

INTRODUCTION

Climate change is related to the increasing concentration of certain greenhouse gases (GHGs) derived from human activity and environmental factors, thus becoming a potential threat to the environment. The main cause of global warming corresponds to anthropogenic emissions of greenhouse gases (Carbon Dioxide – CO₂, Methane – CH₄, Nitrous Oxide – N₂O and halocarbons). In its fifth assessment report, the Intergovernmental Panel on Climate Change finds an almost linear relationship between global warming and cumulative CO₂ emissions in the atmosphere.

It is of great importance for organizations to identify and quantify their direct and indirect greenhouse gas (GHG) emissions associated with their productive activities. The use of energy represents a fundamental aspect for the operation of organizations, whether for the operation of technological equipment, communication equipment, lighting, transportation, backup systems, refrigeration, among others. In some cases, energy use represents direct emissions (on-site combustion) and indirect emissions (combustion in places outside organizational limits) which, depending on the type of electricity generation, represent emissions attributable to both the generator and the consumer.

Energy sources and supply are aspects of great social relevance and of high environmental and economic impact. Its use has led to the growth of society and industry, however it causes environmental effects that increase with wasteful and excessive use and consumption. Therefore, the rational use and consumption of both renewable and non-renewable sources of energy is vital for the achievement of the goals of sustainable development, environmental balance and generation of social welfare. Many business leaders around the world have realized that climate change and environmental degradation pose significant new risks and opportunities to the competitiveness, growth and development of their businesses, and are turning the climate challenge into a market opportunity.

Climate change has relevant consequences for the activities carried out by the organization, this because Colombia has the highest rate in Latin America of recurrent disasters caused by natural phenomena, with more than 600 events reported each year on average (World Bank, 2014, p. 6) and the tenth highest economic risk derived from two or more hazards due to disasters in the world. to the extent that 84.7% of the population and 86.6% of the active are located in areas exposed to two or more natural hazards (World Bank, 2014, p. 5). The foregoing, in a global scenario of climate change, implies that phenomena of hydrometeorological origin can increase their intensity and recurrence, modifying the current pattern of threats and generating a greater number of disasters, if their possible implications are not addressed prospectively. The good state of ecosystems is a key variable for climate resilience and their degradation is associated with increased greenhouse gas emissions. The restoration and conservation of ecosystems and their services are crucial to increase climate resilience and maintain or enhance GHG mitigation capacity.

According to the climate change management policy, it proposes that climate change management be aimed at achieving short-, medium- and long-term adaptation and mitigation goals; and, consequently, it defines the instances and mechanisms for their adoption, distribution and evaluation at the national, sectoral and territorial levels.

1. OBJECTIVES

1.1. General objectives

- Determine and establish aspects related to risk identification, energy performance indicators, energy baseline, energy objectives, energy goals, and action plans for energy efficiency management.
- Design, implement and promote strategies so that the organization has actions aimed at mitigating and offsetting greenhouse gas (GHG) emissions and adapting to the effects of climate change that affect TGI's infrastructure.

1.2. Specific objectives

- Quantitatively characterize the environmental and energy impact generated by the organization through the analysis of energy reviews and the monitoring of the corporate carbon footprint.
- Identify, assess and manage the risks associated with energy performance.
- Establish and consolidate the objectives, goals and indicators and baseline for the EMS.
- Establish strategies for the control, prevention, mitigation and compensation of greenhouse gas (GHG) emissions and compliance with the objectives of the EMS.

2. SCOPE

The Climate Change and Energy Efficiency Program is defined from the result of the analysis of the energy reviews of the headquarters within the scope of the EMS and the calculation of the organization's greenhouse gas (GHG) emissions, quantitatively characterizing the environmental and energy impact generated and then identifying the associated risks, subsequently proposing objectives, goals, indicators and baseline; to finally establish strategies for control, prevention, mitigation and compensation of greenhouse gas (GHG) emissions, framed in energy efficiency strategies.

3. DEFINITIONS

- 3.1. **Scope of the EMS:** group of activities that an organization addresses through an energy management system. Note: The scope of the NSMS can include several limits and can include transport operations.
- 3.2. **Environment:** The environment in which an organization operates, including air, water, soil, natural resources, flora, fauna, human beings, and their interrelationships.
- 3.3. **Environmental aspect:** Elements of an organization's activities, products, or services that can interact with the environment.
- 3.4. **Climate change:** A change in the state of climate, identifiable, for example, by statistical tests, in changes in the mean value or in the variability of its properties, which persists over long periods of time, usually decades or longer periods. Law 1931 of 2018.
- 3.5. **Energy consumption:** Amount of energy used. NTC-ISO 50001.
- 3.6. **Sustainable Development Committee:** Coordinating body, whose purpose is to establish guidelines on environmental, social, real estate and relationship issues with communities and property owners in the area of influence in accordance with the Corporate Sustainability Policy established by the Company and in accordance with the guidelines issued by Grupo Energía Bogotá.
- 3.7. **Energy Performance:** Measurable results related to energy efficiency, energy use, and energy consumption. NTC-ISO 50001.
- 3.8. **ECG:** Gas Compressor Station.
- 3.9. **Greenhouse Effect:** The accumulation and trapping of heat in the atmosphere (troposphere) near the Earth's surface. Some of the heat that returns from the Earth's surface into space is absorbed by greenhouse gases in the atmosphere and then radiated back to the Earth's surface. If concentrations of these greenhouse gases increase in the atmosphere, the average temperature of the lower atmosphere will gradually increase.
- 3.10. **Energy efficiency:** The proportion or other quantitative relationship between the performance result, service, products, raw materials, or energy and energy input. NTC-ISO 50001.
- 3.11. **Energy Management Team:** Person(s) with responsibility and authority for the effective implementation of an energy management system and for the realization of energy performance improvements. NTC-ISO 50001.
- 3.12. **Energy:** Electricity, fuels, steam, heat, compressed air, and other similar means. Note: for the purpose of the EMS, energy is attributed to different types of energy, including renewable, which can be purchased, stored, treated, used in equipment or in a process, or recovered. NTC-ISO 50001.
- 3.13. **Greenhouse gas emissions:** The total mass of a GHG released into the atmosphere in a given period. NTC-ISO 14064-1.

