

	Environmental Strategy		
	HSE Management System HSE Vice Presidency		
	CODE HSE-N-005	Prepared 30/04/2022	Version: 1

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1 INTRODUCTION

The Environmental Strategy of Ecopetrol S.A. is aimed at setting guidelines for environmental protection and is immersed in, and coordinated with the Company's - TESG Strategy Technology, Environmental, Social, and Governance - and its Corporate Responsibility Strategy. It also seeks to promote with the attainment of the corporate goals in the framework of the energy transition.

This strategy is developed based on the Leadership and Planning stage of the HSE Management System, the Strategy and Direction element, and specifically the HSE Strategy, Programs and Plans sub-element, according to the guidelines set out in the ISO 14001 Standard.

The guidelines set out in this strategy will enable the organization to present a vision on Ecopetrol's environmental performance, seeking:

1. Environmental legal compliance.
2. The systematic identification and management of potential environmental impacts and risks associated with the activities of Ecopetrol S.A., with a focus on continuous improvement and the application of the mitigation hierarchy.
3. The generation of long-term environmental value in our operations surroundings.
4. Facilitate with the attainment of corporate environmental goals on the path to the energy transition strategy

The Environmental Strategy is aligned with the Risk Management System of Ecopetrol S.A. (SRI), seeking to promote the prevention of the materialization of potential risks that lead to the impact of natural resources and biota, as well as the preparation and response to potential emergencies that may pose risks to the environment.


This Strategy is applicable to all projects and activities of Ecopetrol S.A. and may be adopted by the companies of the Ecopetrol Business Group.

Based on the above, the following strategic pillars for environmental management were defined:

1. Environmental Planning and Compliance
2. Climate related action
3. Towards Water Neutrality (Water Net Positive)
4. Biodiversity and Ecosystem Services
5. Circular Economy
6. Clean Air for the Environment
7. Waste Management
8. Prevention and Improved Remediation of Impacts to the Environment by Operational Incidents and Process Safety

Likewise, the following strategic drivers were defined:

1. Environmental Culture
2. Innovation and Technology
3. Engagement with Authorities
4. Participation in Public Policy and Regulation Formulation
5. Socio-Environmental Affairs Strategy
6. Learning and Knowledge
7. Tool Management (SIGAR, SIGEA, SICLASST)
8. Strategic Environmental Investments Portfolio

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For each of the strategic pillars and drivers, strategic objectives are defined based on which the indicators and dynamic goals are defined within the framework of continuous improvement for each.

The Environmental Strategy is also developed based on the principles and guidelines established by different national and international standards and initiatives such as: The Dow Jones Sustainability Index, the Carbon Disclosure Project, the Global Compact, the CEO Water Mandate, the Zero Routine Flaring, Clean Air Covenants, the Global Methane Initiative, the Task Force on Climate-Related Financial Disclosures (TCFD), the Sustainability Accounting Standards Board (SASB), among others.

2 VISION

In Ecopetrol S.A.:

- We recognize and manage impacts on the environment, learning from the results obtained.
- We act responsibly, beyond legal compliance, under a framework of environmental culture to have a sustainable operation and products and to advance towards decarbonization and an energy transition
- We are active leaders executing actions that promote the generation of environmental value in the natural capital of the territory where we operate.


3 OBJECTIVES

3.1 GENERAL

Develop an operation in harmony and balance with the environment, progressively reducing potential impacts and risks for ecosystems, and generating environmental value in harmony with the environment and stakeholders.

3.2 SPECIFICS

- Compliance with the national environmental regulation and the environmental requirements established in the environmental management and control instruments issued by the national and regional environmental authorities.
- The systematic identification and management of potential environmental impacts and risks through the HSE Management System in accordance with the guidelines established in the ISO 14001 standard.
- Continuous improvement through the definition of strategic pillars and drivers with specific objectives and dynamic goals that are materialized through tactical plans in the organization.
- The promotion of the E culture among employees, contractors, and the Business Group.
- Include knowledge management, scientific advances and technology, as central tools in the formulation of the objectives and goals of the strategic environmental pillars and drivers.
- Meet the organizational goals included in the Sustainability Strategy.
- Carry out monitoring through the environmental management performance indicators, adjusting the tactical plans with a focus on meeting challenging goals that allow the organization to improve its environmental performance.
- Be a positive influence that addresses aspects of environmental problems in the territories with our stakeholders.

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- Report to our stakeholders and inform the public of the environmental management and performance of Ecopetrol S.A. based on the results of the implementation of the environmental strategy.
- Perform high-level monitoring of the implementation and effectiveness of the environmental strategy, in alignment with corporate objectives and goals.

4 BASIC PRINCIPLES

The Environmental Strategy is framed in the following basic principles:

4.1 The protection of the environment is a corporate responsibility that is promoted through environmental culture

It is Ecopetrol's responsibility to have an environmentally responsible operation in the territory therefore, the life cycle of the activities must be carried out with a focus on ecosystem protection. The foregoing should be promoted relying on elements of the HSE culture drawn up by the organization and in line with the sub-element of Culture: Leadership and Commitment of the HSE Management System Manual.

4.2 Compliance of environmental regulation is the foundation of the HSE Management System

Environmental legal compliance is the foundation of environmental management. Ecopetrol S.A. is committed to complying with the national environmental regulation, and with the requirements issued by the environmental authorities through management and control instruments.

Ecopetrol S.A. proactively provides support to environmental authorities in the formulation of regulations through an active and constructive participation based on technical, scientific, and technical evidence and the organization's *know-how*, to promote regulations for the sector in line with the protection of natural resources and ecosystems.

