

C0. Introduction

C0.1

**(C0.1) Give a general description and introduction to your organization.**

Ecopetrol Group is the largest company in Colombia and one of the most relevant integrated energy companies in Latin America, that participates in all segments of the hydrocarbon chain (exploration, production, midstream, downstream, and commercialization) and in the linear infrastructure, both in energy transmission as well as toll road concessions, with the prospect of potentially continuing to diversify into businesses that allow to continue reducing its carbon footprint.

Ecopetrol has presence primarily in Colombia and activities in the U.S. (U.S. Gulf of Mexico and Permian Basin), Brazil, Mexico, Peru, Chile and Bolivia. In Colombia, it is responsible for more than 60% of the hydrocarbon production, transportation, logistics, and hydrocarbon refining systems, and hold a leading position in the petrochemicals and gas distribution segment. In 2021 Ecopetrol acquired Interconexión Eléctrica S.A. ESP, the leading energy transition group in the Western Hemisphere, effectively diversifying its EBITDA from the hydrocarbon sector. Through ISA Ecopetrol also has operations in the electricity transmission, road concessions and information communications technology business in Colombia, Brazil, Peru, Chile, Bolivia, Argentina, and Central America.

Ecopetrol's shares are listed on the Colombian Stock Exchange (BVC) and its ADRs (American Depositary Receipts) are listed on the New York Stock Exchange (NYSE).

Ecopetrol S.A. is a public limited company. The Republic of Colombia is the majority shareholder, with an 88.49% interest in the company.

Ecopetrol's Colombian operation includes two refineries, one in Barrancabermeja and one in Cartagena, four ports for the export and import of fuels and crude oil in Coveñas, Cartagena and Santa Marta, on the Caribbean Sea, and in Tumaco on the Pacific Ocean. The company also owns most of the country's pipelines and polyducts that connect production systems with large consumption centers and maritime terminals.

The significant colombian subsidiaries are Refinería de Cartagena S.A.S. (Reficar or Cartagena Refinery), Cenit Transporte y Logística de Hidrocarburos S.A.S. (Cenit), Oleoducto Central S.A. (Ocensa) and Interconexión Eléctrica S.A. E.S.P (ISA).

Ecopetrol's 2040 Corporate Strategy has four pillars:

1. Growing with the energy transition - This sets the stage for growth and value generation in Ecopetrol Group in line with the new demands of the energy transition and of the environment. The two (2) purposes of this pillar are to maximize reserves and the production value while diversifying the Group's portfolio in energy and low emission businesses, aligning itself with the Company's climate efforts.
2. Generating value with TESG (technology, environment, social, and governance) - This responds to socio-environmental challenges and the need to achieve sustainable operations while recognizing and working hand in hand with stakeholders. The Company's material issues are a key component of this pillar, including Climate Change, which has been identified as an exceptional issue in the Company's materiality exercise.
3. Competitive returns - This ensures the growth and value generation of Ecopetrol Group, even in low price environments, by focusing on the hydrocarbons' core and sustainable businesses.
4. Cutting-edge knowledge - This includes all efforts to attract, develop, and retain talent, as well as the development of a comprehensive science, technology, and innovation (CT+I) strategy. In a cross-cutting way, it also adapts the organization of Ecopetrol Group by implementing digitization processes and adopting agility and innovation. The Company's efforts to minimize the potential impact of the decarbonization of its operations on its workforce are included in this pillar.

C0.2

**(C0.2) State the start and end date of the year for which you are reporting data.**

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Reporting year	January 1 2021	December 31 2021	Yes	3 years

C0.3

**(C0.3) Select the countries/areas in which you operate.**

Colombia

C0.4

**(C0.4) Select the currency used for all financial information disclosed throughout your response.**

COP

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Operational control

C-OG0.7

(C-OG0.7) Which part of the oil and gas value chain and other areas does your organization operate in?

Row 1

Oil and gas value chain

- Upstream
- Midstream
- Downstream
- Chemicals

Other divisions

- Biofuels

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, a Ticker symbol	Ticker at NYSE is EC
Yes, a Ticker symbol	Ticker at BVC is ECOPETROL

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Board-level committee	The Board's structure includes Board Committees that support the Board review of the company's strategy and decision-making process including climate change and water. The Risk and Audit committee oversees the risks that could be faced by the company, including matters related to Technology, Environmental, Social and Governance (TESG) and particularly to climate change. The current Business Risk Map includes "Inadequate management of climate change and water". The Corporate Governance and Sustainability Committee supports the Board in the analysis and decision-making process to adopt best practices in corporate governance and sustainability matters in general and particularly in relation with the company's TESG strategy. The HSE Committee is responsible for guiding the Environment agenda and the Technology & Innovation Committee for enabling and reviewing topics from an ESG perspective. In 2021 these Committees reviewed topics related to diversification towards businesses associated with the decarbonization needs and with new opportunities arising from the energy transition related to the energy and infrastructure businesses such as wind and geothermal energy, low-carbon hydrogen, biogas, and solar energy, and roadmaps on emission reduction goals, energy transition, carbon neutrality, and circular economy.
Other, please specify (Board of Directors)	All nine (9) members of Ecopetrol's Board of Directors provide corporate oversight and strategic review and recommendations on climate change related matters. In 2021, the Board approved the 2040 Strategy and the 2022-2024 Business Plan. The Strategy has two (2) pillars related to growing with the energy transition and generating value with TESG, which provide the necessary elements to address risks and opportunities related to climate change.

C1.1b

**(C1.1b) Provide further details on the board’s oversight of climate-related issues.**

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
Scheduled – some meetings	<p>Reviewing and guiding strategy</p> <p>Reviewing and guiding major plans of action</p> <p>Reviewing and guiding risk management policies</p> <p>Reviewing and guiding annual budgets</p> <p>Reviewing and guiding business plans</p> <p>Setting performance objectives</p> <p>Monitoring implementation and performance of objectives</p> <p>Overseeing major capital expenditures, acquisitions and divestitures</p> <p>Monitoring and overseeing progress against goals and targets for addressing climate-related issues</p>	<Not Applicable>	<p>The Board is responsible for monitoring and approving the Corporate Strategy. In 2021, the Board approved the 2040 Strategy and the 2022-2024 Business Plan (BP). The Strategy has four (4) pillars, the first two (2) are growing with the energy transition and generating value with TESG. These provide the necessary elements to face the risks and opportunities related to climate change. Topics related to the energy transition and decarbonization were included as part of the annual planning and budgeting, the BP, and performance objectives. The BP now includes the cost of GHG emissions, by using an internal carbon price currently set at USD 20 per tonne of CO2 to evaluate new projects. Nearly 63 MUSD will be invested in Ecopetrol’s decarbonization agenda in 2022, including energy efficiency, new competitive renewable energy and gas utilization projects that are part of the Roadmap to advance towards the goal of reducing 25% of CO2e emissions generated by the operations by 2030 and becoming a net-zero emissions company by 2050 for Scopes 1 and 2. The BP also includes investments of more than 200 MUSD in water management projects, nearly 30 MUSD in fuel quality improvement projects, and 6 MUSD in the development of pilot projects and green and blue hydrogen studies.</p> <p>On the other hand, the Risk and Audit Committee oversees the company’s risks, including matters related to climate change. It met 12 times in 2021, with a regulated minimum of eight (8) meetings a year. The current Business Risk Map includes “Inadequate management of climate change and water”.</p> <p>As for performance objectives, the BoD also reviewed and approved the Group’s 2022-2024 Balanced Scorecard (TBG) and monitored performance of the 2020-2022 and 2021-2023 TBGs. The TBG is used to set and monitor performance in relation to the Company’s targets and it has an impact on variable compensation of employees. The 2021 TBG provided a 55% relevance weight to sustainability metrics. Moreover, the BoD monitors and oversees progress against goals to address climate-related issues through its Committees: (i) Corporate Governance and Sustainability: it supports the analysis and decision-making related to the adoption of best practices on sustainability. It held 7 sessions during 2021. (ii) HSE: it monitors the Company’s decarbonization plan, which includes the approval of specific strategies to meet emission reduction goals. It met 3 times during 2021 and analyzed matters such as neutrality carbon emissions and circular economy. (iii) Technology and Innovation: it held 3 sessions, reviewed the advances on the technology and innovation program, including the technology roadmap for decarbonization. (iv) Compensation, Nomination and Culture: it held 8 sessions, some of which were focused on monitoring performance of the TBG and the variable compensation of employees, which is partly determined by the TBG.</p>

**C1.1d**

**(C1.1d) Does your organization have at least one board member with competence on climate-related issues?**

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues	Primary reason for no board-level competence on climate-related issues	Explain why your organization does not have at least one board member with competence on climate-related issues and any plans to address board-level competence in the future
Row 1	Yes	<p>The Board, according to its medium and long-term business objective and in accordance to its Succession Policy, established the competencies and experience matrix the Board should have in order to determine the knowledge, training and/or expertise required for the performance of their duties and in consideration of the expectations of stakeholders.</p> <p>The matrix included basic and complementary requirements. Basic requirements are the minimum requirements set forth in Ecopetrol’s Bylaws for its members at the time the candidates are nominated. Complementary requirements are defined in the matrix based on the Company’s strategy in order to ensure its continuity in the medium and long-term, considering the characteristics of Ecopetrol and the energy industry, stock market trends, as well as the recommendations offered as a result of the annual evaluation of the BoD.</p> <p>One of the requirements is “health, safety and/or the environment” six (6) members have experience in climate change issues. To assess the competence of the Directors, the Company evaluated the professional profile of each member in order to identify experience and/ or training in renewable and low carbon energy, climate change and environmental impact, among others.</p>	<Not Applicable>	<Not Applicable>

**C1.2**

**(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.**

Name of the position(s) and/or committee(s)	Reporting line	Responsibility	Coverage of responsibility	Frequency of reporting to the board on climate-related issues
Chief Executive Officer (CEO)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	As important matters arise
Chief Operating Officer (COO)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	As important matters arise
Other C-Suite Officer, please specify (HSE Vicepresidency)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	As important matters arise
Other committee, please specify (Executive Committee (ExCo))	<Not Applicable>	Other, please specify (ExCo is a committee that supports Ecopetrol's CEO in monitoring and approving climate strategy and decarbonization strategic plan. )	<Not Applicable>	As important matters arise
Other, please specify (Corporate Strategy and New Businesses Vicepresidency)	<Not Applicable>	Other, please specify (Designs and implements the energy transition roadmap, provides analysis and defines the energy transition scenarios.)	<Not Applicable>	As important matters arise
Other, please specify (Corporate Compliance Vicepresidency)	<Not Applicable>	Other, please specify (Defines the business risk map, where climate change is addressed)	<Not Applicable>	As important matters arise
Chief Financial Officer (CFO)	<Not Applicable>	Other, please specify (Oversees the implementation of the internal carbon price and its analyses, and evaluates and analyzes the financial impact of climate-related risks and opportunities.)	<Not Applicable>	As important matters arise
Other, please specify (Upstream Vicepresidency)	<Not Applicable>	Other, please specify (Implements adaptation plans and decarbonization projects in production facilities.)	<Not Applicable>	As important matters arise
Other, please specify (Commercial and Marketing Vicepresidency)	<Not Applicable>	Other, please specify (Makes the business case for energy efficiency and renewable energy projects to be included in the portfolio.)	<Not Applicable>	As important matters arise
Other, please specify (Corporate Affairs Vicepresidency and General Secretary)	<Not Applicable>	Other, please specify (It monitores and analyzes the Sustainability strategy.)	<Not Applicable>	As important matters arise
Other, please specify (Refining and Industrial Processes Vicepresidency)	<Not Applicable>	Other, please specify (Responsible for the identification, evaluation and implementation of initiatives aligned with the company's energy transition and decarbonization strategy.)	<Not Applicable>	As important matters arise
Other, please specify (Science, Technology and Innovation Vicepresidency)	<Not Applicable>	Other, please specify (Supports technological and digital transformation for issues related to Sustainability strategy.)	<Not Applicable>	As important matters arise
Other, please specify (Sustainability and Decarbonization Management)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	More frequently than quarterly
Other, please specify (Vice-Presidency of Low-Emissions Solutions)	<Not Applicable>	Other, please specify (Responsible for diversifying Ecopetrol's energy matrix with a focus on decarbonization)	<Not Applicable>	As important matters arise

**C1.2a**

**(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).**

CEO: Is responsible for directing and managing the Company. He executes and oversees the implementation of all operations and activities falling within the corporate purpose, including climate change related matters. The CEO is responsible for the Company's Balanced Scorecard (TBG) and communicating progress to the Board. The TBG addresses the energy transition, decarbonization, GHG reduction, and the gas strategy, and it is used as a tool to monitor performance of the Company's objectives, indicators, and milestones defined in the corporate strategy.

Executive Committee (ExCo): is a Senior Management Committee, part of Ecopetrol's collegiate bodies. It is a management tool that supports Ecopetrol's CEO in his activities. The ExCo monitors and approves strategic issues of the corporate areas as well as the goals, objectives, and business initiatives that are relevant to more than one of the Ecopetrol Group's business segments. In 2021, it reviewed climate change and decarbonization issues, among which business risks stand out, as well as the emissions reduction target. It also reviewed and guided the strategic plan for gas and LPG, energy transition scenarios, and the materiality analysis and TSEG roadmap.

COO: Reports to the CEO. Responsible for the strategic direction and administration of the main operations of Ecopetrol and its Subsidiaries, and Shareholdings, in accordance with the corporate strategy, established processes and applicable regulations, seeking to maximize profitability, generating growth and sustainability. The COO establishes assurance and risk mitigation actions within the Company's operations and ensures the accomplishment of objectives and goals of Occupational Health, Industrial Safety and Processes; Corporate Responsibility; and Social and Environmental Management.

HSE VP: Reports to the COO. Directs and leads the definition and implementation of the Environmental Management strategy, that includes climate action strategic lines, Industrial Safety, Process Safety, Integral and Occupational Health through a solid orientation and deployment of management systems, standards, good practices and systematic evaluations of HSE. The role includes measuring their performance, as well as leading the identification of gaps and formulation of intervention plans, at a strategic and tactical level, ensuring the comprehensive care of people, the environment, and the infrastructure of the organization.

Sustainability and Decarbonization Head: Reports to the HSE VP and is responsible for designing and leading climate change, biodiversity, and circular economy, and its alignment with the corporate strategy and plans. In Climate Change, it leads the Decarbonization Plan implementation, manages the Atmospheric Emissions Management System, evaluates initiatives to reduce GHG emissions, defines guidelines for offsets management and establishes climate change adaptation actions to reduce vulnerability and manage climate-related risks.

Corporate Strategy and New Businesses VP: Designs and implements the energy transition roadmap, which includes the development of low-emissions opportunities, provides analysis, and defines the energy transition scenarios.

Corporate Compliance VP: It updates the Integrated Risk Management System and defines the business risk map, where climate change and energy transition are addressed.

Corporate Finance VP (CFO): Oversees the implementation of the internal carbon price and its analyses, compiles TCFD and SASB metrics, leads portfolio and capital allocation, evaluates, and analyses the financial impact of climate-related risks and opportunities. In addition, leads Investor Relations.

Upstream VP: Implements adaptation plans and decarbonization projects for Exploration and production operations and its production facilities.

Commercial and Marketing VP: It participates in the quantification of emissions from hydrocarbon operations up to commercialization and purchase credits for offsetting supply chain operations.

Corporate Affairs VP and Secretary General: Directs the company's Corporate Governance, including acting as corporate secretary to the Board and its committees. It also has the governance over disclosure and reporting and the monitoring and oversight of the TSEG pillar of the strategy.

Refining and Industrial Processes VP: Responsible for the identification, evaluation and implementation of initiatives aligned with the company's energy transition, decarbonization and integrated water management strategy.

Science, Technology, and Innovation VP: Supports technological and digital transformation for issues related to the strategy, including all TSEG aspects.

Low-Emissions Solutions VP: responsible for diversifying Ecopetrol's energy matrix with a focus on decarbonization, generating value by optimizing assets to ensure a reliable and economic energy supply to the Group. It includes the Low-Carbon Hydrogen Strategic Plan development.

**(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?**

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	Yes, the company has short-term incentives "Performance-Based Variable Compensation" (CVR for its acronym in Spanish) linked to the annual achievement of business objectives and targets established in the Balanced Scorecard (TBGs for its acronym in Spanish), one of them being the annual reduction target of GHG emissions. Additionally, there are "Long Term Incentive Plans - LTI", launched every year with a three-year horizon, to leverage the achievement of the objectives of Ecopetrol Group's strategy. GHG emissions reduction target weights depend on the plan. Currently, Ecopetrol has three (3) LTI plans: for 2020-2022, GHG reduction weights 15%; for 2021-2023 it weights 15%; for 2022-2024 it weights 20%.

## C1.3a

**(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).**

Entitled to incentive	Type of incentive	Activity incentivized	Comment
All employees	Monetary reward	Emissions reduction project Emissions reduction target Energy reduction project	The CVR applies to all employees and is recognized based on the results of the strategic objectives and the goals of the Balanced Scorecard (TBGs), also considering other factors such as HSE, ethical and disciplinary events, internal control failures and the individual performance of each employee.  For the year 2021, the Balanced Scorecard includes a GHG reduction goal that measures the cumulative reduction of emissions in Ecopetrol Group in terms of CO2 equivalent (CO2, CH4, N2O), through the implementation of projects such focused on energy efficiency, flaring, venting and fugitive emissions reductions, renewable energy projects, among others.
President	Monetary reward	Emissions reduction target	The Long-Term Incentives (LTI) apply to company executives and each plan includes a GHG reduction target for each three-year period, aligned with the company's goal of reducing GHG emissions by 25% by 2030 (Scopes 1 and 2) and achieving zero net carbon emissions by 2050.  Currently we have implemented three (3) LTI plans for the periods 2020-2022, 2021-2023 and 2022-2024.
Management group	Monetary reward	Emissions reduction target	The Long-Term Incentives (LTI) apply to company executives and each plan includes a GHG reduction target for each three-year period, aligned with the company's goal of reducing GHG emissions by 25% by 2030 (Scopes 1 and 2) and achieving zero net carbon emissions by 2050.  Currently we have implemented three (3) LTI plans for the periods 2020-2022, 2021-2023 and 2022-2024.
Chief Financial Officer (CFO)	Monetary reward	Emissions reduction target	The Long-Term Incentives (LTI) apply to company executives and each plan includes a GHG reduction target for each three-year period, aligned with the company's goal of reducing GHG emissions by 25% by 2030 (Scopes 1 and 2) and achieving zero net carbon emissions by 2050.  Currently we have implemented three (3) LTI plans for the periods 2020-2022, 2021-2023 and 2022-2024.
Chief Operating Officer (COO)	Monetary reward	Emissions reduction target	The Long-Term Incentives (LTI) apply to company executives and each plan includes a GHG reduction target for each three-year period, aligned with the company's goal of reducing GHG emissions by 25% by 2030 (Scopes 1 and 2) and achieving zero net carbon emissions by 2050.  Currently we have implemented three (3) LTI plans for the periods 2020-2022, 2021-2023 and 2022-2024.
Other C-Suite Officer	Monetary reward	Emissions reduction target	The Long-Term Incentives (LTI) apply to company executives and each plan includes a GHG reduction target for each three-year period, aligned with the company's goal of reducing GHG emissions by 25% by 2030 (Scopes 1 and 2) and achieving zero net carbon emissions by 2050.  Currently we have implemented three (3) LTI plans for the periods 2020-2022, 2021-2023 and 2022-2024.
Other, please specify (Procurement and Services; Legal; Compliance) Other, please specify (Other C-Suite employees: Secretary- General; and Director of ICP))	Monetary reward	Emissions reduction target	The Long-Term Incentives (LTI) apply to company executives and each plan includes a GHG reduction target for each three-year period, aligned with the company's goal of reducing GHG emissions by 25% by 2030 (Scopes 1 and 2) and achieving zero net carbon emissions by 2050.  Currently we have implemented three (3) LTI plans for the periods 2020-2022, 2021-2023 and 2022-2024.
Other, please specify (VPs of Sustainable Dev.; Exploration; Dev. and Production; Refinery and Industrial Processes; Commerce and Marketing; Projects and Engineering; Strategy and New Bus.; Digital; Human Talent and other senior employees)	Monetary reward	Emissions reduction target	The Long-Term Incentives (LTI) apply to company executives and each plan includes a GHG reduction target for each three-year period, aligned with the company's goal of reducing GHG emissions by 25% by 2030 (Scopes 1 and 2) and achieving zero net carbon emissions by 2050.  Currently we have implemented three (3) LTI plans for the periods 2020-2022, 2021-2023 and 2022-2024.

## C2. Risks and opportunities

## C2.1

**(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?**

Yes

## C2.1a

**(C2.1a) How does your organization define short-, medium- and long-term time horizons?**

	From (years)	To (years)	Comment
Short-term	0	3	The short-term horizon considers the following aspects: (i) establish and achieve the annual and intermediate GHG emission reduction targets, in line with the Decarbonization Plan, (ii) identify short-term risks and establish mitigation actions, controls and Key Risk Indicators (KRIs) within the framework of the annual risk management cycle, and (iii) identify and implement cost-effective opportunities to contribute to the GHG emission reduction goals.
Medium-term	4	10	The medium-term horizon is used to review both the GHG emission reduction and offset targets for 2030, in accordance with the company's Decarbonization Plan. This horizon also allows the identification of emerging risks that will impact the company in the next 5 years.
Long-term	10		The long-term horizon is used to review market trends, policy and regulatory changes, and emerging technology developments that may impact the company's climate ambition and long-term business strategy (2040).

**C2.1b**

**(C2.1b) How does your organization define substantive financial or strategic impact on your business?**

The definition of a substantial financial or strategic impact for the company is determined by the level of risk or materiality of the element with impact on Ecopetrol and its value chain. In relation to the level of risk, the Company applies the business risk cycle based on the COSO 2017 ERM (Enterprise Risk Management) framework to identify, assess, and manage its business risks. In 2021 the Corporate Risk Map was updated, identifying 15 corporate risks (for detailed information: i) see page 169 of the 2021 Integrated Sustainable Management Report, and ii) Ecopetrol's webpage: <https://saaeuecprdpcep.blob.core.windows.net/web/esp/cargas/business-risk-map.pdf>) which was approved by the Board of Directors. The climate-related risk was defined as "Inadequate management of climate change and water".

Risks are evaluated in terms of their probability of occurrence and their impact dimensions, in accordance with the procedure established in the company's risk assessment matrix (RAM). The dimensions of the impact are measured in terms of the level of impact on the following components:

The health of people, the environment, economic resources, reputation, and customers. The impact assessment levels can be: Insignificant (1), Minor (2), Moderate (3), Major (4), and Catastrophic (5), which are determined through specific impact conditions in each component assessed. From the perspective of the strategic impact, the following dimensions are considered: health of people, impact on the environment, reputation, and customers, and from the financial impact perspective, the following levels are considered, valued at losses for the company: Catastrophic (> US\$150M), Major (US\$50M - US\$150M), Moderate (US\$10M-US\$50M) Minor (US\$1M-US\$10M), and Insignificant (<US\$1M).

In 2021, the risk "Inadequate management of climate change and water" assessed the following scenarios to determine the strategic and financial impact level:

Scenario 1 (strategic impact by reputation dimension): Failure to implement the Decarbonization Plan that fails to reduce the goal set for 2030 (25% of scopes 1 and 2), resulting in the company's image and brand damage, lack of credibility by stakeholders, and loss of share value.

Scenario 2 (financial impact): Production is affected by water discharge restrictions in the Castilla, Apiay, and Suria production fields for 30 days per year, due to a decrease in water flows in the dry season, with a financial impact between US\$50 – 150 M, calculated of barrels of oil deferred.

Scenario 3 (financial impact): Water is limited for refineries operation (freshwater), with a financial impact between US\$50 - 150 M.

These results have allowed establishing short and medium-term actions to reduce impacts on the company.

**C2.2**

**(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.**

**Value chain stage(s) covered**

Direct operations

**Risk management process**

Integrated into multi-disciplinary company-wide risk management process

**Frequency of assessment**

Annually

**Time horizon(s) covered**

Short-term  
Medium-term

**Description of process**

The process for identifying, assessing, and responding to climate-related risks is part of our Integrated Risk Management System (IRMS). Risk management, monitoring, and assurance are carried out permanently to keep the risks within the defined tolerance and acceptance levels. This information is reported to the Executive Committee and to the Board of Directors' Audit Committee. Under the leadership of the Vice-Presidency of Compliance, in 2021 Ecopetrol continued to strengthen its IRMS based on the international technical standard ISO 31000 and COSO ERM 2017 framework.

This establishes a set of principles, reference frame, and process that allow the organization to manage the effects of uncertainty on meeting objectives, to maximize opportunities, and to assist in establishing strategies and making informed decisions. Three of the most important tools within the risk management approach are: i) the risk assessment methodology to define the risk levels based on the impact and probability of occurrence; ii) mitigation plans to reduce the exposure levels; and (iii) monitoring Key Risk Indicators (KRIs) to provide early signals of increased risk exposure. Ecopetrol's risks can be classified as:

-Business Risks: Directly associated with the Company's strategic business plan and are systematically monitored by the Executive Committee. For Ecopetrol, these can divert the company from achieving its strategy and strategic objectives. These risks are identified through the Business Risk Management Cycle, which include the following stages: Plan, Identify, Assess, Treat, Communicate and Consult, Monitor and Review, and Record and Report. The construction and updating of this risk map is done collectively, based on the analysis of the internal and external environments, considering market trends, specific risks of Ecopetrol's Group of companies, business standards, benchmarks and industry risks that are normally subject to analysis and review of sustainability indexes and radars. In the definition of these risks, an analysis of the internal and external environments is performed to determine the issues and trends that may have a potential or real impact on the Company's strategy.