- 3.14. Direct greenhouse gas emissions:** GHG emissions from GHG sources owned or controlled by the organization. NTC-ISO 14064-1.
- 3.15. Indirect emission of greenhouse gases by energy.** GHG emissions that come from the generation of electricity, heat or steam from external sources consumed by the organization. NTC-ISO 14064-1.
- 3.16. Static Factor:** An identified factor that has a significant impact on energy performance and that does not change on a regular basis. NTC-ISO 50001.
- 3.17. Greenhouse gas source:** A physical unit or process that releases a GHG into the atmosphere. NTC-ISO 14064-1.
- 3.18. Climate change management:** Coordinated process of design, implementation, and evaluation of GHG mitigation and climate change adaptation actions aimed at reducing the vulnerability of the population, infrastructure, and ecosystems to the effects of climate change. It also includes actions aimed at enabling and taking advantage of the opportunities that climate change generates. Law 1931 of 2018.
- 3.19. Greenhouse gases (GHG):** These are those gaseous components of the atmosphere, of natural or anthropogenic origin, that absorb and emit solar energy reflected by the earth's surface, atmosphere and clouds. The main greenhouse effects are carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆). Law 1931 of 2018.
- 3.20. Energy Performance Indicator (IDEN):** Measure or unit of energy performance, as defined by the organization. NTC-ISO 50001.
- 3.21. Greenhouse Gas Inventory:** An organization's GHG sources, GHG sinks, GHG emissions, and removals. NTC-ISO 14064-1.
- 3.22. Environmental impact:** Change in the environment, whether adverse or beneficial, as a result of all or part of an organization's environmental aspects. NTC-ISO 14001.
- 3.23. Energy Baseline (LBEn):** A quantitative reference that provides the basis for the comparison of energy performance. NTC-ISO 50001.
- 3.24. Boundaries:** Physical or location boundaries and/or organizational boundaries as defined by the organization.
- 3.25. Improved Energy Performance:** Improvement in measurable energy efficiency results, or energy consumption related to energy use, compared to the energy baseline. NTC-ISO 50001.
- 3.26. Energy Goal:** A detailed and quantifiable requirement of energy performance, applicable to the organization or part of it, that originates from the energy objectives and that must be established and fulfilled to achieve these objectives. NTC-ISO 50001.
- 3.27. Normalization:** Modification of data to take into account changes in energy performance under equivalent conditions. NTC-ISO 50001.
- 3.28. Energy Objective:** Result or achievement specified to comply with the organization's energy policy and related to the improvement of energy performance. NTC-ISO 50001.
- 3.29. Stakeholder:** A person or group that has an interest in, or is affected by, the organization's energy performance. NTC-ISO 50001.
- 3.30. Pollution prevention:** Use of processes, practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or in combination) the generation, emission or discharge of any type of pollutant or waste, in order to reduce adverse environmental impacts. NTC-ISO 14001.
- 3.31. Project, work or activity:** Includes the planning, siting, installation, construction, assembly, operation, maintenance, dismantling, abandonment and completion of all actions, uses of space, activities and infrastructure related to and associated with its development.

- 3.32. Energy Review:** Analysis of energy efficiency, energy use and energy consumption, based on data and other information, aimed at identifying USE (Significant Energy Uses) and opportunities for improving energy performance. NTC-ISO 50001.
- 3.33. Risk:** Effect of uncertainty. NTC-ISO 50001.
- 3.34. Environmental Management System (EMS):** Part of an organization's management system used to develop and implement its environmental policy and manage its environmental aspects.
- 3.35. Energy Management System (EMS):** Management system for establishing an energy policy, objectives, energy targets, action plans and processes to achieve energy objectives and targets. NTC-ISO 50001.
- 3.36. Integrated Management System (IMS):** Part of the General Management System of TGI used to implement and develop its policies and manage: its processes with quality standards and its environmental impacts and its risks in occupational health and safety in a controlled manner, achieving the satisfaction of the interested parties.
- 3.37. TGI:** International Gas Transporter.
- 3.38. Energy Use:** Application of energy. NTC-ISO 50001.
- 3.39. Significant Energy Use (USE):** Energy use that quantifies substantial energy consumption and/or offers considerable potential for improved energy performance. NTC-ISO 50001.
- 3.40. Relevant variable:** A quantifiable factor that has a significant impact on energy performance and changes regularly. NTC-ISO 50001.