4.3 The mitigation hierarchy as the foundation of environmental planning of projects and operations


With the aim of a life cycle of our operations, with a reduced environmental footprint, environmental planning from an early stage in projects and activities is the fundamental principle from which the hierarchy of impact mitigation is implemented, so that they can mostly be prevented and mitigated from their design.

4.4 Continuous improvement aimed at excellence in environmental performance

Through the review of the opportunities for improvement of the different pillars and strategic drivers and in general of the environmental management of the organization, and an approach of these through concrete improvement actions based on the tactical plans and the definition of challenging annual goals, vectors are drawn that lead to the improvement of corporate environmental practices and to improve the environmental culture at all levels of the organization.

4.5 The environmentally smart challenge to meet corporate goals

From the Vice Presidency of HSE, environmental discipline through the Strategy leads to challenging operations in an intelligent, proactive, purposeful and constructive way, to promote environmental

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performance that progressively achieves goals that promote continuous improvement, with the use of tools of science, knowledge and technology, with a view to meeting corporate goals such as carbon neutrality and water neutrality, within the framework of the Corporate Responsibility Strategy, the Sustainability strategy, and the energy transition strategy.

4.6 The route to net positive environmental impact

From a corporate responsibility perspective, the presence of Ecopetrol in the territories must not only imply the execution of activities in a responsible manner with the environment through the implementation of the mitigation hierarchy, but also the search for alternatives to generate a positive environmental footprint on the environment, from different environmental perspectives.

Based on the Materiality Analysis carried out within the framework of Ecopetrol's Corporate Responsibility Strategy, the need to establish ambitious goals that lead to positive has been identified through the different elements identified, especially those of an exceptional and outstanding nature for Ecopetrol.

5 STRATEGIC PILLARS

5.1 Environmental Planning and Compliance

The prior knowledge and diagnosis of environmental aspects and determinants, as well as the specific regulations of the areas where Ecopetrol S.A. carries out projects and operations allow the identification of potential environmental impacts and essential opportunities for the conception and planning of measures focused mainly on the application of the mitigation hierarchy, contributing to the successful development of operations, the viability of new projects and the sustainable development of the territories where it operates.

2017 - 2021 Strategic Objectives


- Achieve excellence levels of environmental performance in the development of projects and operations of Ecopetrol SA, ensuring environmental legal compliance in all its responsibilities.
- Incorporate and implement, from the planning of projects and operations, adequate environmental management measures focused on the hierarchy of environmental impact mitigation promoting the sustainable development of the territories where it operates.

5.1.2 Strategic Lines

- Management and attainment of environmental authorizations

Environmental authorizations are essential in the planning of a project, work or activity and are a prerequisite for the development of operations and projects in the hydrocarbon sector. These are managed in full compliance with current regulations and are important inputs that contribute to environmental planning based on the mitigation hierarchy.

To ensure the timely and adequate development of projects and the operational continuity of businesses, environmental authorizations are built from the early maturation stages, seeking to harmonize operational needs with the environmental and social determinants of the territories.

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The studies that support the environmental authorizations adopt the principles of the mitigation hierarchy and the conflicts associated with the use of natural resources and the environment, the guidelines established within the environmental strategy in alignment with the TESG objectives and the guidelines on archaeological protection prior consultation and land use planning.

- Legal environmental compliance of operations and projects

Advance the systematic management for the environmental legal compliance of the obligations contained in the administrative acts issued by the environmental authorities in the licenses, procedures and permits of the Company, as well as those regulations applicable at the national and local level, establishing responsibilities of each of the areas involved, to identify, update, communicate, plan, and execute the monitoring and control of environmental legal requirements. The foregoing is done through the SICLASST tool, based on the corporate guidelines established for uploading and managing information in it.

Furthermore, as a consequence of a process of monitoring, measurement, analysis, and evaluation of environmental legal compliance, recommendations are made for continuous improvement applicable to the facilities and projects of ECOPETROL S.A. to fulfill this strategic line.

5.2 Climate related action

Ecopetrol remains committed to reducing its carbon footprint and thus joining efforts to limit the increase in global temperature to below 1.5 ° C. To do this, it carries out actions to reduce carbon emissions both in operations and in the Company's value chain, reduce the vulnerability of the operation to variability and climate change, as well as adequately manage risks and identify opportunities in relation to climate change.

5.2.1 Strategic Objectives

Maintain a low-carbon operation and reduce the vulnerability of infrastructure and operations to climate variability and change.

5.2.2 Strategic Lines


This strategic pillar, climate action, is developed through the following lines of action, which aim at meeting the objectives.

Mitigation

This strategic line seeks to reduce the Company's operations and value chain greenhouse gas emissions (in terms of CO_{2e}), in accordance with the business objectives of competitive and sustainable growth, in the short, medium, and long term.

The mitigation actions are in line with Ecopetrol's Corporate Strategy, the Sustainability agenda, and the roadmap to promote the energy transition, and have a detailed decarbonization plan, which ensures the Company's competitiveness and resilience.