-Emerging risks are selected from these trends, confirmed by the Executive Committee, and presented to the Audit and Risk Committee of the Board of Directors, which reviews them and recommends their approval to the Board. The evaluation of emerging risks allows Ecopetrol to prioritize them and determine the appropriate risk treatment plans. Ecopetrol evaluates each potential risk and defines the treatment plan for each emerging risks which include the following: i) New business risk; ii) Incorporation into existing business risk; iii) Continuous monitoring of emerging risks; or iv) Abandonment of emerging risk. For 2021 the top two emerging risks were selected based on the criteria of potential impact and speed of emergence: i) Acceleration in the race to Net-Zero and ii) Technology-enabled Natural Capital Solutions (see: <https://www.ecopetrol.com.co/wps/portal/Home/en/Ourcompany/about-us/risk-management>.)

-Processes Risks: Risks related to potential failures in the activities regarding the core and support business processes that drive Ecopetrol to achieve its objectives.

-Operational Risks: Risks that are at an operational scale and occur in Ecopetrol's day-to-day activities and tasks. The risks are also identified through the business Risk management cycle.

The risks are identified through the Business Risk management cycle, which includes the stages of Planning, Identification, Evaluation, Treatment, Communication and consultation, Monitoring and review, and Registration and Reporting. In 2021, Ecopetrol updated the scenarios of Business risk "Inadequate management of climate change and water". In relation to its treatment, monitoring, and reporting, Ecopetrol established 12 treatment actions, 10 controls, and 5 KRI to reduce the materialization probability. Related to physical risk scenarios, Ecopetrol assesses the following case study using the STAR methodology:

Situation: the "El Niño" phenomenon occurred, which implies less precipitation, this phenomenon coincided with the country's dry season, increasing the risk of water shortages that could affect operations. This climate variability phenomenon is more frequent and intense.

Task: Within the framework of the business risk "Inadequate management against climate change and water" the potential scenario was evaluated, resulting in a high financial impact.

Action: A treatment action was established to reduce the risk of operational interruption associated with water management.

Result: if the action to mitigate the risk is not implemented, its materialization could cost around US\$ 150.

For the process of identifying, assessing, and responding to climate-related opportunities, as part of the company strategy process, Ecopetrol keeps track and assesses the energy market and business environment. After identifying meaningful changes in that environment, the group updates its Energy Transition Scenarios and, in that analysis, lines of actions are defined including opportunities and implications for Ecopetrol and a roadmap to run in-deep analysis of the opportunities. The steps for the process are:

1. Energy Transition scenarios are updated with the current global and local trends (ex. Industry, macroeconomic, and technology trends). As a result, the variables (ex. Primary energy demand, oil and gas demand, emissions projection) for each scenario are updated.
2. Ecopetrol identifies and analyses the driver that is showing a positive trend or perspective in the updated scenarios for the short, medium, and long-term. With this analysis a set of potential opportunities are identified.
3. Ecopetrol calculates the size of the market or the opportunity establishing the capabilities or competitive position of the Company with the interest to capture and the construction of a business plan to evaluate the feasibility.
4. Finally, the roadmap to develop the feasible opportunities is constructed based on the previous Energy transition Scenarios. Ecopetrol is currently analyzing 3 types of diversification opportunities: within the Oil & Gas value chain, in the electricity value chain, and in low-emission businesses (Hydrogen, Carbon Capture, Use & Storage, and Natural Climate Solutions).

Related to opportunity transition, Ecopetrol assesses the following case study using the STAR methodology:

Situation: Derived from the update of the investment portfolio for decarbonization, the development of hydrogen was identified as an opportunity.

Task: this opportunity had a rigorous analysis of technical and economic feasibility.

Action: the economic and financial evaluation of the opportunity was carried out.

Result: structuring of hydrogen roadmap implementation, which resulted in a low-carbon business opportunity, with an EBIDTA of USD 2,4 billion accumulated by 2030.

**C2.2a**

**(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?**

Relevance & Inclusion	Please explain

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	<p>Risk: regulatory changes or restrictive regulatory measures derived from legislation related to climate change.</p> <p>Our operations might be affected by rising climate change and energy transition regulatory developments. The increase in global temperature due to the substantial increase of GHG emissions is a concern worldwide. The Paris Agreement calls for immediate and forceful actions to be taken to limit the increase of global temperature below 1.5°C. In response, government agendas have increasingly been defining normative and regulatory frameworks that determine local actions related to climate change. As a result, companies are increasingly subject to regulatory risks and public policy changes related to climate change.</p> <p>Colombia has binding regulatory measures that address air and fuel quality. Also, Ecopetrol has identified the following current regulatory changes, which may have a financial or strategic impact on the company:</p> <ul style="list-style-type: none"> <li>- Mitigation and adaptation information requirements in current and future licensing processes, by the National Environmental Licensing Authority (ANLA, for its Spanish acronym), which may limit obtaining environmental licenses for the company.</li> <li>- Increased monitoring on the implementation of actions for compliance with regulations related to the management of fugitive emissions and venting, to contribute to compliance with national, sectoral, and corporate goals.</li> <li>- Modifications to the regulations associated with the carbon tax and the Monitoring, Reporting and Verification System for mitigation actions carried out by the company, which establish new requirements for the validation and verification of reduction projects and their registration in the National Registry of GHG Emission Reductions (RENARE, for its Spanish acronym).</li> <li>- New regulations for the detection and repair of leaks, exploitation, flaring and venting of natural gas during hydrocarbon exploration and production activities, which establish requirements for the company.</li> <li>- In December 2021, the Financial Superintendency of Colombia (SFC, for its Spanish acronym) issued instructions to the Legal Representatives and Statutory Auditors of Issuers regarding the disclosure of information on social and environmental matters, including climate issues. The above, with the purpose of standardizing and improving the relevance of the information on sustainability practices for investors and strengthening its disclosure by issuers, under a perspective of financial materiality.</li> </ul>
Emerging regulation	Relevant, always included	<p>Risk: Limited capacity or availability of data for Ecopetrol to adequately respond to or anticipate new regulations that impose GHG emissions or climate-related requirements.</p> <p>The Company's Climate Action Plan includes a component related to Participation in Public Policies and Regulatory Processes, in which regulatory changes associated with climate change are permanently monitored. We participate in open discussions of public policies and regulations, mainly with the Ministry of Environment and Sustainable Development and the Ministry of Mines and Energy.</p> <p>As a result of this monitoring process, Ecopetrol has identified the following emerging regulations:</p> <ul style="list-style-type: none"> <li>- Implementation of the National Cap &amp; Trade System (PNCTE, for its Spanish acronym), similar to an Emissions Trading System, in which emission rights would be assigned. This program is in the design and development phase of the regulatory framework and is expected to start in 2025, with full implementation in 2030. Ecopetrol's inclusion in the program would have a significant financial impact, which will require aligning the company's current climate ambition.</li> <li>- Possible restrictions on voluntary offsetting of GHG emissions for exploration, upstream and downstream activities, to promote and accelerate the development of mitigation actions in the company's value chain.</li> <li>- New rules proposed by the U.S. Securities and Exchange Commission (SEC) for publicly traded companies to disclose specific information on their financial exposure to climate risk and strategies to address it in their registration statements and periodic publications.</li> <li>- Article 221 Law 1819 /2016: Adjustment in terms of tariffs and fossil fuels taxed under the carbon tax.</li> </ul>
Technology	Relevant, always included	<p>Ecopetrol's future performance depends on the successful selection, development, and deployment of new technologies and the necessary capabilities to operate, maintain, and improve them.</p> <p>Technology, knowledge, and innovation are essential to its business, especially for the addition of reserves in complex settings, for reducing operational costs, for reducing the carbon footprint and for adapting to the energy transition in general. If Ecopetrol does not develop or secure access to the right technology, or if it fails to deploy it or obtain the expertise to operate it, the attainment of the company's corporate goals, profitability, and earnings can be jeopardized. Furthermore, as Ecopetrol transitions to a new low carbon economy and addresses climate change related issues, it faces the risk of affecting key financial indicators due to high cost of low-carbon technologies.</p> <p>In addition, the company's performance could be negatively affected by the lack of workforce with the skills needed to execute the business strategy. As the oil and gas industry faces an increasing number of challenges, the ability to react quickly to these challenges has become a key factor in achieving efficiency, profitability, growth, and sustainability. This situation poses a risk if Ecopetrol is unable to timely strengthen its workforce capacities at all levels of the organization and develop the skills needed to find the solutions and implement climate-resilient initiatives and achieve the decarbonization goals.</p>
Legal	Relevant, always included	<p>Risk: Inability to react in a timely manner to the demands and requirements of interested parties derived from climate change issues.</p> <p>Our operations could be affected by reactions of labour unions, social organizations, communities and contractors to Colombia's political and social context, environmental and climate change concerns, and organizational changes. Due to Colombia's political and social context, emerging environmental and climate change concerns and organizational changes, social organizations in the communities in the areas of operation, communities in general, contractors and unions, may react and make additional demands that can potentially affect the Company's operations and financial condition.</p> <p>However, the Company has a permanent interaction scheme with its stakeholders, which allows it to meet the requirements in a timely manner. Likewise, issues related to climate change are publicly disclosed on the website and in the Annual Integrated Report available to the public, among other public platforms, to ensure that we continuously communicate our efforts on climate change to a wide range of stakeholders.</p> <p>In relation to other requirements derived from current legislation related to local licenses and permits, Ecopetrol uses the Environmental Legal Compliance System (SICLASS), a SAP module, which allows the Company to manage all environmental requirements, including those related to climate change.</p>
Market	Relevant, always included	<p>Risk: preference in the use of low-carbon products in the framework of the energy transition</p> <p>The company constantly monitors the evolution and trends of the market in relation to the performance and use of low-carbon products, considering, among other variables, the progress in defining the country's carbon neutrality strategy for 2050, which implies the analysis and market behaviour in relation to the trend in energy use. Here one of the key issues is the participation of natural gas, especially to meet the needs of domestic demand.</p> <p>The foregoing is considered for the evaluation of the Company's energy transition scenarios, which seek to define the diversification portfolio in the medium and long terms, identifying new opportunities in the electricity value chain, specifically in the transmission lines markets. Also, in other potential low-carbon businesses such as green hydrogen and carbon capture, use and storage (CCUS).</p> <p>However, while a market for cost-effective low-carbon products is consolidating, the energy transition advances considering energy sources with less carbon intensity. In this context, Ecopetrol considers natural gas as a transition energy source nationwide, with an expansion strategy aligned with the carbon neutrality of the country and the Company.</p> <p>In 2021, Ecopetrol acquired 51.4% of the outstanding shares of ISA from the Ministerio de Hacienda y Crédito Público (Ministry of the Treasury and Public Credit, MHCP for its Spanish acronym), through which it is expected to reposition the company along the energy value chain by offering services such as electricity transmission and aligning it with the market trends towards decarbonization and electrification.</p> <p>Likewise, the Company is moving towards a low-carbon operation, with the development of a portfolio in renewable energies, energy efficiency, and the evaluation of technological options such as Hydrogen, in line with the company's energy transition plan and long-term corporate strategy (2040).</p>
Reputation	Relevant, always included	<p>Risk: Increased pressure from investors to set ambitious goals on climate change.</p> <p>Ecopetrol constantly conducts benchmarking analysis to compare and challenge its own objectives, action plans and general ambitions against the frontrunners in the industry and other sectors as well, in order to avoid falling behind in this area in the face of reputational risk.</p> <p>In 2021, the company made progress in updating its ambition of reducing emissions in the medium and long terms. To ensure compliance with GHG emissions targets and avoid a reputational risk, Ecopetrol closely monitors progress on its Decarbonization Plan, the GHG emissions inventory is permanently updated as well as the portfolio of reduction and compensation projects.</p> <p>Likewise, Ecopetrol is part of leading global initiatives that promote structural changes in the oil and gas sector related to GHG emissions reductions, such as the Clean Air and Climate Coalition a UN led initiative and the Zero Routine Flaring initiative (ZRF) of the World Bank, which helps the Company align with the highest international standards.</p>
Acute physical	Relevant, always included	<p>Risk: Increased intensity and frequency of climate variability (water shortages, floods, forest fires, storms and hurricanes, and mass movements).</p> <p>Ecopetrol has a KPI to monitor the probability of occurrence of extreme weather events based on monthly alerts, which are issued by the Institute of Hydrology, Meteorology and Environmental Studies of Colombia (IDEAM for its Spanish acronym). As previously mentioned in this report, this KPI is one of the 15 Company risks included in Ecopetrol's 2021 Business Risk Map.</p> <p>These monthly alerts are related to the possible occurrence of El Niño and La Niña phenomena, which trigger the implementation of an action plan when an occurrence probability exceeds 80%.</p>

	Relevance & inclusion	Please explain
Chronic physical	Relevant, always included	<p>Risk: Increased intensity and frequency of climate variability and climate change related events (increased temperatures, rising sea-levels).</p> <p>Ecopetrol has implemented an adaptation plan addressing variability and climate change events in six (6) regions of Colombia, where Ecopetrol has operations, considering the climate change scenario 2011-2040, defined in the "Third National Communication on Climate Change". This is Colombia's communication on the advancement on UNFCCC compromises.</p> <p>This plan includes adaptation measures for the operations and facilities, related to water management, restoration and conservation of natural capital, climate-compatible operations, and resilient infrastructure.</p>

## C2.3

**(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?**

Yes

### C2.3a

**(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.**

**Identifier**

Risk 1

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type & Primary climate-related risk driver**

Acute physical	Drought
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**Primary potential financial impact**

Increased direct costs

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**Company-specific description**

"El Niño" phenomenon is characterized by: (i) the lack of rainfall, which may drastically decrease surface waterbodies flows, affecting both freshwater use and wastewater discharges because of the reduction on dilution potential of receiving waterbodies, (ii) increased temperatures, which causes heat waves and could have a direct impact on the health of the workforce and cause an increase in epidemics and diseases, and (iii) potential negative impact on energy supply due to the decrease in the level of the rivers that feed the hydroelectric generation system of the country. In addition to the "El Niño" climate phenomenon, some basins in Colombia may be affected by seasonal variability in some periods of the year (normally January to March - June to July), which could reduce water flows, affecting freshwater withdrawals and surface discharges, as mentioned previously.

**Time horizon**

Short-term

**Likelihood**

Likely

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

215412605280

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

Ecopetrol used the following scenario: production affected (barrels deferred) for water discharge restrictions in the Castilla, Apiay, and Suria production fields for 30 days per year, due to a decrease in water body flows in the dry season.

Ecopetrol measures its potential financial risks according to a Risk Assessment Matrix (RAM) which assesses potential impacts on the following five (5) dimensions: i) people, ii) environment, iii) economic resources, iv) reputation, and v) clients. The following are the different economic risk levels considered within this matrix: 1. Null: USD 150 million. According to this scale, climate-related risks are considered between medium and high. The exchange rate used for the calculation of the potential financial impacts was COP 3,981.16.

**Cost of response to risk**

62048757346

**Description of response and explanation of cost calculation**

The cost was calculated based on the implementation of measures that reduce the impact on the operation, such as water-efficient use programs, reuse and disposal alternatives portfolio, prevention plans to obtain water from secondary sources, and maintenance and cleaning campaigns on facilities, and hydro-systems, among others. These measures are defined in the adaptation and vulnerability climate plans.

### Comment

This risk could result in fatalities, property damage, project delays, production deferrals, loss of revenue, pollution, and harm to the environment, damaged roads as well as temporary disruptions to Ecopetrol's services, among others. If any of these occur, the Company may be exposed to economic sanctions, damages, fines, or penalties in addition to the negative effects these events may have on our operations and the costs required to repair or remediate the related damage. These costs, fines and penalties may adversely affect Ecopetrol's financial condition, reputation, and results of operations.

For the management of physical risks associated with variability and climate change in Ecopetrol, the Company defined the risk of "Inadequate management of climate change and water" as part of the business risk map. Attention to this risk includes monitoring the probability of occurrence of extreme climatic events from the monthly alerts issued by the Institute of Hydrology, Meteorology and Environmental Studies of Colombia (IDEAM), on the possible presence of the "El Niño" and "La Niña" climatic variability phenomena, activating an action plan at the company level in the event of a probability of occurrence greater than 80% of any climatic phenomenon. Additionally, the Company has a Climate Change and Climate Variability Plan for the areas where Ecopetrol operates.

### Identifier

Risk 2

### Where in the value chain does the risk driver occur?

Direct operations

### Risk type & Primary climate-related risk driver

Current regulation	Other, please specify (NDC update by 2030, adopted by Climate Action Law (2169/2021). The potential risk that the Energy & Mines sector may increase its ambition above its current contribution of 29% to 51% of Colombia's NDC by 2030.)
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### Primary potential financial impact

Increased direct costs

### Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

### Company-specific description

In Colombia, the climate-related regulatory framework has matured substantially. In December 2021, a Climate Action Law (L. 2169/2021) was issued, which promotes the country's low-carbon development through the establishment of goals and measures related to carbon neutrality and climate resilience. This law incorporates the country's Nationally Determined Contribution (Ecopetrol identifies as a potential risk that the Energy & Mines sector may increase its ambition above its current contribution of 29% to 51%, Colombia's NDC, by 2030. This would result in an additional pressure for Ecopetrol to increase its target in the same proportion. This would mean an additional amount of 2.4 MtCO<sub>2</sub> by 2030, equivalent to a reduction of 51% by that year) and it is aligned with the country's Long-Term Climate Strategy (E2050).

### Time horizon

Medium-term

### Likelihood

About as likely as not

### Magnitude of impact

Medium-high

### Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

### Potential financial impact figure (currency)

382191360000

### Potential financial impact figure – minimum (currency)

<Not Applicable>

### Potential financial impact figure – maximum (currency)

<Not Applicable>

### Explanation of financial impact figure

Ecopetrol used the following scenario: an increase in the value of CO<sub>2</sub> ton by 2030 considering the internal carbon price, defined for 2030 at USD\$40 per ton.

Ecopetrol measures its potential financial risks according to a Risk Assessment Matrix (RAM) which assesses potential impacts on the following five dimensions: i) people, ii) environment, iii) economic resources, iv) reputation, and v) clients. The following are the different economic risk levels considered within this matrix: 1. Null: USD 150 million. According to this scale, climate-related risks are considered between medium and high. The exchange rate used for the calculation of the potential financial impacts was COP 3,981.16.

### Cost of response to risk

48729398400

### Description of response and explanation of cost calculation

The cost of response was calculated considering the implementation of initiatives to reduce cost-effective emissions (renewables, fugitive emissions, flaring and venting, energy efficiency) below USD\$40 per CO<sub>2</sub> ton, according to Ecopetrol's abatement curve projected by 2030.

### Comment

### Identifier

Risk 3

### Where in the value chain does the risk driver occur?

Direct operations

### Risk type & Primary climate-related risk driver

Technology	Unsuccessful investment in new technologies
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### Primary potential financial impact

Decreased revenues due to reduced demand for products and services

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**Company-specific description**

Failure to achieve the competitiveness and resilience of the Oil & Gas businesses and the company's assets in the face of the energy transition, in relation to costs, production, and marketing of hydrocarbons and profitable products, which comply with regulations and market requirements

**Time horizon**

Short-term

**Likelihood**

Likely

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, an estimated range

**Potential financial impact figure (currency)**

<Not Applicable>

**Potential financial impact figure – minimum (currency)**

1393406000000

**Potential financial impact figure – maximum (currency)**

1791522000000

**Explanation of financial impact figure**

The financial figure was calculated based on the expected long-term EBIDTA (by 2040).

**Cost of response to risk**

119434800000

**Description of response and explanation of cost calculation**

The response cost was calculated based on the implementation of Ecopetrol's participation in Micro LNG as of 2022.

**Comment**

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**C2.4****(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?**

Yes

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**C2.4a****(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.****Identifier**

Opp1

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Products and services

**Primary climate-related opportunity driver**

Ability to diversify business activities

**Primary potential financial impact**

Increased revenues resulting from increased demand for products and services

**Company-specific description**

In recent analysis and reports, the IEA mentioned the importance and role of natural gas as a transition fuel where it can replace polluting fuels thus, improving air quality, limiting CO2 emissions and even as a source of diversification. Diversification in the Oil & Gas value chain includes but is not limited to gas diversification, logistics and transportation opportunities, and petrochemicals. As part of the energy transition, the company has included in its recently published 2040 strategy, opportunities to make its core business more resilient by taking advantage of the perspectives of gas as transition fuel, the need of logistic and transport for other type of fuels and energy sources, and the growing demand for petrochemical products.

**Time horizon**

Medium-term

**Likelihood**

Very likely

**Magnitude of impact**

Medium

**Are you able to provide a potential financial impact figure?**

Yes, an estimated range

**Potential financial impact figure (currency)**

<Not Applicable>

**Potential financial impact figure – minimum (currency)**

1181760000000

**Potential financial impact figure – maximum (currency)**

6278100000000

**Explanation of financial impact figure**

1. The company has included in its recently published 2040 corporate strategy the increase in participation of gas in the upstream production mix from 18 to 30%, resulting in an EBITDA increase from 1.5 to 3 times in the gas business (vs 2019). That is from USD 300 to 1200 million. This is a gross estimation. Teams are constantly analysing the financials of each business case. 2. The midstream business has identified opportunities that can add from USD 20 to 500 million in EBITDA for that segment. This is a gross estimation; the teams are constantly analysing the financials of opportunities and new business cases. 3. The petrochemical business potential is yet to be defined.

**Cost to realize opportunity**

1630000000000

**Strategy to realize opportunity and explanation of cost calculation**

Strategy to realize opportunity: In the 2040 corporate strategy, the Company has given gas a key strategic role and plan for the next 20 years that includes: i) secure the monetization of the current gas portfolio, ii) develop additional demand in Colombia, iii) expand the Group's participation in the gas value chain in Colombia and the region, according to regulations and where market opportunities are attractive. Also, in the midstream, the Company is currently exploring this as an opportunity. It is included in the strategy for the segment with an estimated business case constantly being analysed and updated. For petrochemicals, as part of the strategy for the segment, it is expected to have an analysis ready during the first semester of 2022.

Explanation of cost calculation: Estimated annual investment required to develop gas projects.

**Comment****Identifier**

Opp2

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Products and services

**Primary climate-related opportunity driver**

Development and/or expansion of low emission goods and services

**Primary potential financial impact**

Increased revenues resulting from increased demand for products and services

**Company-specific description**

Ecopetrol Group is executing a dynamic plan for green, blue and white hydrogen production, an energy source that will provide between 9% to 11% of the decreases in its long-term reduction goals for scopes 1, 2, & 3. For its execution, the Company has outlined a path with three-time horizons: The first (2022-2030), focuses on intensifying hydrogen within its own operations through industrial-scale projects and starting applications in sustainable mobility in cars and buses. The second (2030-2040), seeks to capture and reach significant results in the decarbonization of operations, diversifying with hydrogen business into maritime and aviation mobility, and realizing new business opportunities in the European and Asian markets. For the third horizon, from the 2040 onwards, Ecopetrol is focused on promoting widespread adoption of hydrogen and expanding the portfolio.

**Time horizon**

Long-term

**Likelihood**

Very likely

**Magnitude of impact**

Medium

**Are you able to provide a potential financial impact figure?**

Yes, an estimated range

**Potential financial impact figure (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – minimum (currency)**

1194348000000

**Potential financial impact figure – maximum (currency)**

2786812000000

**Explanation of financial impact figure**

The financial impact provided is an estimated annual EBITDA range by 2040 that considers: i) Ecopetrol's energy transition scenarios, ii) hydrogen demand growth (road transport, maritime, aviation, industrial and gas blending), and iii) market share behaviour as expected. For these calculations, we consider that green hydrogen is produced with additional energy purchase from the matrix when needed.

**Cost to realize opportunity**

796232000000

**Strategy to realize opportunity and explanation of cost calculation**

Hydrogen represents the potential of replacing the H2 on our refineries and the development of the market for others in industrial and mobility applications. It depends on the evolutions of the competitiveness and feasibility of the technology along the value chain and the applications. As a starting point for this hydrogen business, Ecopetrol has started a pilot for replacing grey to green hydrogen. The pilot consists of a hydrolyzer installed at Cartagena Refinery which is currently supplying a percentage of hydrogen used to improve fuel quality.

Cost to realize opportunity is an average between Ecopetrol's energy transition scenarios of the accumulated CAPEX until 2040.

**Comment****Identifier**

Opp3

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Products and services

**Primary climate-related opportunity driver**

Development and/or expansion of low emission goods and services

**Primary potential financial impact**

Increased revenues resulting from increased demand for products and services

**Company-specific description**

The energy transition is opening opportunities in businesses related to the de-carbonization. Considering that the demand of solutions and services will increase in the next decades, the group has identified and prioritized three (3) opportunities as part of the diversification plan, where it can build a profitable segment given its competences, the geographic position of its operations and markets, and the characteristics of its assets. One of these three opportunities is carbon capture utilization and storage (CCUS) opportunities as part of the diversification plan, where it can build a profitable segment given its competences, the geographic position of its operations and markets, and the characteristics of its assets. One of these three opportunities is carbon capture utilization and storage (CCUS).