4. REGULATORY FRAMEWORK

NORM	ISSUED	CONCEPT
NTC-ISO 50001:2018	International Organization for Standardization (ISO)	Energy management systems.
NTC-ISO 14001:2015	International Organization for Standardization (ISO)	Environmental management systems.
NTC-ISO 14064:2006	International Organization for Standardization (ISO)	Greenhouse Gas (GHG) Inventory at the Organization Level
NTC 2050	ICONTEC	Technical Standard 2050 or Colombian Electrical Code.
RETIE	Ministry of Mines and Energy	Technical Regulations for Electrical Installations RETIE

Board 1. Related regulations

See Environmental Legal Requirements Matrix

5. RESPONSIBLE

For the general implementation of the Climate Change and Energy Efficiency Program in TGI, there is the leadership and commitment of the Environmental Subdirectorato attached to the Sustainable Development Management, however, in order to guarantee the execution of the plan in each of TGI's headquarters, the responsibility will be delegated to the HS professionals in the field, who will be the managers for the development and implementation of this plan at the corresponding headquarters. In addition, the HS field professionals will be in charge of verifying, carrying out follow-up and periodic monitoring, and evaluating the fulfillment of the goals established in this program, to ensure their adaptability to the particular conditions and needs of the headquarters. The Environmental Sub-Directorato will be in charge of verifying and monitoring the provisions of the activities carried out by HS professionals in the field. In the energy reviews at the headquarters within the scope of the SGE, positions with responsibilities and the authorities associated with the SGE are evident.

At the strategic level, the Sustainable Development Committee aims (see guideline # 008) to establish guidelines on environmental, social, real estate and relationship issues with communities and property owners in the area of influence in accordance with the corporate sustainability policy, in addition to its functions and responsibilities include:

- ✓ Guide the implementation of the sustainability strategy in the different areas of the company.
- ✓ Propose and/or recommend viable initiatives and solutions leading to the reduction of environmental, real estate and social impacts in the activities, products and/or services developed by the company.
- ✓ Evaluate environmental, energy and social performance through quarterly reports provided by the professionals in charge and propose the required action plans.
- ✓ Monitor the environmental and energy regulatory compliance that applies to the company.
- ✓ Monitor socio-environmental and energy management carried out with suppliers and contractors.
- ✓ Follow up on the energy review and the objectives, goals, and action plans necessary to achieve the results that would improve energy performance.

6. CHARACTERIZATION OF THE ENERGY AND ENVIRONMENTAL IMPACT

TGI recognizes the importance of managing its energy and environmental impacts, under criteria of prevention, mitigation, correction and compensation to detect possible risks in time with the provision of the natural gas transport service. The environmental and energy aspects and impacts of the activities, projects or services that the company can control have been identified and evaluated, in order to take appropriate measures. According to the guidelines established by the organization in its Energy Management System (EMS) based on the ISO 50001 standard and the quantification of greenhouse gas emissions based on the ISO 14064-1 standard, the following are established:

6.1. Characterization of the energy impact

The organization uses the interaction of various administrative, operation and maintenance processes to carry out its natural gas transportation operation. These processes in turn are supported by different areas of support, the identification of activities contained in the related processes allows identifying critical points in which action plans can be implemented within the framework of energy efficiency and climate change management.

Under the current operation of TGI SA ESP, the following energy products are characterized: Natural gas, electric energy and liquid fuels Diesel and gasoline.

a) Energy reviews of the SGE headquarters

The main objective of the energy review is to analyze past, present and future energy uses and consumption, as well as energy performance together with the variables that impact it, identify the present types of energy, the significant uses of energy and the identification of opportunities for improvement at the headquarters in terms of energy management. According to the IMS Energy Review procedure (P-ASI-022), the requirements that the documents associated with the EMS headquarters must have based on the ISO 50001:2018 standard are established.

ENERGY INSPECTIONS HEADQUARTERS SCOPE ISO 50001			
SPECIFIC OBJECTIVE	Survey of Energy Reviews according to the Energy Management System - ISO 50001 version 2018 for TGI work centers scope.		
GOAL	Documentation of Energy Reviews applicable to all the sites within the scope of the SGE.		
RESPONSIBLE	IMPLEMENTATION: Professional – Environmental Sub-Directorate		
	MONITORING AND CONTROL: Deputy Director of Environmental		
JUSTIFICATION	The energy review represents the analysis of energy efficiency, energy use and energy consumption, based on data and other information, aimed at identifying USE (Significant Energy Uses) and opportunities for improving energy performance.		
DESCRIPTION OF THE ACTIVITY(S)	<ul style="list-style-type: none"> • Analysis of information on energy uses, sources and consumption. • Equipment related to consumption, monitoring and measurement. • Identification of significant uses of energy USEs, for these the identification of relevant variables and static factors. • Current and past energy performance. • Managers associated with the associated energy companies. • Opportunities improves energy performance. • Projection of future energy consumption. • Planning for energy data collection. • Operational controls. 		
TRACKING	Review and update of documents according to the SGI Energy Review procedure (P-ASI-022).		
MANAGEMENT INDICATOR			
INDICATOR NAME	INDICATOR TYPE	CALCULATION FORMULA	MEASUREMENT FREQUENCY
Energy Reviews	Management	Energy reviews of operational centres within the scope of EMS.	Annual

Table 2. Energy reviews sub-programme scope of the EMS

b) Results of energy reviews at venues scope

Below is a list of the energy consumption identified for 2022 at the organization's SGE headquarters.