The decarbonization plan includes the following elements:

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- Permanent update and verification of the greenhouse gas (GHG) emissions inventory for scopes 1,2 and 3¹.
- Reduction of GHG emissions associated with:
 - Fugitive emissions and vents: Identify and reduce this type of emissions from the operation, mainly methane, in accordance with the objectives of the initiative "Coalition for Climate and Clean Air - CCAC", led by the United Nations².
 - Flaring: Eliminate routine flaring in the operation in line with the World Bank's initiative "Zero Routine Flaring" by 2030³.
 - Renewable energy and energy efficiency: Incorporate renewable energies and improve energy efficiency levels in the different areas of the operation.
 - The incorporation of emerging technologies such as those associated with Hydrogen and Carbon Capture, Use and Sequestration (CCSU), among other technological options as they become competitive.
- Compensation of difficult to abate emissions, through Natural Climate Solutions, via the implementation of a portfolio of projects with high mitigation potential, use of recognized certification standards, approved methodologies, and social and environmental co-benefits.
- Strategic portfolio optimization through the inclusion of criteria associated with GHG emissions in decision making related to the incorporation and disincorporation of assets and the viability of future projects.

Adaptation and Vulnerability

This strategic line seeks to reduce the risks and impacts on the Company's facilities, surrounding communities, and ecosystems, which may generate the phenomena of variability and climate change. To such end, the Company has defined the following actions:

- Climate vulnerability and risks assessment, considering extreme events such as "El Niño" and "La Niña" phenomena and future scenarios of climate change.
- Formulation of regional plans for adaptation to climate variability and change, which include a portfolio of adaptation measures in water resource management, restoration and conservation of natural capital, climate-resilient infrastructure, and climate-compatible operations.
- Implementation, monitoring, and follow-up of actions related to adaptation to variability and climate change.

Research, Development, and Innovation


¹ Scope 1 emissions: emissions from sources under the Company's control (combustion, fugitives, torches, vents and transportation).

Scope 2 emissions: emissions derived from the generation of electricity purchased from a third party and consumed by the Company.

Scope 3 emissions: emissions derived from the activities of the Company but occur in sources that are not owned or controlled by the Company.

²Objectives:(i) Reduce sectoral methane emissions by 45% by 2025 and 60-75% by 2030 over the levels estimated for 2025, (ii) Reach 4/5 measurement levels by 2024 for 100% of the assets operated and in 2026, 100% of the non-operated assets.

³Conditions: (i) Do not carry out routine flaring in new oilfield developments, (ii) End routine flaring in existing fields as soon as possible and no later than 2030.

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Through this strategic line and with the technical leadership of the Center for Innovation and Technology-ICP, progress is being made in the research, development, and innovation of new low-carbon technologies, such as hydrogen, carbon capture, sequestration, and use (CCUS), large scale storage with batteries, through pilots and progressive scaling in the medium and long term.

Additionally, it seeks to establish alliances with international organizations, research centers, universities, and experts in Climate Change, to deepen knowledge, research and technological advances to reduce GHG emissions in the Company's operations and deal with the challenges of climate change.

5.3 Water Neutrality

The goals associated with water management in the world are framed in the Sustainable Development Goal 6, which seeks to guarantee universal access to drinking, safe and affordable water for all by 2030. Therefore, the comprehensive water management in Ecopetrol must contribute to the equitable, economic and environmental sustainable provision of water resources, articulated with Ecopetrol's Corporate Strategy, the T ESG agenda, the water neutrality roadmap, and the strategic pillars of action for climate, biodiversity and circular economy.

5.3.1 Strategic Objectives

Improve efficiency in water use to reduce operating costs and enable production and reserves.

Contribute to the transformation of conflicts associated with water and water security.

Reduce the water footprint to achieve water neutrality, allowing the management of physical, regulatory and reputation risks at every basin where each operation or project is developed, to increase the resilience of operations in territories for the generation of value in the environment and society, where social expectations and policies are progressively increasing.


5.3.2 Strategic Lines

- Operational efficiency in water management

This strategic line seeks to balance the consumption of water in operations with the availability of water for the ecosystem, with the aim of reaching water neutrality.

The comprehensive management of water in businesses generates value through the qualification of production and reserves, and guarantees the availability and continuity of the current and future supply of water for projects and operations, contributing to the sustainability of the water resource, through the following items:

- i. Reduction of the required water to operate a) Optimization of volumes of water injected for oil recovery; b) Loss and leakage control; c) Water saving devices; and d) Processes optimization
- ii. Maximizing reuse: a) Use of produced water for oil recovery and industrial uses; b) Water transfers between fields, and c) Renewable energies (e.g., green hydrogen)
- iii. Clean water for the ecosystem: a) Gradual reduction in the load of pollutants; b) Zero discharges to freshwater bodies; c) Water reuse in other sectors, industrial symbiosis, and d) Water safeguards

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- iv. Use of alternative sources: a) Industrial wastewater; b) Domestic wastewater; c) Deep aquifers; and d) Sea water
 - v. Estimation of the water footprint
 - vi. Promotion of environmental performance in the chain of goods and services
 - vii. Management of physical, regulatory, legal and reputational risks associated with water
 - viii. Water safeguards, excellence in water protection to avoid potential damage due to operational risks.
- Knowledge and technology integration

This line focuses on the development and transfer of technologies with the support of the Innovation and Technology Center - ICP, that allow:

- i. The optimization of the oil/water ratio: Mechanical and chemical separation of water on wells bottom.
 - ii. Improvement of the treatment for the valuation of water as an asset: a) Polishing and desalination of water at low cost; b) Enrichment of water for agricultural use; c) Bioenergy production; and d) Real-time monitoring (volume and quality)
 - iii. Water supply in areas with water deficit: Generation of knowledge of deep aquifers
 - iv. Platform or technological solution that incorporates analytical and artificial intelligence capabilities for water management.
 - v. Quantification of the return on investments in sustainability, making the positive financial impact explicit and generating competitive advantage
- Sustainability and water security in the environment

Operational efficiency in water management is not enough, it is necessary to propose, plan and implement interventions to achieve the sustainability of natural capital and its ecosystem services, therefore, this line focuses on:


Promoting actions to recover and conserve the natural capital that protects the water supply sources, its regulation and seasonal and spatial availability, contributing to equity in access to water and transforming socio-environmental conflicts.