**Time horizon**

Long-term

**Likelihood**

Likely

**Magnitude of impact**

Medium

**Are you able to provide a potential financial impact figure?**

Yes, an estimated range

**Potential financial impact figure (currency)**

<Not Applicable>

**Potential financial impact figure – minimum (currency)**

3981160000000

**Potential financial impact figure – maximum (currency)**

5971740000000

**Explanation of financial impact figure**

The financial figures are an initial high-level estimation of the annual 2040 EBITDA generated by CCUS. The figures assume a decrease in cost and technological improvements for CCUS, the use of CO2 for Enhanced Oil Recovery (EOR) and industrial use, and the development of regulation regarding carbon taxes and pricing.

**Cost to realize opportunity**

2388696000000

**Strategy to realize opportunity and explanation of cost calculation**

CCUS represents the potential business around providing CCUS solutions to different clusters of companies and industries in Colombia. Ecopetrol Group has been conducting studies regarding CCUS and has identified potential clusters in Colombia which can use CCUS for EOR and have identified a high potential for carbon capture in Barrancabermeja Refinery. Between 22-24 Ecopetrol Group will be investing around USD 7 million in developing CCUS technology.

**Comment**

Cost to realize opportunity is a high-level average between Ecopetrol's energy transition scenarios of the accumulated CAPEX until 2040.

**Identifier**

Opp4

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Products and services

**Primary climate-related opportunity driver**

Development and/or expansion of low emission goods and services

**Primary potential financial impact**

Increased revenues resulting from increased demand for products and services

**Company-specific description**

The energy transition is opening opportunities in businesses related to the de-carbonization. Considering that the demand of solutions and services will increase in the next decades, the group has identified and prioritized three (3) opportunities as part of the diversification plan, where it can build a profitable segment given its competences, the geographic position of its operations and markets and the characteristics of its assets. One of these three (3) opportunities is Natural Climate Solutions (NCS).

**Time horizon**

Long-term

**Likelihood**

Likely

**Magnitude of impact**

Medium-low

**Are you able to provide a potential financial impact figure?**

Yes, an estimated range

**Potential financial impact figure (currency)**

<Not Applicable>

**Potential financial impact figure – minimum (currency)**

796232000000

**Potential financial impact figure – maximum (currency)**

1194348000000

**Explanation of financial impact figure**

The financial figures are an initial high-level estimation of the annual 2040 EBITDA generated by NCS. The figures assume the development of regulation regarding carbon taxes and pricing, and the accounting of NCS in the compliance market.

**Cost to realize opportunity**

278681200000

**Strategy to realize opportunity and explanation of cost calculation**

NCS exists as a potential opportunity of the development of a portfolio manager role developing not only the projects to cover internal decarbonization needs (residual emissions around 30%) but to supply the demand of the markets to abate emissions.

**Comment**

Cost to realize opportunity is a high-level average between Ecopetrol's energy transition scenarios of accumulated CAPEX until 2040.

**Identifier**

Opp5

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Markets

**Primary climate-related opportunity driver**

Access to new markets

**Primary potential financial impact**

Increased revenues through access to new and emerging markets

**Company-specific description**

In 2021 Ecopetrol Group acquired a 51% stake in ISA, a company that has participation in energy transmission, roads, and telecommunications across Latin America. Ecopetrol Group has been working on identifying synergies between ISA and the different companies within Ecopetrol Group. Some of these synergies identified are between ISA and CENIT (Ecopetrol's midstream company). ISA and CENIT have been working on using ISA's Latam expansion know-how to identify potential diversification opportunities for CENIT in the region.

**Time horizon**

Medium-term

**Likelihood**

Very likely

**Magnitude of impact**

Medium

**Are you able to provide a potential financial impact figure?**

No, we do not have this figure

**Potential financial impact figure (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – minimum (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – maximum (currency)**

&lt;Not Applicable&gt;

**Explanation of financial impact figure****Cost to realize opportunity****Strategy to realize opportunity and explanation of cost calculation****Comment****C3. Business Strategy****C3.1**

**(C3.1) Does your organization’s strategy include a transition plan that aligns with a 1.5°C world?**

Row 1

**Transition plan**

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a transition plan within two years

**Publicly available transition plan**

<Not Applicable>

**Mechanism by which feedback is collected from shareholders on your transition plan**

<Not Applicable>

**Description of feedback mechanism**

<Not Applicable>

**Frequency of feedback collection**

<Not Applicable>

**Attach any relevant documents which detail your transition plan (optional)**

<Not Applicable>

**Explain why your organization does not have a transition plan that aligns with a 1.5°C world and any plans to develop one in the future**

Since 2018, Ecopetrol Group has been developing energy transition scenarios as an input to the Company’s business strategy. In 2020, the company developed two (2) scenarios and two (2) sensitivities, in which it considered the following: i) Reference scenario: Includes technological expectations (proved and the ones with the highest development investment), demand (observable and foreseeable trends) and regulatory patterns (existent and those necessary to stimulate technological adoption) ii) Accelerated transition scenario: highest energy efficiency and penetration of renewable energy due to tighter regulation in terms of emissions and cost reduction in parallel with greener consumption patterns and new technological developments. iii) Decelerated sensitivity: considers a slower transition due to economic issues which translates in reprioritization of policies and regulations towards more economy-driven measures vs emissions. iv) 2°C sensitivity: considers radical changes in consumption, regulation, and technology to achieve decarbonization and global warming goal of 2°C.

In 2022 Ecopetrol is updating its scenario analysis taking the 1.5°C scenario as a reference, to better understand the alignment between the current decarbonization plan and the 2040 corporate strategy with a 1.5°C world. If needed, the Company expects to make the necessary adjustments to its climate targets as part of the five-year review cycle announced when the net zero ambition was launched.

**Explain why climate-related risks and opportunities have not influenced your strategy**

<Not Applicable>

C3.2

**(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?**

	Use of climate-related scenario analysis to inform strategy	Primary reason why your organization does not use climate-related scenario analysis to inform its strategy	Explain why your organization does not use climate-related scenario analysis to inform its strategy and any plans to use it in the future
Row 1	Yes, qualitative and quantitative	<Not Applicable>	<Not Applicable>

C3.2a

**(C3.2a) Provide details of your organization’s use of climate-related scenario analysis.**

Climate-related scenario		Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Physical climate scenarios	RCP 6.0	Company-wide	<Not Applicable>	<p>Ecopetrol carried out a physical risk analysis that considered a RCP (Representative Concentration Pathways) 6.0 scenario in accordance with the Colombian Energy and Mines sector plan and the Third National Communication on Climate Change. The third communication uses a reference scenario based on the period 1976 and 2005, considering the CMIP5 global model, temperature variables (minimum, average, and maximum), precipitation on a monthly scale, and data from the country’s meteorological stations. Considering that the temperature changes measured between the 4 RCPs are similar, the country developed a multi-model ensemble to generate a future climate scenario, which was used for Ecopetrol’s analysis.</p> <p>According to the results of the multi-model ensemble, Colombia’s average temperatures, between 2011 and 2040, are expected to increase in 1.0°C approximately for the 4 RCPs. The periods 2041-2070, and 2071-2100 were not considered for this sensitivity analysis, considering that the information is based on the 4RCPs multi-model ensemble, and the differences are not substantial. Besides, Ecopetrol’s long-term period has been defined as 2040.</p> <p>Ecopetrol bases its physical risks analysis on the RCP 6.0 scenario and considers all the areas where there is current and future operation. Additionally, the Company incorporates the following variables, to identify the impact on the infrastructure and operations in the long term: Natural threats (floods, mass movements, forest fires, and water scarcity) that can increase climate risk in a 2040 horizon and increase the assets adaptation costs, production level, and water required for production.</p>
Transition scenarios	Bespoke transition scenario	Country/area	2.1°C - 3°C	<p>Ecopetrol Group has been developing energy transition scenarios as an input to the Company’s corporate strategy. In 2020, the company developed two (2) scenarios and two (2) sensitivities in which it considered the following: (i) Reference Scenario: Included technological expectations (proved as well as those with the highest development investment), demand (observable and foreseeable trends), and regulatory patterns (existent and those necessary to stimulate technological adoption), (ii) Accelerated Transition Scenario: Highest energy efficiency and penetration of renewable energy due to tighter regulation in terms of emissions and cost reduction in parallel with greener consumption patterns and new technological developments, (iii) Decelerated Sensitivity: Considers a slower transition due to economic issues which translate into a reprioritization of policies and regulations towards more economic-driven measures shifting away from prioritizing emissions, and (iv) 2°C Sensitivity: Considers radical changes in consumption, regulation, and technology to achieve decarbonization and the global warming goal of 2°C.</p> <p>Trends from those scenarios and sensitivities were translated into business scenarios in 2021, which were used as an input for the development of Ecopetrol Group’s long-term (2040) business strategy published in the 2022 first quarter. The three business scenarios that resulted are: (i) Reference Scenario: Considers the same trends identified under the Reference Scenario of Energy Transition, which is also the base scenario for the Company’s 2040 corporate strategy, (ii) High-Price Scenario: Linked to the Decelerated Sensitivity trends, and (iii) Stress Test Scenario: reflects the trends of the Accelerated Transition Scenario and some evolutions of the 2°C Sensitivity.</p> <p>To define its 2040 corporate strategy, Ecopetrol used its scenarios and applied some sensitivity variables to them. These sensitivities included i) Ecopetrol’s GHG emissions projection, ii) national demand energy, and iii) global demand energy. The scenario analysis resulted in a long-term strategy focused on growing with the energy transition, with a robust decarbonization roadmap, and TESG (technology at the heart of sustainability) as some of its key drivers.</p>

**C3.2b**

**(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.**

**Row 1**

**Focal questions**

- What climate-related forces and developments have the greatest ability to shape our future performance? What is their likely timing and potential impact?
- What variables are needed to support decision-making?
- Which variables have the greatest impact in our current business model?
- What new opportunities do climate-related forces and developments come with?
- Having two scenarios and two sensitivities allowed us to better understand the different levels of energy transition, which in turn gave Ecopetrol Group a broad vision on what where the key variables on each scenario and how each variable could react.

**Results of the climate-related scenario analysis with respect to the focal questions**

As a result of the scenarios and sensitivities of the energy transition, Ecopetrol Group established a clear course of action to build resilience. The six (6) prioritized fronts were: i) define a strategy for decarbonization, energy efficiency, and fuel quality, ii) ensure the competitiveness of the traditional oil and gas business to avoid stranded assets, iii) formulate a comprehensive vision of gas, iv) capture opportunities in the energy markets, v) review the petrochemical business and vi) explore diversification options in other businesses.

Likewise, the trends of the scenarios and sensitivities were translated into business scenarios in 2021, which served as input for the development of the long-term corporate strategy (2040) of Ecopetrol Group published in the first quarter of 2022. The three (3) business scenarios that resulted are:

- (i) Reference Scenario: Considers the same trends identified in the Energy Transition Reference Scenario, which is also the base scenario of the Company’s 2040 corporate strategy.
- (ii) High Price Scenario: Linked to Decelerating Sensitivity trends.
- (iii) Stress Test Scenario: reflects the trends of the Accelerated Transition Scenario and some evolutions of the 2°C Sensitivity.

To define its 2040 corporate strategy, Ecopetrol used its scenarios and applied some sensitivity variables to them. These sensitivities included i) Ecopetrol’s GHG emissions projection, ii) national energy demand, and iii) global energy demand. The scenario analysis resulted in a long-term strategy focused on growing with the energy transition, with a strong decarbonisation roadmap and TESG (technology at the heart of sustainability) as some of its key drivers. Similarly, the physical climate scenarios used by the company to identify risks and opportunities have made it possible to establish the exposure and vulnerability of assets to threats arising from changes in extreme weather, establishing adaptation measures to increase the response capacity, and minimize the impacts derived from climate change.

However, the company is aware of the need to elevate these analyses with scenarios validated by science, which consider related climate-change variables and allow for an update of its own scenarios, in order to have a better understanding and alignment of Ecopetrol’s climate ambition with the Paris Agreement.

**C3.3**

**(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.**

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	The evolution in the transition scenarios analysis developed by Ecopetrol contributed to establishing a long-term strategy focused on growing with the energy transition, with a decarbonization plan and TESH (technology at the heart of sustainability) as some of its key drivers. The Company will invest in low-carbon technologies and align its activities with global trends to mitigate climate change and ultimately achieve its goal of net-zero emissions by 2050 (scopes 1 and 2). These activities include low-carbon hydrogen production as an energy source, Carbon Capture, Usage and Storage (CCUS), and Natural Climate Solutions (NCS). Also, in 2021 Ecopetrol acquired a 51% stake in ISA a company that has participation in energy transmission, roads, and telecommunications across Latin America. The value proposition includes the diversification into low-emissions business models that will represent between 30% and 50% of Ecopetrol Group's EBITDA by 2040. Also, Ecopetrol Group continues to improve its fuel quality program, which supplies better quality diesel and gasoline to Colombia (known as Ultra Low Sulfur Diesel). Additionally, the diesel sold by Ecopetrol S.A. has a percentage of Biodiesel (Biofuel produced from palm oil). The mixture sold by Ecopetrol from the Barrancabermeja Refinery is known as B2E Diesel (98% Fossil Diesel and 2% Biodiesel). Wholesale distributors mix B2E with an additional 8% Biodiesel, generating a B10 mix (90% Fossil Diesel and 10% Biodiesel), which is what is consumed in the Colombian market. Ecodiesel, one of the subsidiaries of the Ecopetrol Group, has a biodiesel production plant in Barrancabermeja with a production capacity of up to 125 thousand tons per year.
Supply chain and/or value chain	Evaluation in progress	Ecopetrol identified scope 3 emissions for first time in 2020, using 2019 data. During 2021, Ecopetrol advanced the definition of other criteria that may establish a different relevance to that associated with the participation of emissions to drive climate change management strategies with key suppliers. Also, in 2021 Ecopetrol announced 25% scope 1 and 2 emissions reduction by 2030 and net-zero emissions scope 1 and 2 and 50% emissions reduction scope 3 by 2050. Our midstream segment, represented by CENIT, was certified carbon neutral in 2021 by the Colombian Technical Standards and Certification Institute – Icontec.
Investment in R&D	Yes	The Technology and Innovation Committee of the Board of Directors was created in 2019 to review Ecopetrol's Technology Strategy, which includes a major component called "Towards energy transition and carbon neutrality". This component addresses the following topics: 1. Energy diversification (solar, geothermal, wind and green hydrogen); 2. Optimization of water use (reuse, agro-industrial use, optimal quality); 3. Decreasing fugitive emissions, zero flaring, and carbon capture, utilization, and storage (asphalt binders, charcoal fossils, carbon fibers graphene); and 4. Stable and profitable production of ethanol and biodiesel among other biofuels. Ecopetrol's Vicepresidency of Innovation and Technology leads and supports research and development efforts on these fields. In the recently announced Ecopetrol 2040 strategy, one of its pillars is enabling the strategy with cutting-edge knowledge which includes technology and innovation as its main growth lever. The Technology and Strategy teams have defined a digital agenda which established a map of solutions that contribute towards our energy transition and decarbonizing goal. The proposed solutions have been grouped into clusters for each Energy Transition goal. Each cluster will serve as an enabler that supports the completion and accomplishment of the goals through science, technology, and innovation. Energy Transition roadmap and its proposed clusters: 1. Decarbonization: Clean energy and new technologies to decarbonize operations 2. Increase competitiveness to avoid stranded assets: new technologies to improve resilience in assets, replace reserves to assure our core business competitiveness, optimization in strategic processes 3. Technology, Environment, Social and Governance (TESG) agenda: enable by technology Ecopetrol's water management strategy; assure participation in the modernization of territories; technology for ESG reporting and management 4. Diversification: develop technology that supports new businesses. The implementation of this agenda has an estimate impact of 20 – 30 billion dollars of accumulated EBITDA until 2040.
Operations	Evaluation in progress	In response to climate change-related risks Ecopetrol defined its decarbonization plan to reduce emissions through energy efficiency projects, renewables, reduction of routine flaring and reduction of fugitive emissions and vents. All these projects have been so far cost-effective, but as the Company continues to achieve operational efficiencies to drive emissions down, in parallel it must put together an abatement curve to identify additional opportunities, determine additional cost-effective projects and the potential of implementing new technologies (e.g. CCUS).

**C3.4**

**(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.**

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Direct costs Indirect costs Capital expenditures Capital allocation Access to capital Assets	In 2020, Ecopetrol set an internal carbon price at USD 20 tonCO2 in 2021, USD 30 tonCO2 from 2025 and USD 40 ton CO2 from 2030. This criterion is analysed periodically, and it is used to assess and evaluate investment opportunities, with the aim of encouraging clean technologies, and renewable energy projects and low carbon solutions across our operations. To achieve environmentally responsible, safe and efficient operations there are five (5) strategic lines: (i) build and generate value through an efficient, clean and safe production, (ii) accelerate and prioritize decarbonization and efficiency energy, (iii) ensure circular water management, (iv) support the local development of territories where the Company operates and (v) generate trust in the social environment with proactive dialogue and improvement of the quality of life, with a focus on the inclusion and revitalization of local economies. In line with the TESH objectives, the 22 - 24 Plan (without ISA) includes investments for more than USD 1,400 million in circular water management projects, decarbonization, energy efficiency, use of energy and alternative sources, improvement in the quality of fuels, and studies and pilots of green and blue hydrogen for applications in refineries and mobility. Ecopetrol Group will increase its self-generation capacity with renewable energies in a range between 400-450MW by 2023. On the other hand, Ecopetrol is evaluating different sustainable financing alternatives to leverage energy transition projects aimed at meeting the goal of being carbon neutral by 2050.

**C4. Targets and performance**

**C4.1**

**(C4.1) Did you have an emissions target that was active in the reporting year?**

Absolute target

**C4.1a**

**(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.**

Target reference number

Abs 1

**Year target was set**

2021

**Target coverage**

Company-wide

**Scope(s)**

Scope 1

Scope 2

**Scope 2 accounting method**

Market-based

**Scope 3 category(ies)**

&lt;Not Applicable&gt;

**Base year**

2019

**Base year Scope 1 emissions covered by target (metric tons CO2e)**

11047443

**Base year Scope 2 emissions covered by target (metric tons CO2e)**

620369

**Base year Scope 3 emissions covered by target (metric tons CO2e)**

&lt;Not Applicable&gt;

**Total base year emissions covered by target in all selected Scopes (metric tons CO2e)**

11667811

**Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1**

100

**Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2**

100

**Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)**

&lt;Not Applicable&gt;

**Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes**

100

**Target year**

2030

**Targeted reduction from base year (%)**

25

**Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]**

8750858.25

**Scope 1 emissions in reporting year covered by target (metric tons CO2e)**

10306789

**Scope 2 emissions in reporting year covered by target (metric tons CO2e)**

563148

**Scope 3 emissions in reporting year covered by target (metric tons CO2e)**

&lt;Not Applicable&gt;

**Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)**

10869936

**% of target achieved relative to base year [auto-calculated]**

27.353031344097

**Target status in reporting year**

Underway

**Is this a science-based target?**

No, but we anticipate setting one in the next 2 years

**Target ambition**

&lt;Not Applicable&gt;

**Please explain target coverage and identify any exclusions**

In March 2021, Ecopetrol announced its commitment to reduce its emissions by 25% compared to what was emitted in 2019 and to achieve net-zero emissions by 2050 (scopes 1 and 2). Additionally, Ecopetrol seeks to reduce 50% of its total emissions by 2050 (scopes 1, 2 and 3).

The established goals by 2030 cover scope 1 and 2 emissions generated by the Ecopetrol Group, which were estimated for 2019 at 13.5 MtCO<sub>2</sub>e. This amount includes an initial estimate of 2MtCO<sub>2</sub>e additional to those emitted directly by Ecopetrol that correspond to emissions related to the different subsidiaries and equity stakes of the group.

In order to better consolidate and report total emissions for the Ecopetrol group as of 2024, this additional estimate is being reviewed for each of the subsidiaries, and for the assets not directly operated by the company, to standardize the calculation methodologies and to incorporate the emissions of the entire group in the information management tool currently used by Ecopetrol (SIGEA - SAP EC).

**Plan for achieving target, and progress made to the end of the reporting year**

The achievement of this target is part of the net-zero roadmap, which establishes the development of a portfolio for emission reduction projects that levers on the reduction of fugitive emissions and venting, the reduction of gas flaring, and the incorporation of renewable energy projects focused mainly on solar farms, as well as various initiatives to achieve energy efficiency.

Annually, the company establishes a goal that considers the contribution of specific projects in different segments of the company. In 2021, the goal reached through new

project implementation was 293,594 tons of CO<sub>2</sub>e (tCO<sub>2</sub>e), exceeding the original goal of 235,262 tCO<sub>2</sub>e. The accumulated GHG emissions reduction between 2020-2021 was 493,441 tCO<sub>2</sub>e. This accumulated reduction is part of Ecopetrol's short-term reduction target, which is to reduce 1.6 million tons of CO<sub>2</sub>e in the 2020-2024 period.

**List the emissions reduction initiatives which contributed most to achieving this target**

<Not Applicable>

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## C4.2

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**(C4.2) Did you have any other climate-related targets that were active in the reporting year?**

Target(s) to increase low-carbon energy consumption or production

Net-zero target(s)

Other climate-related target(s)

## C4.2a

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**(C4.2a) Provide details of your target(s) to increase low-carbon energy consumption or production.**

**Target reference number**

Low 1

**Year target was set**

2018

**Target coverage**

Company-wide

**Target type: energy carrier**

Electricity

**Target type: activity**

Production

**Target type: energy source**

Renewable energy source(s) only

**Base year**

2018

**Consumption or production of selected energy carrier in base year (MWh)**

0

**% share of low-carbon or renewable energy in base year**

0

**Target year**

2023

**% share of low-carbon or renewable energy in target year**

24

**% share of low-carbon or renewable energy in reporting year**

6.3

**% of target achieved relative to base year [auto-calculated]**

26.25

**Target status in reporting year**

Underway

**Is this target part of an emissions target?**

Yes. Low-carbon energy production would reduce scope 2 emissions. This target is part of Abs1 (reported in question C4.1a) and NZ1 (reported in question C4.2c).

**Is this target part of an overarching initiative?**

No, it's not part of an overarching initiative

**Please explain target coverage and identify any exclusions**

The target covers renewable energy production (self-generation) company-wide. Currently, the self-generated energy matrix has three sources: gas, liquid fossil fuels, and renewable energies (mainly, solar). The target is to increase the share of renewable energies in the self-generated matrix. Self-generated electricity capacity with fossil fuels (gas and liquid) may vary, and even increase, in the future because these sources will be viewed as a backup.

This target refers only to self-generation energy production. Therefore, electricity purchases from the national electrical grid are not included.

**Plan for achieving target, and progress made to the end of the reporting year**

The target includes renewable energy production from wind, solar and geothermal sources. In 2021, two (2) solar projects were inaugurated: i) San Fernando Solar Ecopark initiated operations, with an installed capacity of 61 MWp, and ii) six (6) of Cenit's small solar plants were inaugurated with an installed capacity of 0.46 MWp. Ecopetrol reached an accumulated production of 112.8 MWp between 2020 and 2021.

**List the actions which contributed most to achieving this target**

<Not Applicable>

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## C4.2b

**(C4.2b) Provide details of any other climate-related targets, including methane reduction targets.**

**Target reference number**

Oth 1

**Year target was set**

2020

**Target coverage**

Company-wide

**Target type: absolute or intensity**

Absolute

**Target type: category & Metric (target numerator if reporting an intensity target)**

Other, please specify	Other, please specify (Energy efficiency, measured %)
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**Target denominator (intensity targets only)**

<Not Applicable>

**Base year**

2017

**Figure or percentage in base year**

0

**Target year**

2022

**Figure or percentage in target year**

3

**Figure or percentage in reporting year**

3.1

**% of target achieved relative to base year [auto-calculated]**

103.333333333333

**Target status in reporting year**

Achieved

**Is this target part of an emissions target?**

Yes. This target aims at reducing electricity consumption which means scope 2 emissions will also be reduced. This target is part of Abs1 (reported in question C4.1a) and NZ1 (reported in question C4.2c).

**Is this target part of an overarching initiative?**

No, it's not part of an overarching initiative

**Please explain target coverage and identify any exclusions**

The target covers all facilities where Ecopetrol has operational control.

**Plan for achieving target, and progress made to the end of the reporting year**

<Not Applicable>

**List the actions which contributed most to achieving this target**

In 2021, the main actions were:

1. Energy efficiency initiatives implementation in upstream and downstream.
2. Renewable energy projects portfolio development. In reporting year renewable energy consumption was 39,4 GWh.

**Target reference number**

Oth 2

**Year target was set**

2017

**Target coverage**

Company-wide

**Target type: absolute or intensity**

Absolute

**Target type: category & Metric (target numerator if reporting an intensity target)**

Other, please specify	Other, please specify (Energy efficiency, measured in %)
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**Target denominator (intensity targets only)**

<Not Applicable>

**Base year**

2017

**Figure or percentage in base year**

0

**Target year**

2028

**Figure or percentage in target year**

6

**Figure or percentage in reporting year**

3.1

**% of target achieved relative to base year [auto-calculated]**

51.6666666666667

**Target status in reporting year**

Underway

**Is this target part of an emissions target?**

Yes. This target aims at reducing electricity consumption which means scope 2 emissions will also be reduced. This target is part of Abs1 (reported in question C4.1a) and NZ1 (reported in question C4.2c).

**Is this target part of an overarching initiative?**

No, it's not part of an overarching initiative

**Please explain target coverage and identify any exclusions**

The target covers all facilities where Ecopetrol has operational control.

**Plan for achieving target, and progress made to the end of the reporting year**

The plan to achieve the target includes the development and implementation of energy efficiency initiatives. It has two levers: operational control and technological improvements.

