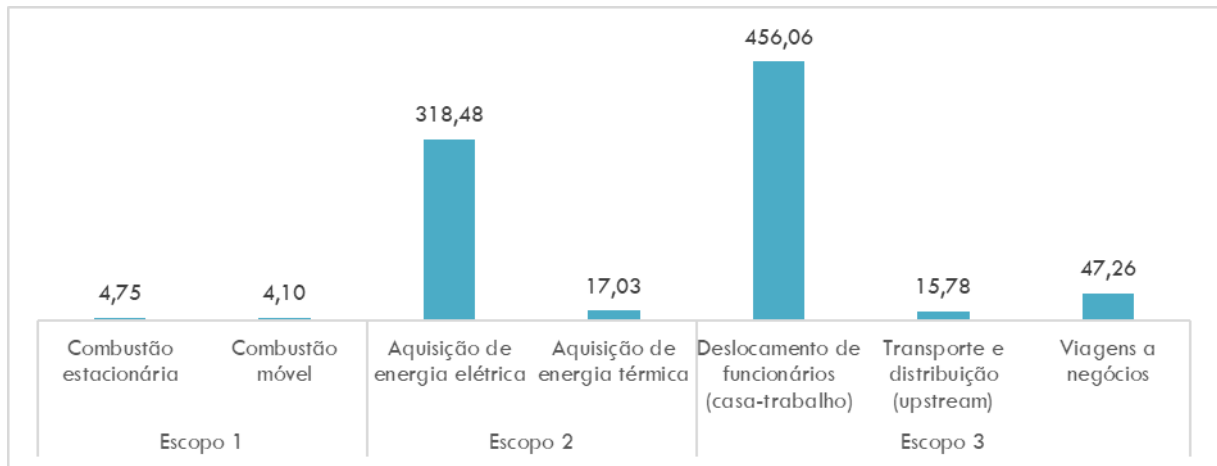
Table 19. M4U's Kyoto GHG emissions in 2020 by scope, category, activity and precursor and their representativeness.

Scope/Category/Activity/Precursor	Emissions (tCO ₂ e)	Emissions (%)
Scope 1	467.05	72.46%
Mobile combustion	467.05	72.46%

Scope/Category/Activity/Precursor	Emissions (tCO ₂ e)	Emissions (%)
Administrative fleet	467.05	72.46%
Gasoline / Brazil	467.05	72.46%
Fugitive	0.00	0.00%
Fire-fighting system recharge	0.00	0.00%
CO ₂	0.00	0.00%
Scope 2	35.72	5.54%
Procurement of Power	35.72	5.54%
Electricity consumption	35.72	5.54%
Power / Brazil	35.72	5.54%
Scope 3	141.80	22.00%
Employee commuting (home to work)	121.79	18.90%
Transport of employees from home to work	121.79	18.90%
Diesel / Brazil	9.23	1.43%
Hydrous ethanol	0.07	0.01%
Natural gas (CNG)	3.10	0.48%
Gasoline / Brazil	107.87	16.73%
São Paulo Subway	1.53	0.24%
Transportation and distribution (upstream)	0.24	0.04%
Material Transportation	0.24	0.04%
Gasoline / Brazil	0.24	0.04%
Business travel	19.76	3.07%
Employee business trips	19.76	3.07%
Gasoline / Brazil	0.38	0.06%
Aviation kerosene	19.38	3.01%
Total	644.57	100.00%

3.4.5 Merchant e-Solutions

Merchant e-Solutions' Scope 1 emissions were 8.85 tCO₂e, 335.52 tCO₂e of scope 2 and 519.09 tCO₂e of scope 3. There were no CO₂ emissions renewable source for this unit in 2020. Figure 9 illustrates the GHG emissions regulated by the Merchant e-Solutions Kyoto Protocol in 2020 by scope and by category.

Figure 9. Merchant e-Solutions' Kyoto GHG emissions 2020 by scope and category (tCO₂e)


Merchant e-Solutions' Scope 3 emissions represent approximately 60% of the unit's total emissions in 2020, mainly from employee commuting. Table 20 shows the emissions regulated by the Kyoto Protocol in 2020 from Merchant e-Solutions by scope, category and activity and their representativeness.

Table 20. Merchant e-Solutions's Kyoto GHG emissions in 2020 by scope, category, activity and precursor and their representativeness.

Scope/Category/Activity/Precursor	Emissions (tCO ₂ e)	Emissions (%)
Scope 1	8.85	1.03%
Stationary combustion	4.75	0.55%
Generation of Power	4.75	0.55%
B0 Diesel	4.75	0.55%
Mobile combustion	4.10	0.48%
Administrative fleet	4.10	0.48%
Gasoline	4.10	0.48%
Scope 2	335.52	38.86%
Procurement of Power	318.48	36.88%
Electricity consumption	318.48	36.88%
Power / USA / SERC South	209.70	24.29%
Power / EUA / WECC Northwest	108.79	12.60%
Procurement of thermal energy	17.03	1.97%
Generation of Power	17.03	1.97%
Natural gas	17.03	1.97%
Scope 3	519.09	60.12%
Employee commuting (home to work)	456.06	52.82%
Transport of employees from home to work	456.06	52.82%
Gasoline	456.06	52.82%
Transportation and distribution (upstream)	15.78	1.83%
Direct and Reverse Logistics	15.78	1.83%
B0 Diesel	0.48	0.06%
Aviation kerosene	15.29	1.77%
Business travel	47.26	5.47%
Employee business trips	47.26	5.47%
Aviation kerosene	47.26	5.47%
Total	863.46	100.00%