Improve the adaptive capacity of the areas where operations and projects are carried out, through approaches such as adaptation to climate change and the application of nature-based solutions (including natural climate solutions).

Articulate and strengthen the interventions of the different public and private actors present in the territory to reduce the gap in access to drinking water and wastewater treatment in areas of influence of the projects and operations.

This line will be developed through:

- i. Management of natural capital for the regulation and availability of water resources: Certification of water security benefits of mandatory and strategic environmental investments (includes natural climate solutions and nature-based solutions)
- ii. Equity in access to water and basic sanitation (in conjunction with the Territorial Development roadmap - Environment Strategy)

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- iii. Nature-based solutions / Natural climate solutions (in conjunction with the strategic pillars of action for climate and biodiversity)
- iv. Water planning and governance: a) Collective action for the management of water security; and b) Participation in the creation of policies, standards, guidelines, and other instruments aimed at the integral management of water.

5.4 Biodiversity and Ecosystem Services

The biodiversity strategic line seeks to generate a positive net impact on biodiversity and ecosystem services, meeting the expectations of the main stakeholders and maintaining the license to operate, through proper management. It has four main axes: i) Mitigation hierarchy, ii) Nature-based solutions iii) Knowledge generation, and iv) Biodiversity culture.

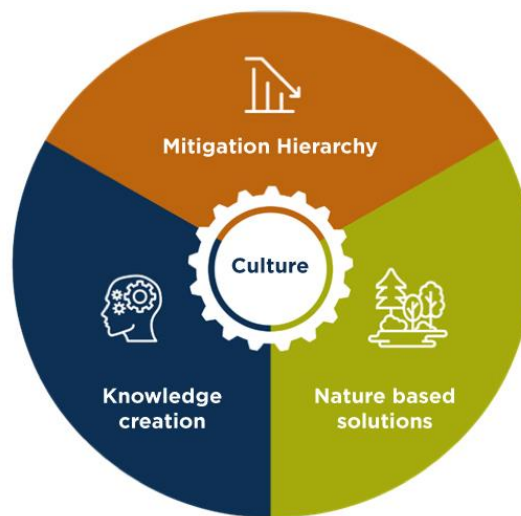



Figure 1. Axes of the Biodiversity and ecosystem services strategy

5.4.1 Objectives and Strategic Lines

Mitigation Hierarchy

Its purpose is to prevent, avoid and mitigate impacts on biodiversity and offset residual impacts, generating a net positive impact (gain in biodiversity).

This hierarchy refers to the sequence of measures designed to manage the negative impacts of a project, work, or activity, to avoid a net loss of biodiversity which must be applied for decision-making in the planning and design stages, see Figure 2.

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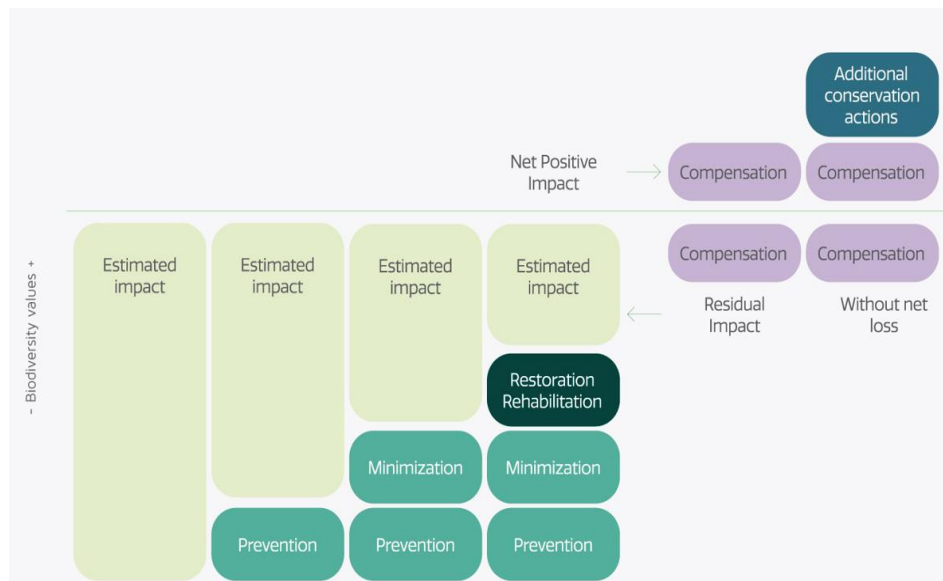


Figure 2. Mitigation hierarchy (Source: Practical Guide to Ecological Restoration, 2018, Biodiversity Foundation, of the Ministry for Ecological Transition, Spain).

As part of the strategy, Ecopetrol S.A. does not have, nor does it plan to intervene in exploration, production, or refining activities in areas classified according to the International Union for Conservation of Nature - IUCN in categories I to IV, of great value to biodiversity. Similarly, Ecopetrol does not have any projects or operations, nor does it plan to intervene in area declared as world heritage by UNESCO.


Nature based solutions:

Seeks to maintain biodiversity and ecosystem services in strategic areas, while improving the livelihood of local communities. It seeks to identify synergies between nature, society, and the economy, to face challenges such as climate change, water resource and biodiversity management, for which work is being done on the consolidation of Nature-Based Solutions (NBS), rather than relying on conventional solutions. Information related to Natural Climate Solutions (NCS), which are part of NBS, is addressed in chapter 5.2 on climate action. As an example, Ecopetrol Business Group's Ecoreservas network and tree planting are part of this type of projects.