Consumption Headquarters (2022)	Consolidated Energy Consumption (GJ)		
	Gas	Electricity	Other Combs.
Ladybug ECG	57352	445	361
ECG Padua	280739	586	273
ECG Miraflores	818348	832	290
ECG Sheet	0	2557	24
Administrative Headquarters	0	210	0
ECG Puente Guillermo	732286	819	1015
ECG Vasconia	226876	457	478
ECG Villavicencio	11647	410	483


ECG Paratebueno	115312	619	796
CO Cagua	10	344	596
ECG San Alberto	16197	345	332
ECG Jagua del Pilar	4157	297	447
Total	2.262.924	7.921	5.095

Table 3. Energy consumption of the SGE headquarters

As can be seen in table 3 Energy consumption at the headquarters within the scope of the EMS, it is possible to conclude that a Significant Energy Use (USE) would be the gas used for the compression process, electrical energy is also considered to be USE by the areas, equipment or processes with potential for savings or efficient use or where opportunities for improvement have been implemented and especially those where the potential for performance improvement is greater.

Below is a summary of the general characteristics of the energy identified in the headquarters within the scope of the EMS:

ENERGETICS IDENTIFIED	Natural Gas, Electric Power and Other Fuels
SOURCES	<p>Natural gas: This resource is taken directly from the gas that reaches the gas compressor stations (ECG) through the pipeline and is the main input for the operation of the compressor engines. In some workplaces, CNG is used for vehicles that is obtained from service stations.</p> <p>Electrical energy:</p> <ul style="list-style-type: none"> The power supply of the headquarters within the scope of the SGE is carried out through transmission lines by the companies providing the service in the different regions. <p>Other Fuels:</p> <ul style="list-style-type: none"> Diesel and gasoline are purchased from suppliers of these energy through service stations.

<p align="center">USES</p>	<p>Natural gas:</p> <ul style="list-style-type: none"> Fuel gas, tea gas, pilot gas and starter gas. <p>Electrical energy:</p> <ul style="list-style-type: none"> Operation and control of electrical consumption equipment such as compressors, auxiliary equipment, laptops and computers, monitors, printers and multifunctional devices, air conditioners, televisions, internal and external lighting, refrigerators and microwaves, UPS, switches and servers, among others applicable to the headquarters within the scope of the SGE. <p>Other Fuels:</p> <ul style="list-style-type: none"> Operation of backup power plant for electricity generation in ECGs. Operation of vehicles required for the mobilization of ECG personnel. Use of scythe. 																																																																																																																								
<p align="center">ANNUAL CONSUMPTION</p>	<p>The annual consumption comes from the sum of the energy identified in the headquarters within the scope of the SGE:</p> <table border="1"> <thead> <tr> <th colspan="8">Consumos Energéticos Consolidados (GJ)</th> </tr> <tr> <th></th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>ECG Mariquita</td> <td>43664</td> <td>82396</td> <td>68192</td> <td>61182</td> <td>55073</td> <td>58793</td> <td>58158</td> </tr> <tr> <td>ECG Padua</td> <td>No hacian parte del alcance</td> <td>139732</td> <td>236707</td> <td>274359</td> <td>235345</td> <td>265232</td> <td>281598</td> </tr> <tr> <td>ECG Miraflores</td> <td></td> <td>494313</td> <td>554884</td> <td>692319</td> <td>749196</td> <td>814684</td> <td>819470</td> </tr> <tr> <td>ECG Sabana</td> <td>1371</td> <td>5787</td> <td>1418</td> <td>980</td> <td>2994</td> <td>3238</td> <td>2581</td> </tr> <tr> <td>Sede Administrativa</td> <td>304</td> <td>332</td> <td>392</td> <td>461</td> <td>300</td> <td>230</td> <td>210</td> </tr> <tr> <td>ECG Puente Guillermo</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>638151</td> <td>734120</td> </tr> <tr> <td>ECG Vasconia</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>446076</td> <td>227811</td> </tr> <tr> <td>ECG Villavicencio</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>13232</td> <td>12540</td> </tr> <tr> <td>ECG Paratebueno</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>117742</td> <td>116727</td> </tr> <tr> <td>CO Cogua</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>535</td> <td>950</td> </tr> <tr> <td>ECG San Alberto</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>16874</td> </tr> <tr> <td>ECG Jagua del Pilar</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>4901</td> </tr> <tr> <td>Total</td> <td>45.339</td> <td>722.558</td> <td>861.594</td> <td>1.029.301</td> <td>1.042.908</td> <td>2.357.913</td> <td>2.275.940</td> </tr> </tbody> </table>  <p align="center">CONSUMO ANUALES (GJ)</p>	Consumos Energéticos Consolidados (GJ)									2016	2017	2018	2019	2020	2021	2022	ECG Mariquita	43664	82396	68192	61182	55073	58793	58158	ECG Padua	No hacian parte del alcance	139732	236707	274359	235345	265232	281598	ECG Miraflores		494313	554884	692319	749196	814684	819470	ECG Sabana	1371	5787	1418	980	2994	3238	2581	Sede Administrativa	304	332	392	461	300	230	210	ECG Puente Guillermo						638151	734120	ECG Vasconia						446076	227811	ECG Villavicencio						13232	12540	ECG Paratebueno						117742	116727	CO Cogua						535	950	ECG San Alberto							16874	ECG Jagua del Pilar							4901	Total	45.339	722.558	861.594	1.029.301	1.042.908	2.357.913	2.275.940
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	<p>Natural gas: Operating conditions of the SNT. Regulation. Nomination. Force majeure events, fortuitous event or extraneous cause. Extreme weather conditions. Motor technology.</p> <p>Electric power: Number of people at the station in the month. Activities carried out for the use of electrical equipment with higher consumption at the station. Detailed Work Plan (PDT). Technical characteristics of electricity consumption of the equipment in the station.</p>
FACTORS STATIC	<p>Natural gas: Type of activity (gas compression), compression process, compressor units.</p> <p>Electric power: Working hours, technologies.</p>
DATA NORMALIZATION FOR USES	<p>Natural gas: Analysis and exclusion of major events of ASD in ECG where climatic conditions are part of them when applicable. Also in periods where gas is not compressed.</p> <p>Electric energy: Analysis of data in consumption and generation format, for electric energy observations are reviewed at the time of energy review.</p>