**List the actions which contributed most to achieving this target**

&lt;Not Applicable&gt;

**Target reference number**

Oth 3

**Year target was set**

2020

**Target coverage**

Business division

**Target type: absolute or intensity**

Absolute

**Target type: category & Metric (target numerator if reporting an intensity target)**

Other, please specify	Other, please specify (Reduction of routine flaring (Zero Routine Flaring), measured in million m3)
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**Target denominator (intensity targets only)**

&lt;Not Applicable&gt;

**Base year**

2017

**Figure or percentage in base year**

439.5

**Target year**

2030

**Figure or percentage in target year**

0

**Figure or percentage in reporting year**

247

**% of target achieved relative to base year [auto-calculated]**

43.7997724687144

**Target status in reporting year**

Underway

**Is this target part of an emissions target?**

Yes, it is part of the net-zero roadmap. Flaring reduction is one of the main levers to achieve the target. This target is part of Abs1 (reported in question C4.1a) and NZ1 (reported in question C4.2c).

**Is this target part of an overarching initiative?**

Other, please specify (Zero Routine Flaring by 2030 lead by World Bank)

**Please explain target coverage and identify any exclusions**

The target covers reduction of upstream flaring. It does not cover downstream flaring.

Regarding upstream flaring, the target covers all production facilities where Ecopetrol has operational control.

Although the target is limited to routine flaring, the reported flaring data in the reporting year and in the base year correspond to the overall gas flaring due to the company's operations, because, to date, Ecopetrol does not have the information segregated into routine and non-routine flaring. The first corporate report made to the World Bank, which was made in 2022, is in line with the reporting conditions allowed by the World Bank within the ZRF initiative as the first corporate report. Currently, Ecopetrol is making progress in characterizing which flaring activities are routine and non-routine to present them from the second report.

**Plan for achieving target, and progress made to the end of the reporting year**

This target will be achieved through evaluation and implementation of projects for usage of gas that is currently flared and through process optimization. These are the main actions to reduce routine flaring :

- Convert associated gas to electrical power: Gas turbines can convert gases that would otherwise be flared into electricity. The electricity can be used on-site to power

equipment.

- Recover associated gases using vapor recovery units: Vapor recovery units can capture flash gas from tanks and compress it in the gas line so that it can be sold rather than released or flared.

- Associated gas recovery: It can be treated to remove water, sulphur and carbon dioxide and then compressed on-site to produce compressed natural gas (CNG) and a natural gas liquids (NGL) product.

In 2021, Ecopetrol implemented nine (9) projects that allowed the reduction of 45,135 tCO<sub>2</sub>e.

Also, Ecopetrol participated in the construction of a national regulation (Resolution 40066 of 2022 of the Ministry of Mines and Energy of Colombia) which aims to reduce exploration and production routine flaring when it is economically possible. This national regulation is aligned with the Zero Routine Flaring (ZRF) initiative.

**List the actions which contributed most to achieving this target**

<Not Applicable>

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## C4.2c

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**(C4.2c) Provide details of your net-zero target(s).**

**Target reference number**

NZ1

**Target coverage**

Company-wide

**Absolute/intensity emission target(s) linked to this net-zero target**

Abs1

**Target year for achieving net zero**

2050

**Is this a science-based target?**

No, and we do not anticipate setting one in the next 2 years

**Please explain target coverage and identify any exclusions**

The target is company-wide, it covers all activities in facilities where Ecopetrol has operational control.

In line with its commitment to mitigate climate change, advance with the energy transition and its TEGS agenda, the Ecopetrol Group announced its goal of having net zero emissions by 2050 for scopes 1 and 2. Under this goal, the company ratifies its responsibility with the Sustainable Development Goals (SDGs) and with the Paris Agreement's purpose of curtailing global warming.

The 2050 objective has intermediate goals and a short, medium and long-term portfolio, with some projects already implemented or in a research stage. By 2030, the Ecopetrol Group seeks to reduce its CO<sub>2</sub>e emissions by 25% (scopes 1 and 2) compared to a 2019 baseline. According to the estimated emissions projected by 2030, this reduction represented an initial estimate of between 5 and 6 million tons of CO<sub>2</sub>e reductions in this decade.

In addition, Ecopetrol seeks to reduce 50% of its total emissions by 2050 (scopes 1, 2 and 3).

In March 2022, SBTi published a Fossil Fuels Policy, which indicates the following premises: (i) pauses the validation of fossil fuel sector targets, (ii) will not accept new commitments from companies or subsidiaries according to the defined categories, and (iii) removal of previous commitments by oil and gas sector companies immediately.

The updated guidance is expected to be published by the end of 2023. Once the specific guidance is released, Ecopetrol will review its ambition and alignment with SBTi.

**Do you intend to neutralize any unabated emissions with permanent carbon removals at the target year?**

Yes

**Planned milestones and/or near-term investments for neutralization at target year**

The net-zero roadmap includes:

2020- 2025:

- Permanently update the inventory of emissions from direct operations, subsidiaries and non-operated assets, including those associated with scope 3.
- Implementation of initiatives identified for energy efficiency, reduction of fugitive emissions, venting and flaring, and renewable energies – solar, wind and geothermal.
- Identifying additional initiatives for efficiency, flaring reduction and biomass.
- Developing the portfolio of Natural Climate Solutions.
- Green hydrogen pilot.

2025-2030:

- Implementing additional technological options in energy efficiency, reduction of fugitive emissions, venting and flaring, fuel substitution, and renewable energies – solar, wind and geothermal.
- Further developing the portfolio of Natural Climate Solutions.
- Gradually escalating green hydrogen and carbon capture, use and sequestration pilots – if the technologies are competitive.

2030-2050:

- Capitalizing on the technological advancement of competitive initiatives in green hydrogen, carbon sequestration and renewable energy with storage through batteries.
- Further developing the portfolio of Natural Climate Solutions.

Additionally, according to the 2040 Corporate Strategy, the Company will neutralize around 30% of emissions through Natural Climate Solutions. Also, over the next three years more than USD 200 million is expected to be invested in green hydrogen projects in the Cartagena and Barrancabermeja refineries, and in CO<sub>2</sub> capture projects through both emerging technologies (CCUS) and Natural Climate Solutions (NCS) projects.

**Planned actions to mitigate emissions beyond your value chain (optional)**

According to Ecopetrol's strategy, around 30% of emissions will be neutralized through Natural Climate Solutions. It includes avoided deforestation projects, restoration and reforestation in agroforestry projects, wetland restoration, among others. It may also represent numerous social and environmental co-benefits to the territories where this strategy is implemented. In addition, these projects have the potential to effectively reduce net CO<sub>2</sub> emissions and contribute to the country's Nationally Determined Contribution (NDC), considering that the main sources of emissions in Colombia (around 60%) are associated with deforestation and land use changes.

In 2021, Ecopetrol started the Nature Climate Solutions portfolio implementation with the development of four (4) projects in partnership with The Nature Conservancy, Wildlife Conservation Society, Acción Fund, ISA – Conexión Jaguar and Natura Foundation, with a potential capture of more than 1MtCO<sub>2</sub>/year. The accumulated potential of these projects, considering their life span, is more than 15 million tCO<sub>2</sub>.

Further details can be found on the following link: <https://www.ecopetrol.com.co/wps/portal/Home/tesg/environmental/biodiversity-and-ecosystem-services/strategic-partners-index>

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## C-OG4.2d

**(C-OG4.2d) Indicate which targets reported in C4.1a/b incorporate methane emissions, or if you do not have a methane-specific emissions reduction target for your oil and gas activities, please explain why not and forecast how your methane emissions will change over the next five years.**

Both targets, the mid-term by 2030 and net-zero by 2050, include the reduction of methane emissions.

Ecopetrol is part of the Climate and Clean Air Coalition (CCAC), in line with the company's efforts to reduce methane emissions into the atmosphere. As part of the commitments, the company is systematically advancing in the identification and quantification of methane emissions. In addition, in 2020, the company joined the OGMP2.0 Methane Initiative Framework (Oil and Gas Methane Partnership), which will lead to more transparent and standardized reporting of methane emissions from oil and gas value chains.

The Company's Fugitive Emissions and Venting Management Strategy has the following objectives:

1. Achieve compliance with the sectoral goal of reducing methane emissions from member companies of the CCAC by 2025, in absolute terms of 45% between 60% and 75% by 2030, exceeding the levels estimated for 2015.
2. Report 100% of operated assets in 2024 and 100% of non-operated assets in 2026, at the 4/5 measurement level in accordance with the commitments established for OGMP 2.0 members.

To this end, progress is being made in the development and implementation of the following: i) Updating and adjusting the methane emissions inventory, construction of our own emission factors, and definition of specific reduction goals; ii) Incorporation of design criteria and good engineering practices to reduce fugitive emissions and venting; iii) Implementation of the LDAR - Leak Detection and Repair, a program for the identification, quantification, and repair of methane emission leaks.

A campaign to detect methane emissions was deployed in 2021, with greater coverage than the campaign conducted between 2019 and 2020 identifying 1,085 leaks that already have an action plan, of which, 184 (17%) have already been closed.

Once Ecopetrol's own emission factors are established, it is expected that methane emissions will increase.

In 2022, Ecopetrol will establish its own methane emission reduction goal.

## C4.3

**(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.**

Yes

### C4.3a

**(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.**

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	45	
To be implemented*	11	67035
Implementation commenced*	18	165450
Implemented*	43	293594
Not to be implemented	7	

### C4.3b

**(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.**

**Initiative category & Initiative type**

Energy efficiency in production processes	Process optimization
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**Estimated annual CO2e savings (metric tonnes CO2e)**

293594

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 1

**Voluntary/Mandatory**

Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**

94919764267

**Investment required (unit currency – as specified in C0.4)**

191985046581

**Payback period**

1-3 years

**Estimated lifetime of the initiative**

3-5 years

**Comment**

Reported information corresponds to 43 initiatives developed in both upstream and downstream, divided as follows: Energy efficiency: 24; Fugitive and venting emissions reduction: 8; Flaring reduction: 9; Renewables energy: 2.

To calculate the figures a COP-USD exchange rate of 3,891.16 was used.

**C4.3c**

**(C4.3c) What methods do you use to drive investment in emissions reduction activities?**

Method	Comment
Dedicated budget for energy efficiency	Ecopetrol has the Energy Efficiency Program, with a dedicated budget, which aims to optimize the organization's energy performance, achieving a reduction in energy consumption and a reduction in GHG emissions as part of its decarbonization program objectives. This program is based on the ISO:50001 Standard
Internal price on carbon	In 2020 Ecopetrol defined the methodology and implemented an internal carbon price that incorporates the carbon dioxide emissions' impact (positive or negative) on investments economic valuations as a complementary decision-making criteria. Ecopetrol has set an internal carbon price at US\$ 20/TCO2 in 2021, 30 US\$/TCO2 from 2025, and 40 US\$/TCO2 from 2030 onwards, which will be used to assess and evaluate current and future projects and investments.
Dedicated budget for low-carbon product R&D	Ecopetrol's Center for Innovation and Technology-ICP develops different projects, (studies on energy efficiencies, hydrogen, optimization in gas processes, etc.) including those that improve the efficiencies of processes in the value chain and reduce the carbon footprint.
Financial optimization calculations	In 2021 an update of capital discipline criteria for resource allocation was conducted, considering the energy transition strategy of Ecopetrol, a lower hurdle discounted rate of return (minimum rate of return expected) was set for energy projects including renewables.
Marginal abatement cost curve	Ecopetrol continues implementing its Marginal Abatement Cost Curve (MACC) identifying six (6) technological levers that lead to 18 mitigation initiatives for the upstream, midstream, and downstream segments. The technological levers are: energy efficiency, methane and flaring, renewable energy, fuel substitution, renewable hydrogen, and CCUS. In addition, an emission mitigation potential was established for 7 global initiatives in the company, which are mainly cost-effective.
Internal incentives/recognition programs	The company has a short-term variable compensation plan tied to business results that is applicable to all employees and reviewed annually through the Management Balanced Scorecards (TBGs). Since 2010, Ecopetrol has been implementing greenhouse gas emissions (GHG) reduction projects in different operational areas, and since 2012 the company has implemented annual emission reduction targets. Each annual target is set by identifying projects from the portfolio that will be developed the following year. For the year 2021, the management Balanced Scorecard includes a greenhouse gas (GHG) reduction goal that measures the cumulative reduction of emissions in the Ecopetrol Group in terms of CO2 equivalent (CO2, CH4, N2O), through the implementation of projects such as energy efficiency, process optimization, gas utilization, changes in the energy matrix, among others. The Long-Term Incentives (LTI) apply to company executives and each plan includes a GHG reduction target for each three-year period, aligned with the company's goal of reducing GHG emissions by 25% by 2030 (Scopes 1 and 2) and achieving zero net carbon emissions by 2050. Currently we have implemented three LTI plans for the periods 2020-2022, 2021-2023 and 2022-2024.

**C4.5**

**(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?**

Yes

**C4.5a**

**(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.**

**Level of aggregation**

Product or service

**Taxonomy used to classify product(s) or service(s) as low-carbon**

Low-Carbon Investment (LCI) Registry Taxonomy

**Type of product(s) or service(s)**

Biofuels	Other, please specify (Biodiesel)
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**Description of product(s) or service(s)**

The diesel sold by Ecopetrol S.A. has a percentage of Biodiesel (Biofuel produced from Palm Oil), in line with Colombia's Law 939 of 2004. The blend marketed by Ecopetrol from the Barrancabermeja Refinery is known as B2E Diesel (98% Fossil Diesel and 2% Biodiesel). Wholesale distributors mix B2E with Biodiesel, generating a B10 mixture (90% Fossil Diesel and 10% Biodiesel), which is the one consumed in the Colombian market. Ecodiesel, one of the Ecopetrol Group's subsidiaries, has a biodiesel production plant in Barrancabermeja with a production capacity of up to 133 thousand tons per year. In 2021, total biodiesel sales were 132.348 tons. Ecopetrol has 50% of the total revenues of this production.

**Have you estimated the avoided emissions of this low-carbon product(s) or service(s)**

Yes

**Methodology used to calculate avoided emissions**

Other, please specify (Resolution 1962 of 2017 of Colombia's Ministry of Environment and Sustainable Development.)

**Life cycle stage(s) covered for the low-carbon product(s) or services(s)**

Use stage

**Functional unit used**

To use Ecopetrol's marketed biodiesel (2% Biodiesel, 98% diesel) compared to 100% diesel.

**Reference product/service or baseline scenario used**

100% Diesel

**Life cycle stage(s) covered for the reference product/service or baseline scenario**

Use stage

**Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario**

185233

**Explain your calculation of avoided emissions, including any assumptions**

Ecodiesel produces 100% biodiesel. Ecopetrol owns half of Ecodiesel's production. Using the 100% biodiesel high heating value, it was possible to calculate the energy contained in the production owned by Ecopetrol and, using the fossil diesel high heating value, it was possible to determine the produced mass if it were fossil diesel. Avoided emissions were calculated using emissions factors for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O for national fuels, calculated by Mining and Energy Planning Unit (UPME, for its Spanish acronym).

Regarding the revenue generated from low-carbon products, Ecopetrol owns 50% of the Joint Venture with Ecodiesel. The income from Ecodiesel corresponds to profit and paid dividends. In 2021, Ecodiesel contributed 4.3% of the total dividends that Ecopetrol receives as non-operating income from joint ventures and associates and 0.16% of profits. In relation to last year report, the reported figure is adjusted according to the equity method.

**Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year**

4.3

**C-OG4.6**

**(C-OG4.6) Describe your organization's efforts to reduce methane emissions from your activities.**

Ecopetrol is part of the Climate and Clean Air Coalition (CCAC), in line with the company's efforts to reduce methane emissions. As part of its commitments, the company is systematically advancing in the identification and quantification of methane emissions. In addition, in 2020, the company joined the OGMP2.0 Methane Initiative Framework (Oil and Gas Methane Partnership), which will lead to more transparent and standardized reporting of methane emissions from oil and gas value chains. Also, the company received technical support from the Canadian government for Bottom-up measurements of methane, through Environment & Natural Resources Canada, among others. The Company's Fugitive Emissions and Venting Management Strategy has the following objectives:

1. Achieve compliance with the sectoral goal of reducing methane emissions from member companies of the CCAC by 2025, in absolute terms of 45% between 60% and 75% by 2030, exceeding the levels estimated for 2015.
2. Report 100% of operated assets in 2024 and 100% of non-operated assets in 2026, at the 4/5 measurement level in accordance with the commitments established for OGMP 2.0 members.

To this end, progress is being made in the development and implementation of the following lines of action: i) Updating and adjusting the methane emissions inventory, construction of our own emission factors, and definition of specific reduction goals; ii. Incorporation of design criteria and good engineering practices to reduce fugitive emissions and venting; ii) Implementation of the LDAR - Leak Detection and Repair, a program for the identification, quantification, and repair of methane emission leaks.

Ecopetrol has an internal guideline for the implementation of the LDAR program, applicable to exploration and production activities, based on the requirements of Resolution 40066, "Technical requirements for the detection and repair of leaks, exploitation, flaring and venting of natural gas during hydrocarbon exploration and exploitation activities", issued by the Colombian Mines and Energy Ministry in 2022 .

In 2021, a campaign to detect methane emissions was deployed identifying 1085 leaks that already have an action plan, of which, 184 (17%) have already been closed.

Once Ecopetrol's own emission factors are established, it is expected that methane emissions will increase.

In 2022, Ecopetrol will establish its own methane emission reduction goal.

## C-OG4.7

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**(C-OG4.7) Does your organization conduct leak detection and repair (LDAR) or use other methods to find and fix fugitive methane emissions from oil and gas production activities?**

Yes

## C-OG4.7a

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**(C-OG4.7a) Describe the protocol through which methane leak detection and repair or other leak detection methods, are conducted for oil and gas production activities, including predominant frequency of inspections, estimates of assets covered, and methodologies employed.**

In 2021, Ecopetrol carried out the first major fugitive measurement detection campaign in all of its Upstream production assets, with the support of the Canadian government to structure a robust baseline on methane, to define specific emissions factors for the organization that will lead to an update of the SAP-EC supported information tool on emissions (named SIGEA) to better monitor and control this source of emissions. Taking this input, as well as the internal guideline for the implementation of LDAR program, and the recent regulatory framework (Res. 40066 of 2022), the company is planning the corresponding Leak Detection and Repair LDAR campaigns. For the Bottom-up campaign carried out in 2021 to measure fugitive methane emissions, OGI cameras were used to detect the leak and Hi-Flow Sampler equipment for measurement, ultrasonic flow meter equipment was used to measure well casinghead venting and cameras OGI, Vortex flow meter equipment and anemometers for venting measurement in tanks, covering approximately 95% of upstream assets to date. Regarding the frequency of monitoring for consecutive periods, Ecopetrol will follow the recent regulatory framework.

## C-OG4.8

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**(C-OG4.8) If flaring is relevant to your oil and gas production activities, describe your organization's efforts to reduce flaring, including any flaring reduction targets.**

The reduction of flaring is very important to Ecopetrol, and efforts have been made in recent years to significantly reduce it, as shown by our latest sustainability reports. Likewise, Ecopetrol is part of the World Bank's Zero Routine Flaring initiative.

Ecopetrol S.A. has implemented the following initiatives to reduce flaring in existing fields:

- Convert associated gas to electrical power: Gas turbines can convert gases that would otherwise be flared into electricity. The electricity can be used on-site to power equipment.
- Recover associated gases using vapor recovery units: Vapor recovery units can capture flash gas from tanks and compress it in the gas line so that it can be sold rather than released or flared.
- Associated gas recovery: It can be treated to remove water, sulphur and carbon dioxide and then compressed on-site to produce compressed natural gas (CNG) and a natural gas liquids (NGL) product.

To manage emissions from flaring, Ecopetrol designed a guide that establishes the internal guidelines required for the implementation of the "Zero Routine Flaring by 2030" initiative, which includes the methodology for estimating the reduction of emissions related to gas flaring. Additionally, this guide is aligned with Resolution 40066 issued by the Ministry of Mines and Energy.

In 2022 Ecopetrol will report, for the first time, routine flaring to the World Bank.

## C5. Emissions methodology

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### C5.1

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**(C5.1) Is this your first year of reporting emissions data to CDP?**

No

### C5.1a

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**(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?**

**Row 1**

**Has there been a structural change?**

- Yes, an acquisition
- Yes, a divestment

**Name of organization(s) acquired, divested from, or merged with**

Acquired organization: 51,41% of ISA's capital stock; Acquired assets: Pauto - Floreña; Divested organization: Cenit, and ODC. Ecopetrol handed over Cenit's and ODC's operational control to Cenit.

**Details of structural change(s), including completion dates**

In August 2021 Ecopetrol acquired 51.41% of ISA's capital stock. ISA is a multi-Latin corporate group operating in Colombia, Brazil, Peru, Chile, Bolivia, Argentina, and Central America. ISA and its 46 subsidiaries operate and maintain electricity transmission networks. However, Ecopetrol does not have operational control on ISA's operations. For this reason, those emissions are not included in this report.

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset, which is why the emissions of these assets are included in 2021. Therefore, the total 2018-2020 historical series was recalculated.

**C5.1b**

**(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?**

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	Yes, a change in methodology Yes, a change in boundary	<p>Change in boundary: For the 2021 term, the operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. In this report, scope 3 emissions are aligned with the boundary selected for scope 1 &amp; 2 emissions (facilities where Ecopetrol has operational control), which include Cartagena's refinery.</p> <p>Change in base year: In 2021, it was updated to 2019.</p> <p>Change in methodology:</p> <p>Scope 2: last year Ecopetrol calculated scope 2 emissions with the location-based method. As a result of the recommendations obtained during the 2021 third-party verification process, this report uses both methodologies, location-, and market-based. However, monitoring is done with market-based method because supplier-specific emission factors are used. This method gives a higher value than the one obtained with location-based method because the national electrical grid has a high hydric component, so the emission factor for electricity provided by the national grid is relatively low compared to emission factors for electricity from other countries.</p> <p>Scope 3 C1: Purchased goods and services is mainly calculated with spend-based method. Last year, Quantis models were used for this calculation. This year, instead of Quantis, EEIO (Environmentally-extended input output) model was used, because it has more specific categories and updated emission factors. In 2021, the inventory has been refined moving away from spend-based method to average-data method or hybrid method, as much as possible.</p> <p>Scope 3 C3: In the previous report fuel and energy emissions were calculated using an average between different methodologies, including an estimate from Quantis tool. For this report, the Quantis tool is no longer used. Emissions are calculated using the national electric grid emission factor, which is updated annually, and using supplier-specific emission factor.</p> <p>Scope 3 C8: Last year, leased assets (upstream) were calculated with spend-based method using the Quantis tool. For this report, it is calculated using the national electrical grid emission factor and the energy consumption in each asset.</p> <p>Scope 3 C11: In the previous report exported oil related GHG emissions were calculated as part of category 10. For this report, those emissions are part of category 11 Use of sold product. The calculation methodology was updated considering the carbon content as a conservative criterion, which allows to cover the maximum possible emissions per oil barrel.</p>

**C5.1c**

**(C5.1c) Have your organization's base year emissions been recalculated as result of the changes or errors reported in C5.1a and C5.1b?**

	Base year recalculation	Base year emissions recalculation policy, including significance threshold
Row 1	Yes	<p>Ecopetrol has an internal design document for emissions management which includes the requirements for inventory recalculation. The frequency for recalculation is defined as annual. These guidelines cover both the base year emissions, and the historical series 2018-2020, considering changes made to the inventory in 2020 and 2021.</p> <p>Base year emissions are recalculated in the following scenarios: i) assets acquisition or divestment; ii) emission sources inclusion; iii) changes in emission factors, such as electrical grid (calculated annually) and national fuels; and iv) improvement in activity data quality.</p>

**C5.2**

**(C5.2) Provide your base year and base year emissions.**

## Scope 1

### Base year start

January 1 2019

### Base year end

December 31 2019

### Base year emissions (metric tons CO2e)

11047443

### Comment

Scope 1 (direct) GHG emissions include all activities under operation control. The included GHG are CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. The global warming potentials used are from the Fifth Assessment Report (AR5). The main calculation methodologies are mass balance and emission factors.

Scope 1 emissions accounted for 95% of Ecopetrol's scopes 1 and 2 total emissions. For base year recalculation, the carbon intensity data of the year in which the acquired asset began its operation in Ecopetrol is taken and extrapolated to the base year using the asset's historical production reported in the National Hydrocarbons Agency. Once total emissions are calculated, scope 1 emissions are calculated using the average of Scope 1 proportion in the last 4 years of Ecopetrol's GHG emissions inventory.

## Scope 2 (location-based)

### Base year start

January 1 2019

### Base year end

December 31 2019

### Base year emissions (metric tons CO2e)

367462

### Comment

Scope 2 (indirect) GHG emissions are those associated with the consumption of purchased electricity.

Scope 2 monitoring and targets are based on market-based method because supplier-specific emission factors are used. However, data for both methodologies are presented in this report.

Scope 2 emissions (location-based) were calculated using the national electrical grid emission factor for 2019, calculated by UPME.

## Scope 2 (market-based)

### Base year start

January 1 2019

### Base year end

December 31 2019

### Base year emissions (metric tons CO2e)

620369

### Comment

Scope 2 (indirect) GHG emissions are those associated with the consumption of purchased electricity. Scope 2 emissions accounted for 5% of Ecopetrol's scopes 1 and 2 total emissions.

For base year recalculation, the carbon intensity data of the year in which the acquired asset began its operation in Ecopetrol is taken and extrapolated to the base year using the asset's historical production reported in the National Hydrocarbons Agency. Once total emissions are calculated, scope 2 emissions are calculated using the average of Scope 2 proportion in the last 4 years of Ecopetrol's GHG emissions inventory.