4. DISCUSSION

As in 2019, the main emission source in Cielo's 2020 inventory is associated with transport and distribution (*upstream*) of machines, coils and other materials supplied by the company to customers, mainly through outsourced aircraft and motorcycles. Emissions from direct and reverse logistics activities, field service (supply coil) and field service (*currier*) were the main ones in the inventory, being responsible for more than 90% of the total emissions in the inventory. Mitigation options arise from the logistics optimization and use of renewable fuels by suppliers, so that the corporation can engage and train the supply chain on the subject.

Next, emissions from fuel combustion in the administrative fleet are highlighted (Scope 1). Cielo has been going through a process of replacing gasoline for ethanol in its fleet vehicles, which has contributed to reducing emissions from this activity in the 2020 inventory. In addition, there is a reduction in emissions from this source due to preventive measures to contain the expansion of the coronavirus in some months of 2020. However, it is noteworthy that, as this is an emission source controlled by Cielo, the replacement of gasoline in vehicles with ethanol is a good mitigation option to reduce these emissions.

The third most significant source of emission is associated with employee commuting (scope 3). Gasoline used in motorcycles and owned cars represents approximately 86% of total emissions in this category. Thus, the mitigation option is to internally promote strategies and policies aimed at raising employee awareness on the use of renewable fuels in passenger vehicles (e.g. ethanol) or even a carpool system for those who live nearby.

Finally, it is worth noting that the other emissions from the other categories (stationary combustion, fugitive, purchase of electricity, purchase of thermal energy, purchased goods and services, waste generated in operations, transport and distribution (*downstream*), use of goods and services sold, and business travel) account for approximately 3% of total inventory emissions.

5. RECOMMENDATIONS

For companies to adapt to the low-carbon economy, a virtuous cycle of analysis and process improvements must be developed. This set of activities, when detailed and organized, make up the corporate plan for greenhouse gas (GHG) emissions management.

The path begins with the diagnosis of the current situation by gathering the technical knowledge on the issue of GHG emissions and applying it to the corporation. Once the impact on Climate Change and its risks to the business are mapped, it is possible to evaluate process alternatives and select projects that reduce carbon intensity (GHG emissions per production). In sequence, a process for continuous monitoring of the corporation's climatic performance should be structured, in order to verify the impact of the projects implemented and to bring information to update the diagnosis.

The GHG inventory is the diagnosis first step and must be continually improved. The recommendations for improvement are as follows:

- Expansion of monitored emission sources
 - Calculate emissions from other Scope 3 categories such as losses in electricity T&D, effluent treatment sent to the municipal network.
- The company can structure a monthly flow of information and monitor the impact on Climate Change month by month as a form of environmental management.
- Inclusion of evidence of emissions in the CLIMAS system

In addition to the inventory, there are other types of studies to diagnose the company's situation in relation to the low carbon economy:

- the calculation of impact indicators by product or service offered allowing the comparison with companies of different sizes and evaluation of the climatic efficiency
- The identification of risks and opportunities in regulatory scenarios with carbon pricing mechanisms, for example

The next step is planning and act on the theme of Climate Change. This includes:

- Sector Benchmarking
- Definition of mitigation strategy and reduction targets
- Definition of the adaptation strategy
- Definition of the neutralization strategy

6. OFFSET'S SALES AND PURCHASES

According to ISO 14.064 - Part 1, if a corporation reports a reduction of emissions or an increase of removals acquired or developed from quantified GHG projects using methodologies such as ISO 14.064 - Part 2, such corporation must list such reductions of emissions or increase of removals, separately, from GHG projects.

Therefore, it is established whether there were sales and purchases of offsets. If so, the corresponding amount of emissions/removals must be indicated in tCO₂e.

- There were no purchases/sales of offsets.
- There were purchases of offsets. Quantity: tCO₂e.
- There were sales of offsets. Quantity: tCO₂e.

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GLOSSARY

Year base: Historical period specified for the purpose of comparisons of GHG removals and emissions, and other related information.

Carbon dioxide equivalent (CO₂e): Unit for comparing the radiative force (global warming potential) of a given GHG to CO₂.

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

Direct GHG emissions: GHG emissions by sources owned or controlled by the corporation. To establish the operational boundaries of the corporation, the concepts of financial control and operational control are adopted.

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

Scope: The 'scope' concept was introduced by the GHG Protocol to assist companies in defining their operational limits. The scopes are differentiated into 3 categories, separated into direct emissions and indirect emissions.

Scope 1: Covers the category of the corporation's direct GHG emissions, that is, that originate from sources that belong to or are controlled by the company within the defined limits. As an example, emissions from the burning of fossil fuels and from manufacturing processes can be mentioned.