5.5 Circular Economy

The Environment and Sustainable Development Ministry and the Commercial Ministry have defined Circular Economy, in the Circular Economy National Strategy, as a "Production and consumption system that promotes the efficient use of materials, water and energy, considering the recovery capacity of ecosystems, the circular use of material flows through the implementation of technological innovation, alliances and collaboration among actors, and the promotion of business models according to the foundations of sustainable development".

In this sense, the circular economy is adopted as a driver that contributes to the energy transition, the goal of zero net carbon emissions, water footprint reduction, closed-loop cycle of material and waste,

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and the diversification of new businesses, to ensure the competitiveness and long-term sustainability of the Company, while striving for the conservation of natural resources and society's well-being.

5.5.1 Strategic Objectives

- Manage change through effective and assertive communication and strengthen skills to instill and promote circular economy within the Company.
- Increase the efficient use of natural and material resources; reduce the generation or increase the utilization of waste; promote industrial symbiosis in projects and operations and create new circular business models.
- Contribute to natural and social capital protection, through circular projects with positive socio-environmental impacts on the territories where the Ecopetrol Group's operating areas are located.
- Measure the Company's progress in circular economy.

5.5.2 Strategic Lines

1) Strengthening skills and knowledge generation

- Generate knowledge about circularity for decision making (e.g.: life cycle analysis).
- Promote cooperation with other companies in the industry (e.g.: internships)
- Participate in education programs for communities.

2) Bank of Circular Initiatives

- Update the Ecopetrol Group's bank of initiatives, permanently.
- Develop mechanisms to overcome internal and external regulatory barriers.
- Generate business cases related to the reduction of GHG emission, water, materials, and waste. Also, articulate initiatives of the Technological Road Maps led by the ICP.
- Calculate environmental, social, and economic benefits of the implemented initiatives.
- Promote the diversification of new products and industrial symbiosis with third parties.
- Create management and monitoring tools.


3) Circularity criteria: Incorporate circular criteria in updating operational, financial, and supply processes.

4) Circularity in the supply chain:

- Define environmental selection criteria for supply contracting strategies.
- Structure green clauses for supply prioritized categories prioritized.
- Support the development and promotion of synergies with suppliers seeking to strengthen circular business.

5) Circularity Metrics

- Structure qualitative and quantitative metrics.
- Implement the qualitative measurement of circularity maturity in the short term, and quantitative measurement in the medium and long term.

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- Contribute to the decarbonization, water and waste goals.
- Contribute to certification schemes that make visible the Company's efforts in circular economy.

5.6 Clean Air for the Environment

Estimate the contribution in the reduction of atmospheric emission criteria contaminants, and/or in the improvement of air quality based on decarbonization projects, energy transition, clean fuels, strategic environmental investment, and mandatory environmental investment (1% and offsets).

5.6.1 Strategic Objectives

- Reduce criteria pollutant emissions to world class standards and contribute to improving air quality to protect our environmental health.
- Implement a Verified Inventory of Atmospheric Emissions in assets operated by Ecopetrol.
- Contribute to achieve and sustain an air quality at the level of the WHO's Air Quality Standards, in the areas of influence of operations.

5.6.2 Strategic Lines

Prevention


Assess air quality sensitive areas to adopt best practices and technologies to reduce emissions of criteria pollutants in projects.

- Identify sensitive areas and receivers with respect to air quality, to then implement the best practices and technologies to reduce criterion criteria air pollutants, optimizing operations, since early stages of the projects.
- Structure and implement a comprehensive air quality management program.
- Identify and prioritize sensitive areas and receptors in terms of air quality.
- Implement standards (based on benchmarks) for the emission of criteria pollutants.
- Establish design criteria and low-impact technologies to reduce the emission of criteria pollutants in existing stationary sources and in new projects.
- Develop criteria pollutant dispersion models for decision making in the operation and in the projects.
- Implement technologies and management systems for monitoring air quality in real time in areas of influence with support of the IoT and analytic (criteria pollutant emissions - climate variables)

Mitigation

Contribute to the reduction of atmospheric emissions of criteria pollutants, through decarbonization initiatives, energy transition, and technological and environmental investments.

- Ensure compliance with regulations on criteria pollutant emissions in direct operations.
- Have an updated and validated baseline and inventory of criteria pollutant emissions in direct operations, supported by measurements and systematic updating of data and parameters in the Information System (SIGEA).

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- Definition of goals to reduce emissions of criteria pollutants in direct operations, based on asset Development Plans and climate change , alternative energy and sources, fuel quality, and Circular Economy initiatives.
- Establish a portfolio of initiatives per asset (according to prioritization of sensitive areas and receivers) to achieve emission standards of criteria pollutants.
- Establish a process for the systematic verification of the inventory of atmospheric emission of criteria pollutants, supported by digital and analytical tools.
- Implement process optimization practices and application of low-impact technologies to reduce emissions of criteria pollutants in current and future operations.

Collective action

- Create synergies with other actors (Government, unions, communities, etc.) to implement joint actions and initiatives aimed at improving air quality and safeguarding the health of the population:
- Jointly develop technology, knowledge management, and environmental investment initiatives for monitoring and improving air quality.
- Manage the strengthening of air quality monitoring and surveillance systems in prioritized areas to quantify contributions from the operation.
- Participate in intersectoral and inter-institutional activities aimed at improving air quality.
- Implement systematic monitoring of operational contribution to the concentration values of criteria pollutants in areas of influence.