Table 4. Energy consumption of the SGE headquarters

c) Energy Performance

For the calculation of indicators (See Annex 1. F-GEG-009 Energy Performance Indicator) of energy performance, the relevant variables and the monitoring of the annual energy consumption of the types of energy identified in the energy reviews for the headquarters within the scope of the SGE are taken into account. The foregoing taking into account the following considerations

- Because several forms of energy are used (natural gas, electric energy and other fuels), for the calculation of energy performance, the conversion and sum of all the identified energy consumptions to a common unit of energy measurement such as the Gigajoule (GJ) is carried out.

The following units are used for conversion:

- 1 Kwh = 0,00360 GJ
- 1 MBTU= 1,05506 GJ
- 1 Gal Diesel= 0,13670 GJ
- 1 Gal Gasolina= 0,12940 GJ

- For the ECG of TGI, energy performance was defined as the ratio of the sum of energy consumption (GJ) over Compressed Gas in volumetric units (KPC). The above following the guidelines of ISO 50006:2014.

$$DE = \sum \text{Energeticos (Gj)} / \text{Gas Entregado (KPC)}$$

Where:

SD = Energy Performance

Sum of Energy = Consumption of (Fuel gas + electricity + other fuels), expressed in energy unit GJ.

Gas Delivered = Total gas compressed or delivered, expressed in volumetric units (KPC: Kilo cubic feet).

SGE Scope Headquarters	Consumption 2022 (GJ)	Gas Transported 2022 (KPC)	Energy Performance 2022 (GJ/KPC)
Ladybug ECG	58.158	5.625.837	0,0103
ECG Padua	281.598	32.722.110	0,0086
ECG Miraflores	819.470	141.033.186	0,0058
ECG Puente Guillermo	734.120	145.963.322	0,0050
ECG Vasconia	227.811	37.832.104	0,0060
ECG Villavicencio	12.540	132.782	0,0944
ECG Paratebueno	116.727	11.186.966	0,0104
ECG San Alberto	16.874	1.595.245	0,0106
ECG Jagua del Pilar	4.901	0	1,6040
ECG Sheet	2.581	2.235.137	0,0012

Table 5. Energy performance ECG scope of the EMS

NOTE: The Jagua del Pilar ECG in 2022 did not compress gas, so the value of energy performance is maintained with the data for 2021.

- For the administrative headquarters and TGI Operational Centers, energy performance was defined as the ratio of the sum of energy consumption (GJ) to TGI headquarters personnel (# of people) Following the guidelines of ISO 50006:2014.

$$DE = \sum \text{Energeticos (GJ)} / \text{Personal sede TGI (\# persona)}$$

Where:

SD = Energy Performance

Sum of Energy = Consumption of (electrical energy + other fuels), expressed in energy unit GJ.

TGI headquarters staff = Total number of people on TGI's linked payroll, expressed in units number (#).

Scope Headquarters	Summatoria Energéticos 2022 (GJ)	Staff Venue 2022 (#)	2022 Performance (GJ/Person)
Administrative Headquarters Calle 73	210	1208	0,1738
CO Cogua	950	320	2,9688

Table 6. Energy performance, administrative headquarters and CO scope of the SGE

d) Energy Baseline and Change Management

The Energy Baseline (LBE) is defined as the quantitative reference that provides the basis for the comparison of energy performance. As a complement in terms of Energy Performance, a breakdown of the variables is made taking into account the headquarters scope of the SGE for TGI, since there are operational stations with reciprocating compression and centrifuge technology, in addition to an administrative headquarters and an operational center.

For the definition of the baselines, the headquarters that manage the same consumption and production units were taken, with respect to the base year and to have comparable data and years in which information has been collected.

NOTE: The baselines (LBE) will be reviewed at the end of each year once the activities proposed in this programme have been completed.

- **Baseline Integral Reciprocating ECGs (Mariquita ECG, Padua ECG, Miraflores ECG, Puente Guillermo ECG, Villavicencio ECG, Vasconia ECG, Paratebueno ECG, San Alberto ECG, Jagua del Pilar ECG):** Relates the consumption of gas, electricity and liquid fuels in (GJ) to the volume of compressed gas in (KPC). A weighting is made according to the contribution of each Reciprocating ECG in the gas transport of the year.