Ecopetrol uses market-based method because supplier-specific emission factors are used. It gives a higher value than the one obtained with location-based method because the national electrical grid has a high hydro component, so the emission factor for electricity provided by the national grid is relatively low compared to emission factors for electricity from other countries.

It is important to notice that electrical energy purchase from local suppliers is favoured by issues such as facilities located in areas with deficiencies in national electrification and low reliability of the national system, which forces the company to acquire electricity from local suppliers. These suppliers have higher emissions factors than the ones for the national electrical grid.

## Scope 3 category 1: Purchased goods and services

### Base year start

January 1 2019

### Base year end

December 31 2019

### Base year emissions (metric tons CO2e)

4980589

### Comment

Category 1 emissions accounted for 3.47% of Ecopetrol's total scope 3 emissions. This category is the company's second most significant emissions contributor. Emissions for purchased goods and services were estimated using three different methods: Supplier specific, Spend-based, and Hybrid according to the subcategory defined and the available information. The specific supplier method was used for some suppliers classified as relevant for the supply area. The spend-based method was used breaking down Ecopetrol's spend data allocated to the most appropriate product group category available within the EEIO (Environmentally-extended input output) model. Finally, the hybrid method was applied when a relevant supplier had an inventory of GHG emissions but the purchased good or service did not account for a relevant volume or mass. In this case, carbon intensity revenue-based was used.

### Scope 3 category 2: Capital goods

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

0

**Comment**

Category 2 is not calculated because emissions related to all contracts are included in category 1.

### Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

33968

**Comment**

Category 3 emissions accounted for 0.02% of Ecopetrol's total scope 3 emissions. In this category Transmission and distribution (T&D) losses, and surplus energy sales are included. Last report was calculated using an average between different methodologies, including an estimate from the Quantis tool. For this report, the Quantis tool is no longer used. Emissions for T&D losses are calculated using the national electric grid emission factor, which is updated annually; emissions for surplus energy sales are calculated using supplier-specific emission factor.

### Scope 3 category 4: Upstream transportation and distribution

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

301217

**Comment**

Category 4 emissions accounted for 0.21% of Ecopetrol's total scope 3 emissions. Ecopetrol divided this category into three (3) subcategories: river, marine, and land transportation. Both river and land transportation occur locally in Colombia, thus, the fuel used in these activities corresponds to fuel sold by Ecopetrol. For this reason, these two subcategories are already included in category 11 (use of sold product). The reported value corresponds to the whole category, divided as follows: 99,615 CO2e tons refer to subcategories accounted for in category 11, and 201,602 CO2e tons refer to the one subcategory which is not accounted for in category 11, that is, marine transportation. Most of these activities are calculated with distance-based method.

### Scope 3 category 5: Waste generated in operations

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

12276

**Comment**

Category 5 emissions accounted for 0.009% of Ecopetrol's total scope 3 emissions. Ecopetrol divided this category into three (3) subcategories: waste sent to incineration, landfill, and composting. This category is calculated using waste-type-specific method.

### Scope 3 category 6: Business travel

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

4375

**Comment**

Category 6 emissions accounted for 0.003% of Ecopetrol's total scope 3 emissions. This category refers to air transportation. Since all travel activities begin in Colombia, the fuel used in these activities corresponds to fuel sold by Ecopetrol. For this reason, this category is already included in category 11 (use of sold product). This category is calculated with distance-based methodology, following the International Civil Aviation Organization (ICAO) recommendation which establishes the average emission per passenger according to the route, type of aircraft, and cabin on each journey.

### Scope 3 category 7: Employee commuting

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

16593

**Comment**

Category 7 emissions accounted for 0.011% of Ecopetrol's total scope 3 emissions. This category refers to both air and ground commuting. Since all activities occur in national territory, the fuel used in these activities corresponds to fuel sold by Ecopetrol. For this reason, this category is already accounted for in category 11 (use of sold product). Some activities are calculated with distance-based method and others using national fuel emissions factors.

### Scope 3 category 8: Upstream leased assets

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

836

**Comment**

Category 8 includes emissions associated with non-industrial leased assets, and Ecopetrol's non-industrial own assets. The last report was calculated with spend-based method using the Quantis tool. For this report, both subcategories are calculated using the national electrical grid emission factor and the energy consumption in each non-industrial asset.

### Scope 3 category 9: Downstream transportation and distribution

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

1153487

**Comment**

Category 9 emissions accounted for 0.8% of Ecopetrol's total scope 3 emissions. Ecopetrol divided this category into two (2) subcategories: river, and marine transportation. River transportation occurs locally (in Colombia), and one portion of marine transportation begins in Colombia, thus, the fuel used in these activities corresponds to fuel sold by Ecopetrol. For this reason, most of these two (2) subcategories are already accounted for in category 11 (use of sold product). The reported value corresponds to the whole category, divided as follows: 1,151,056 CO2e tons refer to activities accounted for in category 11, and 2,431 CO2e tons refer to the portion of marine transportation that is not included in category 11. This category is calculated with distance-based method considering the transported load.

### Scope 3 category 10: Processing of sold products

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

5888337

**Comment**

Category 10 emissions accounted for 4.1% of Ecopetrol's total scope 3 emissions. This category includes the processing of intermediate products that are sold by Ecopetrol such as crude oil. For processing crude oil, average-data method was used. The secondary data used was the carbon intensity of an average refining process. This category is accounted for in category 11 (use of sold product).

### Scope 3 category 11: Use of sold products

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

136862493

**Comment**

Category 11 emissions accounted for more than 95% of Ecopetrol's total scope 3 emissions.

Use of sold product emissions for Ecopetrol includes the direct end-use phase emissions of final products such as liquid fuels and natural gas. Also, this category includes end-use phase emissions of sold intermediate products such as crude oil. The methodology uses net volume in commercial operations where Ecopetrol has the largest total amount of potential sold products (results are the same using total volume). To estimate emissions from fuels based on the final products, the quantities of fuels were multiplied by national combustion emission factor for each type of fuel. Emission factors for CO2, CH4, and N2O were used. National statistics were used to determine the percentage of fuel burned from stationary and mobile sources and the most representative source was used. Finally, for nonenergy final product such as lubricants and paraffins, CO2 emissions were estimated using the IPCC (Intergovernmental Panel on Climate Change) default oxidation fraction.

### Scope 3 category 12: End of life treatment of sold products

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

37195

**Comment**

Category 12 emissions accounted for 0.025% of Ecopetrol's total scope 3 emissions. It includes the emissions associated with end-of-life treatment of lubricants and paraffins. It is assumed that both products are incinerated, so the waste-type-specific method is used.

### Scope 3 category 13: Downstream leased assets

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

3811

**Comment**

Category 13 emissions accounted for 0.003% of Ecopetrol's total scope 3 emissions. This category refers to assets leased to others. Emissions are calculated using spend-based method and the Quantis Tool.

### Scope 3 category 14: Franchises

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

0

**Comment**

This category is not calculated because Ecopetrol does not have any franchises.

### Scope 3 category 15: Investments

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

1281233

**Comment**

Category 15 emissions accounted for 0.89% of Ecopetrol's total scope 3 emissions. This category is the company's third most significant emissions contributor. In this category assets with equity share are included. This category is calculated with the average data method considering Ecopetrol's upstream carbon intensity.

### Scope 3: Other (upstream)

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

0

**Comment**

No other upstream category is considered because all indirect Ecopetrol activities are taken into account in the above categories.

### Scope 3: Other (downstream)

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

0

**Comment**

No other downstream category is considered because all indirect Ecopetrol activities are taken into account in the above categories.

## C5.3

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**(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.**

American Petroleum Institute Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, 2009

ISO 14064-1

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

The Greenhouse Gas Protocol: Scope 2 Guidance

Other, please specify (Technical Guidance for Calculating Scope 3 Emissions (version 1.0))

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## C6. Emissions data

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### C6.1

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**(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?**

**Reporting year**

**Gross global Scope 1 emissions (metric tons CO2e)**

10306788

**Start date**

January 1 2021

**End date**

December 31 2021

**Comment**

The included GHGs are CO2, CH4, and N2O. Other GHGs are not included as they are not material to the company's operations. The global warming potentials used are taken from the Fifth Assessment Report (AR5).

**Past year 1**

**Gross global Scope 1 emissions (metric tons CO2e)**

10214171

**Start date**

January 1 2020

**End date**

December 31 2020

**Comment**

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset, which is why the emissions of these assets are included in 2021. Therefore, the total 2018-2020 historical series was recalculated.

Also, the inventory has had improvements in data quality (among these, the emissions calculation for venting activities during catalyst regeneration in catalytic cracking, in which the coke content was updated from 2018 to 2021).

**Past year 2**

**Gross global Scope 1 emissions (metric tons CO2e)**

11047443

**Start date**

January 1 2019

**End date**

December 31 2019

**Comment**

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset, which is why the emissions of these assets are included in 2021. Therefore, the total 2018-2020 historical series was recalculated.

Also, the inventory has had improvements in data quality (among these, the emissions calculation for venting activities during catalyst regeneration in catalytic cracking, in which the coke content was updated from 2018 to 2021).

**Past year 3**

**Gross global Scope 1 emissions (metric tons CO2e)**

11170105

**Start date**

January 1 2018

**End date**

December 31 2018

**Comment**

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset, which is why the emissions of these assets are included in 2021. Therefore, the total 2018-2020 historical series was recalculated.

Also, the inventory has had improvements in data quality (among these, the emissions calculation for venting activities during catalyst regeneration in catalytic cracking, in which the coke content was updated from 2018 to 2021).

## C6.2

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### (C6.2) Describe your organization's approach to reporting Scope 2 emissions.

#### Row 1

##### Scope 2, location-based

We are reporting a Scope 2, location-based figure

##### Scope 2, market-based

We are reporting a Scope 2, market-based figure

##### Comment

Scope 2 monitoring and targets are based on the market-based method because supplier-specific emission factors are used. It gives a higher value than the one obtained with location-based method because the national electrical grid has a high hydric component, so the emission factor for electricity provided by the national grid is relatively low compared to emission factors for electricity from other countries. However, in this report, both methodologies are used:

For scope 2, location-based figure, the company uses the emission factor for the national electrical grid (National Interconnected System, SIN for its Spanish acronym) calculated by the Colombian Mines and Energy Planning Unit (UPME for its Spanish acronym) annually.

For Scope 2, market-based figure, the company uses supplier-specific emissions factors for (i) San Fernando Solar Park, and (ii) natural gas generation centres.

## C6.3

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**(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?**

**Reporting year**

**Scope 2, location-based**

291432

**Scope 2, market-based (if applicable)**

563148

**Start date**

January 1 2021

**End date**

December 31 2021

**Comment**

In 2021, scope 2 emissions were reduced by 33% because of the reduction in the national electrical grid factor emissions (From 203 KgCO2e/MWh in 2020 to 126.376 KgCO2e/MWh in 2021). In 2021, a LPG generation centre was dismantled, and the San Fernando solar park initiated operations.

**Past year 1**

**Scope 2, location-based**

495457

**Scope 2, market-based (if applicable)**

845587

**Start date**

January 1 2020

**End date**

December 31 2020

**Comment**

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset. For these reasons, the total 2018-2020 historical series was recalculated.

**Past year 2**

**Scope 2, location-based**

367462

**Scope 2, market-based (if applicable)**

620369

**Start date**

January 1 2019

**End date**

December 31 2019

**Comment**

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset. For these reasons, the total 2018-2020 historical series was recalculated.

**Past year 3**

**Scope 2, location-based**

277378

**Scope 2, market-based (if applicable)**

428830

**Start date**

January 1 2018

**End date**

December 31 2018

**Comment**

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset. For these reasons, the total 2018-2020 historical series was recalculated.

**C6.4**

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**(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?**

Yes

**C6.4a**

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**(C6.4a) Provide details of the sources of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure.**

**Source**

Administrative Areas (office building facilities)

**Relevance of Scope 1 emissions from this source**

Emissions are not relevant

**Relevance of location-based Scope 2 emissions from this source**

Emissions are not relevant

**Relevance of market-based Scope 2 emissions from this source (if applicable)**

Emissions are not relevant

**Explain why this source is excluded**

The contribution of Administrative Areas owned by Ecopetrol is not significant as compared to the total scopes 1 and 2 inventory. These areas are not included as part of scopes 1 and 2 emissions because they are not related to Ecopetrol's core business. However, these areas are accounted for in scope 3, as part of category 8.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

Emissions of Administrative areas owned by Ecopetrol are estimated as part of scope 3 category 8, based on energy consumption. The percentage of emissions is calculated by dividing those scope 3 category 8 emissions by total scopes 1 and 2 emissions.

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**Source**

Emissions due to refrigerants and extinguishers

**Relevance of Scope 1 emissions from this source**

Emissions are not relevant

**Relevance of location-based Scope 2 emissions from this source**

No emissions from this source

**Relevance of market-based Scope 2 emissions from this source (if applicable)**

No emissions from this source

**Explain why this source is excluded**

The Ozone Depleting Substances (ODS) inventory, for the 2018-2021 period, maintains the results on percentages under 0.13% compared to Ecopetrol GHG emissions inventory.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

The Ozone Depleting Substances (ODS) inventory, for the 2018-2021 period, maintains the results on percentages under 0.13% compared to Ecopetrol GHG emissions inventory. Further information on ODS inventory can be found on the 2021 Integrated Sustainable Management Report page 250, table 67. The calculation was done by multiplying the highest value for ODS inventory of the historical series by the Global Warming Potential and divided by Ecopetrol's scope 1 and 2 emissions.

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**Source**

Fugitive emissions in pipe fittings communicating facilities

**Relevance of Scope 1 emissions from this source**

Emissions are not relevant

**Relevance of location-based Scope 2 emissions from this source**

No emissions from this source

**Relevance of market-based Scope 2 emissions from this source (if applicable)**

No emissions from this source

**Explain why this source is excluded**

Published emission factors have an uncertainty of +/- 100%. Also, fugitive emissions due to fittings represent less than 2% of Ecopetrol's GHG emissions inventory.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

Estimation is based on Ecopetrol's current GHG emissions inventory.

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**Source**

Non-routine or emergency activities, such as pipeline pigging operations, and well testing.

**Relevance of Scope 1 emissions from this source**

Emissions are not relevant

**Relevance of location-based Scope 2 emissions from this source**

No emissions from this source

**Relevance of market-based Scope 2 emissions from this source (if applicable)**

No emissions from this source

**Explain why this source is excluded**

Currently, the operational boundary for the inventory covers routine operations in facilities under Ecopetrol's operational control.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

Estimation based on Ecopetrol's current GHG emissions inventory.

---

**(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.****Purchased goods and services****Evaluation status**

Relevant, calculated

**Emissions in reporting year (metric tons CO<sub>2</sub>e)**

5731395

**Emissions calculation methodology**Supplier-specific method  
Hybrid method  
Spend-based method**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

18.8

**Please explain**

In 2021, Category 1 accounted for 4.23% of Ecopetrol's total scope 3 emissions. This category is the company's second most significant emissions contributor. It is also relevant because Ecopetrol has identified that there are potential emissions reductions that could be undertaken or influenced by Ecopetrol, especially in the supply chain. Reported data for the percentage of emissions calculated using data obtained from suppliers or value chain partners include supplier engagement through both supply chain and sales.

**Capital goods****Evaluation status**

Not relevant, explanation provided

**Emissions in reporting year (metric tons CO<sub>2</sub>e)**

&lt;Not Applicable&gt;

**Emissions calculation methodology**

&lt;Not Applicable&gt;

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

&lt;Not Applicable&gt;

**Please explain**

Category 2 is not calculated because emissions related to all contracts are included in category 1.

**Fuel-and-energy-related activities (not included in Scope 1 or 2)****Evaluation status**

Not relevant, calculated

**Emissions in reporting year (metric tons CO<sub>2</sub>e)**

46442

**Emissions calculation methodology**Supplier-specific method  
Average data method**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

58.5

**Please explain**

In this category Transmission and distribution (T&D) losses, and surplus energy sales are included. Emissions for T&D losses are calculated using the national electric grid emission factor, which is updated annually; emissions for surplus energy sales are calculated using supplier-specific emission factor. This category is considered as not relevant because of its low contribution to the total scope 3 inventory.

**Upstream transportation and distribution****Evaluation status**

Relevant, calculated

**Emissions in reporting year (metric tons CO<sub>2</sub>e)**

149907

**Emissions calculation methodology**

Distance-based method

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

100

**Please explain**

Ecopetrol divided this category into three (3) subcategories: river, marine, and land transportation. Both river and land transportation occur locally, in Colombia, thus, the fuel used in these activities corresponds to fuel sold by Ecopetrol. For this reason, these two (2) subcategories are already accounted for in category 11 (use of sold product). The reported value corresponds to the whole category. Most of these activities are calculated with distance-based method, for which the value chain partner is contacted for the information.

This category is considered relevant because Ecopetrol has identified that there are potential emissions reductions that could be undertaken or influenced by Ecopetrol.

## Waste generated in operations

### Evaluation status

Not relevant, calculated

### Emissions in reporting year (metric tons CO2e)

39592

### Emissions calculation methodology

Waste-type-specific method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

Ecopetrol divided this category into three subcategories: waste sent to incineration, landfill, and composting. This category is calculated using waste-type-specific method. The information source is SIGAR, an Ecopetrol internal analytical tool for waste management. This category is considered not relevant because of its low contribution to the total scope 3 inventory.

## Business travel

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

1089

### Emissions calculation methodology

Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

This category refers to air transportation. Since all travel activities begin in Colombia, the fuel used in these activities corresponds to fuel sold by Ecopetrol. For this reason, this category is already accounted for in category 11 (use of sold product). This category is calculated with distance-based methodology, following the International Civil Aviation Organization (ICAO) recommendation which establishes the average emission per passenger according to the route, type of aircraft and cabin on each journey. To obtain the information about distance, the value chain partner is contacted.

This category is considered relevant because Ecopetrol has identified that there are potential emissions reductions that could be undertaken or influenced by Ecopetrol.

## Employee commuting

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

10009

### Emissions calculation methodology

Fuel-based method  
Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

This category refers to both air and land commuting. Since all activities occur in national territory, the fuel used in these activities corresponds to fuel sold by Ecopetrol. For this reason, this category is already accounted for in category 11 (use of sold product). Some activities are calculated with distance-based method and others using national fuel emissions factors. For both activities, the value chain partner is contacted to obtain information about distance and fuel consumption.

This category is considered relevant because Ecopetrol has identified that there are potential emissions reductions that could be undertaken or influenced by Ecopetrol.

## Upstream leased assets

### Evaluation status

Not relevant, calculated

### Emissions in reporting year (metric tons CO2e)

536

### Emissions calculation methodology

Average data method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

Category 8 includes emissions associated with non-industrial leased assets, and Ecopetrol's non-industrial own assets. Both subcategories are calculated using the national electrical grid emission factor and the energy consumption in each non-industrial asset. This category is considered as not relevant because of its low contribution to the total scope 3 inventory.

## Downstream transportation and distribution

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

987944

### Emissions calculation methodology

Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

Ecopetrol divided this category into two (2) subcategories: river, and marine transportation. River transportation occur locally, in Colombia, and one portion of marine transportation begin in Colombia, thus, the fuel used in these activities corresponds to fuel sold by Ecopetrol. For this reason, most of these two (2) subcategories are already accounted for in category 11 (use of sold product). The reported value corresponds to the whole category. This category is calculated with distance-based method considering the transported load. To obtain this information, the value chain partner is contacted.

This category is considered as relevant because Ecopetrol has identified that there are potential emissions reductions that could be undertaken or influenced by Ecopetrol.

## Processing of sold products

### Evaluation status

Not relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

5301394

### Emissions calculation methodology

Average data method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

This category includes the processing of intermediate products that are sold by Ecopetrol such as crude oil. For processing crude oil Average-data method was used. The secondary data used was the carbon intensity of an average refining process. This category is already accounted for in category 11 (use of sold product). For this reason, it is considered not relevant.

## Use of sold products

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

128582642

### Emissions calculation methodology

Methodology for direct use phase emissions, please specify (Direct use phase emissions are calculated considering fossil fuels combustion, with national fuels emission factors. )

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

Category 11 emissions accounted for more than 95% of Ecopetrol's total scope 3 emissions. For this reason, this is the most relevant category.

Use of sold product emissions for Ecopetrol includes the direct end-use phase emissions of final products such as liquid fuels and natural gas. Also, this category includes end-use phase emissions of sold intermediate products such as crude oil. The methodology uses net volume in commercial operations where Ecopetrol has the largest total amount of potential sold products (results are the same using total volume). To estimate emissions from fuels based on the final products, the quantities of fuels were multiplied by national combustion emission factor for each type of fuel. Emission factors for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O were used. National statistics were used to determine the percentage of fuel burned from stationary and mobile sources and the most representative source was used. Finally, for nonenergy product final such as lubricants and paraffins, CO<sub>2</sub> emissions were estimated using the IPCC (Intergovernmental Panel on Climate Change) default oxidation fraction.

## End of life treatment of sold products

### Evaluation status

Not relevant, calculated

### Emissions in reporting year (metric tons CO<sub>2</sub>e)

39767

### Emissions calculation methodology

Waste-type-specific method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

This category includes the emissions associated with end-of-life treatment of lubricants and paraffins. It is assumed that both products are incinerated, so the waste-type-specific method is used. This category is considered not relevant because of its low contribution to the total scope 3 inventory.

## Downstream leased assets

### Evaluation status

Not relevant, calculated

### Emissions in reporting year (metric tons CO2e)

3535

### Emissions calculation methodology

Spend-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

This category refers to assets leased to others. Emissions are calculated using spend-based method and the Quantis Tool. This category is considered not relevant because of its low contribution to the total scope 3 inventory.

## Franchises

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

### Please explain

This category is not calculated because Ecopetrol does not have any franchises.

## Investments

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

918978

### Emissions calculation methodology

Average data method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

This category is the company's third most significant emissions contributor. For this reason, it is considered relevant. In this category assets with equity share are included. This category is calculated with average data method considering Ecopetrol's upstream carbon intensity.

## Other (upstream)

### Evaluation status

Not evaluated

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

### Please explain

No other upstream category is considered because all indirect activities are accounted for in the previous categories.

## Other (downstream)

### Evaluation status

Not evaluated

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

### Please explain

No other downstream category is considered because all indirect activities are accounted for in the previous categories.

C6.5a

**(C6.5a) Disclose or restate your Scope 3 emissions data for previous years.**

**Past year 1**

**Start date**

January 1 2020

**End date**

December 31 2020

**Scope 3: Purchased goods and services (metric tons CO2e)**

4323422

**Scope 3: Capital goods (metric tons CO2e)**

0

**Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)**

70590

**Scope 3: Upstream transportation and distribution (metric tons CO2e)**

201587

**Scope 3: Waste generated in operations (metric tons CO2e)**

18682

**Scope 3: Business travel (metric tons CO2e)**

981

**Scope 3: Employee commuting (metric tons CO2e)**

8462

**Scope 3: Upstream leased assets (metric tons CO2e)**

830

**Scope 3: Downstream transportation and distribution (metric tons CO2e)**

1178922

**Scope 3: Processing of sold products (metric tons CO2e)**

6091674

**Scope 3: Use of sold products (metric tons CO2e)**

132947757

**Scope 3: End of life treatment of sold products (metric tons CO2e)**

36966

**Scope 3: Downstream leased assets (metric tons CO2e)**

3520

**Scope 3: Franchises (metric tons CO2e)**

0

**Scope 3: Investments (metric tons CO2e)**

986957

**Scope 3: Other (upstream) (metric tons CO2e)**

0

**Scope 3: Other (downstream) (metric tons CO2e)**

0

**Comment**

Main changes from previous reports:

Scope 3 category 1: Purchased goods and services is mainly calculated with the spend-based method. Last year, the Quantis models were used for this calculation. This year, instead of Quantis, EEIO (Environmentally-extended input output) model was used, because it has more specific categories and updated emission factors. In 2021, the inventory has been refined moving away from the spend-based method to the average-data method or hybrid method, as much as possible.

Scope 3 category 3: In the previous report fuel and energy emissions were calculated using an average between different methodologies, including an estimate from the Quantis tool. For this report, the Quantis tool is no longer used. Emissions are calculated using the national electric grid emission factor, which is updated annually, and using supplier-specific emission factor.

Scope 3 category 8: Leased assets (upstream) emissions were calculated with the spend-based method using the Quantis tool. For this report, it was calculated using the national electrical grid emission factor and the energy consumption in each asset.

Scope 3 category 11: In the previous report exported oil related GHG emissions were calculated as part of category 10. For this report, those emissions are part of category 11. The calculation methodology was updated considering the carbon content as a conservative criterion, which allows covering the maximum possible emissions per oil barrel.

Ecopetrol's scope 3 figures differ from public data (GRI report) and from what was published last year because, now, the report includes all facilities where Ecopetrol has operational control, which means that scope 3 emissions related to Cartagena's refinery are included.