5.7 Waste Management

This strategic pillar includes the implementation of operational and organizational measures intended to reduce (to economic and technically feasible levels) the quantity and danger of the waste generated, based on three (3) fundamental aspects: a) Reduction at the source or origin; b) Recovery of material through the use of waste, via the implementation of the Multi-R or 9Rs concept of circular economy; c) Incorporation of disruptive technologies.


5.7.1 Strategic Objectives

Implement actions for the comprehensive management of waste generated by Ecopetrol S.A., focused on the zero-waste management system.

Incorporate circular initiatives to prevent and reduce the generation of waste, as well as to increase its use, in line with the circular economic model for Ecopetrol Group.

5.7.2 Strategic Lines

1. **Information management and culture:** Promote culture, education, and innovation in comprehensive waste management, establishing awareness and training processes aimed at officials and contractors to generate awareness on the aspects related to comprehensive waste management, especially specific procedures, functions, responsibilities, coordination mechanisms, as well as the guidelines included in the current regulations.

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2. **Analysis and Risk:** Waste management traceability analysis to identify prevention, minimization, and end-of-cycle actions, aimed at minimizing generation and maximizing utilization.
3. **Prevention and minimization (reject, reduce, and redesign):** Actions for comprehensive waste management, incorporating prevention and minimization concepts, identifying opportunities for improvement, and control of possible effects on the environment or people's health through initiatives to minimize the generation and enhance the use of waste.
4. **End of chain (reuse, repair, restore, remanufacture, and recycle):** Identification and development of options for internal and external use of waste for responsible return downstream of the value chain; work actively with organizations, institutions, and partners to set goals to properly manage, reduce, minimize, and benefit properly from waste.

5.8 Prevention and Improved Remediation of Impacts to the Environment by Operational and Process Safety Incidents


This pillar focuses on the prevention of operational incidents that affect the environment, incorporating proactive risk management and the analysis of potential materialization of environmental risks inherent in the various business areas.

5.8.1 Strategic Objective

Define actions aimed at the prevention and mitigation of environmental damage that may be caused by operational and process safety incidents, seeking business sustainability through the generation of trust with stakeholders.

5.8.2 Strategic Lines

1. **Proactive Risk Management:** Strengthen and proactively manage the threats and vulnerability of the exposed elements, for an adequate, timely assessment of risk scenarios and prevention of environmental impacts; the foregoing through the coordination of operational plans and tools of asset integrity, and the improvement of corporate management systems that strengthen decision-making and the prioritization of their interventions.
2. **Incorporation of technology in the management of environmental information:** Strengthening of the environmental information of the Company's businesses through technological tools for an adequate, updated analysis, as well as the fulfillment of objectives for environmental risk management and incident prevention.
3. **Continuous improvement analysis:** Analysis of results, causes, effects and controls on incidents that affect the environment and their relationship with the scope of the business management systems.
4. **Remediation and condition improvement:** Conduct remediation of the areas affected by the materialization of incidents with an impact on the environment, ensuring reinstatement and improvement of the original conditions.

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5. **Impact on culture:** Strengthening of skills and culture E relative to environmental risk management to raise awareness on the effects on ecosystems generated by incidents, the time it takes to restore to original conditions, the legal risks, and the impact on the reputation and the stakeholders.

6 STRATEGIC DRIVERS

6.1 Environmental Culture

The culture defines the principles and values that guide our behavior.

Life First is one of the cultural principles of Ecopetrol S.A., where each one, as an Ecopetrol employee takes care of himself and others, acts with rigor and discipline regarding the HSE management system, and takes care of the environment and its surroundings, considering future generations.

The environmental culture in Ecopetrol S.A. focuses on strengthening, at a cross-cutting level in the organization, the value of protecting the environment and the day-to-day systematic actions, aimed at the protection of ecosystems to prevent and mitigate potential environmental impacts of Ecopetrol's activities.

6.1.1 Objectives:


- Promote the generation and leadership in the environment (E) in Ecopetrol employees and contractors through the different sub-elements of the HSE Management System, specifically those associated with Culture, Leadership and Commitment, Skills Management, and Contractor Management.
- Top management promotion of continuous improvement in environmental performance, imparting environmental culture items that permeate all levels of the organization.

6.2 Innovation and Technology

Innovation and technology are key elements for developing Environmental Strategic objectives; it is, therefore, necessary to establish an efficient scheme for the acquisition, adaptation, and development of high-impact technologies for operating processes in the energy sector. This is all intended to strengthen competitiveness, to minimize the environmental impact, as well as to manage information using digital tools, aimed at safe and efficient processes leading to agile and timely decisions, based on reliable data.

6.2.1 Objectives

- Achieve improvements asset efficiency and competitiveness, through the incorporation of innovative process technologies, ensuring high performance in aspects such as energy consumption, operational reliability, asset integrity, operational excellence, etc., which contribute to reducing the environmental impact.
- Incorporate clean and low-emissions technologies, supported by optimization tools for the energy value chain, which include the cost of emissions for purposes of operational and business decision-making.