SGE SCOPE HEADQUARTERS (RECIPROCATING ECG)	TRANSPORTED GAS 2022(KPC)	WEIGHTING (%)	2022 WEIGHTED RESULTS (GJ/KPC)
Ladybug ECG	5.625.837	1,5%	0,0002
ECG Padua	32.722.110	8,7%	0,0007
ECG Miraflores	141.033.186	37,5%	0,0022
ECG Puente Guillermo	145.963.322	38,8%	0,0020
ECG Vasconia	37.832.104	10,1%	0,0006
ECG Villavicencio	132.782	0,0%	0,0000
ECG Paratebueno	11.186.966	3,0%	0,0003
ECG San Alberto	1.595.245	0,4%	0,0000
ECG Jagua del Pilar	0	0,0%	0,0000
TOTAL	376.091.552	100%	0,0060

Table 7. Baseline Comprehensive Reciprocating ECGs (Mariquita ECG, Padua ECG, Miraflores ECG, Puente Guillermo ECG, Villavicencio ECG, Vasconia ECG, Paratebueno ECG, San Alberto ECG, Jagua del Pilar ECG)

Note: As the scope has been extended to other operational sites with reciprocating technologies, the weighted results are updated taking into account the established weighting for which the Comprehensive LBE (Reciprocating ECGs) is established as 0.0060 GJ/KPC. For the year 2021 this figure was 0.0062 GJ/KPC.

- **Baseline ECG Centrifuge (Savannah ECG):** Relates the consumption of electricity and liquid fuels in (GJ) to the volume of gas transported in (KPC).

Baseline (GJ/KPC)	2022 Performance (GJ/KPC)
0,0010	0,0012
0,0010	0.0006 (Normalized)

Note: The Sabana ECG in 2022 did not compress gas for the first 7 months, but it did consume energy due to availability issues. Normalizing for the months where it had a gas compression behavior (October, November and December), it is evident that the energy performance was 0.0006 GJ/KPC.

- **Baseline (Administrative Headquarters Bogotá and CO Cogua):** Relates the consumption of electricity and liquid and gaseous fuels in (GJ) with respect to the staff of the headquarters (People).

Headquarters	Baseline (GJ/Person)	2022 Performance (GJ/Person)
Administrative Calle 73	0,1159	0,1738
CO Cogua	1,6500	1,6379

Table 8. Baseline (Bogotá Administrative Headquarters and CO Cogua)

Note: Having abnormal conditions in the year 2022-2023 due to the return to normality due to the COVID 19 pandemic, virtuality issues and modifications in the infrastructure, the number of effective personnel of the administrative headquarters was affected, for this reason the administrative LBE is updated to 0.1738 GJ/Person.

e) **Future energy consumption**

Future energy consumption (2023) is evidenced in the energy reviews of each site within the scope of the SGE.

f) **Objectives, energy goals and action plans**

- Promote environmental-energy programs and projects that contribute to environmental improvement and quality.
- Promote the application and dissemination of best practices in environmental and energy management in the operation and maintenance of infrastructure.

Goals:

- Comprehensive Target ECG Reciprocating SGE (Taking into account weights): ≤ 0.0080 GJ/KPC.
 - Individual goals 2022:
 - Ladybug ECG ≤ 0.0106 GJ/KPC.
 - ECG Padua ≤ 0.0090 GJ/KPC.
 - ECG Miraflores ≤ 0.0064 GJ/KPC.
 - ECG Puente Guillermo ≤ 0.0051 GJ/KPC.
 - ECG Vasconia ≤ 0.0061 GJ/KPC.
 - Villavicencio ECG ≤ 0.0453 GJ/KPC.
 - Paratebueno ECG ≤ 0.0101 GJ/KPC.
 - San Alberto ECG (Range Expansion): \leq According to 2022 energy performance
 - ECG Jagua del Pilar (Extension of scope): \leq According to energy performance in 2022
- Centrifugal Meta-ECG (Sheet ECG): ≤ 0.0010 GJ/KPC
- Administrative Headquarters Goal: ≤ 0.1300 GJ/Person
- CO Goal ≤ 1.6500 GJ/Person

Note: The targets would remain in place for 2023 unless the LBEs are updated.

Action plans: The implementation of action plans is specifically evidenced in the energy reviews of the headquarters within the scope of the EMS.

6.1.1. Identification and assessment of risks associated with energy performance

Risk information of the EMS contained in document F-GEG-046 Risk and Controls Matrix.

6.1.2. Communications relevant to the EMS

Information contained in Annex 3. EMS communications matrix.

6.2. Environmental impact characterization

6.2.1. Greenhouse Gas (GHG) Emissions Inventory

For the development of the Company's greenhouse gas inventory, the provisions of the WRI and WBCSD greenhouse gas protocol and NTC-ISO 14064-1 Guide will be taken as a reference. "Greenhouse Gases Part 1: Specification with guidance, at the organizational level for quantification and reporting of greenhouse gas emissions and removals." This part of the ISO14064 standard details the principles and requirements for the design, development, and management of greenhouse gas (GHG) inventories for companies and organizations, and for reporting on these inventories.

In addition, the emission factors for Colombian fuels published by the Mining and Energy Planning Unit (UPME), FECOC 2016, will be taken into account. Ministry of Mines and Energy and the GHG Protocol 2017. Emission Factors from Cross-Sector Tools. The electricity emission factor is calculated based on the information on the Colombian energy market published by XM Expertos and the emission factors for fuels based on the Colombian Mining and Energy Information System (SIMEC), which in turn presents the Mining and Energy Environmental Information System (SIAME) module. SIAME calculates the emission factors for fuels in Colombia.

To calculate the emission factor associated with air flights, data from the carbon calculator of the ICAO - International Civil Aviation Organization will be used, where the route can have the emission in kgCO₂ for each of these. For the GHG emissions inventory, the classification must be defined (See Figure 1), these are classified into direct emissions (Scope 1), indirect emissions from electricity consumption (Scope 2) and other indirect emissions (Scope 3).