## Past year 2

### Start date

January 1 2019

### End date

December 31 2019

### Scope 3: Purchased goods and services (metric tons CO2e)

4980589

### Scope 3: Capital goods (metric tons CO2e)

0

### Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

33968

### Scope 3: Upstream transportation and distribution (metric tons CO2e)

301217

### Scope 3: Waste generated in operations (metric tons CO2e)

12276

### Scope 3: Business travel (metric tons CO2e)

4375

### Scope 3: Employee commuting (metric tons CO2e)

16593

### Scope 3: Upstream leased assets (metric tons CO2e)

836

### Scope 3: Downstream transportation and distribution (metric tons CO2e)

1153486

### Scope 3: Processing of sold products (metric tons CO2e)

5888337

### Scope 3: Use of sold products (metric tons CO2e)

136862493

### Scope 3: End of life treatment of sold products (metric tons CO2e)

37195

### Scope 3: Downstream leased assets (metric tons CO2e)

3811

### Scope 3: Franchises (metric tons CO2e)

0

### Scope 3: Investments (metric tons CO2e)

1281233

### Scope 3: Other (upstream) (metric tons CO2e)

0

### Scope 3: Other (downstream) (metric tons CO2e)

0

### Comment

In 2020, the first scope 3 inventory estimation was carried out for 2019.

Main changes from previous reports:

Scope 3 category 1: Purchased goods and services is mainly calculated with the spend-based method. Last year, the Quantis models were used for this calculation. This year, instead of Quantis, EEIO (Environmentally-extended input output) model was used, because it has more specific categories and updated emission factors. In 2021, the inventory has been refined moving away from the spend-based method to the average-data method or hybrid method, as much as possible.

Scope 3 category 3: In the previous report fuel and energy emissions were calculated using an average between different methodologies, including an estimate from the Quantis tool. For this report, the Quantis tool is no longer used. Emissions are calculated using the national electric grid emission factor, which is updated annually, and using supplier-specific emission factor.

Scope 3 category 8: Leased assets (upstream) emissions were calculated with the spend-based method using the Quantis tool. For this report, it is calculated using the national electrical grid emission factor and the energy consumption in each asset.

Scope 3 category 11: In the previous report exported oil related GHG emissions were calculated as part of category 10. For this report, those emissions are part of category 11. The calculation methodology was updated considering the carbon content as a conservative criterion, which allows covering the maximum possible emissions per oil barrel.

Ecopetrol's scope 3 figures differ from public data (GRI report) and from what was published last year because, now, the report includes all facilities where Ecopetrol has operational control, which means that scope 3 emissions related to Cartagena's refinery are included.

Past year 3

Start date

End date

Scope 3: Purchased goods and services (metric tons CO2e)

Scope 3: Capital goods (metric tons CO2e)

Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

Scope 3: Upstream transportation and distribution (metric tons CO2e)

Scope 3: Waste generated in operations (metric tons CO2e)

Scope 3: Business travel (metric tons CO2e)

Scope 3: Employee commuting (metric tons CO2e)

Scope 3: Upstream leased assets (metric tons CO2e)

Scope 3: Downstream transportation and distribution (metric tons CO2e)

Scope 3: Processing of sold products (metric tons CO2e)

Scope 3: Use of sold products (metric tons CO2e)

Scope 3: End of life treatment of sold products (metric tons CO2e)

Scope 3: Downstream leased assets (metric tons CO2e)

Scope 3: Franchises (metric tons CO2e)

Scope 3: Investments (metric tons CO2e)

Scope 3: Other (upstream) (metric tons CO2e)

Scope 3: Other (downstream) (metric tons CO2e)

Comment

In 2020, the first scope 3 inventory estimation was carried out for 2019. For this reason, Ecopetrol does not have GHG emissions data for 2018.

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?

Yes

C6.7a

(C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	426	For biogenic emissions calculation, a 10% biodiesel content in fuels is considered. Emission is calculated with the emission factor for combustion of national fuels (FECOC).  Indirect biogenic CO2 emissions (scope 3): 280,169 t. Scope 3 Biogenic emissions occur from biofuels combustion. The diesel sold by Ecopetrol S.A. has a percentage of Biodiesel (Biofuel produced from Palm Oil), in line with Colombia's Law 939 of 2004. The blend marketed by Ecopetrol from the Barrancabermeja Refinery is known as B2E Diesel (98% Fossil Diesel and 2% Biodiesel). Wholesale distributors mix B2E with Biodiesel, generating a B10 mixture (90% Fossil Diesel and 10% Biodiesel), which is the one consumed in the Colombian market.  These emissions are not relevant to the company.

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

**Intensity figure**

1.39e-7

**Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)**

10869936

**Metric denominator**

unit total revenue

**Metric denominator: Unit total**

78188013237433

**Scope 2 figure used**

Market-based

**% change from previous year**

45.3

**Direction of change**

Decreased

**Reason for change**

Intensity in 2020: 0.0000002541 tCO2e/COP.

Intensity decreased because the revenue (denominator) increased as a result of: i) increase in revenues mainly due to a 94.2%, or US\$ 32.4 per barrel increase of the average crude oil basket price and a 61.8%, or US\$ 30.4 per barrel increase of the average refined products basket price, which in turn was primarily due to the strengthening of the international reference prices, a better-negotiated oil spread as a result of the company's commercial efforts, and improved refined products indicators; ii) increase in the service revenue, primarily due to the consolidation of ISA's revenues from September 2021; iii) increase in revenues resulting from a 1.52% depreciation of the Colombian Peso against the U.S. dollar, from an average exchange rate of COP\$ 3,691.27/US\$ 1.00 in 2020 to an average exchange rate of COP\$ 3,747.24/US\$ 1.00 in 2021, resulting in an increase in revenue from exports; and iv) increase in revenues attributable to an increase in sales volume.

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**Intensity figure**

0.02919

**Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)**

5747243

**Metric denominator**

barrel of oil equivalent (BOE)

**Metric denominator: Unit total**

196871980

**Scope 2 figure used**

Market-based

**% change from previous year**

2

**Direction of change**

Decreased

**Reason for change**

The intensity figure corresponds to upstream carbon intensity. It is calculated by dividing upstream scope 1 and 2 emissions by oil, gas, and white product production. This is done considering operational control boundary.

Intensity decreased mainly because the scope 2 emission factor for the national electrical grid (National Interconnected System, SIN for its Spanish acronym) calculated by the Colombian Mines and Energy Planning Unit (UPME for its Spanish acronym) was updated for 2021. It decreased from 0.203 in 2020 to 0.126 tCO2e/MWh in 2021.

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**Intensity figure**

0.03968

**Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)**

5122693

**Metric denominator**

barrel of oil equivalent (BOE)

**Metric denominator: Unit total**

129100500

**Scope 2 figure used**

Market-based

**% change from previous year**

5.3

**Direction of change**

Decreased

**Reason for change**

The intensity figure corresponds to downstream carbon intensity. It is calculated as downstream scope 1 and 2 emissions divided by annual loaded barrels to the Barrancabermeja and Cartagena refineries. This is done considering operational control boundary.

The reduction in the downstream intensity figure, between 2020 and 2021, is mainly due to the implementation of energy efficiency initiatives in the refineries.

## C-OG6.12

### (C-OG6.12) Provide the intensity figures for Scope 1 emissions (metric tons CO2e) per unit of hydrocarbon category.

#### Unit of hydrocarbon category (denominator)

Other, please specify (KBOE: thousand barrels of oil equivalent produced)

#### Metric tons CO2e from hydrocarbon category per unit specified

26.3

#### % change from previous year

3

#### Direction of change

Increased

#### Reason for change

Scope 1 upstream carbon intensity increased mainly due to the reversal of assets with high carbon intensity, previously operated by a third party (for example, Pauto and Floreña), and to a greater energy consumption associated with the different oil types that make up the company's portfolio.

#### Comment

The intensity figure corresponds to scope 1 upstream carbon intensity. It was calculated as upstream scope 1 divided by oil, gas, and white product production. This is done considering operational control boundary.

#### Unit of hydrocarbon category (denominator)

Thousand barrels of refinery throughput

#### Metric tons CO2e from hydrocarbon category per unit specified

39.7

#### % change from previous year

5

#### Direction of change

Decreased

#### Reason for change

The reduction in downstream intensity figure, between 2020 and 2021, is mainly due to the implementation of energy efficiency initiatives in the refineries.

#### Comment

The intensity figure corresponds to downstream carbon intensity. It is calculated as downstream scope 1 emissions divided by annual loaded barrels to the Barrancabermeja and Cartagena refineries. This is done considering operational control boundary.

## C-OG6.13

### (C-OG6.13) Report your methane emissions as percentages of natural gas and hydrocarbon production or throughput.

#### Oil and gas business division

Upstream

#### Estimated total methane emitted expressed as % of natural gas production or throughput at given division

0.134

#### Estimated total methane emitted expressed as % of total hydrocarbon production or throughput at given division

0.134

#### Comment

Methane intensity refers to methane emissions in oil and gas assets operated by Ecopetrol divided by: i) total gas production from upstream operations, and ii) total hydrocarbon production (it includes gas, oil, and white products).

The following are some of the main actions taken in 2021 to improve the direct measurements of methane emissions and advance in implementing the Leak Detection and Repair Program:

- For the 2021 period, the company focused its efforts on having more precise data through direct measurements, which is why it carried out Bottom-Up Measurement of 95% of operated assets during this period.
- Progress is being made in the construction of specific emission factors, based on a periodic program of Bottom-Up measurements set up to update the organization's GHG emissions inventory.
- Different technologies, both Top Down and Bottom Up, are being used to refine the methane data and to establish the monitoring program, in line with the recent Colombian regulation (Resolution 40066 of 2022 of the Ministry of Mines and Energy of Colombia) for the control and reduction of fugitive methane emissions.
- Based on the measurements made between 2019 and 2021, Ecopetrol has been defining both the baseline and the different scenarios to set specific methane reduction targets that will be made public during 2022.

## C7. Emissions breakdowns

### C7.1

#### (C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	9780832	IPCC Fifth Assessment Report (AR5 – 100 year)
CH4	17674	IPCC Fifth Assessment Report (AR5 – 100 year)
N2O	117	IPCC Fifth Assessment Report (AR5 – 100 year)

C-OG7.1b

(C-OG7.1b) Break down your total gross global Scope 1 emissions from oil and gas value chain production activities by greenhouse gas type.

**Emissions category**

Combustion (excluding flaring)

**Value chain**

Upstream

Downstream

**Product**

Unable to disaggregate

**Gross Scope 1 CO2 emissions (metric tons CO2)**

7712757

**Gross Scope 1 methane emissions (metric tons CH4)**

1081

**Total gross Scope 1 emissions (metric tons CO2e)**

7773380

**Comment**

Combustion accounts for more than 75% of scope 1 emissions.

In 2021, Ecopetrol updated the GHG inventory, which included (among other aspects), the validation and inclusion of new sources, and the review and update of emission factors.

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset, which is why the emissions of these assets are included in 2021.

For these reasons, the total 2018-2020 historical series was recalculated.

**Emissions category**

Flaring

**Value chain**

Upstream

Downstream

**Product**

Unable to disaggregate

**Gross Scope 1 CO2 emissions (metric tons CO2)**

869744

**Gross Scope 1 methane emissions (metric tons CH4)**

1927

**Total gross Scope 1 emissions (metric tons CO2e)**

923755

**Comment**

Flaring accounts for 9% of scope 1 emissions.

In 2021, Ecopetrol updated the GHG inventory, which included (among other aspects), the validation and inclusion of new sources, and the review and update of emission factors.

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset, which is why the emissions of these assets are included in 2021.

For these reasons, the total 2018-2020 historical series was recalculated.

**Emissions category**

Venting

**Value chain**

Upstream

Downstream

**Product**

Unable to disaggregate

**Gross Scope 1 CO2 emissions (metric tons CO2)**

1194486

**Gross Scope 1 methane emissions (metric tons CH4)**

6417

**Total gross Scope 1 emissions (metric tons CO2e)**

1374151

**Comment**

Venting accounts for 13% of scope 1 emissions.

Ecopetrol's GHG inventory includes, in the venting category, emissions associated with gas treatments (amine and glycol), the chemical treatment process of hydrocarbons (delayed coking and fluid catalytic cracking), and other industrial processes such as hydrogen and sulphur plants. This categorization is based on the API-2009 compendium methodology.

The inventory has had improvements in data quality (among these, the emissions calculation for venting activities during catalyst regeneration in catalytic cracking, in which the coke content was updated from 2018 to 2021).

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset, which is why the emissions of these assets are included in 2021. Therefore, the total 2018-2020 historical series was recalculated.

**Emissions category**

Fugitives

**Value chain**

Upstream

Downstream

**Product**

Unable to disaggregate

**Gross Scope 1 CO2 emissions (metric tons CO2)**

3534

**Gross Scope 1 methane emissions (metric tons CH4)**

8249

**Total gross Scope 1 emissions (metric tons CO2e)**

235192

**Comment**

Fugitives account for 2% of scope 1 emissions.

In 2021, Ecopetrol updated the GHG inventory, which included (among other aspects), the validation and inclusion of new sources, and the review and update of emission factors.

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset, which is why the emissions of these assets are included in 2021.

For these reasons, the total 2018-2020 historical series was recalculated.

**C7.2****(C7.2) Break down your total gross global Scope 1 emissions by country/region.**

Country/Region	Scope 1 emissions (metric tons CO2e)
Colombia	10306788

**C7.3****(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.**

By business division

By facility

**C7.3a****(C7.3a) Break down your total gross global Scope 1 emissions by business division.**

Business division	Scope 1 emissions (metric ton CO2e)
Upstream	5184699
Downstream	5122089

**C7.3b**

**(C7.3b) Break down your total gross global Scope 1 emissions by business facility.**

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Barrancabermeja Refinery. Emissions correspond to those from the Barrancabermeja Refinery and its river terminal. The reported coordinates correspond to the Barrancabermeja Refinery.	3063378	7.07657 3	- 73.873751
Cartagena Refinery. Emissions correspond to those from the Cartagena Refinery, and both its terminals (river and maritime). The reported coordinates correspond to the Cartagena Refinery.	2058711	10.3162 5	- 75.492614
Piedemonte Production Area (GDP, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	2607742	5.42608 5	- 72.448688
La Cira Infantas Production Area (GCT, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	35974	6.99178 7	- 73.781754
Catenare Production Area, Catatumbo Production Department (GCU, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	14054	8.71047 5	-72.72546
Mares Production Area (GMA, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	176493	7.03718 6	- 73.556775
Rio Production Area (GRI, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	51475	7.38477 8	- 73.895538
Catenare Production Area, Teca Production Department (GTA, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	52330	6.03205 5	- 74.611959
Chichimene Production Area (GCH, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	568090	3.93341 5	- 73.685159
Aplay Production Area (GDA, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	150120	4.06690 9	-73.42461
Castilla Production Area (GDT, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	466283	3.85262 4	- 73.674399
CP09 Production Area (GLC, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	21688	3.88146 8	- 73.785302
Oriente Production Area (GOR, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	790547	3.80364 7	- 71.445118
Andina Production Area, Huila Production Department (GPA_H, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	150467	3.07724 4	- 75.273188
Andina Production Area, Putumayo Production Department (GPA_P, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	99436	0.55017 8	- 77.097228

**C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4**

**(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.**

	Gross Scope 1 emissions, metric tons CO2e	Net Scope 1 emissions, metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Electric utility activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	5184699	<Not Applicable>	During 2021, Ecopetrol updated the GHG inventory, which included (among other aspects), the validation and inclusion of new sources, the review and update of emission factors. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset, which is why the emissions of these assets are included in 2021. For these reasons, the total 2018-2020 historical series was recalculated.
Oil and gas production activities (midstream)	0	<Not Applicable>	For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Therefore, the total 2018-2020 historical series was recalculated.
Oil and gas production activities (downstream)	5122089	<Not Applicable>	During 2021, Ecopetrol updated the GHG inventory, which included (among other aspects), the validation and inclusion of new sources, the review and update of emission factors. The inventory has had improvements on data quality (among these, the emissions calculation for venting activities during catalyst regeneration in catalytic cracking, in which the coke content was updated from 2018 to 2021). For these reasons, the total 2018-2020 historical series was recalculated.
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

**(C7.5) Break down your total gross global Scope 2 emissions by country/region.**

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Colombia	291432	563148

**C7.6**

**(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.**

By business division

By facility

**C7.6a**

**(C7.6a) Break down your total gross global Scope 2 emissions by business division.**

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Upstream	290828	562544
Downstream	604	604

**C7.6b**

**(C7.6b) Break down your total gross global Scope 2 emissions by business facility.**

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Barrancabermeja Refinery. Emissions correspond to those from the Barrancabermeja Refinery and its river terminal. The reported coordinates correspond to the Barrancabermeja Refinery.	604	604
Cartagena Refinery. Emissions correspond to those from the Cartagena Refinery, and both its terminals (river and maritime). The reported coordinates correspond to the Cartagena Refinery.	0	0
Piedemonte Production Area (GDP, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	0	0
La Cira Infantas Production Area (GCT, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	65911	97906
Catenare Production Area, Catatumbo Production Department (GCU, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	1686	1686
Mares Production Area (GMA, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	3529	8960
Rio Production Area (GRI, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	26414	98402
Catenare Production Area, Teca Production Department (GTA, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	1612	1612
Chichimene Production Area (GCH, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	13015	32791
Apiay Production Area (GDA, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	4969	12518
Castilla Production Area (GDT, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	35423	89246
CP09 Production Area (GLC, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	1555	3919
Oriente Production Area (GOR, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	100081	100081
Andina Production Area, Huila Production Department (GPA_H, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	35048	94239
Andina Production Area, Putumayo Production Department (GPA_P, for its Spanish acronym). The geographic coordinates correspond to a representative point of the reported area.	1585	21184

C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7

**(C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7) Break down your organization's total gross global Scope 2 emissions by sector production activity in metric tons CO2e.**

	Scope 2, location-based, metric tons CO2e	Scope 2, market-based (if applicable), metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	290.828	562.544	In 2021, Ecopetrol updated the GHG inventory, which included (among other aspects), the validation and inclusion of new sources, and the review and update of emission factors. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset. For these reasons, the total 2018-2020 historical series was recalculated. For scope 2, location-based figure, the company uses the emission factor for the national electrical grid (National Interconnected System, SIN for its Spanish acronym) calculated by the Colombian Mines and Energy Planning Unit (UPME for its Spanish acronym) annually.
Oil and gas production activities (midstream)	0	0	For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. Therefore, the total 2018-2020 historical series was recalculated.
Oil and gas production activities (downstream)	604	604	In 2021, Ecopetrol updated the GHG inventory, which included (among other aspects), the validation and inclusion of new sources, and the review and update of emission factors. Additionally, in 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset. For these reasons, the total 2018-2020 historical series was recalculated. For scope 2, location-based figure, the emission factor for the national electrical grid (National Interconnected System, SIN for its Spanish acronym) calculated by the Colombian Mines and Energy Planning Unit (UPME for its Spanish acronym) annually is used.
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

**C7.9**

**(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?**  
Decreased

**C7.9a**

**(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.**

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	1929	Decreased	0.02	In 2021, the San Fernando solar park was implemented, which allowed the reduction of 1,929 tCO2e. The percentage was calculated as the emissions reductions divided by 2020 scope 1 and 2 emissions.
Other emissions reduction activities	291665	Decreased	2.65	Emissions decreased due to the implementation of emissions reduction initiatives, which include energy efficiency, reduction of venting and fugitive emissions, and reduction of flaring. The percentage was calculated as the emissions reductions divided by 2020 scope 1 and 2 emissions.
Divestment	266860	Decreased	2.41	Emissions decreased due to 2020 recalculation. It was required because operational control of midstream subsidiaries Cenit and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. The percentage was calculated as the emissions reductions divided by 2020 scope 1 and 2 emissions.
Acquisitions	107900	Increased	0.98	In 2020, Ecopetrol took over the operation of the upstream Pauto - Floreña asset. For this reason, these assets are included in 2021. The percentage was calculated as the emissions divided by 2020 scope 1 and 2 emissions.
Mergers	0	No change	0	
Change in output	220068	Increased	1.99	Barrancabermeja refinery emissions increased by 347,804 tCO2e due to a higher refining load related to stabilization after the COVID-19 pandemic; on the other hand, the Cartagena refinery emissions decreased by 127,736 tCO2e as a result of a reduction in the operation of the Cracking Units (FCCs), due to a three-month scheduled maintenance. Consequently, the downstream emissions increased compared to the previous year. The percentage was calculated as the emissions divided by 2020 scope 1 and 2 emissions.
Change in methodology	143125	Decreased	1.29	Intensity decreased mainly because the scope 2 emission factor for the national electrical grid (National Interconnected System, SIN for its Spanish acronym) calculated by the Colombian Mines and Energy Planning Unit (UPME for its Spanish acronym) was updated for 2021. It decreased from 0.203 in 2020 to 0.126 tCO2e/MWh in 2021. The percentage was calculated as the emissions reductions divided by 2020 scope 1 and 2 emissions.
Change in boundary	0	No change	0	
Change in physical operating conditions	0	No change	0	
Unidentified	26829	Increased	0.24	The percentage was calculated as the emissions reductions divided by 2020 scope 1 and 2 emissions.
Other	0	No change	0	

## C7.9b

**(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?**

Market-based

## C8. Energy

### C8.1

**(C8.1) What percentage of your total operational spend in the reporting year was on energy?**

More than 35% but less than or equal to 40%

### C8.2

**(C8.2) Select which energy-related activities your organization has undertaken.**

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	Yes
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	Yes
Generation of electricity, heat, steam, or cooling	Yes

### C8.2a

**(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.**

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	0	4331699	4331699
Consumption of purchased or acquired electricity	<Not Applicable>	2049249	419726	2468975
Consumption of purchased or acquired heat	<Not Applicable>			
Consumption of purchased or acquired steam	<Not Applicable>			
Consumption of purchased or acquired cooling	<Not Applicable>			
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	54551	<Not Applicable>	54551
Total energy consumption	<Not Applicable>	2103800	4751425	6855225

**C8.2b**

**(C8.2b) Select the applications of your organization's consumption of fuel.**

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	Yes

**C8.2c**

**(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.**

**Sustainable biomass**

**Heating value**

Unable to confirm heating value

**Total fuel MWh consumed by the organization**

0

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

0

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

0

**Comment**

**Other biomass**

**Heating value**

Unable to confirm heating value

**Total fuel MWh consumed by the organization**

0

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

0

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

0

**Comment**

**Other renewable fuels (e.g. renewable hydrogen)**

**Heating value**

Unable to confirm heating value

**Total fuel MWh consumed by the organization**

0

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

0

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

0

**Comment**

**Coal**

**Heating value**

LHV

**Total fuel MWh consumed by the organization**

268608.66

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

224330.84

**MWh fuel consumed for self-generation of steam**

0

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

44277.82

**Comment**

Heat rate= 11000 Btu/kWh. LHV Petcocke= 16722 btu/lb.

**Oil**

**Heating value**

LHV

**Total fuel MWh consumed by the organization**

1046828.75

**MWh fuel consumed for self-generation of electricity**

851423.33

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

195405.42

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

0

**Comment**

**Gas****Heating value**

LHV

**Total fuel MWh consumed by the organization**

15797540.6

**MWh fuel consumed for self-generation of electricity**

7723718.65

**MWh fuel consumed for self-generation of heat**

6414254.3

**MWh fuel consumed for self-generation of steam**

1340889.27

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self- cogeneration or self-trigeneration**

318678.33

**Comment**

Essentia: Heat Rate: 11,7 kWh/m3

GRB: Heat Rate=11,58 Btu/KWh

GRC: Natural Gas, Heat rate= 11000 Btu/kWh

**Other non-renewable fuels (e.g. non-renewable hydrogen)****Heating value**

LHV

**Total fuel MWh consumed by the organization**

1446286.17

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

1202428.02

**MWh fuel consumed for self-generation of steam**

243858.15

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self- cogeneration or self-trigeneration**

0

**Comment**

This section includes Refinery gas, H2 PSA off-gas (225 BTU/scf) and propane.

Refinery gas corresponds to 77% of Total fuel MWh consumed; H2 PSA off-gas corresponds to 20%, and propane corresponds to 3%.

**Total fuel****Heating value**

LHV

**Total fuel MWh consumed by the organization**

18559264.14

**MWh fuel consumed for self-generation of electricity**

8575141.98

**MWh fuel consumed for self-generation of heat**

7841013.16

**MWh fuel consumed for self-generation of steam**

1780152.84

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self- cogeneration or self-trigeneration**

362956.15

**Comment**C8.2d

---

**(C8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.**

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	6435499	4331699	0	2103800
Heat	0	0	0	0
Steam	1873518	1873518	0	0
Cooling	0	0	0	0

### C8.2e

**(C8.2e) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in C6.3.**

**Sourcing method**

Direct procurement from an off-site grid- connected generator e.g. Power purchase agreement (PPA)

**Energy carrier**

Electricity

**Low-carbon technology type**

Solar

**Country/area of low-carbon energy consumption**

Colombia

**Tracking instrument used**

Contract

**Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)**

38615.1

**Country/area of origin (generation) of the low-carbon energy or energy attribute**

Colombia

**Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)**

2019

**Comment**

The reported year is the date in which the Castilla solar park began operations (October 2019).

**Sourcing method**

Direct procurement from an off-site grid- connected generator e.g. Power purchase agreement (PPA)

**Energy carrier**

Electricity

**Low-carbon technology type**

Solar

**Country/area of low-carbon energy consumption**

Colombia

**Tracking instrument used**

Contract

**Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)**

14747.76

**Country/area of origin (generation) of the low-carbon energy or energy attribute**

Colombia

**Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)**

2021

**Comment**

The reported year is the date in which the San Fernando solar park began operations (October 2021).

### C8.2g

**(C8.2g) Provide a breakdown of your non-fuel energy consumption by country.**

**Country/area**

Colombia

**Consumption of electricity (MWh)**

2103800

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

2103800

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

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**C9. Additional metrics**

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**C9.1**

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**(C9.1) Provide any additional climate-related metrics relevant to your business.**

**Description**

Energy usage

**Metric value**

5946

**Metric numerator**

Energy consumed by the company in GWh.