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- Develop, through optimization tools, the water value chain, incorporating alternatives for collection, use, reuse, recirculation, reutilization, and disposal, which leverage the Water Neutrality strategy.
- Develop tools for calculating and monitoring the impact of Greenhouse Gas Emission compensation alternatives (SNC, SBN).
- Streamline the evaluation and diagnosis processes of land use planning conditions and archaeological findings, based on Geomatic-based solutions.
- Propel circular economy businesses and initiatives based on new applications and products developed from by-products and potential waste from our operations.
- Develop technological platforms to monitor and project the impacts of circular economy initiatives.
- Development of digital tools to support the development of the strategic actions lines defined in the roadmaps of exceptional, outstanding and compliance elements, which are included in the TESH Strategy.
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6.3 Engagement with Authorities

Engagement with Authorities seeks to establish working relationships based on trust with the authorities to promote the achievement of business objectives and the sustainable development of the territory; further, exchanging information and identifying opportunities for optimization and innovation in:

- The management and attainment of environmental authorizations.
- Management of socio-environmental conflicts.
- The identification of territory opportunities that allow for guiding, proposing, and discussing various initiatives, actions, and projects to be included in Territorial Environmental Action Plans.
- Ecopetrol Environmental Strategy

Within the above framework, permanent engagement mechanisms (communication spaces) have been defined, such as: meetings, training, online conferences (webinars), disclosures, technical and legal work groups, and/or joint events.


6.3.1 Objectives

Harmonization of territorial and environmental planning instruments with Ecopetrol's environmental management instruments.

Ecopetrol strives for the viability of future projects through collaborative participation with territorial entities and Environmental Authorities in the formulation and updating of territorial planning instruments, seeking to harmonize Ecopetrol's bets with said instruments, providing recent and specialized technical data for enriching planning exercises, and adjusting them to the territory's current reality.

Environmental legal compliance

The inter-institutional engagement between Ecopetrol S.A. and the Environmental Authorities includes the management, monitoring, and attainment of environmental authorizations, intended to develop

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projects in accordance with the Company's planning.. Likewise, the relationship with the Authorities takes place within the framework of monitoring and control of management and control instruments, in accordance with national and regional environmental regulations.

Action within the framework of the environmental lines of action

Ecopetrol S.A. currently promotes voluntary actions leading to the improvement of environmental issues in the territories where it operates, which promote coordination actions with public institutions and engagement with other stakeholders. Hence, it defines environmental action lines to promote joint work with environmental authorities, organizations, and institutes, for the mutual transfer of technologies and knowledge, aimed at contributing to the solution of the environmental issues identified in the territories, and the initiatives and projects defined for their improvement.

Addressing petitions, complaints, and claims

The engagement also incorporates the articulation of various public and private institutions of the national order and the operational areas, to provide effective solutions to environmental situations, through inclusive and participatory channels such as the Citizen Participation Office, visits , etc.

Institutional Strengthening of the Authorities

By strengthening the technical capacities of the direct and contractor personnel of the Authorities, Ecopetrol promotes relationships of trust based on technical knowledge, which contribute to the decision-making process relative to the administration of the natural resources in the territory where it operates.


6.4 Participation in Public Policies and Regulations

The guidelines, criteria, and conditions required for the planning of Ecopetrol's projects, works and activities, include public environmental policies and the applicable environmental and sectoral regulatory framework, as these establish, without limitation, the environmental determinants, land use regimes, environmental restrictions, and guide management and development strategies, both at the sectoral level and for the comprehensive management of natural resources. It is worth highlighting that in the country, the changes and/or regulatory and public policy adjustments in recent years have been widely invigorated, due to the need to harmonize the country's development and economic growth with the conservation of the environment and the guarantee of sustainable development.

Thus, participation in the processes of formulating new regulations and public policy is essential to know first-hand the changes that will take place, promote the recognition of the Company and its assets in said processes, promote the harmonization of Ecopetrol activities with a regional and national vision, and contribute with technical inputs and other information that allow for new regulatory instruments to be developed based on the best information available.

6.4.1 Strategic Objectives

- Identify new and/or updated processes for formulating environmental regulations and public policies, to identify their influence on Ecopetrol, their impact, and opportunities.

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- Participate in the formulation of regulations and public policy, both at a regional and national scale, in processes identified as having an impact on Ecopetrol, to promote the harmonization of Ecopetrol's activities with the regional and national vision and contribute with technical input and other information enabling development of new regulatory instruments based on the best information available.

6.5 Socio-Environmental Affairs

Environmental Management at Ecopetrol and its Business Group, in line with the "Environmental Management Strategy", seeks to contribute to improving the environmental quality of the territories where operations are conducted, developing initiatives and projects to manage environmental impacts and contribute to the conservation of natural resources.

Ecopetrol and its Business Group have close links with the environment, where engagement with the various stakeholders, as a strategic axis, translates into favorable conditions for the viability of operations and the contribution to sustainable development.

Sustainable development as the Company's purpose and, in line with the Sustainable Development Goals (UNDP, 2016), allow for implementing actions that benefit economic prosperity, social inclusion and cohesion, and environmental sustainability; the foregoing contributes to society, via the eradication of poverty, protection of the environment, and prosperity.

6.5.1 Strategic Objectives


- Together with the Environment Management Area, interact with stakeholders as part of the environmental management, and within the framework of the planning processes (feasibility) of Ecopetrol's projects and activities to disclose the objectives, potential impact, opportunities, and management measures established to control them, including the measures established in the social files of management plans.
- During the execution and operation of the projects and activities, together with the Environment professionals, interact in the various spaces to address community concerns, or to actively disclose environmental management matters.
- Through the participation mechanisms established at Ecopetrol, provide a timely response to concerns and requests associated with environmental management submitted by the stakeholders.

6.6 Learning and Knowledge

This lever allows for incorporating and transferring knowledge and skills required by the organization's collaborators involved in the implementation of the Environmental Strategy through each of the defined strategic pillars. Learning and knowledge management are developed jointly with each of the target audiences, especially with the business segments, the HSE Vice Presidency, and the Human Talent Vice Presidency headed by Ecopetrol University.