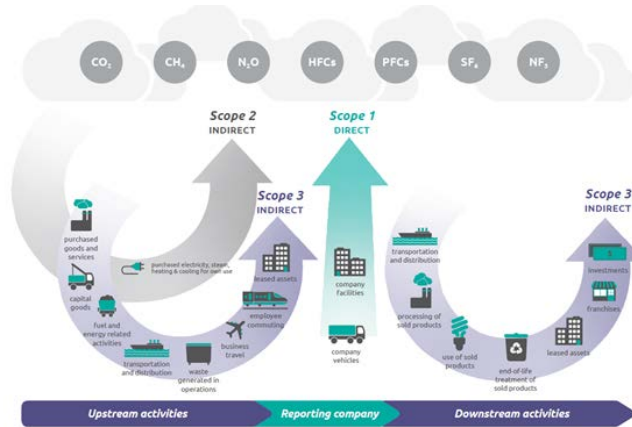


Figure 1. Scopes (Scope) GHG Protocol, 2013.

TGI S.A. ESP., has established the methodology to carry out the inventory of greenhouse gas (GHG) emissions through the instruction **I-ASI-052 Greenhouse Effect Gas (GHG) Monitoring**, which aims to carry out the inventory of the GHG generated in the company's own activities, based on the methodology defined to calculate the carbon footprint. establishing the flow of information, responsibilities and provisions to carry out and facilitate the completion of the **F-ASI-173 Greenhouse Gas (GHG) Report**.

QUANTIFICATION OF GREENHOUSE GAS (GHG) EMISSIONS	
SPECIFIC OBJECTIVE	Quantify TGI's Carbon Footprint
GOAL	Absolute sum of all GHG emissions caused directly and indirectly by the organization.

RESPONSIBLE	IMPLEMENTATION: Professional Environmental Sub-Directorate		
	MONITORING AND CONTROL: Deputy Director of Environmental		
JUSTIFICATION	Measure the impact of the organization's activities on the environment, determined by the amount of GHG emissions produced, measured in units of carbon dioxide equivalent.		
DESCRIPTION OF THE ACTIVITY(S)	<ul style="list-style-type: none"> • Monthly Report F-ASI-173 Report on Greenhouse Gases and Environmental Indicators • Preparation of the greenhouse gas report • GHG verification statement by an external entity • Contract to develop a methodology that includes efficient and cost-effective technologies and practices for the detection, quantification and management of methane emissions in TGI's natural gas transportation infrastructure. • Results of quantification and socialization to stakeholders 		
TRACKING	Verify monthly the generation of indicators and quarterly the preparation of documents and management of contracts required for the fulfillment of the activities listed for this subprogram.		
MANAGEMENT INDICATOR			
INDICATOR NAME	INDICATOR TYPE	CALCULATION FORMULA	MEASUREMENT FREQUENCY
TGI Carbon Footprint	Compliance	number of tonnes of CO2 equivalent emitted	Annual

Table 9. Subprogram Quantification of GHG emissions

The different headquarters of the organization have their own GHG inventory as established in the aforementioned format, in addition to generating the organization's greenhouse gas emissions report annually.

7. STRATEGIES FOR CONTROL, PREVENTION, MITIGATION AND COMPENSATION OF ENERGY AND ENVIRONMENTAL IMPACTS

Through the following activities, the strategies defined for the control, prevention and compensation of environmental and energy impacts are established.

7.1 Offsetting greenhouse gas (GHG) emissions

When the activities related to the quantification of the organization's GHG emissions are carried out and once the GHG report for the year has been validated, the GHG emissions offset will be generated as established below:

OFFSETTING GREENHOUSE GAS (GHG) EMISSIONS.	
SPECIFIC OBJECTIVE	Voluntarily offset GHG emissions generated by TGI
GOAL	Offset 100% of emissions from TGI's gas pipeline network emergencies – Achieve 50% emissions reduction by 2030 and 100% by 2050
RESPONSIBLE	IMPLEMENTATION: Professional – Environmental Sub-Directorate
	MONITORING AND CONTROL: Deputy Director of Environmental
JUSTIFICATION	Capture a number of tonnes of CO2 equivalent to that generated in our activity, through the implementation of a carbon sink project by reforestation.
	<ul style="list-style-type: none"> • Habitat Bank Implementation • Projects for the conservation and sustainable use of soils

DESCRIPTION OF THE ACTIVITY(S)	<ul style="list-style-type: none"> Acquisition of carbon certificates 		
TRACKING	Verify on a quarterly basis the preparation of documents and management of contracts required for the fulfillment of the activities listed for this subprogram.		
MANAGEMENT INDICATOR			
INDICATOR NAME	INDICATOR TYPE	CALCULATION FORMULA	MEASUREMENT FREQUENCY
Offset emissions	Compliance	number of tonnes of CO2 equivalent offset	Annual

Table 10. GHG emissions offsetting subprogram

7.2 Adaptation to climate change

The measures taken by the organization for adaptation to climate change through the management of risks related to this climatic condition are carried out through the following activities:

ADAPTATION TO CLIMATE CHANGE			
SPECIFIC OBJECTIVE	Develop initiatives and measures that reduce the vulnerability of TGI's natural gas system to the actual or expected effects of climate change.		
GOAL	Generate a climate change adaptation model of TGI		
RESPONSIBLE	IMPLEMENTATION: Professional – Environmental Sub-Directorate		
	MONITORING AND CONTROL: Deputy Director of Environmental		
JUSTIFICATION	It is essential that the organization adopt measures and practices to protect itself from likely damage and disturbance. Adaptation to climate change must consider not only how to reduce vulnerability to negative impacts, but also how to benefit from the positive effects. Adaptation measures should focus on the short and long term, and include components of environmental management, planning, and disaster management.		
DESCRIPTION OF THE ACTIVITY(S)	Develop entrepreneurial skills, focused on the search for a prosperous business that adapts to change, which delivers economic, environmental and social benefits.		
TRACKING	Verify quarterly the preparation of the model and management of contracts required for the fulfillment of the goal.		
MANAGEMENT INDICATOR			
INDICATOR NAME	INDICATOR TYPE	CALCULATION FORMULA	MEASUREMENT FREQUENCY
TGI's climate change adaptation model	Management	Approved document	Annual

Table 11. Subprogram Adaptation to climate change

7.3 Environmental Energy Awareness

Through awareness-raising actions, information related to this program will be transmitted as stipulated below:

ENERGY - ENVIRONMENTAL AWARENESS	
SPECIFIC OBJECTIVE	Raise awareness among employees and contractors at TGI headquarters on issues related to climate change and energy efficiency.
GOAL	Carry out 90% of the programmed awareness-raising activities.
RESPONSIBLE	IMPLEMENTATION: Professional – Environmental Sub-Directorate

	MONITORING AND CONTROL: Professional Environmental Sub-Directorate		
JUSTIFICATION	The Energy-Environmental Awareness is a tool that serves to strengthen the level of knowledge and awareness of the collaborators and contractors of TGI's headquarters, on issues related to climate change and energy efficiency, fosters positive attitudes and achieves a multiplier effect.		
DESCRIPTION OF THE ACTIVITY(S)	It is proposed to carry out two environmental awareness activities at the work headquarters, either in person or virtually, using the following means of internal communication: <ul style="list-style-type: none"> • Wallpaper • Intranet • Mailing • Whatsapp Groups • Newsletter • Virtual Training 		
TRACKING	The person responsible for this subprogram will be in charge of verifying that the activities are carried out in their entirety. You must submit photographic material and attendance lists that support the participation of all workers at TGI headquarters.		
MANAGEMENT INDICATOR			
INDICATOR NAME	INDICATOR TYPE	CALCULATION FORMULA	MEASUREMENT FREQUENCY
Awareness-raising activities	Compliance	(number of activities carried out / number of activities programmed) * 100	Annual

Table 12. Environmental Energy Awareness Sub-program

8. INTERNAL MONITORING AND EVALUATION

Monitoring and evaluation are interrelated activities that constitute a perspective of action guided by the need to know the results in advance and to make adjustments in a timely manner. Within the focus of the continuous improvement cycle, the PHVA (Plan, Do, Verify and Act) model contemplates monitoring, control and evaluation actions, in order to make necessary adjustments and achieve the improvement of climate change management and energy efficiency in TGI.

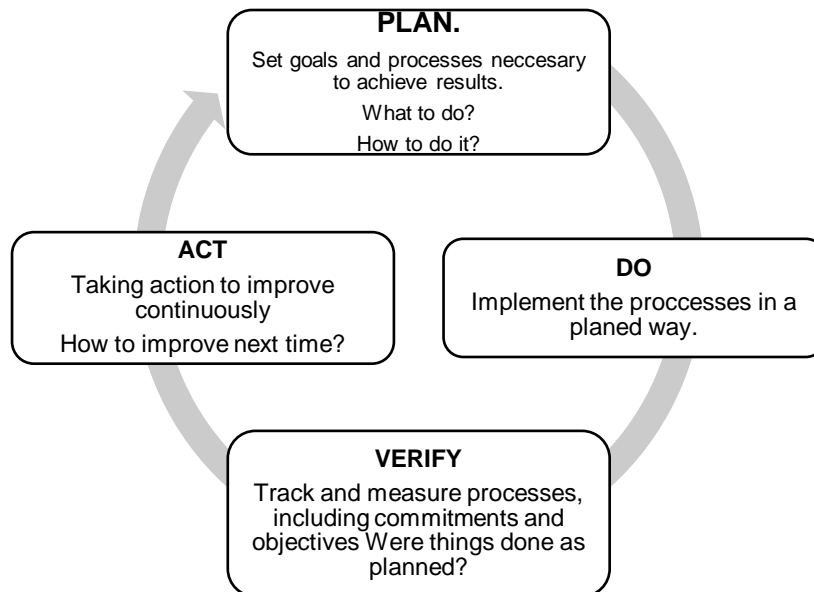


Figure 2. PHVA Cycle.

Validity of the program: The program will be valid annually and will be updated or modified according to the results obtained for the Energy Performance indicators.

9. IMPLEMENTATION TIMELINE

Through the stipulation of the schedule of activities (see Annex 4. Climate Change and Energy Efficiency Program Schedule 2023) plans the way to achieve the objectives and goals set according to the identified action plan, where it is evident what will be done, necessary resources, responsible people, estimated execution times and evaluation of results will support the following aspects regarding the proposed actions.

RELATED FILES

- P-ASI-022 Energy Review of the IMS
- I-ASI-052 Greenhouse Gas (GHG) Tracking