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

Scope 3: Covers the category of indirect GHG emissions from other sources, i.e. emissions that occur due to the activities of the corporation but that originate in sources not owned or controlled by the corporation. Some examples of scope 3 sources are: transportation of products in non-company vehicles, use of third-party vehicles, transportation of employees, and business travel.

Emission factor or GHG removal factor: Factor that relates activity data to GHG emissions and removals.

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

Greenhouse Gas (GHG): An atmospheric constituent 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, the atmosphere, and clouds. Among GHGs, we can mention Carbon Dioxide (CO₂),

Methane (CH₄), Nitrous Oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulfur Hexafluoride (SF₆).

Inventory of GHG emissions: Document in which the sources and sinks of GHG are detailed and the GHG emissions and removals are quantified during a given period.

Offset: GHG emissions offset credits.

Corporation: Company, corporation, enterprise, authority, institution - or part or combination of - whether incorporated or not, public or private, which has its own functions and administration.

Other indirect GHG emissions: GHG emissions other than those indirect emissions related to power consumption. They are a consequence of the activities of the corporation, but come from sources whose ownership or control is carried out by other corporations.

Global Warming Potential: A factor that describes the impact of the radiative force of a given mass unit of a given GHG on a unit of mass of carbon dioxide (CO₂) in a given period of time.

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

GHG Reservoir: Means a physical unit or component of the biosphere, geosphere or hydrosphere capable of storing or accumulating GHGs removed from the atmosphere by a sink or GHG captured from a source. The total mass of carbon contained in a GHG reservoir in a specific period of time may be referred to as the carbon stock of the reservoir. A GHG reservoir can transfer its gases to another GHG reservoir. The collection of a GHG from a source before this GHG enters the atmosphere and its storage 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 - REPORTING TO THE GHG PROTOCOL BRAZIL 2020

Summary of total emissions in tons of gas (tGHG)

Gas family	Scope 1	Scope 2	Scope 3	Total
CH4	0.796638	0.000716	6.620821	7.418175
CO2	1,659.864318	270.405776	42,361.075599	44,291.345693
N2O	0.199803	0.000043	1.964100	2.163946

Summary of total emissions in tons of CO₂-equivalent (tGHG)

Gas family	Scope 1	Scope 2	Scope 3	Total
CH4	19.915950	0.017900	165.520525	185.454375
CO2	1,659.864318	270.405776	42,361.075599	44,291.345693
N2O	59.541294	0.012814	585.301800	644.855908
Total	1,739.321562	270.436490	43,111.897924	45,121.655976

Scope 1 emissions broken down by category

Scope	Category	Emissions
Scope 1	Mobile combustion	1,739.163562
	Fugitive	0.158000
Total		1,739.321562

Scope 1 emissions broken down by category - Emissions and Removals of biogenic CO₂

Scope	Category	Emissions (tGEE)	Removals (tGEE)
Scope 1	Mobile combustion	933.408668	0

Scope 2 emissions broken down by category

Scope	Category	Emissions
Scope 2	Procurement of Power	270.43649
Total		270.43649

Scope 2 emissions broken down by category - Emissions and Removals of biogenic CO₂

Scope	Category	Emissions (tGEE)	Removals (tGEE)
Scope 2	Procurement of Power	0.583440	0

Scope 3 emissions broken down by category

Scope	Category	Emissions
Scope 3	Goods and services purchased	0.000000
	Employee commuting (home to work)	687.294363
	Waste generated in operations	110.442761
	Transportation and distribution (downstream)	4.360454
	Transportation and distribution (upstream)	41,824.467651
	Use of goods and services sold	251.553731
	Business travel	233.778964
Total		43,111.897924

 Scope 3 emissions broken down by category - CO Emissions and Removals of biogenic CO₂

Scope	Category	Emissions (tGEE)	Removals (tGEE)
Scope 3	Goods and services purchased	0.000000	0
	Employee commuting (home to work)	522.118162	0
	Transportation and distribution (downstream)	29.509983	0
	Transportation and distribution (upstream)	0.481023	0
	Business travel	1,670.663964	0

Emissions outside Brazil

Country	Scope 1	Scope 2	Scope 3	Total
United States	8.854512	335.515100	519.090204	863.459816
Total	8.854512	335.515100	519.090204	863.459816

Emissions per unit

Operating Unit	Scope 1	Scope 2	Scope 3	Total
Braspag	37.554243	9.713125	30.212970	77.480338
CIELO SA, Servinet, Aliança and Stelo	1,181.416397	223.187041	42,906.622588	44,311.226026
Cateno	53.301692	1.812750	33.263751	88.378193
M4U	467.049230	35.723574	141.798615	644.571419
Total	1,739.321562	270.436490	43,111.897924	45,121.655976



Edifício Asamar
Rua Paraíba, 1000 – 7º andar
CEP 30130– 141 - Belo Horizonte – MG
Phone | Fax 55 31 3656-0501

BH | SP | RJ

WWW.WAYCARBON.COM