**Metric denominator (intensity metric only)**

NA.

**% change from previous year**

15.1

**Direction of change**

Decreased

**Please explain**

Ecopetrol monitors the energy consumption in both upstream and downstream operations. It includes energy consumption from the following sources: purchases to the national electrical grid (SIN, for its Spanish acronym), non-renewable, and renewable generation centres.

Energy consumption decreased due to process optimization, technological improvements, and implementation of energy efficiency initiatives.

---

**Description**

Other, please specify (Risk management - Compliance with emission reduction target)

**Metric value**

1.25

**Metric numerator**

Achieved emission reduction per year in tCO2e

**Metric denominator (intensity metric only)**

Emission reduction target per year in tCO2e

**% change from previous year**

0

**Direction of change**

No change

**Please explain**

This metric monitors emission reduction progress based on the annual target established by Ecopetrol. It is measured on a monthly basis, and it allows to manage any delay that may occur.

This metric is built based on new reduction initiatives identified for the year. For this reason, it is not possible to compare changes regarding the previous year.

In 2021, the emission reduction target established by Ecopetrol was 235,263 tCO2e; the achieved emission reduction was 293,594 tCO2e, exceeding by 25% the target.

---

**Description**

Other, please specify (Non-GHG emissions (SOx) in kton)

**Metric value**

14.81

**Metric numerator**

Total non-GHG emissions (SOx) to air in kton

**Metric denominator (intensity metric only)**

NA

**% change from previous year**

---

0.14

**Direction of change**

Decreased

**Please explain**

SOx emissions decreased due to reduced operation in the Cracking Units (FCCs), mainly at the Cartagena Refinery, due to a three (3) month scheduled maintenance that mainly affected PM and SOx emissions.

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. For this reason, air emissions from midstream are not included.

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**Description**

Other, please specify (Non-GHG emissions (NOx) in kton)

**Metric value**

28.3

**Metric numerator**

Total non-GHG emissions (NOx) to air in kton

**Metric denominator (intensity metric only)**

NA

**% change from previous year**

1.67

**Direction of change**

Decreased

**Please explain**

NOx emissions decreased due to retrofitting actions to key processes in the refineries within Catalytic Cracking Units and Sulphur Recover Units, using emission control technologies and undertaking major maintenance actions.

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. For this reason, air emissions from midstream are not included.

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**Description**

Other, please specify (Non-GHG emissions (PM) in kton)

**Metric value**

1.4

**Metric numerator**

Total non-GHG emissions (PM) to air in kton

**Metric denominator (intensity metric only)**

NA

**% change from previous year**

8.5

**Direction of change**

Decreased

**Please explain**

PM emissions decreased due to reduced operation in the Cracking Units (FCCs), mainly at the Cartagena Refinery, due to a three (3) month scheduled maintenance that mainly affected PM and SOx emissions.

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. For this reason, air emissions from midstream are not included.

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**Description**

Other, please specify (Non-GHG emissions (VOC) in kton)

**Metric value**

111.64

**Metric numerator**

Total non-GHG emissions (VOC) to air in kton

**Metric denominator (intensity metric only)**

NA

**% change from previous year**

4.05

**Direction of change**

Decreased

**Please explain**

VOC emissions decreased due to retrofitting actions to key processes in the refineries within Catalytic Cracking Units and Sulphur Recover Units, using emission control technologies and undertaking major maintenance actions.

For the 2021 term, operational control of the midstream subsidiaries CENIT and Oleoducto de Colombia (ODC) was handed over by Ecopetrol. For this reason, air emissions from midstream are not included.

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**Description**

Other, please specify (Non-GHG emissions (SAO) in ton)

**Metric value**

0.19

**Metric numerator**

Total non-GHG emissions (SAO) to air in ton

**Metric denominator (intensity metric only)**

NA

**% change from previous year**

85.6

**Direction of change**

Decreased

**Please explain**

Substitute ODS substances used in refrigeration and firefighting systems are not included in the calculation, as they have zero ozone depletion potential. UPCC's Advanced Level 2<sup>nd</sup> Method (bottom up). The bottom-up approach considers the time interval between consumption and emission explicitly through emission factors. This is based on the number of products and end uses where chemical substances are consumed and released. With this approach, actual annual emissions are estimated based on the number of equipment units using these chemicals, the average load of the substance, the average service life, emission rates, recycling, and disposal considerations, among others. This method was selected because, although Ecopetrol S.A. is a consumer of ODS substances or their substitutes, the Company does not produce, export (neither in bulk nor in products that contain them) or sell these substances; the Company has only purchased the equipment that contains them from various suppliers (e.g., air conditioners, stationary refrigerators, and fire-fighting systems).

**Description**

Waste

**Metric value**

137.37

**Metric numerator**

Total hazardous waste generated in kton

**Metric denominator (intensity metric only)**

NA

**% change from previous year**

2.18

**Direction of change**

Decreased

**Please explain**

Hazardous waste generation in 2021 shows a reduction vs. 2020, as less soil was contaminated with hydrocarbons thanks to environmental contingencies. These are the wastes generated according to their quantities: oily sludge, HC-impregnated elements, hydrocarbonimpregnated soils, spent cracking catalyst, soda treatment clays, polyethylene additive residues, used filters, and asphalt residues.

**Description**

Waste

**Metric value**

157.7

**Metric numerator**

Total non-hazardous waste generated in kton

**Metric denominator (intensity metric only)**

NA

**% change from previous year**

26.64

**Direction of change**

Increased

**Please explain**

Non-hazardous waste includes debris, metal scrap, water-based drilling cuttings, and clarification sludge from drinking water treatment. This type of waste increased due to the restart of activities after the restrictions implemented during the pandemic.

C-OG9.2a

**(C-OG9.2a) Disclose your net liquid and gas hydrocarbon production (total of subsidiaries and equity-accounted entities).**

	In-year net production	Comment
Crude oil and condensate, million barrels	192.39	Ecopetrol information reported the 2021, 20F report, in thousands of barrels of oil equivalent KBPED.
Natural gas liquids, million barrels	8.41	Ecopetrol information reported the 2021, 20F report, in thousands of barrels of oil equivalent KBPED.
Oil sands, million barrels (includes bitumen and synthetic crude)	0	There is no production of oil sands or synthetic crude.
Natural gas, billion cubic feet	268.09	Ecopetrol information reported the 2021, 20F report, in thousands of barrels of oil equivalent KBPED.

C-OG9.2b

**(C-OG9.2b) Explain which listing requirements or other methodologies you use to report reserves data. If your organization cannot provide data due to legal restrictions on reporting reserves figures in certain countries, please explain this.**

The reserves are estimated and certified by recognized external independent engineers DeGolyer and MacNaughton, Gaffney, Cline & Associates, Ryder Scott Company, and Sproule International Limited, on December 31st, 2021, in compliance with the definitions of the Society of Petroleum Engineers and the applicable SEC rules. Ecopetrol's reserves process uses deterministic methods which are commonly used internationally to estimate reserves. These methods whilst reliable, have some inherent uncertainty, and thus, the estimates should not be interpreted as being exact amounts. The majority of the producing proved reserves were estimated by applying appropriate decline curves or other performance relationships. In analysing decline curves, reserves were estimated by calculating economic limits that are based on current economic conditions. In certain cases, where the methods previously employed could not be used, reserves were estimated by analogy with similar reserves for which more complete data was available. Estimates of reserves were prepared by geological and engineering standard methods commonly used in the oil and gas industry. The method or combination of methods used in the analysis of each reserve was adopted from experience analogy reserves, including information on development stage, quality and completeness of basic data, and production history.

**C-OG9.2c**

**(C-OG9.2c) Disclose your estimated total net reserves and resource base (million boe), including the total associated with subsidiaries and equity-accounted entities.**

	Estimated total net proved + probable reserves (2P) (million BOE)	Estimated total net proved + probable + possible reserves (3P) (million BOE)	Estimated net total resource base (million BOE)	Comment
Row 1				Ecopetrol does not disclose 2P and 3P reserves and resources. By the end of 2021, the Ecopetrol Group's net proven reserves totalled 2,002 million barrels of oil equivalent (MBOE)

**C-OG9.2d**

**(C-OG9.2d) Provide an indicative percentage split for 2P, 3P reserves, and total resource base by hydrocarbon categories.**

	Net proved + probable reserves (2P) (%)	Net proved + probable + possible reserves (3P) (%)	Net total resource base (%)	Comment
Crude oil/ condensate/ natural gas liquids				Ecopetrol does not disclose 2P and 3P reserves and resources. This percentage represents 1P Net Reserves: Crude oil / Condensate / Natural gas liquids = 72% of 1P
Natural gas				Ecopetrol does not disclose 2P and 3P reserves and resources. This percentage represents 1P Net Reserves Natural gas = 28% of 1P
Oil sands (includes bitumen and synthetic crude)	0	0		

**C-OG9.2e**

(C-OG9.2e) Provide an indicative percentage split for production, 1P, 2P, 3P reserves, and total resource base by development types.

**Development type**

Onshore

**In-year net production (%)**

96

**Net proved reserves (1P) (%)**

89

**Net proved + probable reserves (2P) (%)**

**Net proved + probable + possible reserves (3P) (%)**

**Net total resource base (%)**

**Comment**

Ecopetrol does not disclose 2P and 3P reserves. Percentages belongs to 1P reserves distribution.

**Development type**

Ultra-deepwater

**In-year net production (%)**

2

**Net proved reserves (1P) (%)**

1

**Net proved + probable reserves (2P) (%)**

**Net proved + probable + possible reserves (3P) (%)**

**Net total resource base (%)**

**Comment**

Ecopetrol does not disclose 2P and 3P reserves. Percentages belongs to 1P reserves distribution.

**Development type**

Tight/shale

**In-year net production (%)**

2

**Net proved reserves (1P) (%)**

10

**Net proved + probable reserves (2P) (%)**

**Net proved + probable + possible reserves (3P) (%)**

**Net total resource base (%)**

**Comment**

Ecopetrol does not disclose 2P and 3P reserves. Percentages belongs to 1P reserves distribution.

C-OG9.3a

(C-OG9.3a) Disclose your total refinery throughput capacity in the reporting year in thousand barrels per day.

	Total refinery throughput capacity (Thousand barrels per day)
Capacity	406

C-OG9.3b

(C-OG9.3b) Disclose feedstocks processed in the reporting year in million barrels per year.

	Throughput (Million barrels)	Comment
Oil	129.2	
Other feedstocks	0.1	
Total	129.3	

C-OG9.3c

(C-OG9.3c) Are you able to break down your refinery products and net production?

Yes

C-OG9.3d

(C-OG9.3d) Disclose your refinery products and net production in the reporting year in million barrels per year.

Product produced	Refinery net production (Million barrels) *not including products used/consumed on site
Liquified petroleum gas	3.31
Naphtha	6.98
Gasolines	31.65
Other, please specify (Jet)	9.02
Diesel fuels	69.25
Fuel oils	10.48
Asphalt and tar	3.43
Waxes	0.15
Lubricants	0.1
Petroleum coke	4.89
Other, please specify (Aliphatic)	0.32
Other, please specify (Sulfur)	0.27
Other, please specify (Sulfur Acid)	0.09

C-OG9.3e

(C-OG9.3e) Please disclose your chemicals production in the reporting year in thousand metric tons.

Product	Production, Thousand metric tons	Capacity, Thousand metric tons
Other, please specify (Aromatic)	73.29	152.39

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	Ecopetrol's Innovation and Technology Center (ICP, for its Spanish acronym) has proposed several specific initiatives aimed at process optimization, energy efficiency, new energy vector valuation, carbon capture, and low-carbon products development. In 2021, six (6) studies which explore a portfolio of key technologies for O&G operations decarbonization and establish Ecopetrol's energy transition pathway began. This research lines include the following activities: 1a) CCUS potential identification and estimation; 1b) vegetables oil coprocessing in refineries; 1c) oxycombustion technologies (flameless) potential evaluation in thermal generators; 2) Beginning of Green hydrogen production pilot in the Cartagena refinery; 3) High enthalpy geothermal potential estimation and pilot conceptualization; 4) Pilot testing for CCUS emerging technologies evaluation; 5) First field test to evaluate native sources for the capture and fixation in soil; and 6) Offshore renewable energy potential estimation for Colombia. Also, a program aimed at identifying and quantifying large methane emissions has been started, using satellite images and overflights with infrared spectrum analysis.

C-CO9.6a/C-EU9.6a/C-OG9.6a

**(C-CO9.6a/C-EU9.6a/C-OG9.6a) Provide details of your organization's investments in low-carbon R&D for your sector activities over the last three years.**

Technology area	Stage of development in the reporting year	Average % of total R&D investment over the last 3 years	R&D investment figure in the reporting year (optional)	Comment
Carbon capture and storage/utilisation	Applied research and development	≤20%	9531248555.92	Analytical tools were developed for the identification of both relevant CO2 sources and potential areas for CCUS project development. With identified areas and CO2 volumes, business scenarios were built to develop a CCUS technological portfolio in Ecopetrol.
Renewable energy	Applied research and development	≤20%	3511437260.24	Areas with wind and solar potential were identified in the Colombian Caribbean. Marine energy generation technologies are analysed to identify the most promising development pathways for Ecopetrol and Colombia.
Carbon capture and storage/utilisation	Pilot demonstration	≤20%	6843752752.2	Three (3) native sources (morichales, wetlands, and mangroves) were identified with high potential for CO2 capture and fixation, in areas of influence of Ecopetrol operations. Field pilots are being considered to measure real fixation potential as carbon sink.
Renewable energy	Applied research and development	≤20%	5284720586.6	Potential areas for high enthalpy geothermal energy development were identified, starting with a 10 MW pilot. Also, a technological partner was identified.
Hydrogen	Pilot demonstration	≤20%	4250862721.56	Ecopetrol initiated a green hydrogen production pilot in the Cartagena refinery, using a 50 kW PEM electrolyser, integrated into a photovoltaic solar park.
Carbon capture and storage/utilisation	Applied research and development	≤20%	4170599764.24	A review of promising CO2 capture technologies was carried out to reduce the capture cost per CO2 ton, being this one of the greatest limiting issues for implementation. Cryogenic, advances solvents, membranes, sorbents (adsorption) have been considered. A TPD CO2 capture pilot plan began its conceptualization.
Renewable energy	Full/commercial-scale demonstration	≤20%	9346566320	Implementation of solar energy generation in Ecopetrol's Innovation and Technology Center (ICP, for its Spanish acronym).
Other energy efficiency measures in the oil and gas value chain	Full/commercial-scale demonstration	≤20%	7393204000	Sustainable and efficient use of heat energy in experimental activities in Ecopetrol's Innovation and Technology Center (ICP, for its Spanish acronym).
Other, please specify (Sustainability and decarbonization initiatives)	Applied research and development	≤20%	749569715.44	Sustainability and decarbonization projects were proposed, including circular economy, water savings, inventory update, reduction projects verification, among others.
Methane detection and reduction	Applied research and development	≤20%	3138862581.4	R&D investments are related to top-down technology evaluation for methane emission measurements in upstream areas. It has included satellite imag analysis over national territory, from the European Space Agency, and aerial campaigns for methane super emitters detection.
Carbon capture and storage/utilisation	Applied research and development	≤20%	33677989.8	Business scenarios simulations for CO2 capture processes in refineries.

**C-OG9.7**

**(C-OG9.7) Disclose the breakeven price (US\$/BOE) required for cash neutrality during the reporting year, i.e. where cash flow from operations covers CAPEX and dividends paid/ share buybacks.**

41.6

**C10. Verification**

**C10.1**

**(C10.1) Indicate the verification/assurance status that applies to your reported emissions.**

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	No third-party verification or assurance

**C10.1a**

**(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.**

**Verification or assurance cycle in place**

Biennial process

**Status in the current reporting year**

Underway but not complete for reporting year – previous statement of process attached

**Type of verification or assurance**

Limited assurance

**Attach the statement**

C10.1a\_RCE Translation scope 1\_HSE.pdf

C10.1a\_RCE Verification\_HSE.pdf

**Page/ section reference**

See main statements translation. In 2021, Ecopetrol's GHG emissions inventory was verified by Ruby Canyon Engineering firm in accordance with ISO 14064-1:2006. This firm validated the used methodology and recognized that the GHG emissions reported by Ecopetrol are accurate, consistent, transparent, and without noticeable discrepancies for 2017-2020 period. Ecopetrol established a biennial verification frequency. The next third-party verification will be held on 2023, for the 2021-2022 period.

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

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**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Limited assurance

**Attach the statement**

RIGS 2021\_HSE.pdf

**Page/ section reference**

Integrated Sustainable Management Report: Document page 7: External verification; document page 378: Our engagement was conducted in accordance with the International Standard ISAE3000; document page 382: conclusion; document page 383: Appendix 1; document page 385: Appendix 2.

**Relevant standard**

ISAE3000

**Proportion of reported emissions verified (%)**

100

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**C10.1b**

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**(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.**

**Scope 2 approach**

Scope 2 market-based

**Verification or assurance cycle in place**

Biennial process

**Status in the current reporting year**

Underway but not complete for reporting year – previous statement of process attached

**Type of verification or assurance**

Limited assurance

**Attach the statement**

C10.1b\_RCE Translation scope 2\_HSE.pdf

C10.1b\_RCE Verification\_HSE.pdf

**Page/ section reference**

See main statements translation. In 2021, Ecopetrol's GHG emissions inventory was verified by Ruby Canyon Engineering firm in accordance with ISO 14064-1:2006. This firm validated the used methodology and recognized that the GHG emissions reported by Ecopetrol are accurate, consistent, transparent, and without noticeable discrepancies for 2017-2020 period. Ecopetrol established a biennial verification frequency. The next third-party verification will be held on 2023, for the 2021-2022 period.

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

---

**Scope 2 approach**

Scope 2 market-based

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Limited assurance

**Attach the statement**

RIGS 2021\_HSE.pdf

**Page/ section reference**

Integrated Sustainable Management Report: Document page 7: External verification; document page 378: Our engagement was conducted in accordance with the International Standard ISAE3000; document page 382: conclusion; document page 383: Appendix 1; document page 385: Appendix 2.

**Relevant standard**

ISAE3000

**Proportion of reported emissions verified (%)**

100

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**C10.2**

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**(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?**

Yes

**C10.2a**

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**(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?**

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C4. Targets and performance	Product footprint verification	ISO 14067	<p>In 2021, Ecopetrol hired an independent verification by SGS for a Product Carbon Footprint (partial) for a barrel of Castilla Blend, to determine compliance with the requirements of ISO 14067 standard. This verification covered the Carbon Footprint emissions of the "HCP" cradle-to-gate GHG product included in the life cycle of the product.</p> <p>Partial Product Footprint: Direct cradle-to-gate emissions; from the extraction and production of raw materials, treatment, dilution and blending of crude oil, as well as the transport of Castilla Blend for export to Coveñas port and arrival at foreign terminals.</p> <p>Materiality: SGS considered a materiality below 5% as a requirement for verification, based on the needs of the intended users of the GHG assertion.</p> <p>Conclusion:</p> <p>Ecopetrol provided the HCP Statement based on the requirements of the ISO 14067:2018 standard.</p> <p>The 2020 GHG information was verified by SGS to a reasonable assurance level, consistent with the objectives, criteria, and scope of the plant gate verification agreement.</p> <p>Based on the data and information given and the processes and procedures carried out by SGS, it is concluded, with reasonable assurance, that:</p> <ul style="list-style-type: none"> <li>-The HCP Statement is materially correct and is a fair representation of the GHG data and information.</li> <li>-The applied GHG accounting methodology is solid, valid and in accordance with the ISO 14067:2018 standard.</li> <li>-The HCP is accurate, complete, consistent, transparent, and free of material errors or omissions.</li> </ul> <p>C10.2a_SGS Translation_HSE.pdf                      C10.2a_SGS Product Carbon footprint english_HSE.pdf                      C10.2a_SGS Product Carbon footprint spanish_HSE.pdf</p>
C8. Energy	Energy consumption	ISAE 3000	<p>Ecopetrol's Senior management reviewed and approved the 2021 Integrated Sustainable Management Report and entrusted EY with the limited assurance of the social, environmental, and economic indicators. One of the material topics was "Use of Energy and Alternative Sources" with the following GRI indicators: 302-1 Energy consumption within the organization; 302-3 Energy intensity; 302-4 Reduction of energy consumption. See pages 378 - 385 of attached document (Integrated Sustainable Management Report 2021).</p> <p>RIGS 2021_HSE.pdf</p>

**C11. Carbon pricing**

**C11.1**

**(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?**

Yes

**C11.1a**

**(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.**

Colombia carbon tax

**C11.1c**

**(C11.1c) Complete the following table for each of the tax systems you are regulated by.**

**Colombia carbon tax**

**Period start date**

January 1 2021

**Period end date**

December 31 2021

**% of total Scope 1 emissions covered by tax**

0

**Total cost of tax paid**

0

**Comment**

The carbon tax is an economic instrument created to encourage compliance with greenhouse gas (GHG) mitigation goals at the national level and consists of the payment of a fee related to the carbon content of fuels.

The fuels that are taxed by this tax are: Gasoline, Kerosene, Jet Fuel, ACPM and Fuel Oil. Natural gas is also taxed but only for use in the hydrocarbon refining and petrochemical industry, and liquefied petroleum gas (LPG) but only for sale to industrial users.

The tax considers its non-causation through neutralization with carbon credits derived from eligible projects in accordance with the national regulations established for such purpose.

In 2021, Ecopetrol accessed this mechanism using GHG emission reduction certificates obtained from its own energy efficiency projects, and the Cartagena Refinery neutralized emissions through the purchase of carbon credits from projects available in the Colombian carbon market. Total taxed and neutralized emissions were 1,562,930 tCO<sub>2</sub>, approximately 15% of Scope 1 emissions.

**C11.1d**

### **(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?**

Ecopetrol's climate change strategy incorporates an action line focused on managing regulatory risks, by actively participating in different discussion scenarios or public consultations, to anticipate changes and potential implications for the company. In addition, within the framework of the business risk map, there is the "Regulatory Management Risk", which includes emerging regulatory issues associated with climate change and is analysed from the impact perspective of the business.

Regarding the current regulations, since 2017 Colombia has applied a tax on the consumption of all fossil fuels, including all petroleum derivatives and all types of fossil gas (only for refining) that are used for energy purposes. This tax is currently priced at approximately US\$5 per ton of CO<sub>2</sub>e emitted. The tax considers its non-causation through the neutralization with carbon credits derived from eligible projects in accordance with the national regulations established for such purpose.

Regarding emerging regulation, the climate change law (National Law of Colombia 1931 of 2018), defined the provisions for the creation and establishment of a National Cap & Trade System (PNCTE, for its acronym in Spanish), which is expected to come into force in 2022; according to the law, however, this period can be extended until 2025, inclusive.

For the above, the company has a Decarbonization Plan, which involves a permanent update of the GHG emissions inventory, a portfolio of emission reduction projects and a compensation portfolio in Natural Climate Solutions, this plan is part of the carbon neutrality roadmap for 2050 and intermediate goals, which will allow rapid adaptation to the PNCTE, envisaged by the national government.

## C11.2

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### **(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?**

Yes

## C11.2a

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### **(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.**

#### **Credit origination or credit purchase**

Credit origination

#### **Project type**

Other, please specify

#### **Project identification**

The casinghead gas from the field La Cira Infantas was not historically captured; on the contrary, it was vented to regulate the pressure of the wells. The project, which has been implemented since 2010, consists mainly in establishing the casinghead gas network and connecting the wells to this network, thus directly avoiding the emission of methane contained in the associated gas into the atmosphere. In addition, the project avoids emissions from natural gas consumption by allocating the recovered gas to other energy uses, thus replacing the use of natural gas with recovered casinghead gas. This project was verified in 2020, and registered on CSA in 2021.

Details on the project can be found on the following link: [https://www.csaregistries.ca/cleanprojects/masterprojectdetails\\_e.cfm?pid=1045](https://www.csaregistries.ca/cleanprojects/masterprojectdetails_e.cfm?pid=1045).

#### **Verified to which standard**

CDM (Clean Development Mechanism)

#### **Number of credits (metric tonnes CO<sub>2</sub>e)**

107801

#### **Number of credits (metric tonnes CO<sub>2</sub>e): Risk adjusted volume**

0

#### **Credits cancelled**

Yes

#### **Purpose, e.g. compliance**

Voluntary Offsetting

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#### **Credit origination or credit purchase**

Credit purchase

#### **Project type**

Hydro

#### **Project identification**

The Project consists of a run-of-river power plant that will use the water of the Río Negro basin. The main works are located in the El Porvenir, Salto Arriba, Rosario and Pozo counties, within the municipality of Marinilla, Department of Antioquia, Colombia. The project will have a total installed capacity of 55 MW with a nominal flow rate of 39.5 m<sup>3</sup>/s, a 160.12 m net head, and three (3) vertical axis francis-type turbines that generate 20 MW each. The electricity generated by the project is expected to be around 269 GWh per year, which will be delivered to the National Interconnected System (SIN, for its Spanish acronym), avoiding part of the electricity generated by the grid-connected power plants. The construction of the project started in 2016 and began operation in 2019. These credits were purchased for the offsetting of 1 million barrels of Castilla Blend crude exported to China (scopes 1 and 2, with transport to Coveñas).

Details on the project can be found on the following link: <https://registry.verra.org/app/projectDetail/VCS/1723>

Details on the first shipment of carbon neutral crude oil can be found on page 98 of 2021 Ecopetrol Sustainability Report:

<https://files.ecopetrol.com.co/web/esp/cargas/ecopetrol-rigs-2021-eng.pdf>.