6.6.1 Strategic Objectives

- **Technical Skills and Competencies:**
Design and implement learning strategies for focus and target audiences of the environmental strategy, leveraged on the HSE Academy, seeking to have the technical skills required for the development of this strategy.


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- **Knowledge Transfer:**
Incorporate knowledge and practices in the environmental strategy at a technological, industrial, and governmental level, based on knowledge management mechanisms: RANE's, talks E+ knowledge, communities of practice, among others.
- **Development of operating practices and standards:**
Develop and support the operational areas on the implementation of environmental standards to adapt or incorporate new technologies and processes within the framework of continuous improvement related to environmental performance.

6.7 Management of tools (SIGAR, SIGEA, SICSAST)

The environmental management tools seek to consolidate and organize information regarding water management, waste, and atmospheric emissions, as well as to standardize the management and monitoring process of legal compliance in Ecopetrol's operations and business group. These tools are developed in SAP operating systems, which allows their interaction with other Company databases and information systems. Furthermore, they provide the information required for sustainability reports, the Dow Jones Sustainability Index (DJSI), the Carbon Disclosure Project (CDP), Water Information Request, and ARPEL Environmental Benchmarking, among others.

System	Description
SIGEA	SIGEA (Atmospheric Emissions Management System) allows to conduct the inventory of greenhouse gases, criteria pollutants, and VOCs, to report, monitor, optimize processes, and mitigate the impact caused by emissions from daily operations in the value chain segments. Additionally, it serves as a repository for isokinetic and air quality studies conducted to comply with the requirements set out for atmospheric emission permits from fixed sources in operations. This system has been verified by a third party. SIGEA is a fundamental part of the business group's climate change strategy, and for monitoring actions defined in the strategic mitigation line of the clean air roadmap for the environment.
SIGAR - WASTE	SIGAR - Waste (Hazardous and non-hazardous waste management system) is aimed at monitoring the quantities generated by each waste stream, obtaining reports of generation indicators and managing the documents that support the corresponding legal management. Based on consolidated information on waste management, it is possible to identify opportunities for improvement in management and, circular economy actions can be promoted.
SIGAR-WATER	SIGAR - Water (Water Management System) It allows to consolidate, analyze, verify, and report the information associated with water management in operations and projects, to guide decision-making in water management operational efficiency, generating value by enabling production and reserves, as well as monitoring the availability and continuity of the current and future supply of water for projects and operations, considering the sustainability of the water resource.
SICLASST	SICLASST (Environmental Legal Compliance System for Safety and Occupational Health) enables standardizing the management and monitoring process of legal compliance in the area of Health, Safety and Environment - HSE; in particular, concerning environmental issues, it standardizes the management and monitoring process of environmental legal compliance; it enables a comprehensive management of information through the

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	uploading of requirements, their classification according to the non-compliance risk, the incorporation of operational controls, documentation of fulfillment of requirements, generation of tasks, warnings, reports, and indicators. The foregoing is intended to achieve proper control and monitoring by each of the roles in the various management processes.
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6.8 Portfolio of Strategic Environmental Investments

Strategic environmental and sustainability investments enable Ecopetrol's active participation in the territory, including environmental dialogue and contribution to the solution of environmental and sustainability challenges. In the same vein, they promote the generation of knowledge and culture, and leverage the actions defined in the TESG strategy roadmaps, within the framework of corporate responsibility. Thus, along with strategic environmental partners at the national, regional and/or local level the organization's efforts can be multiplied to support the solution of environmental issues in the territories,.

6.8.1 Objectives

1. Identify gaps and provide solutions to strategic environmental issues for the organization and its stakeholders, promoting science based innovation, and leveraging the regional and national proposed goals.
2. Promote alliances and collective work with strategic partners to generate greater impact and benefits on environmental dimensions and environmental sustainability.
3. Develop environmental and sustainability projects or initiatives that generate knowledge, information, and technologies to ensure the Company's value promise and seek shared prosperity in the territory.


7. Governance of Environmental Strategy

The Environmental Strategy is structured and updated by the HSE Vice Presidency and specifically by the Environmental Management and Engagement Management Area and the Sustainability and Decarbonization Management Area.

The monitoring of the implementation of the various strategic pillars and levers, as well as the assurance of their inclusion in the tactical plans of the various operational Vice Presidencies, and the follow-up on fulfillment of their goals, is the responsibility of the two Environmental Management Offices of the HSE Vice Presidency.

The strategic objectives of each pillar and lever must be disclosed to the Operational Vice Presidencies for incorporation into their tactical plans. The annual goals must be established with a focus on continuous improvement, and agreed upon with the Operational Vice Presidencies of Ecopetrol S.A.

In line with the Management Review sub-element of the HSE Management System Manual, senior management shall review the organization's HSE Management System and, hence, the implementation of the Environmental Strategy aimed at ensuring its convenience, suitability, and effectiveness.

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8. REFERENCES

- Ecopetrol S.A. Corporate Responsibility Policy
- Ecopetrol S.A. Corporate Strategy
- TESH Strategy
- Sustainability strategy roadmap booklet.
- ISO 14001(International Organization for Standardization – Environmental Management System)
- HSE Management System Manual
- Ecopetrol's Integrated Risk Management System

LIST OF VERSIONS

Previous Document			
Version	Date (dd/mm/yyyy)	Document Code and Title	Changes
1	N.A.	N.A.	N.A.
New Document			
Version	Date (dd/mm/yyyy)	Changes	
1	30/04/2022	Document Preparation and Document translation to English	

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