#### **Verified to which standard**

VCS (Verified Carbon Standard)

#### **Number of credits (metric tonnes CO<sub>2</sub>e)**

32000

#### **Number of credits (metric tonnes CO<sub>2</sub>e): Risk adjusted volume**

0

**Credits cancelled**

No

**Purpose, e.g. compliance**

Voluntary Offsetting

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**Credit origination or credit purchase**

Credit purchase

**Project type**

Forests

**Project identification**

The Delfines Cupica conservation project is a REDD+ project type. It is expected that this project generates social benefits in terms of improving living conditions of Afro communities, such as health, food security, restoration, sustainable production, territory control, and biodiversity benefits through natural habitat conservation. Project details are available on Biocarbon registry platform.

**Verified to which standard**

Other, please specify (Colombian Technical Specification (NTC, for its Spanish acronym) 6208)

**Number of credits (metric tonnes CO2e)**

137242

**Number of credits (metric tonnes CO2e): Risk adjusted volume**

0

**Credits cancelled**

Yes

**Purpose, e.g. compliance**

Voluntary Offsetting

---

**Credit origination or credit purchase**

Credit purchase

**Project type**

Forests

**Project identification**

The Kaliawiri conservation project has four (4) main objectives:

- Mitigate effects caused by climate change by adopting measures for CO2 reduction and capture, avoiding deforestation, and promoting degraded forest land restoration.
- Promote forest sustainable management located in the area of influence of the project.
- Cooperate in the conservation of biodiversity by protecting the ecological connectivity and the habitat of those species that are included in some category of threat and which represent an environmental interest as bioindicators.
- Contribute to education on gender equality by increasing the leadership capacity and empowerment of Afro women.

Project details are available on Biocarbon registry platform.

**Verified to which standard**

Other, please specify (Colombian Technical Specification (NTC, for its Spanish acronym) 6208)

**Number of credits (metric tonnes CO2e)**

209932

**Number of credits (metric tonnes CO2e): Risk adjusted volume**

0

**Credits cancelled**

Yes

**Purpose, e.g. compliance**

Voluntary Offsetting

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**Credit origination or credit purchase**

Credit purchase

**Project type**

Forests

**Project identification**

The Palameku Kuwei REDD+ conservation project seeks, through forest conservation, to mitigate the effects caused by climate change through CO2 emissions reduction by avoiding deforestation and forest degradation. The project proponents are six (6) Indigenous Reserves (Ríos Muco and Guarrojo, Tomo and Beweri, Punta Bandera, San Luis del Tomo, La Esmeralda and Valdivia) and BIOFIX, which is a Colombian company expert in the structuring of Greenhouse Gas mitigation projects. The project has an extension of 32,629 hectares of forest (eligible area) and a total area of 166,317 hectares.

Project details are available on Biocarbon registry platform.

**Verified to which standard**

Other, please specify (Colombian Technical Specification (NTC, for its Spanish acronym) 6208)

**Number of credits (metric tonnes CO2e)**

54593

**Number of credits (metric tonnes CO2e): Risk adjusted volume**

0

**Credits cancelled**

Yes

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**Purpose, e.g. compliance**

Voluntary Offsetting

**Credit origination or credit purchase**

Credit purchase

**Project type**

Forests

**Project identification**

Tángara REDD+ conservation project is located south of the Buenaventura Bay, on the Pacific coast in the department of Valle del Cauca, specifically in the municipality of Buenaventura, Colombia.

It comprises an area of 8,558.37 ha whose forestry activities contemplate the implementation of actions for the forests conservation to avoid deforestation through actions carried out by the company Suites Houses and as of 2018 the company Tángara Forest Zomac which focuses on territorial governance. Main deforestation activities include: Wildlife release, ecotourism, monitoring and rangers programs, Borojo production derivatives, Pinagua sustainable use, and medicinal plants. Project details are available on Biocarbon registry platform.

**Verified to which standard**

Other, please specify (Colombian Technical Specification (NTC, for its Spanish acronym) 6208)

**Number of credits (metric tonnes CO2e)**

277790

**Number of credits (metric tonnes CO2e): Risk adjusted volume**

0

**Credits cancelled**

Yes

**Purpose, e.g. compliance**

Voluntary Offsetting

**Credit origination or credit purchase**

Credit purchase

**Project type**

Forests

**Project identification**

The Yaawii ipana REDD+ project is being carried out in the municipalities of El Retorno and San José del Guaviare, located in the department of Guaviare, in the northern region of the Amazon biome, in southeastern Colombia.

The area covered by the conservation project is 253,760 hectares (intervention area), of which 248,046 ha of forest were registered at the start of the project in 2015 (eligible area) and the reference region is 3,573,512 hectares.

The main objectives are:

- To mitigate the effects caused by climate change by adopting measures to reduce and capture CO2 emissions, avoiding deforestation and promoting the restoration of degraded forest lands.
- To promote the sustainable management of the forests located in influence of the project by the forest custodians.
- To cooperate in the conservation of biodiversity by protecting the ecological connectivity and habitat of those species that are included in some category of threat, that represent an environmental interest as bioindicators in ecosystems or that have scientific interest such as the case of the Panthera onca (jaguar).
- To contribute to education on gender equity by increasing the leadership, empowerment, and entrepreneurship capacity of women from the indigenous reservation in collective territories.

Project details are available on Biocarbon registry platform.

**Verified to which standard**

Other, please specify (Colombian Technical Specification (NTC, for its Spanish acronym) 6208)

**Number of credits (metric tonnes CO2e)**

458279

**Number of credits (metric tonnes CO2e): Risk adjusted volume**

0

**Credits cancelled**

Yes

**Purpose, e.g. compliance**

Voluntary Offsetting

**C11.3****(C11.3) Does your organization use an internal price on carbon?**

Yes

**C11.3a**

**(C11.3a) Provide details of how your organization uses an internal price on carbon.**

**Objective for implementing an internal carbon price**

Stakeholder expectations  
Change internal behavior  
Drive energy efficiency  
Drive low-carbon investment

**GHG Scope**

Scope 1  
Scope 2

**Application**

The Internal Carbon Price is applicable to Upstream, Midstream, Downstream and Energy projects, incorporating the estimated increase or reduction of carbon dioxide equivalent (CO<sub>2</sub>e) in the Net Present Value – NPV analysis of future projects.

**Actual price(s) used (Currency /metric ton)**

79626.2

**Variance of price(s) used**

Ecopetrol, as part of its long-term strategy "Energy that Transforms" and in line with its T ESG agenda, expects to invest approximately US\$ 1.4 billion in projects for comprehensive water management, decarbonization, energy efficiency, use of energy and alternative sources, fuel quality improvements, and studies and pilots in green and blue hydrogen for applications in refineries and mobility, between 2022-2024. Additionally, the company has set an internal price on carbon (shadow price) at US\$20/TCO<sub>2</sub> in 2021, 30 US\$/TCO<sub>2</sub> from 2025, and 40 US\$/TCO<sub>2</sub> from 2030 onwards, which will be used to assess and evaluate current and future projects and investments. See the 20F Report - Strategy and Market Overview—Our Corporate Strategy—2040 Strategy: Energy that Transforms for detailed information on our strategy and carbon internal price (shadow price).

**Type of internal carbon price**

Shadow price

**Impact & implication**

Applying an internal carbon price (shadow price) in the evaluation of the company's investment opportunities, results in the selection of cleaner technologies that seek to contribute to the emission reduction objectives in the short, medium, and long term.

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**C12. Engagement**

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**C12.1**

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**(C12.1) Do you engage with your value chain on climate-related issues?**

Yes, our suppliers

**C12.1a**

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**(C12.1a) Provide details of your climate-related supplier engagement strategy.**

**Type of engagement**

Information collection (understanding supplier behavior)

**Details of engagement**

Collect climate change and carbon information at least annually from suppliers

**% of suppliers by number**

2.78

**% total procurement spend (direct and indirect)**

36.78

**% of supplier-related Scope 3 emissions as reported in C6.5**

13.75

**Rationale for the coverage of your engagement**

During 2021, Ecopetrol improved its scope 3 emissions inventory, collecting suppliers' specific information based on activity, which is more accurate than the spend-based approach. For 92 suppliers, Ecopetrol calculated the indirect emissions based on the activity of their main emissions' sources.

**Impact of engagement, including measures of success**

The percentage of supplier-related Scope 3 emissions is based on all the activities that are purchased through suppliers that follow Ecopetrol's Procurement Model, and the services of the Shared Services Model. Therefore, it includes not only the C1 category (purchased goods and services), but also part of C4 (upstream transportation and distribution), C6 (business travel), C7 (employee commuting), C8 (upstream leased assets), C9 (downstream transportation and distribution) and C13 (downstream leased assets) categories.

The 2020 inventory of the categories mentioned above corresponded to 2,26M Ton CO2e. The categories were prioritized based on the following criteria:

- Size of the procurement category, considering the amount of scope 3 emissions.
- Ability of Ecopetrol to manage the decarbonization cycle in the category
- Interest of the market to be part of Ecopetrol's Decarbonization Strategy
- Effort level required to achieve the decarbonization goals

As a result of the application of the criteria, 16 categories were prioritized, which corresponded to 1,5M Ton CO2e. The suppliers of the prioritized categories were the ones that have reported information, equivalent to 13,75% of total supplier-related Scope 3 emissions.

During 2021, collecting data from suppliers allowed to the reduction of 8,288 Ton CO2e, which represents an increase of 282% compared to 2020.

**Comment**

Past CDP Climate report informed a 100% of supplier data collection, considering that the inventory based on spend had a full coverage of suppliers. For 2021, Ecopetrol updated the inventory based on spend and improved it with suppliers' specific activity information. In this case, the percentage reported was based on specific supplier information. This improvement from the 2021 inventory will continue during 2022 and beyond, as data from other suppliers is collected.

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**C12.2**

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**(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?**

Yes, climate-related requirements are included in our supplier contracts

**C12.2a**

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**(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.**

**Climate-related requirement**

Implementation of emissions reduction initiatives

**Description of this climate related requirement**

Due to collaborative work with 19 suppliers, during 2021 2,520 tCO2e were mitigated and 5,769 tCO2e were offset, for a total of 8,288 tCO2e reduction compared to the 2019 baseline.

**% suppliers by procurement spend that have to comply with this climate-related requirement**

9.12

**% suppliers by procurement spend in compliance with this climate-related requirement**

9.12

**Mechanisms for monitoring compliance with this climate-related requirement**

Certification

**Response to supplier non-compliance with this climate-related requirement**

Other, please specify (Contract administrator communication)

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**Climate-related requirement**

Waste reduction and material circularity

**Description of this climate related requirement**

Implementation of different kind of circular initiatives like the following examples:

- "Materials showcase", a platform in which all the materials that Ecopetrol no longer requires are published and to which other companies of the group have access. As of December 31st, 2021, there are 31,260 materials. The platform is complemented by the materials loan agreement between the subsidiaries, which allows, in a matter of days, to use leftover materials from one company in another.
- On September 15, 2021, the United Nations Industrial Development Organization -UNIDO- recognized Ecopetrol as a leading company in the implementation of this model, which consists of moving from the purchase of chemical products to payment for their service.
- 97% of ferrous waste management.
- First contractual model developed to allow ferrous waste to be used by a third party as raw material in materials required for the company's warehouse infrastructure. This model can be replicated so that other waste can be used as raw material in goods required by Ecopetrol.
- Re use of pipe plugs.
- Circular initiatives in 8 Catering contracts allowed a waste utilization rate of 84% and a circular index of 69% during 2021.

**% suppliers by procurement spend that have to comply with this climate-related requirement**

11.4

**% suppliers by procurement spend in compliance with this climate-related requirement**

11.86

**Mechanisms for monitoring compliance with this climate-related requirement**

Certification

Supplier self-assessment

**Response to supplier non-compliance with this climate-related requirement**

Retain and engage

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**C12.3**

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**(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?**

**Row 1**

**Direct or indirect engagement that could influence policy, law, or regulation that may impact the climate**

Yes, we engage directly with policy makers

**Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?**

Yes

**Attach commitment or position statement(s)**

[https://www.ecopetrol.com.co/wps/portal/Home/en/?1dmy&page=detailNews&urile=wcm:path:/ecopetrol\\_wcm\\_library/as\\_en/news/noticias-2021/emissions-reduction](https://www.ecopetrol.com.co/wps/portal/Home/en/?1dmy&page=detailNews&urile=wcm:path:/ecopetrol_wcm_library/as_en/news/noticias-2021/emissions-reduction)

**Describe the process(es) your organization has in place to ensure that your engagement activities are consistent with your overall climate change strategy**

In line with its commitment to mitigate climate change, advance with the energy transition, and its T ESG agenda, Ecopetrol announced its net zero emissions goal for scopes 1 & 2 by 2050. Under this goal, the Company ratifies its commitment to the Sustainable Development Goals and the Paris Climate Agreement's purpose of curtailing global warming. This objective has the intermediate goal of reducing 25% of scope 1 and 2 emissions by 2030, compared to a 2019 baseline.

Furthermore, Ecopetrol seeks to reduce 50% of its total emissions by 2050 (scopes 1, 2 & 3), contributing to the Colombian government's commitment to reduce 51% of GHG emissions by 2030. Under this goal, the energy sectorial target is to reduce 11,2 million tons, and Ecopetrol will contribute with more than half of this reduction.

The Sustainability and Decarbonization Area of the HSE Vicepresidency is responsible for the Company's climate change strategy and for revising the scope and implications of national Law and regulations. The actions that are taken in each case are decided in tandem with the Legal Vicepresidency. The Company ensures the alignment of its climate related policy efforts with its 2040 Corporate Strategy and its environmental strategy. The latter includes, in its Climate Change Pillar, an action line called "participation in public policy documents", which establishes the revision and compliance mechanisms of climate related legislation and policy.

Furthermore, the strategic risk "Inadequate management of climate change and water" includes a Key Risk Indicator (KRI) called "Analysed HSE and climate and water related normative projects" that seeks to monitor and analyse national, regional, and local legislative projects that affect HSE, climate, and water issues. This is another mechanism to assure that climate related policy actions taken are aligned with the Company's overall strategy.

**Primary reason for not engaging in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate**

<Not Applicable>

**Explain why your organization does not engage in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate**

<Not Applicable>

**C12.3a**

**(C12.3a) On what policy, law, or regulation that may impact the climate has your organization been engaging directly with policy makers in the reporting year?**

**Focus of policy, law, or regulation that may impact the climate**

Emissions trading schemes

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

The 2169 Law of 2021 establishes the targets and minimum measures in terms of carbon neutrality, climate resilience, and low-carbon development in Colombia in the short, medium, and long-term, which were included in the Nationally Determined Contributions (NDC) paper submitted to the United Nations Framework Convention on Climate Change (UNFCCC).

This law reiterates the country's obligation to fully implement the National Cap & Trade System (PNCTE, for its Spanish acronym) as a NDC implementation mechanism by 2030. This obligation, in turn, creates a set of commitments for Ecopetrol, that include:

- Mandatory reporting of its direct and indirect GHG emissions as well as the information and documentation for the elaboration of GHG inventories.
- Mitigation initiatives reporting in the country's National Registry of Emissions and GHG removal (RENARE - Spanish acronym).

The Law is set to enter into force in 2025.

**Policy, law, or regulation geographic coverage**

National

**Country/region the policy, law, or regulation applies to**

Colombia

**Your organization's position on the policy, law, or regulation**

Support with no exceptions

**Description of engagement with policy makers**

Ecopetrol has participated in two (2) construction workshops and has provided information of the Company's GHG emissions for the sectorial baseline used to construct the Law.

Colombia is in the process of structuring the National Cap & Trade System (PNCTE for its Spanish acronym). The roadmap for its implementation has a 5-year duration in three (3) phases: i) Regulation; ii) Institutional and operational arrangements; and iii) Start up. It is expected that Ecopetrol will further engage with the government during the implementation phases.

In 2021, as part of the first phase, regulation design adjustments were made for both the PNCTE, and the Corporate GHG Emissions Reporting Program. Also, as part of the second stage, institutional arrangements were started. This is an effort that is currently being led by the Colombian Ministry of Environment and Sustainable Development. In 2022, the first phase is expected to finish with the regulation of both the Corporate GHG Emissions Reporting Program, and the PNCTE. The PNCTE is expected to start by 2025

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

**Focus of policy, law, or regulation that may impact the climate**

Methane emissions

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

Resolution 40066 / 2022, by which technical requirements are established for the detection and repair of leaks, the use, burning and venting of natural gas during hydrocarbon exploration and exploitation activities.

**Policy, law, or regulation geographic coverage**

National

**Country/region the policy, law, or regulation applies to**

Colombia

**Your organization's position on the policy, law, or regulation**

Support with no exceptions

**Description of engagement with policy makers**

In 2021, Ecopetrol supported the development of Resolution 40066 / 2022, led by the Ministry of Energy and Mines, by participating in workshops and providing information related to fugitive emissions. This resolution is part of the Integral Climate Change Plan of the Mines and Energy sector. Also, the Ministry carried out a participative regulatory process related to the reduction of methane emissions, in which Ecopetrol actively participated. The law was released in early 2022.

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Focus of policy, law, or regulation that may impact the climate**

Adaptation and/or resilience to climate change

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

Comprehensive Climate Change Management Plan for the mining and energy sector was approved by Ministerial Resolution No. 40807 in 2018 and updated in 2021, considering the Nationally Determined Contribution (NDC) presented by Colombia to the UNFCCC at the end of 2020.

**Policy, law, or regulation geographic coverage**

National

**Country/region the policy, law, or regulation applies to**

Colombia

**Your organization's position on the policy, law, or regulation**

Support with no exceptions

**Description of engagement with policy makers**

The plan aims to reduce vulnerability to climate change and promote low-carbon development at the sectoral level while strengthening and protecting the sustainability and competitiveness of the industry. In 2021, Ecopetrol supported the adaptation, vulnerability, and resilience component, with the promotion of climate risk analysis methodology and the identification of sectoral measures.

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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C12.4

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**(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).**

**Publication**

In voluntary sustainability report

**Status**

Complete

**Attach the document**

RIGS 2021\_HSE.pdf

**Page/Section reference**

Risks: see document page 170 - 171.

Emissions figures and targets: see document page 182 -191.

Other metrics: air emissions, see document page 248 - 250; waste, see document page 256-261; water, see document 201-205

Indicators integration with other reports: see document page 389-405.

**Content elements**

Risks & opportunities

Emissions figures

Emission targets

Other metrics

**Comment**

The Integrated Sustainability Management Report 2021 has a section dedicated to climate action. However, throughout the document the issue of climate change is addressed, in terms of risks, opportunities, strategy and other associated metrics.

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**Publication**

In other regulatory filings

**Status**

Complete

**Attach the document**

20F Report 2021\_HSE.pdf

**Page/Section reference**

Strategy: see document pages 5-10.

Risks: Chapter 5, document page 140.

**Content elements**

Strategy

Risks & opportunities

**Comment**

Throughout the 2021 20F Report, the climate-related issues are addressed, in terms of risks, opportunities, strategy and other associated metrics.

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**Publication**

In mainstream reports

**Status**

Complete

**Attach the document**

**Page/Section reference**

Strategy, indicator EM-EP-110a.3, document page: 9.

Throughout the 2021 SASB report the emissions figures are presented.

**Content elements**

Strategy

Emissions figures

Emission targets

Other metrics

**Comment**

It is not possible to attach the document. However, the document in Spanish can be found in the following link: [https://files.ecopetrol.com.co/web/esp/cargas/2021-Ecopetrol\\_Informe%20SASB%20V7-2.pdf](https://files.ecopetrol.com.co/web/esp/cargas/2021-Ecopetrol_Informe%20SASB%20V7-2.pdf)

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## C15. Biodiversity

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### C15.1

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**(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?**

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity	Scope of board-level oversight
Row 1	Yes, both board-level oversight and executive management-level responsibility	Ecopetrol's BoD is responsible for monitoring and approving Ecopetrol Group's Strategy. On December 2021, the Board approved the 2040 Strategy which included TESG issues. This Strategy incorporates four strategic pillars: (i) Grow with the Energy Transition; (ii) Generate Value through TESG (Technology, Environmental, Social and Governance), (iii) Cutting-edge Knowledge, and (iv) Competitive Returns". The Board analyzed the Strategy and its pillars. The pillar "Generating value with TESG" includes two strategic purposes, one of which is harmonizing TESG under a transparent and ethic governance frame. One of the prioritized material elements in the TESG strategy is Biodiversity and Ecosystem Services.	<Not Applicable>

**C15.2**

**(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?**

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have made public commitments and publicly endorsed initiatives related to biodiversity	Commitment to Net Positive Gain Commitment to No Net Loss Adoption of the mitigation hierarchy approach Commitment to not explore or develop in legally designated protected areas Commitment to respect legally designated protected areas Commitment to avoidance of negative impacts on threatened and protected species Commitment to no conversion of High Conservation Value areas Commitment to secure Free, Prior and Informed Consent (FPIC) of Indigenous Peoples Commitment to no trade of CITES listed species Other, please specify (Commitment to secure Free, Prior and Informed Consent (FPIC) of Indigenous Peoples in Colombia is known as Prior Consultant. )	CBD – Global Biodiversity Framework SDG Other, please specify (1torg: WEF public initiative. Our commitment is to protect 30,000 ha, plant 12 million trees and capture at least 2 million tCO2e by 2030. Joining as member of the Taskforce on Nature-related Financial Disclosures – TNFD.)

**C15.3**

**(C15.3) Does your organization assess the impact of its value chain on biodiversity?**

	Does your organization assess the impact of its value chain on biodiversity?	Portfolio
Row 1	No, but we plan to assess biodiversity-related impacts within the next two years	<Not Applicable>

**C15.4**

**(C15.4) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?**

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity-related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Land/water protection Land/water management Species management Education & awareness Livelihood, economic & other incentives Other, please specify (Monitoring, Resilience, Genomics, and Ecoreservas, which are voluntary areas dedicated to the conservation (preservation, restoration, sustainable use or knowledge) of biodiversity and ecosystem services by the Ecopetrol Group.)

**C15.5**

**(C15.5) Does your organization use biodiversity indicators to monitor performance across its activities?**

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	Yes, we use indicators	State and benefit indicators Pressure indicators Response indicators

**C15.6**

**(C15.6) Have you published information about your organization’s response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).**

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications	Content of biodiversity-related policies or commitments Governance Impacts on biodiversity Details on biodiversity indicators Risks and opportunities Biodiversity strategy	Integrated Sustainable Management Report <a href="https://files.ecopetrol.com.co/web/esp/cargas/ecopetrol-rigs-2021-eng.pdf">https://files.ecopetrol.com.co/web/esp/cargas/ecopetrol-rigs-2021-eng.pdf</a>
In mainstream financial reports	Content of biodiversity-related policies or commitments Impacts on biodiversity Details on biodiversity indicators Risks and opportunities	20F report
In other regulatory filings	Please select	

## C16. Signoff

### C-FI

**(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization’s response. Please note that this field is optional and is not scored.**

Ecopetrol’s environmental strategy (scope includes the companies within the Ecopetrol Group, in which Ecopetrol S.A. holds interests) has defined eight pillars, and Climate Action is one of them. This pillar seeks to maintain a low emissions operation, reduce infrastructure and operational vulnerability, and adequately manage risks and opportunities associated to climate change. The Climate Action pillar is based on four strategic lines:

1. Mitigation: Ecopetrol pledged to reach net-zero emissions by 2050 (scopes 1 and 2), reduce 25% of its CO2e emissions by 2030 compared to a 2019 baseline (scopes 1 & 2) and reduce 50% of its total emissions by 2050 (Scopes 1, 2, & 3).

For the development of the proposed goals, Ecopetrol has a decarbonization plan that includes:

- a) Permanent update and verification by a third party of the GHG emissions inventory.
  - b) Portfolio optimization by implementing an internal carbon price and diversifying towards low emission businesses.
  - c) Gradual incorporation of low-carbon emissions technologies (energy efficiency in operations, gas flaring, fugitive emission, and venting reductions, use of renewable energies, fuel substitution, hydrogen, and carbon capture, use, and storage).
  - d) Natural-Climate Solutions (NCS) to compensate for residual emissions (around 30%), subject to the mitigation hierarchy.
2. Adaptation and vulnerability: This component seeks to reduce risks and impacts derived from climate change and variability on the company’s facilities, nearby communities, and ecosystems. The Company has identified inadequate management of climate change and water as a strategic risk. Therefore, it has deployed controls and actions to prevent its materialization. The Company has implemented a plan to adapt to variability and climate change in six regions of Colombia.
3. Research, development, and innovation: The Center for Innovation and Technology (ICP acronym in Spanish) oversees leading studies, research, and new developments, to leverage Ecopetrol’s decarbonization goals. The ICP has defined a technological portfolio, which includes initiatives for processes optimization, energy efficiency, new energy vectors valuation, carbon capture and development of low carbon products. In 2022, the Center for Innovation and Technology (ICP acronym in Spanish) was integrated to the new Science, Technology and Innovation VP to strengthen and develop the Technology, science and innovation agenda in all segments of the Ecopetrol Group’s value chain.
4. Participation in the drafting of public policies: Ecopetrol articulates its climate change strategy with the National Government’s policy and contributes to the construction of technical and regulatory guidelines to strengthen the country’s institutional capacity in climate change.

## C16.1

**(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.**

Job title	Corresponding job category
Row 1 Vicepresident of Corporate Affairs and Secretary General	Other C-Suite Officer

Submit your response

**In which language are you submitting your response?**

English

**Please confirm how your response should be handled by CDP**

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

**Please confirm below**

I have read and accept the applicable Terms